

Civilization II: War Academy

Civilization Fanatics Center (<http://www.civfanatics.com/civ2strategy1.shtml>)

War is a matter of vital importance to the state; a matter of life or death, the road either to survival or to ruin. Hence, it is imperative that it be studied thoroughly. -- Sun Tzu

Welcome to the War Academy, generals! This Academy is dedicated to strategy and tactics for Civilization II. Although military strategy is our focus here, you will also find strategies for economy and science that will help you wage a successful military campaign.

To graduate the Academy, you are required to learn the following arts of war in this sequence:

1. Learn the Basics of War: this prepares you for more rigorous trainings later.
2. Read Octagon's Strategy for Civilization II.
3. Gov't Change, SSC, and Super Growth
4. Read SeanL's Strategy for Multiplayer Games
5. Stefan Winkler's Scrolls of Ancient Wisdom
6. Andu Indorin's Power Graph Explained!
7. Alan Nicoll's How I Play Civ2
8. Read Mark Fisher's Thesis: Fire! Making War in Civilization II.
9. Marquis de Sodaq's Complete Civilization II Combat Guide
10. The Strategy & Tips forum has TONS of great tips not mentioned in the Academy. So be sure to check it out!

OPTIONAL READINGS:

1. Words of Wisdom: these are quotations from famous military tacticians, commanders, and philosophers.
2. Sun Tzu's Art of War: the oldest military treatise in the world.

End of Training! You now have what it takes to be an expert Civ2 player. We encourage you to compete in the popular Game of the Month feature and Tournament Ladder to test your skills.

Chapter 1

The Basics of War

I. Starting a game

Just a few good reminders: always choose "raging horde" as the level of barbarian activities. This not only adds a 25 point bonus at the end, it also gives you 150 Gold when you capture a barbarian leader -- the amount given is higher for higher barbarian activity. Although barbarians at this level may be overwhelming and may capture one of your cities, the chance is very low if you stationed 2 phalanxes, for example, in the beginning of the game, and built the city wall improvement or the Great Wall. At the "customize rules" screen, remember to check "don't restart eliminated players"; this way the civilizations you've conquered will not resurrect overtime. I suggest you play your first game on "Chieftain level", for it is the easiest, then play your second game on "Prince level", third game using the "King level", in other words, one game per level in gradually harder sequence. (I often play on Emperor level, by the way) After this setting adjustment, at the main screen, I preferred to turn off "auto save each turn" because you can save easily by yourself, but this feature is useful if you frequently forget to save the game.

II. A good start

Let's get to the real thing now.... Your first settler unit should not spend more than 3 turns looking for a good location to built a city. In fact, I usually build my first city at where the settler stands, unless there is a truly great location adjacent or the initial position is desert or tundra. This saves you precious time at the beginning. After you have built your first city, choose to build the unit with highest movement point first, such as horseman (research horseback riding if necessary). After the first unit is completed, move it to explore the surroundings, then change production to settlers. As one pointed out, the golden rule for this game is "Populate to Accumulate", you will need many settlers to keep building cities and irrigate city squares. At the same time don't overlook your city's defense since your enemies may be nearby and the occurrence of barbarians is unpredictable. At the beginning of the game, you just have to take the risk.

As your units explore the unknown squares, you may discover "goody huts" . These huts are mini tribes that lacked the necessities to become competing civilizations. Instead they may be awed by your civilization's greatness and may offer to join you for free when your units enter the huts. In other cases, they may present you with valuables or knowledge that is unknown to you. A less favorable outcome is that they could be insulted by your unit's arrogance and they would appear as a bunch of barbarians attacking you. Due to these random events, it's a good practice to save the game before entering a goody hut in order to get a satisfying outcome. In multiplayer games, you should still visit the huts as soon as possible because benefits outweighed the risk.

Soon your units will encounter other competing civilizations' units. If a competing culture resides on the same continent as yours, your first priority is to conquer it to ensure sole access to the continent's resource and your own safety. If you find yourself on a small island, you should research Map Making and build trireme as soon as possible. It should not take long to reach another island or continent. After you have uploaded the unit, use the trireme to get a rough outline of the continent or island by traveling along the coast. In summary, rapid exploration and expansion are vital to success.

There are a few Wonders that can accelerate your empire's growth in the beginning. The first one is the Pyramid that acts as a granary in each of your cities and its effect does not expire. The second one is the Great Wall that acts as a city wall for each of your cities; although its effect will expire after the discovery of metallurgy, it provides each of your cities with a city wall at the early stage of your empire's development. You do not need to pay any upkeep fees for the granaries provided by the Pyramid (this is true for all Wonders with "universal" effect). These two Wonders should be built as soon as possible. If you have to choose between the two, pick Pyramid. On deity level, however, Pyramid is not a must because rapid population growth could result in massive unhappiness and Great Wall is preferred. I don't find Lighthouse very useful (If you started on a tiny island, then Lighthouse is very important). Another early Wonder is the Oracle, which doubles the effectiveness of your temples and will expire after the discovery of Theology. It's not an essential wonder, at least not on Emperor or lower levels.

III. Domestic Management

III.1. Building cities

Many factors should be taken into account when selecting good sites to build cities. For strategic defense, in the beginning of the game you should build your cities along the coastline and on lands close to the boundary of your opponents. Building along coastline allows more naval exploration and an impressive naval force later in the game. Also, you are more able to prevent establishments by distant civilizations. Do not build cities in the center of your territory until you have built enough cities along the borders -- territory claim is very important; you will have an ample amount of time to build cities in the "inner" territory of your empire.

It's best to build cities on grassland and plain with 2 to 3 forests and 1 to 2 mountains or hills within the city radius. Rivers are also ideal sites because they have more trade and give your city a defense bonus. Avoid building on mountains and hills, unless it is a potentially dangerous location or has a special resource such as pheasants or coal.

Talking about special resources, your cities can have a maximum of 4. If you observe carefully you should be able to tell where to place your new city so that it encompasses 4 special resources; the

resources are at the 4 extreme corners of the city radius.

How many cities do you want to build? As many as possible! However, you should know that when your empire is large, the cities farther away from your Capital will have more corruption and waste, and subsequently more unhappiness. This is a small price to pay for huge production potential in the future. Corruptions and wastes are eliminated or reduced when you switch to a more advance government type: communism, democracy, republic, or fundamentalism. If you own the Statute of Liberty, you can switch to more advance government types much earlier.

Never stop building cities and place your cities wisely.

III.2. Managing city squares

After you build 5 or 6 cities, you need to use some of your settlers units to improve city squares to make them as productive as possible. Grasslands, plains and desert should have roads and irrigations (if allowed); mountains and hills should be mined and have roads. Always build roads first before irrigating the square simply because it takes longer to irrigate. Building roads and railroads on every city square is important because of these benefits:

1. More trade means more science, higher income and luxury. Roads are especially important in a republic or a democracy in reducing unhappiness.
2. Lower corruption. If there is a road linking the city to the Capital city, corruption and waste are significantly lowered.
3. Faster movement -- the primary benefit of road. Having roads or railroads on every square is important in cleaning pollutions; roads allow your settlers and engineers to get to the polluted sites quickly. It's no joke that roads could help you prevent a global warming!
4. Linking all your cities on the same continent with railroads offers unprecedented offensive and defensive potential. If a city is being attacked by your enemy, you could send in reinforcements instantly and annihilate all the invading enemy units. On the other hand, you could use all your military units in attacking enemy cities on the same continent. Victory is almost guaranteed.
5. Higher shield production. With railroads, mountains, hills, and forests produce one extra shield.

Therefore, roads and railroads on every city square are extremely beneficial.

One problem with roads and railroads is that foreign diplomats could infiltrate to the heart of your empire much faster. To minimize technology theft and loss of a city from revolt, create a perimeter defense and a network of diplomats or spy for anti-espionage purpose. Unfortunately, diplomats and spies are not very effective at anti-espionage. To slow down enemy spies, you should build a few

fortresses on railroads and station 2 units in each of them. If you only station one unit, that unit is vulnerable to bribery. And watch out for diplomats and spies in boats! It's hard to stop them if you don't have a good navy.

Begin irrigating city squares for the second time once you discover Refrigeration advance. Set your cities to build supermarket once you have irrigated about half of the city squares. Many of the cities would have a food shortage when the population exceeds 20, depending on the terrain within the city radius. Build lots of settlers or engineers -- in fact, it could be said that an empire has no future if it only has several engineers. Lastly, check your citizens once in a while so they are assigned to work in the most productive city squares -- this changes often as you improve the city squares.

III.3. Managing Cities

After a city is built, you now need to decide what to build in the city. You could build either military units, city improvements, or Wonders. Knowing what to build at different time at different city is of ultimate importance.

III.3.1. Building Wonders

A city that is capable of building wonders should have the following characteristics: relatively high shield production, stable in terms of citizens' happiness, and has an adequate defense. A high shield production enables a wonder to be completed faster than a city with lower shield production, obviously. With a stable city, you will not need to assign entertainers in the period of wonder building, and this in term makes shield production stable. Except in the beginning of the game, you should often choose cities that already have a temple and a coliseum to build wonders. Cities with these improvements are more stable than those without these improvements for a longer period of time. An adequate defense is one that has at least 2 military units, depending on the city's location: higher if the city is near enemy cities and lower if it's not. If your government is not a democracy, a republic, or a fundamentalist government, 3 is the minimum because they can maintain order at the same time.

Wonder building is like car racing; you often need to compete with your opponents for speed. How could you increase your chances of building a wonder before everyone else? There are several ways:

1. Stay ahead in the science race. If you can discover an advance earlier than other civilizations, you can start building a particular wonder earlier than other civilizations.
2. Money! As you know, money is good for many things. :-) If you receive a message saying that another civilization would finish building the wonder you are building next turn, you could 'rush' build the wonder by paying your workers a higher salary. This method is often expensive, but the

benefits of some wonders are worth it. You just can't miss some wonders...

3. Build caravans and freights and move them into the wonder-building city. All shields went into producing the caravans and freights are instantly added to wonder building. If you have enough caravans or freights, you could build a wonder in one turn.

4. Having multiple cities to build wonders at any time. If you want to build a particular wonder but has not yet discover the advance, set a city to build a wonder currently allowed, you could switch to the wonder you want to build when you discover that advance or have "acquired" it. It's a good idea to have 2 to 3 cities building wonders at any time.

5. If you have discovered Capitalization advance and your city has almost enough shields to complete a particular wonder, but you don't want the wonder it's building, you can change production to Capitalization and earn money. When you have the appropriate advance, just switch to the wonder you want to build; all the shields are still there intact. This way you successfully avoided wasting shields and earning money at the same time.

What wonders should you build? There is no absolute answer to this question because people have different values and style. There are some Top Ten Wonders Lists on the web, but don't just take their words for it! After a few games you should be able to evaluate the importance of each wonder by yourself. Here I will only list and briefly describe those wonders that I often build: Pyramid gives your cities free granaries, Great Library gives you free tech already possessed by 3 other civilizations, Michelangelo's Chapel gives your cities free cathedrals, Leonardo's Workshop updates your troops for free automatically, J.S. Bach's Cathedral increases your people's happiness on the same continent where the Wonder is built, United Nations gives you embassies and some peace, SETI doubles your science output, Magellan's Expedition makes your navy more formidable by allowing your ships to move a longer distance and attack more times, Adam Smith's Company makes you rich and faster discovery because it allows you to set the tax rate lower and make the science rate higher, Hoover Dam gives you free hydro plants that increase factory output and also good for lowering pollution, Statute of Liberty gives you access to more advance government types faster and allows smoother government transition, Women's Suffrage reduces unhappiness caused by units not stationed in the cities or fortresses in a republic or democratic government, and King Richard's Crusade increases shield productions relatively early in the game and enables you to build/own more wonders as a result. It's important to note that all 28 wonders have some values, and if resources permit, build as many as you can, just don't miss the key wonders! If your opponents have built an important Wonder before you, it's not the end of the world! Capture it and it will be yours (ok, I know it's harder than it sounds :-).

III.3.2. Building City Improvements

Before choosing which city improvement to build, you must be familiar with the various city improvements, both benefits and costs. Timing is very important in building city improvements. For

example, aqueducts should be built when the city's population is 8, and cities should start building sewer system when the population is 12, not lower. If you build them too early, you will probably face a budget deficit because all of them have maintenance costs, with the exception of City Walls. Also, building markets, banks, stock markets, libraries, and universities in cities with very low trade activity is a waste. Building a bank in a city that has an income of 2 Gold is a waste because the bank's maintenance cost alone is 3 Gold. There are so many similar examples... you really need to know when to build each city improvement. Fortunately it's fairly easy to see which structure is needed at a particular time.

Some players preferred to designate a particular city as a 'trade city' or 'science city'. A trade city will have a market and a bank (even a stock market) before building any science improvements; a science city is the other way around. This may be a good idea because it potentially maximizes either trade or science in a city. But in practice there are difficulties. Banks, Stock markets, and Universities take much longer time than level one improvements (libraries and markets, etc). I believe larger city improvements should be built when the city is more capable in shield production, trade or science. The second difficulty is balance of trade cities and science cities; you need to keep track of the rough numbers of each type of city . I never follow the specialized-cities formula strictly...

III.3.3. Special Citizens

When a city's population is above 5, you have the option to set some citizens as scientists, tax collectors, or entertainers, by clicking on the citizen icon(s) at the city production screen . Entertainers should be avoided in stable cities. In cities that have more science improvements, such as library, University, Newton's College, scientists should be favored, in cities with high income, set tax collectors. It's not a good idea to have too many special citizens because it would hamper the growth of the city due to fewer food and shields. Long term population growth is more important than short term gains in science and income. I only set special citizens in developed cities with a large population, greater than 12, and in cities with science and trade wonders.

III.4. A balance between tax, science, and luxury

Luxury is not necessary early in the game. The default tax rate is just fine and requires no change for many years. During this time, military units and temples are sufficient to keep cities stable. Even if you set the luxury rate to 10% or 20%, the effect is almost negligible due to the small amount of trade in the cities. Once your government becomes a monarchy, or when the average city size is around 4 or 5, there is a need to adjust the tax rate to allow some luxury. A sample distribution rate is 60% science, 30% tax, 10% luxury. When you change to another government type, you must adjust the percent distribution to suit the characteristics of a particular government type. A republic or a democratic government should set at least 20% luxury; a communist government should set 10% luxury, and a

fundamentalist government could set luxury to 0% -- but higher doesn't hurt because each happy citizen contributes an amount of gold per turn (known as 'tithe') in a fundamentalist government.

It pays to make your citizens happy. In a democracy, a city that has more happy citizens than content citizens, and has no unhappy citizens and enough food, the city population increases by 1 each turn. Because of this rapid increase in population, you may need to rush-build aqueducts or sewer systems at the thresholds of 8 and 12, in order to make the incrementation uninterrupted. Many players have taken advantage of this unique ability and set luxury rate higher than 50% for some time; I often let it run for 6 turns then set it back to normal. In a communist government, happy cities collect resources as in a democracy. Happy citizens also contribute more points than content citizens in final score calculation (2 points instead of 1). For this reason, you should set the luxury rate to maximum just before final score calculation.

III. 5. Caravans and freights are essential

The basic idea behind Caravans is the Principle of Supply and Demand. Those who have taken an economic course should be very familiar with it. Since a city can't possibly produce all the goods its citizens demand due to the limitation of resources, trade with other cities, foreign or domestic, is your only mean to satisfy the material demand of your citizens. In Civilization II, every city produces 3 types of products and demand 3 other different products at any time. It is your goal to try to satisfy your citizens every need and make their lives better and happier.

Caravans provide a mean of transporting goods between cities. The moment your caravans arrive at another city, you instantly gain an amount of gold from selling those goods. The amount of gold is determined by several factors:

1. The distance between the two trading cities. The farther the distance, the higher the profit.
2. Does that city demand your product? If yes, then you can sell them at a higher price and thus more profit.
3. Which civilization owns that city? If it's not your own city, then you will receive a higher profit. Maybe it's because of the mystery behind imported goods...
4. Do you have a peaceful relation with the civilization that owns that city? You will receive a lower amount of gold if you are at war with that civilization.
5. The populations of the two trading cities. If both cities are large, then the profit will be higher. If the size of your city is small and the destination city is large, the income is only average because your city's small population can not produce enough goods to satisfy the demand of the larger population.
6. There's a boost if the two cities are on different continents. Small islands make great trade centers. (From GJ)

These are basically the factors that affect the profit you receive from selling goods via caravans and freights. After you sell the goods, a trade route between the two cities is automatically established. There is no need to send caravans to that city anymore. Instead, the two cities will gain an increase in trade. Often times my cities gain 2 to 5 trade increase from one trade route (remember that a city could have 3 trade routes, which could mean up to 15 trade bonus at this rate!). This number changes from time to time as the two cities' populations increase in number. I would suggest that you try to fulfill every demand of your citizens by trading between your own cities and foreign cities as early as possible. Freight is an improved version of the caravans; they can move 2 squares per turn instead of 1, although they have the same role. Caravans and freights are essential for a great economy.

IV. Military

I just counted the number of units in Civilization II...and the answer is 51 units, from the ancient warrior unit to nuclear missiles! Here they are:

Type	Units	Total
Air	Bomber, Fighter, Helicopter, Stealth Bomber, Stealth Fighter, Cruise Missile, Nuclear Missile	7
Land	Alpine Troops, Archers, Armor, Artillery, Cannon, Caravan, Catapult, Cavalry, Chariot, Crusader, Diplomat, Dragoons, Elephants, Engineers, Explorers, Fanatics, Freight, Horseman, Howitzer, Knights, Legion, Marines, Mech. Infantry, Musketeer, Paratroopers, Partisans, Phalanx, Pikemen, Rifleman, Settlers, Spy, and Warriors	32
Naval	AEGIS Cruiser, Battleship, Caravel, Carrier, Cruiser, Destroyer, Frigate, Galleon, Ironclad, Submarine, Transport, and Trireme	12

Grand Total

51

For complete statistics, please visit this page.

"Wow...Impressive!" You said. "But what can I do with these units? How do I use them effectively??" Don't worry... because you can't build ALL of these units in 4000 BC (unless you use cheat codes). Maybe you don't need to build them all -- you may be able to conquer all your enemies in the musketeer age!

IV.1. Things every player should know

IV.1.1. Use a Combination of Units

Cities should have more than one type of units. The preferred combination is 1 defender (archer, pikemen, legion, musketeer, etc), 1 attacker (catapult, cannon, etc), and 1 mounted unit (horsemen, knight, Calvary, etc). The defender units will be useful when enemies attack your cities, the attackers can easily destroy any slow enemy units, and the mounted unit is good at offense and has fair defense -- they are especially useful in destroying enemy diplomats because they can move 2 squares per turn. The defender and attacker unit are not effective against diplomats because they can only move 1 square per turn. One unit of each type should be sufficient for most cities.

IV.1.2. Diplomats and Spies

Diplomats or spies are not needed inside your territory. You only need them in the border or coastal cities. Having diplomats and spies in border cities also make it easy for you to quickly send them to enemy cities. In emergency situations, having 1 or 2 diplomats in a city could mean victory or defeat. They could bribe enemy units and you can then use the newly joined units to attack other enemy units. Although it's expensive to bribe enemy units, you just have to spend the money in order to save your city under some (rare) circumstances. Diplomats and spies can be seen as reserved forces against enemies and barbarians.

Inciting revolts in your rivals' cities is one of the most effective way to capture enemy cities because all the units and improvements in the city are intact and the city population only decrease by one (I think). You also avoid losing units. Early in the game, most enemy cities are very cheap, some cost less than 100 Gold. As the population of the city grows and as the government changes, the cost becomes increasingly higher. A prosperous city later in the game could cost 8000 Gold! The incite revolt cost is determined by the following factors:

* the happiness of its citizens

- * the size of the city
- * the distance between the city and its capital
- * the government type
- * whether the city has courts
- * whether the owner of that city has a Capital (or Palace).
- * Is the city in riot? Lower cost if yes.

A trick in bribing cities: if a particular enemy's capital is to the South, you should incite revolt at the northern edge of the city; if the enemy capital is in the east, then you should incite revolt at the western edge. In other words, your goal is to maximize the distance between your diplomat and your enemy's capital. The price difference is significant. [Click here](#) to see a graphical representation of incite revolt cost.

IV.1.3. Terrain and Fortresses

It's important to consider the terrain in defending a city. If a square next to your city has a mountain or a hill, you should not let your enemies move troops to that square. You should build a fortress there beforehand and put some 2 or three units in there. Of course, having fortresses at the corner of the city radius could also block your enemies from moving into strategically important locations. In fact, having fortresses at the corners of the city radius is a more efficient method; a city could have more than one mountains and hills and building fortresses on all of them is too much work. Similar to diplomats, fortresses are only needed for border cities. The benefits of fortress are:

- * Units in the fortress gain a defense bonus
- * Your stacked units don't get killed at once
- * You get increased defense from enemy diplomats and spies because you can spot them earlier. They also cannot bribe your stacked units.
- * Units in fortresses within a city radius do not cause unhappiness in a democratic or republic government.

Roads should be established between the fortresses and the city in order to facilitate the movement of troops.

IV.2. Navy: Queen of the Sea

Navy has important impacts on exploration, transportation, and in military. Here I will mainly talk about the military use of naval units.

Before ironclad, earlier naval units are not effective in bombarding enemy cities. Their main

purpose is exploration. Indeed, if you use them well you can have the largest empire without much difficulty. You can also use them to transport military units to other islands or continents and possibly take a few enemy cities.

Ironclads are somewhat useful in attacking enemy units and cities if your opponents do not have coastal fortress or musketeers. They are capable of destroying the lower level units such as pikemen and legion. You should never use them to attack cities that have coastal fortress or musketeers stationed inside. And since ironclads have more firepower than wooden ships, you can use them to destroy any triremes, caravels, and galleons.

Destroyers are your first modern naval unit. They see farther than earlier naval units and thus are good for exploration and destroying enemy submarines. Their attack power is similar to an ironclad's, so don't use them to attack enemy cities with coastal fortress or musketeers.

Cruisers are much better in attacking enemies than previous naval units. You can use them to attack cities that have musketeers or even cities that have coastal fortress (but NOT cities that have coastal fortress AND rifleman, if you don't want to rely on luck).

With ironclads, destroyers, and cruisers, you can attack enemy units that are adjacent to the ocean. If you see any settlers or engineer units, be sure to attack them with your metallic ships! If you patrol enemy coastlines often you should be able to destroy some settlers and engineers units. Also, units such as catapults, cannons, caravans, and crusaders are easy targets if they are not stationed inside a city. Destroying those units along the coastline will force your opponents to build more of those units to replace them (we want to waste their resources).

You all have witnessed the power of battleships... They are expensive, but they can take lots of punishment. In one game, my veteran battleship was still alive after six cruise missile attacks in the same turn! A combination of battleships, cruisers, and transports is very effective in taking over enemy cities.

AEGIS cruiser is just a normal cruiser with added anti-air capabilities. If your enemies have a good air force or a large arsenal of missiles, then AEGIS cruisers are excellent for defending your ships, especially your transports. If your enemies don't have a good air force, then there is no need to build AEGIS cruisers.

And finally there is submarine... They have very low defense and can be destroyed by any naval unit starting from ironclad. Submarines (attack power 10) are deadly if you attack first, just like cannons and catapults. In most cases, if you can move a longer distance per turn than your enemy's naval units, your submarine can attack first and kill any naval unit except the battleship.

"First attack" is very important in civ2 and you should do all that's necessary to improve your naval units' speed. There are three possible ways:

1. Research the "Navigation" technology
2. Build Magellan's Expedition!
3. Research fusion power

Your naval units can move at least 4 squares more if you have all three. (correct me if I am wrong, I am writing from memory here...)

This increase in speed not only allows your naval units to move faster, but also allow them to attack more times, as long as their sustained damage is below 50% (or no yellow color health bar) and the movement point is not used up. For example, if your battleship (assumed 7 movement points) is right next to an enemy city, you can attack a maximum of 7 times if its health is still good after each attack!

More on submarines: Stationing one or two submarines in a city can be very useful sometimes. Suppose your enemy attacked your city with a battleship, you may lose one rifleman, but you can unleash your submarines next turn and destroy that battleship easily since it must be injured. One rifleman for a battleship is a pretty good exchange rate. :-) And have I mentioned that you can equip your submarines with nuclear missiles?

Another tips, if your enemy has many ships stacked together or within a few squares, use a nuclear missile! It will not cause any pollution in the ocean.

Please note that the players' input below may or may not represent my ideas.
Player Input: submitted by David Wendelken on 2/12/00.

Navy? To Be or Not To Be, that is the question.

First, a qualification is in order. I have only played against the AI. Personally, it is a rare game that I build a navy unit (other than for transport). I find them expensive and rarely useful. Of course, if I was playing a game with lots and lots of small islands, I might change my strategy! The few occasions that I use one are when someone has a veteran Ironclad and I can't get the rifleman advance quickly. If the other person's navy is a bother, I just figure out their "shipping lanes" to my territory. I then build a city on a coastal mountain astride their sea route to my territory. It almost always becomes a "ship magnet" where countless fleets of ships dash themselves against the rocks and sink.

As for crossing the ocean, I find narrow crossing points where the transporting ship can make it in

one pass. The ships carry an engineer who builds a city which the ship then sails into. I make sure I have enough gold to build city walls and garrison the city with the rest of the transport's cargo. If the ocean is too wide to sail across in one setting, then make peace! Load up several transports with spies, engineers and howitzers and have fun when you disembark on the opposite shore.

IV.3. Air Force: Ruler of the Sky

Player Input: submitted by Dave on 3/7/00

The only thing the airforce is good for

You generally can guess if there are fighters in a city u are about to attack. If there are none, u can place an air unit on top of ground units in a square adjacent to the city making it impossible for a unit from the city to destroy your force. I rarely use planes for anything else.

* Army: 80% of your military

Chapter 2

Octagon's Strategy for Civ2

Posted by Octagon, Compiled by Thunderfall

Sections:

- * The start
- * Wonder which wonders are worth it?
- * Diplomacy and city formatting
- * Military dominance
- * Get rich quick
- * Happiness is the key
- * To summarize...

I. The start

I have been playing Civilization from the original to Civ2 ToT since the early 90's. What is wonderful about this games is that it has continual playability like no other game I have ever encountered and that you are ALWAYS learning something new. I play all my games on Deity, Raging Hordes, 7 Civilization, in other words as hard as you can get it. I have reached the stage in the last few years where I can always pull the game around so I win, no matter what the difficulties I face. But enough self glorification, I just want to let people know what a tried and tested strategy is that will definitely work.

Your first priority in research is to go for Monarchy. This government has only advantages for you at the start of the game. Only divert to horseback riding briefly if you are in a wide open space and want to go hut hunting fully.

As for you cities, build a unit as quick as possible i.e. militia or phalanx if good production and then go settler. After the settler go temple. By then, the city has an option of building according to its advantages, Wonder if high production, settlers if high food, libraries if high trade. Always try and have a road on all the squares that you city is using that will give you trade for doing so. The amount of time that passes in the early stages means that just one extra trade can really boost your research.

DO NOT stop colonizing until you have at least 6 cities. Try and get a wonder under you belt also... Pyramids and Colossus being the two best. Of course this is only for the start of the game.

While writing this, I'm realizing this is far too complicated to condense into just one post, so I'm going to segregate into topics.

II. Wonder which wonders are worth it?

Easily the best wonder in the game is Hoover Dam. Following that would be Michelangelo's Chapel and Adam Smith's Trading Comp. about equal second. Leonardo's workshop saves you a lot of bother and time and all the ones that don't expire are worth it if you can get them. In each stage, if I could only get two, it would be Great Library and Colossus, Michelangelo's Chapel and Leonardo's Workshop, Adams's Smith Trading Company and Darwin's Voyage, Hoover Dam and Women's Suffrage.

That said, I normally get them all past the first stage anyways as with good usage of research to get the access to the wonders and caravans to be helping build them quickly so that you beat the cheating computer players.

All in all, try and go for the wonders in the cities where it will benefit you the most and use them to your advantage. It is no point getting Magellan's Expedition if you aren't going to be using any ships.

I do love wonders, but they tie up the production of a city up for a long time so shouldn't be taken on lightly.

III. Diplomacy and City Formatting

Other civs can be the best way to keep abreast of the tech of the time and help your exploration and cash reserves. My favorite tactic is a well placed refusal of a cease fire/peace treaty or demand for a tribute. Do this to a wealthy civ, which the computer players normally are after you have just taken one of their cities or you are particularly powerful and they will give you a large sum of money. Then you can use it to go right on ahead and purchase one or two of their own cities with their money if it so pleases you.

Talking to civs too much bothers them and not talking to them at all makes relations strained also. When you meet a civ for the first time, the way you encounter them and deal with them can colour your relations with them for the rest of the game. Meet them from a position of strength and you can tend to get the upper hand. If they stumble upon a defenseless city when they first meet you, it can spell big trouble as they can be very demanding. Don't be afraid to pay a tribute now and then, it normally sets them to neutral if they were annoyed to start with. You never know, that potential enemy can end up an ally.

As a general rule, the first civ I encounter I try to be on good terms with if they are not the military aggressive expansionist type, so that I can have a safe border and trading partner. The second civ I find

I be a real bastard to and try to draw them into a war so that I have space to expand into and spoils of war to gain.

To city formatting, keep it a constant work in progress all game. Every city should have its own settler supported by it, unless it is a weak food producer. Road first, irrigate next and mine those hills if the surplus food is adequate. Special squares should be the highest priority if they can be improved. Try and set up a highway between your cities for ease of travel and with the discovery of railroads, make the track join all your cities. It makes warfare and defense extremely easy. Railroad all you trade and production squares as it adds an extra 50% to them both. Clean ALL pollution as it appears. That stuff can really cock your game up, and it is one of the only aspects I still get frustrated at. The recycling plant and mass transit never seem to get there soon enough for my liking and I have engineers working round the clock cleaning up crap.

IV. Military dominance

You don't need to have the biggest force or the best units to be safe and sound in civ. I prefer to keep the minimum amount of troops in the field to do the job, and the ideal is to have 2 defensive and 1 offensive unit in each city. City walls are a must in all cities for obvious reasons and as they do not take maintenance and are quite cheap to buy, there is really no excuse for not having them. The offensive unit can attack those pesky bombarding units with weak defense and the defenders do just that...defend.

When attacking an enemy city, try and attack from defensive bonus terrain, hills or mountains that are adjacent to the city if possible. Send a high defense unit onto it, fortify and then move in the attacking units. Even better is to sit in a fortress if one is built, but don't expect them to let a settler just waltz in a build one...I always end up using pre-existing ones as the computer loves to build them. The added advantage of the fortified defender on the mountain is that the computer tends to throw a lot of units at it, and hence lose a lot of its garrison. When the attack is finally ready, and do use as large a force as you can muster at one time, throw everything you have at it. There is no point doing attacks piecemeal as a barracks in the city will heal all the damage you have done to the units that weren't killed. When all the defenses are gone you never have to worry about not having movement left with any of your units as you simply activate the fortified defender and claim the city.

To specific units and stages...I believe that cities are up for grabs all the way up to gunpowder. After that it is very hard to break through 3 or more musketeers in a city as there just isn't the firepower in the units. Conscription makes it highly impossible.

Sea power is a great way to limit the computers ability to wage war on you if you are on a different land mass to them, and all the coastal cities of your enemies are easy prey with a good fleet. Even Ironclads can do some good damage, although cruisers(AEGIS especially) and battleships take the cake. Air

power can be good, especially if they are too heavily entrenched with ground forces. Bombers can be used to surround a city when attacking to limit the amount of partisans that appear when it is taken and stop them movement of enemy ground troops through the squares they occupy.

I cannot stress this one aspect enough though....make sure your units are veteran!! They stand little or no chance if they are not. One way to ensure that your force is well trained is to leave the building of your army to a few select cities with good production. I even do this very early in the game, so that all my city defenders are veteran and will not lose to barbarians that frequently appear. This makes the military producer suffer from lack of infrastructure, but I compensate for this by buying its needed buildings. One thing is for sure though, it is better to defend and choose the terrain than to be the attacker.

After conscription the advent of armour and especially howitzers make cities up for grabs once again on land. Even mech. infantry cannot stand up against a howitzer assault on a large scale. Even a dozen turns where you have armour and your opponent does not can be enough to decimate his empire. A good reason to go for the tech and then guard the technology for as long as possible.

V. Get rich quick

Lots of money is wonderful in civ, in fact it is the gateway to a sure fire domination of the game.

Surplus cash enables quick reaction to ALL situations, by lieu of the fact that you can purchase that needed unit for defense, buy that hostile force or subvert that enemy city into turning sides. Large amounts of cash make it more difficult for diplomats to buy your cities when not in a democracy and let you sneak that wonder in just before the computer was about to build it.

Cash really doesn't start flowing in large quantities until the Republic or Democracy stage, but an effective ground work in trade routes to far away foreign cities that demand your product make the change of government have a huge impact on your surplus cash and hence ability to support more structures in your cities. Roads take no time at all and should always be built on plains and grassland squares in the radius of a city so that the trade is garnered and not wasted. I usually keep as high a science rate as I can throughout the game until I become a republic. Then it is good policy to go for highest tax possible, buy banks and stock exchanges if possible for all your cities. These structures are always worth buying, as long as they have a little production in them already so they are not at a premium price, as they pay for themselves and their maintenance by increasing your surplus cash and making more luxuries enabling less entertainers.

When I become a Democracy, I frequently go on the defensive and cease all military action, make peace with my enemies with the aid of the United Nations and then subvert the computer players to

oblivion. This way you gain even more score as there is a longer period of total peace and your population is increasing all the time.

Having no money sucks.

VI. Happiness is the key

One of the greatest difficulties in Civ, especially on Deity level is keeping your people happy. As the number of cities you have increases, so does the difficulty in keeping out of riot. Always try and keep at least 2 units in each city, preferably one defensive and one offensive, like a phalanx and a catapult. You can have up to 3 units in the city to keep the citizens content under a monarchy without slowing production. Happiness of your cities is the key factor in enabling you to progress to a republic/democracy, which is essential if you wish to accumulate a decent wealth and stay ahead with a good research time. The way to change to a republic/democracy safely can be achieved 2 ways; you can get the happiness wonders or if that is not possible or in addition to, you need to build banks in all your cities followed by cathedrals or coliseums. In order to aid this, set up at least one trade route in each city. When you change governments, up the luxuries rate to 20%, 10% if you are lucky on the wonders.

Keep the people happy and you are half way to having won the game already.

VII. To summarize...

There are still many little strats that help a lot in the game, like disbanding obsolete units in cities for production boosts or using capitalization to save your production if you were building a wonder that got built and you don't want to waste it till the next wonder is available, but hopefully I have given a good overview of the general aspects of the game and the best strats to use.

My games normally now go as follows:

1. Straight to Monarchy.
2. Quick expansion to around 8 cities and temples all round and a ratio of 2 libraries to 1 marketplace.
3. Build banks and switch to Republic having obtained Michelangelo's Chapel (along with Great Library as it's a good safety net if you fall behind).
4. Get trade routes in all major cities start the cash rolling in.
5. Start buying all the enemy cities, especially in a Democracy with a little help from the United Nations to stop them going to war if YOU want them not to. At some stage I have normally worked out who is the most powerful civ beside me and I concentrate on breaking their power, as the rest are

easy.

If anyone would like to ask any questions, have a chat or just comment please don't hesitate. I would love to hear some other opinions and strats, or help anyone that is having any difficulties. You can email me at aaron@mafoo.com. Have fun playing Civ.

Chapter 3
Gov't Change, Super Science City, & Super Growth
 Switching Government

Original Author: Oedo; Reposted by Smash

I. Change of Government

A discovery has been made by Oedo concerning the turn on which government changes happen. It's not random.

Here is a list for King level

-3850	-925	460	1330	1715	1853	1913	1973
-3650	-825	540	1370	1735	1857	1917	1977
-3450	-725	620	1410	1752	1861	1921	1981
-3250	-625	700	1450	1760	1865	1925	1985
-3050	-525	780	1490	1768	1869	1929	1989
-2850	-425	860	1515	1776	1873	1933	1993
-2650	-325	940	1535	1784	1877	1937	1997
-2450	-225	1010	1555	1792	1881	1941	2001
-2250	-125	1050	1575	1800	1885	1945	2005
-2050	-25	1090	1595	1808	1889	1949	2009
-1850	60	1130	1615	1816	1893	1953	2013
-1650	140	1170	1635	1824	1897	1957	2017
-1450	220	1210	1655	1832	1901	1961	2021
-1250	300	1250	1675	1840	1905	1965	
-1050	380	1290	1695	1848	1909	1969	

Here is a list for Deity level.

-3850	-925	460	1580	1836	1903
-3650	-825	540	1620	1844	1907
-3450	-725	620	1660	1851	1911
-3250	-625	700	1700	1855	1915
-3050	-525	780	1740	1859	1919
-2850	-425	860	1756	1863	1923
-2650	-325	940	1764	1867	1927
-2450	-225	1020	1772	1871	1931
-2250	-125	1100	1780	1875	1935
-2050	-25	1180	1788	1879	1939
-1850	60	1260	1796	1883	1943
-1650	140	1340	1804	1887	1947
-1450	220	1420	1812	1891	1951
-1250	300	1500	1820	1895	1955
-1050	380	1540	1828	1899	1959 ...

ie. If you revolt in 4000 (lets say you already have monarchy) you will not "change" until 3850. Better to wait and revolt in 3900.

It works on all levels for all governments. Just remember the pattern:
x-x-x-0-x-x-x-0

No more 3 turn revolutions.

II. Super Science City (added on 11/05/00)

Super Science City (SSC) is a well-known strategy in Civ2 that allows you to win the science race w/o much difficulty. I asked Stellar Converter in our forum to write a few paragraphs on SSC:

The Super Science City (SSC) is not necessarily your first city. A great place for it is on rivers, though not necessary, and it should have special trade resources for it. You will find a great example on the World Map. Be the Indians and go up. There is a large river, gold, and silk, which are great trade squares.

When you start out, get to monarchy as soon as possible (Alphabet, Ceremonial Burial, Code of Laws, and Monarchy). Next, get to Bronze Working for Colossus. The Colossus adds one trade unit to every square in your city radius, which therefore, increases your science output. I wouldn't even bother with Great Library because you will be very far ahead. As you have probably already realized, the SSC NEEDS Wonders to be a good science city.

The next Wonder you need is Copernicus' Observatory. This wonder acts as another library (increases science output by 50%). This is probably more important than the Colossus because it directly affects the science output.

After Copernicus' Observatory you will build Isaac Newton's College, which comes with the Theory of Gravity technology. This doubles the science production of the city. I do not believe it takes into account any improvements you have, but does it after the science rate and scientists you have in the city.

Of course, as you probably know, have 3 good caravans trade routes which will increase trade even more. I am happy to say that URANIUM DOES EXIST; I saw it in my last game. You will also build a library, university, bank, stock exchange, and super highways.

Additionally, you need to build SETI Program wonder. It counts as a research lab in all of your cities.

In my previous game at king level, the science rate of my SSC was 716 beakers a turn! It was on a river, and also had several scientists in it. I did not have any special resources in it though! Furthermore, my science rate was only 50% .

Hope this has been helpful guys.

III. Super Growth Strategy (added on 12/26/00)

Author: markusf

Here is what I have been using lately... Its very simple and very effective. I can beat anyone's science and tech output with half the cities. Here is step by step what you do.

1. Build settlers and go make cities SPACED OUT, connect them by roads.
2. Go for Monarchy, as soon as you get it irrigate everything and go for trade.
3. Once you have trade go for Republic, by this time you should have 15 or 16 cities with about 16 settlers. (about 1 ad and all your land should be transformed and irrigated + roads)
4. Set your inner cities to build caravans.
5. Once in Republic send caravans from all your cities into your capitol.
6. Go for Monotheism, build libraries & temples & market places. Keep all your cities celebrating with 20% luxuries.
7. Go for Construction & Sanitation. By the time you get them most of your cities should be size 8, then you celebrate your cap up past size 20. Once you have done this ALL the trades routes in EVERY city will grow by one, forcing them to celebrate as well.
8. Switch to Democracy at about 300 AD and you should make \$400 gold per turn and 2 turns a tech and by that time your far ahead of everyone else.

Here is a screenshot of a game I played. I am 1 tech from railroad here. I have Democracy, Monotheism, Navigation, Economics, University etc. About 20% less cities then everyone else, half the maintainance costs, but double the income and science. In this pic I am making 800 gold a turn, even after my growth was stunted by fighting a major war, in another 10 rounds all those size 12 cities will be size 22. Here's another screenshot.

Special thanks to Oedo, Stellar Converter, and Markusf for these useful strategies!

Chapter 4

SeanL's Strategy for Civ2 Multiplayer Games

Strategy Written by SeanL(EyesOfNight); Compiled by Thunderfall

Sections:

- * Basics of Dueling
- * Advanced Tactics
- * Using Explorers Effectively
- * Locating a Civ Using Demographics

1. The Basics of Dueling

Contained in this section is the basic knowledge of playing a duel. What is a duel you ask? A duel is a 1 on 1 game with no AI on a small usually customized map. The entire idea of this kind of game is to destroy your opponent as soon as possible. There is no peace and you can expect to be fighting most of the time by 3400BC on average. Most of what I'll be talking about on here is very basic and is geared towards the beginning player.

I. Getting a good start

A. First thing you need to do is research horseback riding. Next after that research ceremonial burial, then alphabet, then code of laws, then monarchy. You should be able to go straight to monarchy this way assuming you don't get any techs out of huts. Either way your primary goal is to get monarchy as soon as possible.

B. The first unit you should build is a warrior, even if you can get horseback riding in 3 turns using a whale or silk or some other high trade resource. If you can get horseback riding that quick, your second unit should be a horseman. If not then build another warrior. After you have 2 units built go ahead and start building settlers. Remember in the beginning to always build on a square that will produce at least 2 shields or more and then set resources on a forest. This way you can build your warriors in 2 turns instead of 3. The key to a good start is early exploration and speed.

C. Be aggressive!! Never stop exploring. Go out there and get every hut you can. Think of the map as your country, your pride and joy, and the enemy has decided to settle on it. Stop at nothing to destroy them. Everything belongs to you, every resource, every hut. Grab as much land as possible early on. Take control of rivers especially along with any resource you can find. Once you find your opponent kill off his exploring units. It is devastating to lose horsemen early on. A good strategy is the Box and

Squeeze (I know, it sounds cheesy, but I couldn't think up a better name). In order to do this you need to effectively take out and contain any exploring units your enemy might have. Next, push in as far as possible into enemy territory. If it seems you are encountering too much resistance and your casualties are rising, then go ahead and set up your perimeter. Fortify on mountains and other high defense bonus spots. The idea here is to make it so your enemy can't expand or at least will have a great deal of trouble doing so. It's usually a good idea to keep a steady flow of units coming to increase the strength of the border. From there just sit back and expand. Your opponent can't do anything because he is completely boxed in. There are of course plenty of other strategies other than the above mentioned, this is just the one I have had more success with.

II. Middle Gameplay

A. By now you have gotten Monarchy and are doing some heavy duty fighting. Hopefully you have contained the enemy, but if not that's ok. At this point you need to choose what tech path you will take. Any tech path will do, however some are best used in times when you don't have to worry about being attacked. Usually the best route to take next is to get Warrior Code - Feudalism - Chivalry. It will provide pikemen for defense, and Knights for attacking. It also allows you to get Sun Tzu's War Academy, which is a very good wonder, and I recommend it for every game. In general however your tech route at this point is more determined by the situation your civilization is in and how powerful your enemy is.

B. I can't stress expansion enough. Whoever has more cities 99% of the time will win the game. By 3000BC 6-8+ cities is optimal. 2000BC 22+ cities is a good goal. 1000BC 60+ cities is what you're shooting for. Of course you can't do this every game unless you've mastered all of the aspects of civ2. A really bad start and bad huts will severely hamper your city building. However these numbers are the ideal average.

III. End Game-Play

A. There really is no end game-play in a duel. There's a beginning, a middle, and the end only comes once your opponent is destroyed. There is no space race, and there is no defining ending phase.

This is just a very rough overview of what a duel is and what some ideal goals are in it.

2. Advanced Tactics

Composed in here are some of the tactics that I have come up with over the years. I've found them to be very useful in my game play and they have won me games. Use great care and decision making in using these. These can lose a game for you as well as win it.

I. Luring

This has to do with luring your enemy into a false sense of security. If used correctly it can effectively overstretch your opponent's military, allowing you to sneak in and take undefended cities. First you need to have a good idea of where your opponent is. You also need to have a lot of the map explored. Usually I use this when I've gotten very close to the enemy and he's taken out a lot of my units. Instead of engaging the enemy again, allow him to expand his perimeter. Keep some of the units you still have left and hide them someplace close. Wait a few turns and then sneak in. You need to have a feel for where cities might be. Rivers of course are always a great place to begin along with anywhere that is near a resource. Your opponent by now is fairly confident that he's secured the area. If the enemy has begun defending his cities, which you can tell by the top 5 cities usually or by military service, then this obviously won't work since the goal here is to take undefended cities. Be sure to keep track of how many units you allowed to pass. You don't want this to backfire and your opponent march in with a horde of horsemen. It's best to keep a force just outside your cities or at the mouth of rivers to take out any incoming units. This takes some practice since a lot of the success of this is picking out the weakest entry point into the enemy territory. It's a fairly simple strategy so it should be too hard to master.

II. Ghosting

I haven't really used this one a whole lot since it has more to do with having a navy and on a small map it's not usually needed. However it does come in handy sometimes. To do this get 15-20 ships and put a diplomat on each of them. Two diplomats is ok too since they will be used later on. Line the ships up along the enemy coast and sentry them there. Make sure your opponent can see them. I would recommend having lighthouse because you don't want to lose your fleet. Now what your opponent sees is a fleet of ships with most likely units on them. Obviously he's going to prepare for an invasion. Therefore a lot of resources will be put into that front. Keep your land front weak, at least as far as your opponent can tell. However get about 50-75 units built up along the land front ready to attack. It is imperative that your opponent not see this. Now from your opponent's point of view he sees a very weak front, and a very strong front. This is where your opponent will make a fatal mistake in thinking the land front is safe. Build up a lot of gold. 1000+ is recommended. Now when you're completely set, send in all of your knights at once and start pushing through. On the same turn use the diplomats in the ship to bribe all of the coastal cities. More than likely these cities will be heavily defended have units on them. Therefore you'll be gaining a lot of units for a relatively cheap price. If you can take the capital out before bribing, that is even better. If you do it right and take out key targets correctly, you can effectively cripple your opponent in one turn and completely destroy them a few turns after that.

III. Follow the Leader

This strategy has to be used in certain situations. Land formation can have an effect too. To do this

early expansion really helps but it can be used just about anywhere. Take a warrior or some other cheap unit and fortify it on a mountain or hill. Make sure you're a long ways away from any of your cities. You need to be very sneaky and clever about doing this. The object is to make your opponent think he's reached a strong hold and that you're defending your cities behind the false defenses. Obviously it's not a good idea to try this right outside of your opponent's territory. I suggest channels or alcoves especially. They keep very little land from being wasted, easy to defend, and easy to keep your opponent from finding out what's behind the warriors. Defend the position with your life, keeping up the false guise that this is your last line of defense. I like to sometimes go on to the King's Chat and tell my opponent "I can't believe how fast you found me! How did you do it?" or something to that effect. Your opponent thinking he's truly great will go about trying to make short work of your warriors. Meanwhile this leaves lots of land open to you. Even if the enemy has some intelligence and decides to keep exploring, you've still succeeded in taking away resources. It gets pretty funny when they start throwing elephants at you. Don't be afraid to allow the enemy some room to make him think he's gaining ground.

IV. The King of Lies

This is probably one of my favorite tactics and it has nothing to do with actually playing the game. Believe it or not, King's Chat is actually one of the most effective offenses there is. You can make your opponent think just about anything you want if you're good at it. During WWII against the Japanese, American pilots used to drop propaganda telling the Japanese soldiers that it was honorable to surrender. In reality they were forged writings made to look like the Emperor's orders. Deceit and lies have been used throughout history in every war ever fought. Don't be afraid to use it when you're conducting war in Civilization 2.

V. Kamikazi

This one needs to be used with great care. And it needs to be used at the right time. You also have to judge the personality type of your opponent. By this I mean whether or not he's expansionistic, or more of a defensive player. Lets say you attack a city. You take out a warrior on there. More than likely the guy will build a horseman real quick. You lose that unit. Send in another horseman, but this time let him die. Take a second horseman that same turn and bring it up and around the city so you can attack from the exact opposite direction, make sure you're not seen though. The object here is to get your opponent to take his defenses off of the cities in exchange for a chance to gain more ground and take out more of your units. It's a lot like the luring strategy, but this time you're actually letting your units die on purpose. I want to make it very clear, this strategy is very hard to use and it doesn't always work. It has to be used at the correct times and only when your opponent has the game style to fall for something like that. I have rarely used it, but it has won me games before. I take no responsibility if you end up empty handed with no units left. Use it at your own risk, you've been warned. I can't stress it enough.

All of the strategies I've mentioned on here need to be used with very good decision making skills. Only a true master of the game will be able to use these to the full effectiveness. Especially the Kamikaze strategy! 90% of this game is decision making. Anyone can send out some horsemen and get huts. Only the truly great players though will win time and again primarily because of their decision making skills. If you're new this game I wouldn't recommend using most of these strategies until you have a very good understanding of the game.

3. Using Explorers Effectively

In order to get explorers the following techs are needed: Alphabet - Pottery - Mapmaking - Seafaring. I would not recommend going straight for explorers. As a general rule it's best to get seafaring if and only if you get pottery and mapmaking from the huts. You can of course gun for Seafaring right off the bat, but it's a very risky play and it isn't advised. What's nice about explorers is that they treat everything as a road. This makes for an enormous speed up in early expansion regardless of whether or not it is 2x2x or 1x1x. Obviously early exploration is an advantage, however that is not their key use. Most experienced players do not defend their cities. Since an explorer can move 6 spaces on 2x2x, one can move right in and take out half a civilization in 1 turn. In order to do this effectively though you must move through the territory undetected. If you're spotted it's very easy to throw some warriors on all the cities as defense and your plan will be ruined. If this does happen they are still useful, just not as useful as they might be. You'll still have accomplished forcing the enemy to defend all newly built cities, which is a real hindrance to fast expansion. They also can be fortified on mountains and hills, allowing them to work as a barricade surrounding an entire civilization. I have won entire games by doing this against some of the best players in Gameleague. Once your explorer has exhausted his moves and is down to 1/3 movement, make sure to fortify on a hill, mountain, river, or some other terrain that has a defense bonus. The best way to defend against this strategy is to post units in passages and other places where an enemy unit might come through. Without advanced warning of what is coming you could be facing the loss of a few cities or more. You can defend each city as you go, but I wouldn't recommend this as it will severely hamper how fast you can expand.

4. Locating A Civ Using Demographics

This only works in 1 on 1 games. I'm not saying it doesn't work in larger games, but it's much harder to do and it's not really needed as much. Also this pertains more to duels on a small map. All resource values are assumed to be 2x. It's extremely difficult to do and you have to have a lot of knowledge of the values of resources and how the AI sets the map up, along with an active imagination to visualize how the map looks. Also I am assuming that the age of this map is 3 billion. On 5 billion or 4 billion the resources occur too sporadically to classify into zones. This can't always be used, but a lot of times it can. Either way you can find out what's in your opponent's city view.

1. ZONES

First let us divide the map up into zones. Zone 1 is the arctic region, 2 is the part between the arctic region and the equator, 3 is the equator, then it goes 2 again and then 1. N1 is the northern arctic zone, S1 is the southern arctic zone just as N2 and S2 are north and south zones.

2. DESCRIPTION OF ZONE TERRAIN

Of course these descriptions are not set in stone, but can be used as basic guidelines for zone formation.

A. Zone 1

Very bottom region of map. Glacier, Tundra, plains, and forest can be found here. Plains squares are usually sporadic and are fairly rare.

B. Zone 2

Most diverse terrain. Can have just about anything in it. Jungles, and swamps will occur here most, but will sometimes be in zone 3 too. Mountains, hills, grassland, with even the occasional desert square. Mostly grassland however. Usually has the best land on the map.

C. Zone 3

Mostly desert and plains. Forests will occur here but will be sporadic. Occasionally there will be some jungle and swamp in this region but it's usually in patches and not widespread. Mountains many times will occur in large ranges. Grassland will also be seen here, but not in large quantities.

3. RESOURCE ZONES

Most resources occur in these certain zones, but can however be found sometimes out of their normal zones. Water resources are not included. This table shows zones of the resources, and my rough estimates of how often they will occur in these zones. * indicates a zone where the resource will occur only in extremely rare circumstances.

Buffalo:	2-35% 3-65% 1*
Coal:	Just about anywhere. Not used in tracking civ.
Desert Oil:	3-80% 2-20%

Arctic Oil:	1-100% 2*
Fruit:	3-30% 2-70%
Furs:	3-60% 2-40% (only very lower regions of Z2)
Game:	Same as Furs.
Gems:	2-70% 3-30%
Gold:	3-55% 2-45%
Iron:	Same as gold.
Ivory:	3-100% 2*
Oasis:	3-80% 2-20%
Peat:	2-70% 3-30%
Pheasant:	ANYWHERE. Not as common in 3,1&2 most likely.
Silk:	Same as Pheasant.
Spice:	2-70% 3-30%
Wheat:	2-35% 3-65%
Wine:	Just about anywhere. Harder to use in tracking civ but can give idea and tell what's in view.

4. EXAMPLE SITUATIONS

There are many situations you can tell where a civ is using demographics. It's obviously not a pinpoint of where it is, but it will tell you the zone the player is in.

A. Let's say you start out on a grassland square, no resources around you except for a forest and a lake. It's the first turn of the game, you both have a city. Now let's say you put your resource on the forest and the demographics say you are first in MFG, 2nd in GNP, and 2nd in Food production (FP). Put your resource back on a grassland square. The new values are 2nd GNP, 2nd MFG, 2nd in FP. In this situation if it shows you are first in FP then it's most likely a whale in your opponent's capital. If that's the case it's not of much use to you but it does tell you your opponent is near a water source. However, if you're second in FP still then you have to go down the list of possibilities. There aren't very

many that can give this combination of high food and high production along with GNP. Of course there could be a double combination of resources where your opponent built on a resource and has another one in view, but that is more rare and far more complicated. We'll assume the simpler combinations for now. A forest is obviously in view. Silk won't give the food but pheasant will. Now in order to get the GNP your opponent has to be on a river. TO test this we put our resource on the lake. If you're now first in GNP then your opponent has a pheasant and a river in view. This doesn't give a clear distinction of what zone your opponent is in, however it does tell what to look for. If you're still second in GNP then there's two resources in play which is far more complicated and would take a lot of writing to explain how to figure out what exactly they're using. But I want to assert that it is definitely possible to figure out what they're using in most cases.

B. Lets take another situation. Same resources in your city as before. You put the resource on the forest just as before, but this time you're second in MFG still. However you're first in FP, second in GNP. It could be that you're tied for first in FP, so take all your resources off and put on an entertainer. Look at the demographics, if you're second for FP then the following could be true: You both have the same resources and are using a forest, a river could explain the higher GNP of the opponent. Your opponent is using a double resource equation to explain the higher GNP, MFG, and either 3 or 4 wheat surplus (the amount of food going into the granary). If you're 1st in FP then your opponent is almost definitely using a combination of iron/oil with a river. To make sure it's a river and not a double resource combination use the lake again. In this case it shows you as first in GNP showing your opponent is using a river. Now the probability that your opponent is using oil on the artic is very low so we'll rule out zone 1. That leaves zone 2 and 3. Now we know that mountains occur in the upper regions of 2 and all along 3 and that oil is primarily in 3. So our target is the equator. It could be very possible that your opponent is on a river with iron down towards the bottom of the map, but it's far more rare.

Obviously there is some room for error using this technique, but it gives you an idea of where your opponent could be and in some cases a very clear idea of where they are. In the examples I know it's a little confusing and I didn't go into all the combinations and possibilities. I basically gave the examples to give you an idea of what this does and how to do it. You can't always use this technique because sometimes there are just too many possibilities. Majority of the time though you can or at least get some sort of advantage from it. Also, there may be a few mistakes up there because it was very hard to explain how to do this and got a little confusing trying to explain all the possible combinations on paper. It takes a lot of experience and a lot of practice to master using this so if you can't get any results on the first few times don't give up on it.

Thanks SeanL for sharing these MP strategies!

Chapter 5 Scrolls of Ancient Wisdom

Author: Stefan Winkler; Reformatted by Thunderfall;

I would like to thank Stefan Winkler for allowing me to add his Scrolls of Wisdom article to the War Academy for everyone to read. It is truly an interesting article and contains some facts even expert civers might not know... Check out his homepage for more interesting stuff such as quotations and humor.

Sections:

- * Airbase Magic
- * Irrigation Anywhere
- * Settler Speedup
- * Trade-offs
- * Bribery
- * Spaceship Shuffle
- * Demographics
- * Time Warp

Sid Meier's Civilization II is one of the greatest computer games of all times. It is seriously addictive and has kept me from getting enough sleep many a night. Here I compiled some little-known facts I have found neither in the handbook nor in online strategy guides so far, but which were mentioned on the alt.games.civ2 newsgroup, and some I discovered all by myself.

I. Airbase Magic

This is one of the neatest tricks in Civilization II. If you build an airbase, it counts as farmland and railroad in all respects: two additional food tokens if you have a supermarket in the city, no movement cost, road/railroad trade benefits, and an additional shield where applicable! This works on most terrain types, but it is particularly useful on squares which you would not or could not normally irrigate, e.g. hills or mountains, as you can combine the effects of irrigation/farmland and mining. In the example on the right (the city has a supermarket and superhighways), only airbases were used, and four squares were mined (mountain, hill, coal, oasis), but



no irrigation, farmland, roads or railroads were built.

Terrain	Typical	Instead	Adds
Desert	M+RR	M+A	+1F
Fruit(Jungle)	RR	A	+2F
Hill	M+RR	M+A	+2F
Mountain	M+RR	M+A	+1F
Oasis(Desert)	II+RR	M+A	+2S
Spice(Jungle)	RR	A	+1F

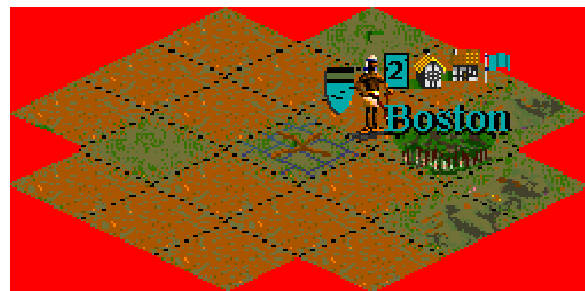
Key: M:Mine, II:Farmland, RR:Railroad, A:Airbase, F:Food, S:Shields

As you can see from the table above, on certain types of terrain airbases add even more food production compared to what would be possible otherwise following normal procedure (the figures assume a supermarket in the city). Airbases also work together well with special squares on these terrain types such as coal, wine, iron, gold, and oil (desert). Unfortunately, they do not have similar beneficial effects on swamp, jungle, or glacier. An interesting side effect of surrounding a city with several airbases is that attacking enemy air units will have a hard time finding a way in. Make sure your own planes don't get stuck in the airbase labyrinth, though!

A few concluding remarks: it is not possible to build an airbase and a fortress on the same square, and Despotism restrictions (no more than two tokens of any kind) apply to airbases also.

II. Irrigation Anywhere

This is a very handy settler cheat. Remember those grassland squares for which you would have to transform three mountains in order to get them irrigated? The automated settler can do it much quicker. Press "k" or choose "Automate Settler" from the "Orders" menu, and the settler will first build a road and then irrigate the square, even if there's no water around! However, I have found that this does not work reliably in all circumstances. In particular, it only seems to work as long as the nearby squares don't have too many improvements, otherwise the settler gets confused and wanders off immediately. From my experience it's safest to start with the pesky square right away.



3. Settler Speedup

If you are in a hurry improving a particular square, you can interrupt a Settler or Engineer that has already been working (but not yet finished) on another piece of land for a while and move him to that square - the number of turns he has already worked are stored and will now be added to the new task. Of course, you can also stack any number of these units to work simultaneously to really speed up terrain improvements.

4. Trade-offs

The amount of trade and the bonus payment you get for establishing a trade route between two cities with a caravan or a freight depends on quite a few factors. The formulas below contain all the details; they are based on an alt.games.civ2 post by Robert Lancaster:

$$\text{Trade} = (\text{trade of home city} + \text{trade of destination city} + 4) / 8$$

Note that it does not directly depend on city size or distance. The following (cumulative) modifiers apply:

Both cities are yours	-50%
Freight instead of caravan	+50%
Cities connected by road	+50%
Cities connected by rail	+50%
Cities on different continents	+100%
Airports in both cities	+50%
Superhighways in home city	+50%

The one time bonus payment is calculated as follows:

$$\text{Payment} = ((\text{distance} + 10) \times (\text{trade of both cities})) / 24$$

It increases if the destination city demands one of these goods (double these figures if the city is not yours):

Silver, Cloth, Wine	+ 50%
---------------------	-------

Silk, Spice, Gems, Gold	+100%
Oil	+150%
Uranium	+200%

The final bonus payment figure is then doubled during the first 200 game turns or until both Navigation and Invention are discovered. It is reduced by one third after the discovery of Railroad, and by another third after the discovery of Flight.

5. Bribery

The cost for bribing an enemy city depends on a number of factors. The formula below contains all the details; it is taken from an alt.games.civ2 post by Daniël Proost:

$$\text{Cost} = ((\text{enemy gold} + 1000) / (\text{distance} + 3)) \times \text{citysize}$$

I am not sure which distance is meant in this formula. It is probably the distance between the city and its capital. However, the cost depends on the square your Diplomat or Spy bribes from. It often pays to try to bribe from different squares - I have observed the cost vary by as much as 20%. At any rate, the distance is also influenced by the following factors:

Courthouse in city	half distance
Enemy government is Communism	max. distance is 10
Enemy has no palace	distance = 32

The following (cumulative) modifiers apply to the cost for bribing:

City in disorder	-50%
No units in city	-50%
City was yours before	-50%
Spy is bribing	-16%
Veteran unit is bribing	-33%

6. Spaceship Shuffle

Have you ever been producing your spaceship and wondered if you needed to build any more structurals, or how many propulsion units would be enough? This little table below summarizes these data for a spaceship with one habitation unit, one solar panel and one life support.

Components	Structurals	Years
6	15	15.7
8	17	13.2
10	21	10.0
12	25	8.3
14	29	6.7
16	33	5.7

The number of components given always comprises an equal number of propulsion and fuel units (i.e. 8 components means 4 of each). The number of years in the table already includes the 25% boost from the discovery of fusion power.

7. Demographics

The following table is based on alt.games.civ2 posts by Robert Lancaster and Jeffery S. Jones.

Annual Income	\$ per capita	-
Approval Rating	%	Ratio of happy to unhappy people
Disease	%	Based on number of Aqueducts, Sewer Systems; discovery of Medicine, Sanitation
Family size	children	Based on average food surplus
GNP	million \$	Based on trade and tax/luxury rates
Land Area	sq. miles	Number of squares that your units have been the last to move through
Life Expectancy	years	-
Literacy	%	Based on number of Libraries, Universities, Research Labs; discovery of Writing, Literacy; science rate
Manufactured goods	Mtons	Total number of shields (including unit support)

Military Service	years	Number of military units in relation to population
Pollution	tons	Total number of "smoke stacks" times 10
Population	-	-
Productivity	-	Shields (minus support) per square in use (?)

8. Time Warp

The number of years that pass each turn depends on the difficulty level: playing the easier levels gives you more turns to finish the game. The tables below contain all the details (this information is based on an alt.games.civ2 post by Jon Nunn; I have only partially confirmed the figures). Note that as soon as a spaceship is launched, the game will automatically switch to one-year turns.

Years/Turn	Chieftain	Warlord	Prince	King	Emperor	Deity
4000BC-2000BC	20		40	50	50	
2000BC-1000BC			20	25	20	25
1000BC-0001AD						
0001AD-1000AD						
1000AD-1500AD	10		10	10		
1500AD-1750AD	5		5	5		10
1750AD-1850AD	2		2	2		2
1850AD-	1		1	1		1

Total Turns	Chieftain	Warlord	Prince	King	Emperor	Deity
until 2000BC	100		50	40	40	
until 1000BC	150		100	60	60	
until 1AD	200		150	100	100	

until 1000AD	250	200	150	150
until 1500AD	300	250	200	175
until 1750AD	350	300	250	200
until 1850AD	400	350	300	250
until 1900AD	450	400	350	300
until 1950AD	500	450	400	350
until 2000AD	550	500	450	400

Chapter 6 Power Graph Explained v2.0

Author: Andu Indorin

Since my first experiment to determine what the Power Graph actually measures, I have conducted a number of more precise follow up experiments. Having tested nine variables, only three factors are included in the Power Graph: Net Population, Tech Levels, and Money.

Basics: The power graph records the relative strengths of civilizations every four turns. The Power Graph is updated on turns that correspond with those identified by Oedo in "Switching Governments"; however, while the graph is updated on these turns, inclusive of the measurement of tech levels and money, the measurement for net population is actually made on the turn previous. For example, the first change in the Power Graph is illustrated in the year 3850 B.C., but it actually measures the net population in the year 3900 B.C.

To illustrate the points made in the following demonstrations, I have included an illustration that combines three different Power Graphs, one from each demonstration. In each demonstration, all the tested variables are held constant for at least twelve turns, or three separate measurement periods, primarily to make the illustration more clear.

Demonstration 1: What affects a Power Graph?

- 4000 B.C.: (A) Barbarians set at Raging Hordes for +25 points; this has no effect on the Power Graph for the first three measurements.
- 3350 B.C.: (B) Rome given 40 techs; this is the first jump in the Power Graph
- 2750 B.C.: (C) Rome given 3840 in gold; this is the second jump in the Power Graph
- 2150 B.C.: (D) Rome is founded; Population established at 15; this is the third and final jump in the Power Graph. (Note that these measurements are taken with an established Fundamentalist government such that all citizens will remain content but not happy until 375 B.C.; likewise, throughout the remainder of this demonstration, the amount of gold and techs are held constant so as not to effect the rest of this demonstration.)
- 1550 B.C.: (E) 20 Wonders of the World are added to Rome; this has no effect.

- 975 B.C.: (F) 20 Armor units are added to Rome; this -- and all other military units -- have no effect.
- 675 B.C.: (G) 18 city improvements added to Rome; this has no effect.
- 375 B.C.: (H) Remaining Wonders added; Government switched to Democracy and Luxury Tax set at 100%, resulting in 11 happy citizens and 4 content citizens. This has no effect on the Power Graph, demonstrating that graph measures the net population of citizens, and does not include the "bonus" for happy citizens.
- 75 B.C.: (I) 20 pollution "skulls" added to Rome; this has no effect.

Demonstration 2: Relative Weight of Measured Variables

- 3750-3350 B.C.: (A) 40 total techs added in 3 increments of 13, 14, 13 tech levels; tech levels removed in 2750 B.C.
- 2350-1950 B.C.: (B) 3840 total gold added in 3 increments of 1280; money removed in 1350 B.C.
- 975-775 B.C.: (C) 15 total population added in 3 increments of 5.

The results on the Power Graph demonstrates the relative weight of these three variables:

$$40 \text{ techs} = 3840 \text{ gold} = 15 \text{ citizens}$$

- or -

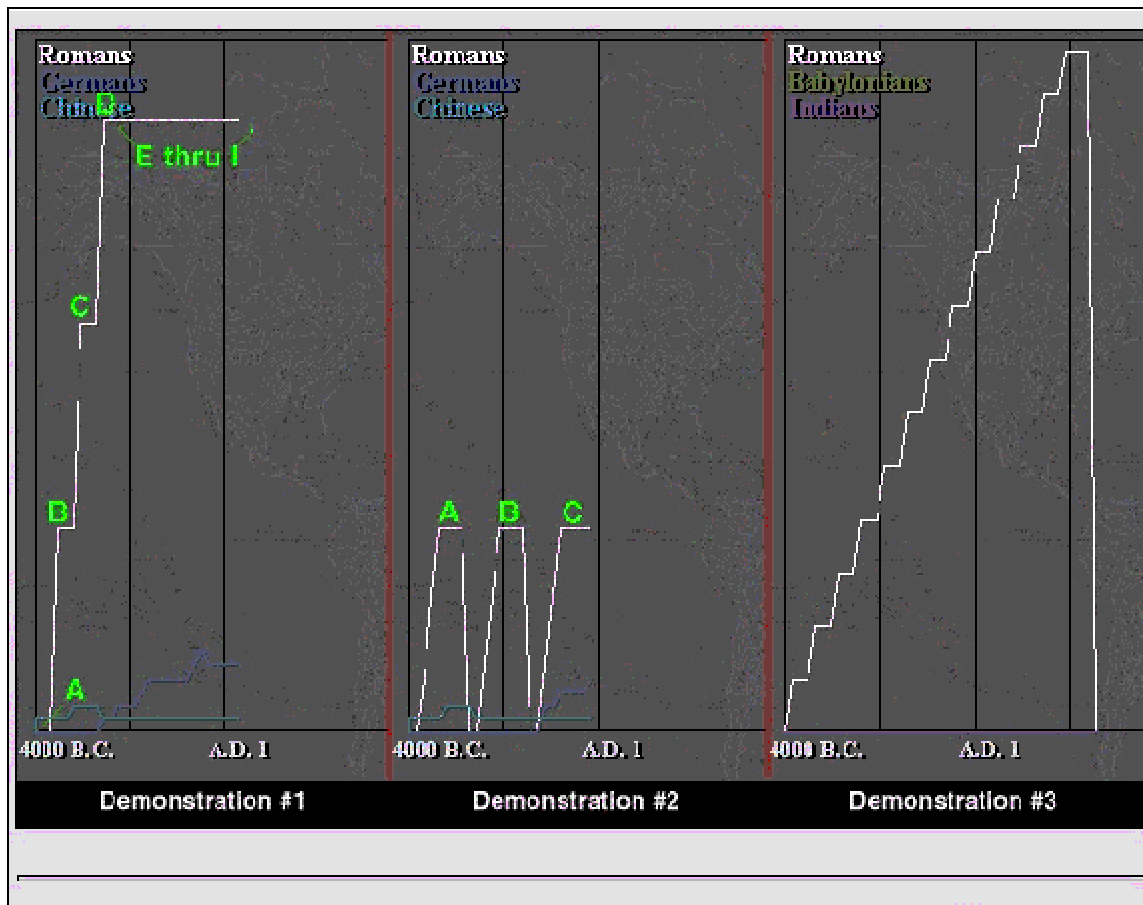
$$1 \text{ citizen} = 2.67 \text{ techs} = 256 \text{ gold}$$

Demonstration 3: Compression of Power Graph as Score Rises

The first two demonstrations have been done on an "early game" Power Graph. The last part of the attached illustration demonstrates an "end game" Power Graph after scoring has reached higher levels. Each step in this final segment represent incremental jumps in the net population of 20; techs and money have been held constant so as not to effect this graph. The graph maxes out at the equivalent of a net population of 264; after many attempts -- during which I learned that population is measured the turn

before the Power Graph is updated (!!!) -- I determined that a downward spike occurs when the score reaches the equivalent of a net population of 4096.

Because the early game Power Graph goes up to about 57, the Power Graph begins to "compress" once the score passes the equivalent of a net population of 58, reaching its final form once it is maxed out at 264. Note that by the end of the game, "all techs given" is the equivalent of a net population of only 32; while 30,000 gold is the equivalent of a net population 117. More than anything else, therefore, the Power Graph ultimately measures net population.



Thanks Andu Indorin for his time and effort in explaining the elements that affect the Power Graph. It is definitely one of the most fascinating discoveries in the world of Civilization. Send your appreciation to ASToll2525@aol.com.

Chapter 7 How I Play Civ2

Author: Alan Nicoll [Homepage]

Editor's Note: Alan Nicoll's How I Play Civ2 is the most comprehensive Civilization II strategy article I have seen. Not only does it contain detailed strategy against the AI, there are also TONS of excellent advice for winning multiplayer games against human players. Compared to Marc Fisher's Fire! - Making War in Civilization II (also an excellent article), How I play Civ2 takes a more practical approach, while Fire! emphasizes more on conceptual and philosophical aspects of the game. I strongly recommend this article to both newbies and veterans of the game. ~ Thunderfall

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- * Deity Level Against the Computer 3
- * Early PDS Strategy for King-Level Multiplayer Games 11
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I. Introduction: Choice of Overall Strategy

My overall plan, whether against the computer or against human players, at any difficulty level, is to grow my civilization as quickly as possible by building settlers and founding many new cities, not taking time for irrigation, mines, extensive roads, granaries, or Ancient Wonders (except I go for the Pyramids at deity level). I also work to advance my technology as fast as possible to get, first, an improved

government, and second, important military technologies and the later wonders. I then will be in position to conquer the world or build the spaceship. Of course, all plans may go awry, which is one reason I find this wonderful game remains playable after ten years or more of intense involvement.

Growth in civilization works like compounding interest. A fast start and efficient management, plus some luck, should let you hold your own in a "standard" 2x2x king-level multiplayer game; deity level AI is often tougher in the early stages. The most serious problem is lack of good land; sometimes you just have to quit and start over, or be content with a long uphill struggle.

I think it is important to have a general strategy or plan of play, largely because it forces you to think in general terms rather than floating from specific choice to specific choice. General plans and ideas can be refined and improved; specific choices will mostly be forgotten. Three basic strategies are discussed in this document, all dealing with how to start a game. Later decisions are mostly made opportunistically.

I.1. Difficulty Level and Production/Movement

When talking about how to play, it's important to specify the game conditions: vs. AI at Deity level, or vs. human players. The main difference I've found between playing against deity-level computer and human players on the net is that human players are more likely to attack very early, on first contact (which I consider stupid except, naturally, in a 2-player game), and are more likely to build carefully to an overwhelming surprise attack that really hurts and maybe wins the game (which is smart, and something the AI can't do). Human players also pursue critical wonders more effectively, forcing you to do so as well.

Because the game takes a long time, internet games are likely not to be at deity level; king level with double production is the most popular. Normal production and movement are, in general, to be preferred because the game was designed with them in mind. 2x2x introduces anomalies that distort the design of the game, but it is certainly playable and enjoyable. Double production speeds up growth and acquisition of technology. Double movement, which is also a common internet option, allows quicker exploration and earlier contact with other civilizations, but also changes the relative value of the pieces (Catapults become monster Chariots and greatly reduce the value of Pikemen). When playing at king level, citizen unrest is much less of a problem than at deity level; other differences seem very much less important.

I now play on the Internet almost exclusively. When I used to play vs the computer, I would play on a large map, because I like to build and build with minimum outside interference, as well as to go for a large score. Against human opponents, a small map is the more likely choice, to reduce game length and get earlier contact.

I.2. My Three Strategies

* In the usual multiplayer internet game, which most often is at double production, double movement (called 2x2x), King level, I pursue what I call the Early PDS strategy: President's Day Sale under Republic. This is as much a technique as a strategy; the population-pumping can happen in any game when Republic or Democracy is the government. The Early PDS strategy aims to make this happen as soon as possible, taking "reasonable risks" to speed growth and the research for Republic. This strategy has won me many games against some good players, and, because it starts militarily weak, has lost me some games against strongly militaristic human opponents. For the strategy to work, a long period of comparatively peaceful growth is needed at the start, such as is possible under low density conditions. As well, high trade is important to quick discovery of the Republic technology. If the initial start looks unpromising for high trade, I would give serious thought to one of the other strategies, reserving a later PDS for when conditions were right.

* Against the computer at Deity-level I pursue a slower but less risky plan based on Monarchy and the Pyramids. This is less risky because more defensive military units are built to keep cities out of revolt. Early PDS at Deity level is impossible. It is usually necessary to defer Republic until the Michelangelo's Chapel wonder is obtained. Then the PDS stratagem can be tried to pump up city size. This will be more important if the Pyramids are not acquired.

* As an alternative to the above strategies, I consider a Maximum Growth and War strategy based on exploitation of AI Civs. I have little experience with this, so most of this document assumes one of the above strategies.

A good strategy should lead to won games, and should also be fun to play. Many more strategies have been devised, some better than these, perhaps. A good source for ideas is the Civilization Fanatics website.

II. Deity Level Against the Computer and How to Start a Game

Many of the ideas in this section will apply regardless of opening strategy or difficulty level.

II.1. Building the Capital

Locating the capital is often a hard decision. You want to start as fast as possible, but you also want as good a location as possible. At double production I will go after whales, given the chance, because high trade early brings tech in a hurry, and the extra shields builds settlers quicker. The food production is reduced compared to fishes or wheat, but I find that the extra shields compensate for this very well. However, going for whales may also mean that the capital is a port city, which makes it vulnerable later in the game (against human players). It might be worthwhile relocating the capital (by building a palace elsewhere) after factories are built, both for safety and to minimize corruption, but I've rarely or never

done this. And since I normally build most of my wonders in the capital, moving the capital still leaves the wonders vulnerable. This is especially important for Leonardo's Workshop, where losing it for one turn to an enemy will upgrade his units.

At 2x production a good site for the capital is on a river, because this gets you an extra trade arrow compared to building on grassland, as well as a 50% defensive bonus. At normal production, this advantage does not occur. Also, at 2x2x it often makes sense to build a road on a grassland or wheat square before building your capital on an adjacent location, because the road provides immediate additional trade. Ironically, with normal production and movement, the road is comparatively more valuable but takes longer to build and longer to move to the capital site. All this assumes, of course, that you're stuck in grassland without rivers or whales or the other good things that would make this option unimportant.

II.2. Choice of First Tech

Your choice of which technology to research first should be determined by your overall strategy. My first choice for research is most likely going to be Alphabet, Bronze Working, or Horseback Riding. Because I have doubts about the usefulness of Horsemen for exploration and because I think Bronze Working can be delayed, my first choice these days most often will be Alphabet. Ceremonial Burial and Masonry are important tech that I will soon want, but my first goal is to improve my government to either Monarchy (at deity level) or Republic (king level multiplayer), so my first two choices will be Alphabet and Code of Laws (or Ceremonial Burial if I'm going for Monarchy, as both are needed).

If I am concerned about aggressive human players, or if I plan to build the Colossus, I may choose Bronze Working first. If I plan to try to intimidate neighboring AI, Horseback Riding is a good choice. These choices are not cut-and-dried, but rather depend on the particular parameters of the game, most notably, how crowded the map is (that is, the likelihood of early hostile contact). See the extensive discussion, "Pre-Republic Exploration: Horsemen or Warriors?", under Reconsidering Exploration, below, for my thoughts on why Horsemen are usually a poor choice for early exploration, and "Bronze Working" under Selected Technologies for reasons to delay this research.

II. 3. Building the First Unit

I aim to have a second city as quickly as possible, but I want it well situated, so my first build is a Warrior unit to explore around the capital for a second city site. I think this is always worth doing regardless of the overall strategy you will be following and what subsequent builds you plan. The only other choice I would consider would be a Horseman if I already have Horseback Riding, or can get it before my first build, and if my capital is producing at least 5 shields per turn or I have enough gold to rush build the unit. After the first exploring unit is built, a Warrior unit is also necessary to keep the

capital out of unrest (at deity level). At king level I'll start building a settler immediately after the exploration unit, not worrying about defensive units until later.

Tech and Exploration

After the first exploring unit and Settler are built, then I may build a second Warrior or a Phalanx for crowd control (deity) and to defend the capital. In this early play I worry very little about defending, taking great risks to get more Settlers, more land, and more goody huts. Slow and steady at this stage is a sure way to poor scores. But at deity level, keeping cities out of disorder is essential, and tricky. Depending on the timing of growth and shield production, I may build a second Warrior or a Horseman to help with exploration, or a second Settler, before building a defensive unit. Extra money is spent as efficiently as possible to speed expansion. See the extensive discussion of "Rush Building" under Efficiency and Micromanagement, below.

Before building the second city, I may take the time to build a road or two for the increased trade (research), or I may get the road for free (see "Free" Roads!, below). Again this is more likely at 2x2x; at 1x1x it will less often be worth the delay.

With unlikely early contact (e.g., large map or 1x movement), I may skip Bronze Working and build more Warriors or Horsemen early. If you find enough goody huts, you'll get "advanced tribes" or "wandering nomads" to speed your growth, more than making up for the loss of time in building explorers.

Technology is critical, and I always have my research set at maximum unless I'm in a desperate war. Once I start building factories, I'll often greatly increase taxation to rush build factories, and go back to research after this is mostly done. If I can locate an early city by a wine, spice, gold, gems, or silk resource, I do so and sacrifice some growth and production for the extra research (especially for PDS). My first big research goal (at deity) is Monarchy. If I am first to Monarchy and also have the Pyramids, no AI civ is likely to beat me in population. Even if I'm behind early on, I'll soon overtake them. This is one way I've sometimes gotten ahead as a late comer to a multiplayer game on the net, but the PDS Strategy (see below) is way more powerful at 2x2x king level. The technology path I follow for PDS is very different, so I'll say no more about it here.

II. 4. More Cities

For managing the growth of cities I typically rely on very few military units, one or two per city (maybe three in the capital) and build Temples to keep order. This works well with the Chapel, which allows transition to Republic at deity level, or reduction to 0% luxuries at king level. As much as possible I like to devote one or two cities with high shield production to building military units for all the other cities as this allows me to have veterans while economizing on barracks. I usually start this when I have 3 or 4

cities; I can then delay building defensive units in subsequent new cities in order to get veterans from this city. Unfortunately, at normal movement this is often too slow, and military units have to be built before Settlers in each new city to maintain control. After factories are built (much later!) I'll build more barracks and gear up for conquest.

When I have four or five cities working, I like to start connecting them with roads. I frequently build roads in conjunction with building new cities, in order to keep the trade flowing. With luck (notably whales, wine, gold, etc.), I can keep the technology advances rolling in every 4 turns or better through the whole game. I never do any irrigation early, it's way too slow, preferring to use settlers for roads and new cities. It's generally not that important to population growth until much later (Railroads), especially if I have the Pyramids. I occasionally build a city on gold or wine at 2x production--but not the capital or earliest cities, when quick growth is very important. I lost in a multiplayer game because I built my capital on wine; the research was great, but the slow growth was fatal.

When I have about five to eight cities, I definitely want them connected by roads. This is important for defense (the fewer units you have, the better mobility they need) and for getting caravans to the capital for building wonders, as well as speeding expansion of new settlers to the frontier and keeping trade (research) high. However, I generally defer the bridge building tech until it's needed for railroads. Aside from roads, I might irrigate the occasional buffalo, or mine where there's coal, iron, gold, or wine. An oasis I'll either mine (with road) or build on for extra wheat.

By the time I have 5-8 cities I expect to be first in all the important demographics. Against human opponents this doesn't always happen, of course. I'm almost always militarily weaker than the leading opponent civ, but fewer units are needed for defense than for conquest. Against human players I'm definitely more cautious about this. I don't build city walls against AI, considering them a ridiculous waste; I build more cities. Against human players, city walls are more important, especially later on, when big invasions are possible. This is because the humans can coordinate and plan attacks much more effectively than even deity AI. When spies become available to your enemies, you might as well sell off your city walls as to have them easily destroyed.

II. 5. How Much Is a Barracks Worth?

Consider the pre-Gunpowder Barracks. If a veteran unit is worth 1.5 recruit (non-veteran) units of the same type, then a Barracks is worth one 40-shield unit or two 20-shield units. This seems obvious (a Barracks costs 40 shields!) but in fact it's interesting that it works out that way. For example, if you're building Elephants, two veteran Elephants are as strong (as a sum of A/D factors) as three recruit Elephants, and it takes as many shields to build the Barracks and two Elephants as it takes to build three Elephants. So a Barracks is worth one Elephant or two Phalanxes, militarily speaking.

Once you've built the Barracks and pumped 80 shields through it, the rest is gravy; you're making a profit. If you sell the Barracks or lose the city before you used it to build 80 shields worth of units, you've suffered a loss. Looked at a certain way, a Barracks in essence increases the shield yield (say that five times fast) of a city by 50%, provided those shields are used to build military units.

This analysis neglects the cost of the gold to support the Barracks, but that cost is mostly negligible. To see the negligibility, we need to consider the equivalence (or lack of same) of gold and shields. Citizen assignments in the city window provide a tradeoff of about 1 trade arrow to 1 shield. For example, an ocean square (at normal production under Despotism) provides 2 trade arrows and 2 food; a forest square provides 1 food and 2 shields; a grassland square with road and shield dimple provide 2 food, 1 shield, and 1 trade. A well-employed citizen thus produces about four units of stuff per turn. Shields are perhaps a bit harder to come by than trade, which is readily available from ocean squares, but I like the 1-to-1 factor better than, say, 1.5 trade to 1 shield.

If this is accepted, then the pre-Gunpowder Barracks can be said to cost 1 shield per turn. This is negligible compared to the 50% increase in a city's shields (metaphorically speaking) that a Barracks provides. Considering the example of the Elephants, if the city is producing 10 shields per turn, it will take 12 turns to build 3 Elephants or a Barracks and 2 Elephants. The latter choice additionally costs 8 gold. If the city is producing 5 shields, the cost in gold naturally doubles. 16 gold isn't much compared to the quantity of shields involved (120).

So when should you build a Barracks? Naturally, when you have the leisure to do so, and when you can use that city to build at least 80 shields worth of military units. I generally prefer to rush build the Barracks when I can, because rushing city improvements is an effective use of "excess" gold. In fact, since a Barracks can later be sold, the start-up cost is actually somewhat less than calculated above.

Where should you build a Barracks? Because the effect of a Barracks is to "increase shield production," the cities with strong shield production should get preference. This is what most people do anyway, but it's nice to know why.

How many Barracks should you build? In general, I prefer to build all military units out of Barracks, but usually end up building a non-vet Phalanx for city defense in about half of my new cities.

Leonardo's Workshop upgrades units, but these units lose veteran status. In other words, when you build Leonardo's you might as well sell your Barracks unless you're already at war, or you're building units not likely to be upgraded soon, or ever, such as Riflemen, Cavalry, or Marines.

II.6. Building Wonders

I offer extensive general comments elsewhere in this document about the relative values of the wonders. Here I am concerned about how they work in my various strategies. Versus the computer, when I have three cities and/or settlers going, I'll start the capital building the Pyramids or another wonder. This assumes that I'm getting good production from the capital; otherwise, I'll build in another city. I'll probably want a Temple in the capital to maintain order, because the capital will grow during the time it takes to build the Pyramids, so I may have to build that first. I'll rush build the Temple, if possible. Alternatively, I'll build extra military units in another city and send them to the capital. If I haven't gotten Masonry by this time, I'll start building the Colossus while researching Masonry, then switch to Pyramids. I consider it a devastating failure if another civ beats me to this wonder. When that does happen I switch to the Great Library (if I'm isolated) or Sun Tzu (if I'm not).

Regarding wonders in general, against the computer in deity level I never build the Lighthouse, Hanging Gardens, Great Wall, or Oracle, and the Colossus and Richard's Crusade only seldom. In any case I want Michelangelo's Chapel (which allows a painless transition to Republic), Leonardo's Workshop, Newton's College, Darwin's Voyage, Bach's Cathedral, Hoover Dam, Women's Suffrage, and Apollo, and Magellan's (I usually don't get this).

Against human players, above all I want Michelangelo's Chapel, because I'll be playing the PDS strategy (described below) and the Chapel works great with that strategy. Because the Chapel costs as much as three Pyramids, it is less urgent to start building right away (i.e., at 3 cities), and I'll defer starting it until I have 5 or 6 cities, probably. Also, I most likely won't have the tech (Monotheism) when I want to start working on it, so I'll start the Colossus as I work for the tech. I have often built the Colossus first, waiting to get Trade to help with building the Chapel, but lately I've realized that the Colossus is no bargain. Against humans the Great Wall is very good if war happens early, but I'd prefer Sun Tzu's Academy (and more military units) given the choice, though I usually don't get it because it's someone else's top priority. If I need the Great Wall, I'll switch the Chapel build over, and worry about that later.

The Great Library can be important if you are playing against 3 or more other humans, though it's better to trade tech (via Marco Polo if necessary) if you can. Against AI only, it is still important and very worthwhile, though less so than the Pyramids, I think. One difference is that the GL won't help the AI much if you win the game easily, because you will have many tech advances that will never get to a second civ (and thus be nabbed by the GL). If you have serious struggles against AI, the GL becomes more important.

Leonardo's and Sun Tzu don't work well together, because upgrading via Leonardo's loses veteran status. I consider that a small price to pay when Warriors and Phalanxes become (eventually) rookie Riflemen; as well, it's better to get less than optimum use out of these two wonders than allow other civs to get either one. Also, the value of Barracks is reduced when you have Leonardo's. Either sell your

Barracks or build units not likely to be upgraded soon, if ever, such as Riflemen, Cavalry, and Marines.

My second goal (after the Pyramids) is to get the Great Library. When playing against the computer, I generally select 7 civs, and the value of the GL increases with more opponents. I may skip the GL if opponent civs are willing to trade tech. Libraries are worth doing, but I consider them a luxury. While trying to beat other civs to the GL after building Pyramids, I always build a few caravans, so I pursue Trade as soon as possible after getting Monarchy, unless I need military tech to fight a war right away. In the quest to be first to important wonders, I'll sometimes use a settler or two to increase the size of my capital quickly, and spend extra cash to rush build a Temple and extra military units to maintain control. This might be most sensible when you have plenty of cities started and plenty of room to expand further; then the race to wonders becomes a higher priority. You could set a city to building settlers which then go to the capital and do a (b)uild. Another option is to have two or three cities each building wonders.

If I do build the GL, one effective use of it is to set taxes at maximum (research at minimum) and concentrate on growth and military units, using the GL and conquest as sources of tech; this is especially attractive if I'm in an early war. Otherwise I push research hard in the direction of Religion and Invention, aiming for Mike's Chapel, Leonard's Workshop, Gunpowder, Metallurgy, and Railroads. Along the way I switch to Republic and build the Observatory or Newton's. An ideal situation is to have both the Chapel and Bach's; this may let me keep luxuries at 0 while not needing Coliseums for quite a while. When I get the Chapel (deity level), I immediately switch to Republic; there's never any reason to wait once the Chapel is built. I seldom get Adam Smith's or Marco's Embassy; both are valuable, but I'd rather have the religious wonders. I'm usually first to Railroads, and so usually build Darwin's Voyage, but I doubt it's worth the cost when I'm getting tech every 2-4 turns anyway. Using that production to build Libraries and Universities may be more cost effective, but I usually end up with Darwin's anyway, because by the time I get railroads, other good wonders are gone, and I should get almost all the rest of the wonders if I'm careful about what others are building.

Women's Suffrage is also very important, as it allows a painless transition from Republic to Democracy. The Statue of Liberty seems most important against human players, I think, because humans are more dangerous, and one wants more options, but information provided at the Civilization Fanatics website (and in this document) make the SOL obsolete. I have used it primarily to switch to communism when I get the espionage tech, build swarms of veteran spies, then either switch back to democracy or republic to pursue further research, like armor, or stay in communism and reduce research to go on the attack. If I am leading the tech race, I want two veteran spies in each city to defend against tech theft, plus ten or more others to investigate and sabotage enemy cities. Against deity AI, this tactic is certainly unnecessary, because the AI seldom steal tech.

II.7. Dealing with AI Civs

In early encounters with AI civs I want to trade as much tech as possible, unless I have the GL; then I don't trade. (Trade 2 or more at a time if possible to reduce the effect on your own research.) This is another reason to explore early and extensively. AI civs are ordinarily willing to trade early; once they've traded with another civ, though, they're less likely to trade with you, or you may have nothing they want. If you can contact 2 or 3 AI civs very early, you can get a great start on tech. This is very helpful toward getting a high score, but the absolute essential (at least the way I play) is plenty of room and good terrain to build many good cities.

If an AI civ demands tribute early, I'll generally pay it to avoid war. Usually they don't ask more than once, as my growth overtakes them; then I start demanding payback.

I try not to give Polytheism (Elephants) or Mathematics (Catapults) to a strong neighbor, unless I have to stay out of war. Also, I won't trade the tech needed for a wonder I'm currently building or planning to build. I learned that lesson in Civ 1. After I discover Invention, I won't trade tech unless I'm behind.

In a multiplayer game I'll trade tech with anyone. In a multiplayer game it's foolish to make enemies and wise to make friends. You're not likely to overpower anyone early; an early war is a sure way to lose out to the guy on the other side of the world who is building, building, building. You may lose the tech race and almost certainly the growth race. But since I rarely play that way, I can't say for sure that early aggression can't work. And, of course, in a two-player game, war is on from the beginning.

There is an exception to the early peace rule, however. If you happen to be trapped on a peninsula by an opponent and have insufficient land for about 15 good cities, or if you simply encounter an AI civ very early (when you have only a couple of cities), a quick strike with horses might eliminate an opponent who will otherwise be a constant annoyance throughout a long game. This is very risky, but sometimes the alternative is to give up and start over anyway. 15 thriving cities is something of a practical minimum; if you have fewer than that, you'll likely be overtaken by larger civs, even on a small map. If you're out of land and don't have room to build 15 or more cities, better start building Triremes or go to war, and don't expect a top score. When I've got over a dozen cities, I tend to build more wonders and city improvements and fewer settlers. 30 cities is probably more than you need to win the game, but for high scores, the more the merrier. In some games on the net my opponents have built 30+ cities (they usually win these games, too).

It can be a big mistake to pile a lot of military units into a newly captured city; they may all go to the enemy along with the city (via bribery) unless you're under democracy. A whole lot of stuff often goes very cheaply. Also, if you're in all-out war against a human player, depending on the circumstances it may be best to destroy cities rather than capture or bribe them, lest they be bought back cheaply and give up units and important tech. It is possible to make a new (or newly captured) city more difficult to

bribe by using settlers or engineers to pump up the population immediately; but it's always discouraging when this enlarged city goes over to the enemy anyway. It may be worthwhile to move your palace closer to the front to discourage bribery; this is less important under communism. You can build courthouses, but it generally isn't enough; you need to be in democracy, which means you need Suffrage. In multiplayer games, it often happens that the players agree to limit bribery.

II.8. Trade

Trade can be a big factor in your civilization's later development. I sometimes get all my cities to have a full set of trade routes (3 each) established; the more trade I get done, the better I like it. It takes a lot of effort to do this if you have 15 cities, and I've only done it against the computer. Against human opponents, war is always on one's mind, and trade gets done more haphazardly because there's less time for that kind of attention to detail. You want to keep the game moving. One habit that helps is this. When you've looked at supply and demand and have decided to build a gold caravan to send to a foreign city, write down "Gold: Berlin" to remind yourself where that caravan needs to go. Otherwise, you forget and end up using the caravan for a wonder or just plugging it into any reasonably large city because there just isn't time to look these things up over and over again in a multiplayer game.

The bigger your cities are, the more cost effective and important it is to establish trade routes. In a recent game (2x2x) a single freight unit delivered to a foreign city (size 12) on another continent brought in over 700 in gold and 11 or 12 trade arrows. It pays to trade with AI civs (rather than humans) because they usually have good trade routes established, which increases your result. If you need gold or more happy citizens, consider building caravans/freight. I tend to focus more on trade after I have factories built, probably because freight then takes fewer turns to build.

Trading with foreign cities gives you a research bonus (same number of beakers as you get gold), but also gives them a good trade route. Trade with your own cities gives each city a trade route but generally little gold and no research. It's a trade-off! Best is to trade with allied human players.

Navies

I don't build any ships early unless I discover that I'm on an island that's too small for the minimum number of cities I want to build--at least 15 on a small map. I'd rather struggle along with a smallish island than try to expand onto adjacent continents because defense becomes much more difficult, and the new cities tend to be a drain on resources for a long time before they start paying back. Exploring for huts, however, is always worthwhile.

Later I'll build one Trireme to sail around exposing sea squares (and, hopefully, resources) that my already-built cities can then use or for use by new cities, though just exposing ordinary ocean squares is important enough. Sometimes I'll use 1 or 2 Triremes to bypass a strong defense point to attack weaker

cities on my continent. I may also use Triremes to transport Caravans to other continents, because the cash and research bonus is increased.

When Ironclads become available, I'll build these ASAP and use them both to defend my coast and to harass enemy shipping, and occasionally to bombard a Settler or Catapult.

When I have enough Marines and Spies I may make an invasion of enemy civs, or I may wait until I have Bombers and Armor. In any case, this means a D-Day invasion sooner or later.

If I get as far as Battleships, I'll build a few and sail around hammering shore units while waiting to assemble invasion forces.

I rarely get the Lighthouse or Magellan's except by conquest because I push for religious wonders and Leonardo's rather than these.

II.9. Advanced Games

After Invention is discovered, Leonardo's Workshop seems very big, though the loss of veteran status sometimes more than offsets the gains. Upgrading of diplomats and settlers (to spies and engineers, respectively), however, is delightful. I always go for Leonardo's Workshop unless some other wonder (Michelangelo's Chapel) seems even more important.

In an advanced game, railroads and espionage are important goals, though the reduced effectiveness of railroads (compared to Civ 1) is discouraging. Still, they allow fast movement of caravans and make for a quick response to perceived threats. Railroads also present a risk, allowing an enemy to invade more effectively. It pays to consider the risks. Build railroads first in those locations that are producing the most shields, such as on pheasant, bison, oil, and iron resources. City sites automatically receive railroads when you get the tech, giving you an instant production boost even if you never take the time to build any others.

Build and occupy forts at strategically critical locations to block out enemies. This may help keep roving spies in check, though at 2x movement they get 6 MP. I wrote at length about espionage in "Spy Power" (below) so I'm not going to repeat those thoughts here. Suffice it to say that against human opponents spies are more important than armor, and you might want to consider agreeing on "house rules" to limit the use of spies so they don't end up dominating the game. One use of spies is to sabotage a wonder under construction; this happened to me in a recent game, and it was a telling blow. This is one reason to not trade maps with powerful opponents, as it gives away the location of all your cities. Of course, you get the same from your opponent; the player who prefers to defend and build rather than attack has the most to lose in this exchange.

When the end of the game is in sight, set your luxuries at maximum, both to increase population growth and to get more happy citizens (they count more towards your final score). Sell off unnecessary improvements (barracks, library, factories, etc.) so you can reduce taxes to keep luxuries high. Future tech is trivial by comparison in the final score.

II.10. No More 3-Turn Revolutions

A discovery has been made by Oedo concerning the turn on which government changes happen. It's not random. See this page for the list of years for Deity and King level.

III. Early PDS Strategy for King-Level Multiplayer Games

The above strategy is inefficient at King level, where early PDS is winning play, and perhaps the one unbeatable strategy (assuming otherwise good play and good luck, such as getting control of plenty of land, building lots of cities early, avoiding early war, etc., etc.). Against the computer at deity level, however, early PDS is much less important because the quick growth leads to very many unhappy citizens, and unmanageable cities. Since playing PDS multiplayer extensively, I have gotten away from playing against the computer at deity level, so I'm a little vague on how it might be made to work there. The one game I tried lately came as a great shock. I couldn't keep the citizens content even with Temples and very high luxuries. The technique was a complete failure; Michelangelo's Chapel is needed to make it work, and that's so far down the line that early Monarchy is much more sensible.

"PDS" stands for "President's Day Sale," a term I first encountered in the Civ 1 book, Sid Meier's Civilization, or Rome on 640K a Day. The important concept is that while a city is celebrating "We love the Consul," that city will grow one population point each turn. The PDS technique requires Republic or Democracy, though "We love the _____" does provide increased resources under lesser government types. I doubt that this latter tradeoff is worthwhile (though I've seen some good players apparently doing it).

I make a distinction between the "PDS technique" of using Republic and high luxuries to pump up city populations, and the "Early PDS Strategy," which aims to use the PDS technique as early in the game as possible. The basic theory behind the Early PDS Strategy is to take "reasonable chances" (defensively) to accelerate growth. The slope or angle of the power graph is the critical factor. The steeper you can get your line going, the quicker you will build an insurmountable lead over the other civilizations. Every game element that detracts from growth in cities and population must withstand careful scrutiny and "earn its keep." Exploration clearly earns its keep because you need to know where to put your cities, and you need to collect goody huts and contact other civs. Researching Horseback Riding and Bronze Working so you can build stronger units is a doubtful strategy because it will flatten out the power graph or growth curve. With the Early PDS Strategy you have to be willing to leave

piddling 1 and 2 point cities undefended and at the mercy of enemies in order to build many more piddling 1 and 2 point cities that will later grow to 8 point game-winners. If you can't bear to lose (sacrifice) a few cities, you should play a different strategy. Defense comes later. Growth comes first.

Getting to Republic is the top research priority. The other top priority is getting cities and keeping them out of unrest. Push hard in these two directions, and you have the "Early PDS Strategy." Until Republic is discovered, the main difference with the deity strategy is in choice of technology to research. But the consequences of this change are far-reaching.

If you're unfamiliar with the requirements for a PDS, briefly they are these: in any city of size 3 or larger, if half or more of the citizens are happy and none are unhappy, you get a "We love the _____," where the fill-in depends on the kind of government in place (i.e., Republic fills in "Consul"). The result is that on the next turn any celebrating cities get resources as though the government were one level higher than that in place, or, if the government is Republic or Democracy, the population increases by one. If normal growth would result in a population increase that turn, the growth will be 2 that turn.

As each new city grows to size 3 and gets a Temple, 5 or 6 turns of carefully-managed PDS will inflate it to an 8. It is wise to maximize the efficiency of PDS by not having luxuries high all the time. Going into PDS mode when it can be used most efficiently will result in an astonishing rate of growth. Any civ that doesn't use the PDS technique should be hopelessly behind by 1000 BC, and will have to attack you to have a chance of winning.

I always try to build Temples during the PDS rounds, or before, because this makes it fairly easy to keep most cities in PDS growth with luxuries at 40% up to size 7 or 8. However, it would be a worthwhile experiment (if something of a long-shot) to put off building Temples and instead increase luxuries to 60% or higher. This might be the best approach if you're trying to manage PDS and a war at the same time, since you could build military units instead of Temples. It's not a strategy I've tried yet; my guess is that it might get you one more population point than the 40% luxury level before unrest took the city out of PDS.

All details such as wonders and technologies are unimportant compared to early PDS, though of course you may be playing against others who are equally adept at the PDS technique. Michelangelo's Chapel is exceptionally valuable in large Republics or Democracies, with Bach's a poor second; the Great Library and Sun Tzu's Academy are also important depending on conditions, but the Pyramids are suddenly less important (except to deny them to others) because PDS supplies all the growth one could wish. The Pyramids or granaries will become important much later in the game, once you've built factories, if you generally aren't going into PDS for growth of cities past size 8. This is what's happening in a game I'm playing now. I've built aqueducts, factories, and sewers, have cities of size 11-13. Building a granary, which takes 2 to 3 turns, seems well worth doing.

To play a PDS strategy and pursue the Pyramids while someone else beats you to Mike's Chapel would be criminal. I frequently build the Colossus in my capital, intending to go on to the research wonders as well. In the same game I'm playing now, I am getting over 300 research beakers per turn from my 11-point capital, largely as a result of wonders. If I had better trade routes, it would be even higher. But the Colossus is relatively unimportant, and it would probably be better to pursue additional cities or store up Caravans to rush the Chapel.

Having maxed-out (i.e., 8 points before aqueduct) cities cranking out swarms of settlers is worth considering, because the reductions in size will be recovered at the next PDS or by normal growth. PDS should be even more powerful at 1X1X, because everyone else's growth will be slower, while the PDS growth rate will remain virtually as high as at 2X2X during the PDS turns. These details can be worked out through experience, but the basic strategy seems clear:

- * Are you at King level or lower? If not, try another strategy.
- * Expand quickly at the start, maximizing number of cities. Gamble on growth, minimize defense. Do defend the capital, however, in two ways: with a Phalanx, and by building other cities in all directions around it. Make sure that the enemy will encounter other cities before stumbling onto your capital.
- * Direct research toward Republic, Philosophy, Trade, Construction (for aqueducts and forts), and Monotheism, in approximately that order; but especially Republic, of course. Philosophy is important mostly because it gets you a free advance if you're first (you should be first if you're following PDS strategy), but you'll also need it to get to Monotheism.
- * When you're soon to go Republic, start building Temples. Temples are necessary for keeping most cities in PDS up to size 7 or so without going to excessive luxuries. When you'll soon have Republic and you found a new city, it might be wise to start building a temple as the first build for that city (assuming you get a veteran Phalanx from a city with a barracks); by the time the temple is built, the city may be in PDS already, and so can grow to maximum immediately.
- * When you get the Republic tech, or before, check the table on page 10 to see when you should go into revolution to avoid multiple turns of anarchy.
- * When Republic is established, raise luxury level as high as is needed to get all 3+ size cities into "We love the consul" mode; adjust entertainers and use of city squares (i.e., trade arrows) as necessary to keep enough happy citizens and no unhappy. At King level, 10% taxes, 50% science, and 40% luxuries generally works very well, though cities with low trade or high corruption will have trouble. 50% luxuries shouldn't be necessary, but do that anyway if you have to; it's better to be in PDS at 50% than not in it because you can't quite get 40% to work.
- * If you have a number of 2 point cities and not that many 3 point cities, it makes sense to delay the PDS a few turns until most cities are size 3.
- * Build up your military ASAP. Once you've started the PDS technique, cities become more valuable and must be defended.
- * Build Mike's Chapel as soon as possible--all other wonders are secondary if you're playing PDS.

* Check every city every turn to keep PDS going. This will take some time. Use the Attitude Advisor (F4 key) to pinpoint likely trouble spots if you need a shortcut, or raise luxuries to 50% or 60% if you get desperate to keep up.

* When most cities reach size 7 or 8, reduce luxuries to maintenance level (20%); when Mike's Chapel is built, reduce luxuries to 0 until aqueducts are built. Concentrate on building military strength for a while. Go after Leonardo's Workshop as your next major goal.

* When new cities reach size 3, pump them up with further PDS if you can do so efficiently (i.e., several cities at a time).

* Build aqueducts, marketplaces, and sewers to continue growth, with or without further PDS. After factories and sewers are built, consider building granaries.

* If you wish, point out to other players that you now dominate the game (direct their attention to "top 5 cities" display) and anticipate early resignations. If you don't get them, start building military units, because you will be attacked. This assumes, of course, that you do dominate the game.

* PDS strategy won't compensate for lack of cities. If you have 8 cities at 7 or 8 population each, you'll be in the lead in population, probably, right after your PDS turns. But you may still lose to the guy who has 15 cities and is building more as rapidly as possible. On the other hand, if you're definitely trailing in all the important demographics, wonders, and so on, keep playing if you have enough land; you may be able to catch up just by building more and more cities. A late PDS may overtake the leader and win the game.

* Whether to build a large or a smaller civilization is not an easy question, because although a larger civilization has more potential, it is also harder to manage and defend, especially in multiplayer games with limited time. I prefer a compact, defensible layout with about 15 cities minimum. The properly-sized island is ideal.

If you get Monarchy before you get Republic, go to Monarchy while waiting for Republic, if you know about how to stay out of Anarchy. If early war is probable, Monarchy is also probably the better choice for a while.

IV. The Maximum Growth Strategy

A recent game (2001) persuades me that the PDS strategy is not the only way to compete, though it's probably the easiest. The alternative (Maximum Growth and War, or MGW) is to create the maximum number of cities as quickly as possible, sacrificing all other values to do so. The details are unclear, since I've never played this and can only infer from the results of others. The following discussion is mostly theoretical, since I've tried only one game with a strategy like MGW.

Research is minimized from turn one, and city improvements, irrigation, roads, and wonders have to wait. Money is used to rush build settlers, military units, and barracks. Government will eventually be Monarchy, allowing maximum exploitation of foreign civs. Build one barracks for each 2 cities; cities

with barracks build mostly military units, others build settlers only. Encounters with foreign civs are managed to extract the greatest possible amount of tech and money from them without provoking war before you're ready. Keep an eye on your power readout in the F3 display; if you're not mighty or supreme, you won't intimidate AI civs, and if you try, you'll get into a war you should not want. Peace treaties are not granted; extortion must be early and often. For this to work well, a good feel for what the AI will do is vital (though this will develop with experience), and playing at an easy level (e.g., King) is virtually required, both so that the AI civs will be easier pickings, and so that unrest is not an unmanageable problem. A small map may be essential. Human players are treated more kindly, as dangerous enemies, until quick conquest seems likely. This requires craft, painstaking preparation, and bold ruthlessness.

When you feel confident you can quickly conquer a neighboring AI civ, make demands and more demands until they declare war on you. Make sure you do this before moving your units. But don't wait too long; if they build city walls, you've got trouble. And I think it likely that they will start building city walls the first time you demand tribute.

PDS possibly will lose to such a strategy. In one game, my opponent apparently created swarms of horsemen and used exploration as a strong ally of quick multiplication of cities. He also destroyed two of my new cities before I was able to erect a defense. It is also possible that I was cheated against; it does happen.

Details: minimize research, using your 40% for Horseback Riding, Warrior Code, Feudalism, and Chivalry, using extra money to build units. Build barracks? Probably not at first. Try to get seafaring from AI civs to obtain Explorers for faster exploration and ZOC evasion. If playing multiplayer, encourage a ban on bribery against other humans, because with a far-flung empire this is more likely to hurt you than help you.

An alternative tech policy would be to go for Horseback Riding, Ceremonial Burial, and Polytheism, to get Elephants as soon as possible to attack a neighbor. I don't consider Elephants to be cost effective, yet they are undeniably the best attacking forces early in the game. Build barracks and Elephants, and stomp, stomp, stomp. In an ongoing game I did this, and destroyed an AI civ. This didn't seem terribly profitable, as all I got was two small cities for my own, plus a lot of land and a few gold and tech. I had to build several barracks and about eight elephants to do this. I needed the land, but I feel I would have done better to avoid war and simply demand tribute.

Start by building a Warrior in the capital. This will enable quick exploration for location of the second city, and will be useful for defense and crowd control later. Research Horseback Riding, then build as many Horsemen and Settlers as possible. Build a horse or two from each new city before building Settlers. Explore, explore, explore, not making special efforts to explore thoroughly, but rather, trying

to contact as many civs and grab as many goodie huts as possible. Build no Phalanxes and few Warriors (primarily for crowd control, but also to deny land to other civs) because you must be on the attack, not trying to hold little 2 point cities. When you encounter undefended AI cities, capture them immediately, and demand tribute from the owner. Use extra funds to build units (Settlers or military), not buildings. Go to Monarchy as soon as possible; build the Lighthouse if necessary; you need to find and conquer or exploit as many civs as possible. Rely on conquest, intimidation, and theft to get most of your tech. Build no other wonders or city improvements except Barracks. Don't build Temples; rather, reduce city size by building more Settlers. Build Knights or veteran Chariots in preference to Elephants because they are too expensive for what you get.

This strategy may be beaten by difficult geography or perhaps by bribery. It should be possible to overwhelm any civ you meet early. A lot of time will be needed; you can't do this at 30 seconds a turn.

This strategy is enhanced by certain game parameters: villages only; large land mass; many AI opponents; poor terrain (this reduces opponents' ability to build settlers while not affecting settlers obtained from huts); plenty of time per turn (start at 2 minutes).

Main advantages to MGW: enemy civilizations can be attacked when they're weak, forcing them to build defensive units and expand more cautiously, while your expansion continues unchecked in distant parts of the world. Something like this strategy is probably required to defeat PDS. You should be able to deny opponents land, confining them while you expand unchecked; this can be devastating. When war comes, you'll have a lot of units for the attack. You should be able to intimidate and extort money, tech, and maps from AI civs. Building the Pyramids becomes very effective. The game is more fun to play (especially if you're winning).

Main disadvantages: slow to get better government; you need time to move many units (better be the host!), and other players may not grant time increases. Your goals should be: money, tech, and cities you can keep, preferably without acquiring a too awful reputation.

Final comments: I tried to play an early version of this strategy last year and labored along in 2nd place. I was way too slow getting Monarchy, though I got Pyramids because opponent wanted Hanging Gardens instead. Land was poor, a big factor in this game. Two pointless wars against weaker opponents (one AI) slowed me down considerably. I got into these because I tried to intimidate them and failed--neglected to check my power first. I was on the point of attacking the leader with about six veteran Elephants and a few weaker units when game ended. The strategy might have worked if I had better land to start, and possibly, those elephants would have turned the tide, but overall I wasn't happy with the result. Doubtless more experience would be helpful. In particular, I didn't go for maximum growth by limiting research, probably a crucial part of the strategy. Also, I didn't research the proper techs.

PDS or Maximum Growth? This is not an easy choice, but it must be made from the start because you need to decide where to set your research and taxation percentages. Also, this discussion is based more on theory than on practice; it's possible that the MGW will usually lose out to PDS. It's tough to try to capture phalanx-defended cities with horses. I think if the terrain promises good or excellent trade, especially for the capital, go for PDS, because you can get Republic early. I'd be inclined to think of MGW with a small map, lots of AI civs, 2x movement, and plenty of time; with few AI civs or, especially, insufficient time, MGW will be too tough. When conditions are right, consider MGW; at least it's better than wandering around with that first settler, forlornly looking for whales or fish.

It occurs to me that maximum growth need not be coupled with war; perhaps it could be used as a preliminary to a later Republic and PDS. Minimizing research at the beginning in order to increase taxation, the money being used to speed expansion, might be more effective than starting with research at maximum. Certainly, ten gold are likely to be less useful than the first tech discovery . . . it's something worth looking at, because one additional city early can make a big difference.

IV.1. Going to War

Pursuing war early against AI civs might seem a good way to make a profit. One game I played recently suggests otherwise. I built many veteran Elephants early, extorted money from an AI civ, later turned down 150 gold to try for all the civ's gold and tech, but got a war instead. Thought I was ready to roll over the AI civ (this was at King level), discovered that cities are more easily destroyed than captured. Ended up capturing two small cities (1 point and 2 points) for all my effort. It was painfully obvious that I would have done better to avoid war by being satisfied with the gold the AI offered.

My conclusion: war is hell unless you have an overwhelming tech advantage (e.g., Musketeers and Cannon) and your purpose is to destroy cities. Otherwise, just demand tribute (and not too often) and take what you get. Don't violate your cease-fires.

V. Where Do I Stand?

It is important to know how well you're doing compared to the other players. This is critical in deciding how to handle AI civs (especially with an MGW strategy) and when to attack another human player, but it is important in many lesser ways.

Three function keys provide most of the clues: F3, F8, and F11. F3 brings up the Foreign Affairs Advisor. Once you have made contact with another civ, you can get an instant readouts of where you stand regarding military might and trustworthiness, such as "Sire, our power is supreme and our reputation is spotless." Supreme power means yours is the top civ in the game. Here's the full list:

* Pathetic

- * Weak
- * Inadequate
- * Moderate
- * Strong
- * Mighty
- * Supreme

I would guess that this measure is based on the same information as the powergraph displayed on retirement. If so, it's a measure of population, tech, and gold, and the factors are: 1 citizen = 2.67 techs = 256 gold (these factors taken from Power Graph Explained v2.0, by Andu Indorin, on the Civilization Fanatics web site. As a formula this would be:

$$\text{Power} = \text{Population} + (\# \text{ of Techs}/2.67) + (\text{Gold}/256)$$

where "Population" would be the total of the numbers of all your cities.

In addition, if you have established embassies, you can examine the tech and number of cities for that civ, as well as seeing which and how many wonders they are building. Of course, a player can switch wonders at any time; just because he's building the Hanging Gardens doesn't mean that that's what he'll eventually build, eh? You can also watch his gold fluctuate; a player with a lot of gold may be planning to rush build a wonder that you're also working towards, or may be planning a bribery campaign against your cities. Don't rely too heavily on the amount shown, however; a player going for a critical wonder may well sell off libraries or aqueducts or disband units to beat you to the punch, or he could have Caravans standing by.

F8 is the Top 5 Cities display. The clues here are generally harder to interpret, because even if you have no city in the top 5, you could be winning. However, with this display you can see when someone else is using a PDS strategy, when they have acquired Invention (faces change their mode of dress), and so on. How someone manages their cities also gives you a clue about their overall skill. If you see unnecessary entertainers, or defended 1 and 2 point cities very early in the game, chances are the player doesn't know how to get the most out of his citizens. Also, if you want to raid a major city, this display informs you about the presence of city walls.

F11 gives comparative numbers and rankings for population, family size, land area, research, and so on. Being first in population is always welcome; if you are first in both population and family size, your civ is both larger and growing faster than any other, at least for the moment. In the early turns, or when civs are changing governments, demographics can fluctuate wildly, but later on it's a solid clue to who is ahead. "Land area" indicates the area last occupied by your units, or, in essence, area explored; it is best to be first in this, but I often fall behind other players, especially after I get Republic, when I want

to bring units home to diminish unrest. The critical factor is to get enough land for sufficient cities; if you're playing PDS, you don't necessarily have to be first in land area.

V.1. Trading Maps with AI

Trading maps can be very informative, but it is also risky because you have to give away your own location. If you want to trade maps with an AI civ, you'll probably have to give them gifts until they are shown as "worshipful." Then offer the trade. I do this a lot when playing against human players with some AI civs in the game. I won't give away certain key technologies unless they're already being discovered by other civs or are likely to be soon. Despite being worshipful, a few leaders will still refuse to trade maps. If you're lucky, you may discover that your human opponent has traded with this civ and you get his map along with the AI map. Of course, once you've traded, the same can happen to you.

Reasons to trade maps include: you don't waste time exploring territory where the goody huts have already been taken; you obtain city locations for establishing trade routes; you know where to expand or attack.

V.2. Deity-level Example

I started a deity-level game recently against 3 AI civs on a large map. Movement and production were normal, and barbarians were raging hordes. Starting with 2 settlers, 1 tech (Horseback Riding) and average land (grassland with a lot of forest and no rivers), I came up with these demographics at 800 BC: 220,000 population in 7 cities, 11 units including 2 Settlers, the Pyramids, and Monarchy government. Many cities had Temples to keep order. I was extremely close to the best AI civ on the power graph, and our populations were about equal. I was on an island, with 55,000 sq. mi. of land. Most of the goody huts had contained not-great tech (Pottery and Warrior Code, I think). I considered this a good result, but because I was confined to a small island, future prospects were dim.

VI. Reconsidering Exploration

When exploring, my first purpose is to find good sites for new cities. Because a good city site has resource squares such as whales or fish, I want to explore coastlines thoroughly, revealing all the ocean squares I can. This is slow. Also, I generally concentrate my exploration around the capital before expanding outwards. This approach results in finding the maximum possible fish and whales and best possible sites for new cities, but it is not the fastest way to find other civs. If pursuing MGW, it would make more sense to push on in approximately straight lines (though moving diagonally as much as possible) as quickly and as far as possible, hoping to contact other civs early, because to dominate other civs must be your goal from the beginning.

I won many games in Civ1 using a land grab strategy against the AI; that is, I would fortify Warriors or Horsemen near an AI civ to restrain its growth towards my civ. I have rarely used this tactic in Civ2, perhaps because I have learned much. It is still an important tactic if the other civ is close by. Also, when you first locate a foreign civ, build new cities ever closer to it; the land in the other direction may be available later, but the land between the two civs will go to the first to occupy it.

VI.1. The Geometry of Movement

Moving diagonally into the dark can reveal up to five squares. Moving orthogonally (due north, south, east, or west) can reveal up to three squares. Therefore, when exploring, diagonal moves are to be preferred. When you must stop moving in a particular diagonal direction, a 90 turn left or right would be best because on such a turn you reveal up to four new squares. A 45 turn to the orthogonal will reveal only three squares at most.

So much is simple. However, if you have two movement points, but you can move diagonally only one square (say, onto a hill), you might do well to move orthogonally onto a grassland or plains square, revealing three, retaining one movement point to go on from the new location. This tactic can reveal up to eight new squares (one orthogonal, then one diagonal) in a single turn, rather than the five of the diagonal move. If that orthogonal move reveals only more hills, you have a 50% chance of moving onto a hill with your 1 MP. If that move is diagonal, you have a 50% chance of revealing 5 squares, for an expected outcome of 2.5 squares. This 2.5 plus the 3 for the orthogonal move gives a total of 5.5 for the expected outcome of that unit's total movement, contrasted with the sure 5 of the original diagonal move.

We can look further. If you have a choice of moving diagonally onto the hill, orthogonally onto plains or grassland, or making a 90 turn to the other diagonal, you should make the turn if that move will take you onto plains or grassland (or other terrain that costs 1 MP to enter). By that move you reveal 4 squares. If you then encounter hills (or forest, swamp, or other terrain that costs 2 MP to enter) all around, you still have an expectation of another 2.5 squares (50% chance of a diagonal move), for a total of 6.5. This is another improvement, and offers the best chance with 2 MP available and 2 MP terrain diagonally ahead.

What about mountains? When you have a Horseman and try to move onto mountains with 2 MP available, you have a 2/3 chance of success, and a 1/3 chance of no movement. (Curiously enough, a Warrior or Settler can move diagonally onto the mountain every time.) Your expected outcome then is 5 times 2/3, a total of 3.33. Clearly, a turn aside onto grassland, either orthogonally or, preferably, onto the other diagonal, is the better choice.

The bottom line then, when you want to reveal as much unknown map as possible, is to move

diagonally when it costs 1 MP, or turn aside when it costs less than to go diagonally. This does not take into account, of course, other factors such as the geometry of the squares already revealed, the presence of bodies of water and rivers, or the desire to complete a search pattern or to reveal every square of a shoreline. Also worth considering is the potential presence of enemies, which would probably encourage you to take to the hills (or any other terrain that offers a defensive bonus). With a unit that has 1 MP per turn, simply move diagonally regardless of terrain. Note, too, it makes good sense to use 1 MP units to explore mountains.

VI.2. Pre-Republic Exploration: Horsemen or Warriors?

In the very early stages of multiplayer games I have always gone for Horseback Riding, usually as my first research goal. But giving it much thought, it now seems clear that building Warriors instead of Horsemen should be very cost effective for exploration, which is my main purpose in going for Horsemen. In a comparison of building two Warriors or one Horseman, note the following:

IV.2.1. General Points

* Horsemen require discovery of a specialized tech at a time when Republic beckons. This by itself is enough to convince me that I would do well to go for Warriors, unless other reasons are compelling. Also, if you build a Settler in your capital while waiting for Horseback Riding tech, in a slow research situation you may end up with a Settler built and no exploring done, which can be miserably inefficient. Even if you want to build Horsemen, start with a Warrior first in this situation so you can tell where to put that crucial second city.

* Nominal cost to build is the same, but building Warriors may result in greater waste. Micromanagement can help.

* Two Warriors can always explore more quickly than one Horseman. The more rough terrain (requiring 2 MP to enter) encountered, the more advantageous it is to have Warriors. For example, at 2x movement, when moving through mountains (3 MP required) two Warriors will always move 2 squares, while one Horseman will move an average of 1.33 squares (that is, usually 1 square per turn, and sometimes 2). With normal (1x) movement, the advantage is even greater, 2 for the Warriors to .667 for the Horseman.

* Two Warriors double the chance you will meet an opposing civ during their movement; I consider this a plus, because I'm rarely interested in getting in a first attack.

* A Warrior costs less to give up; a Warrior is less to lose than a Horseman. A Warrior's defense is the same as a Horseman's. If you lose to an attack, you still have the other Warrior. Even if you survive

and have to go sleep for a while to recover, or if you want to fortify the unit on an enemy frontier, the other Warrior continues exploring. When switching to Republic, you will be able to disband a distant Warrior with a light heart compared to the doubly expensive Horseman. These are a real savings---you have the minimum number of eggs in each basket. On the other hand, returning the Horseman to the closest city will go almost twice as quickly, depending on terrain.

* Come to think of it, the Warriors even have the advantage militarily: 2 attacking and 2 defending points, vs. 2 and 1 for a horse. When it comes to attacking a city, however, I would prefer a single horse to 2 Warriors. But put 2 Warriors and a single Horseman close together on a field, at the end, one wounded Warrior standing is the most likely result. But this is beside the point; the thrust of the section is, after all, "Exploration."

IV.2.2. There are some drawbacks to using Warriors:

* When entering a goody hut, Warriors are more vulnerable to barbarians, being unable to attack first.

* Having two Warriors increases the chance that shield support will be required; this is usually avoidable, depending on how many Warriors you want and whether you're at 2x production (faster city growth).

* If you are offensively minded, Warriors are ineffective attackers compared to Horsemen. Also, and especially at 1x movement, the owner of an undefended city will get a chance to rush build a defender more often with approaching Warriors.

* Using Warriors or Horsemen as defenders of cities is generally ineffective because either is likely to lose to an enemy Horseman. Warriors perform as well as Horsemen in static defense, but are less effective in active defense. Overall, if you're going to war, you're obviously better off with Horsemen; and, of course, you can never tell when you'll end up in a war.

* In multiplayer, you'll need slightly more time to move two Warriors compared to one Horseman because of shifting of map display. With a very short time limit, Horsemen might be more effective.

IV.2.3. Thoughts on effectively using Warriors:

* If each new city builds a Warrior, then a Settler, support will seldom be required, especially at 2x production (multiplayer). This allows settler unit to be started quicker than if one must build a Horseman first. This also allows one to follow one set pattern of builds: Warrior (to explore), then Settlers (to expand).

* If you'll soon be building Leonardo's Workshop, don't be in a hurry to disband useless Warriors; they'll become Musketeers, and later Riflemen. But, if it's early, consider whether support costs will eat up this profit. Also, consider the benefits of disbanding (getting half the shields back).

IV.2.4. Conclusion:

Whether to start with Horsemen or Warriors for early exploration is almost a toss-up. If you get Horseback Riding for free (from a goody hut--trading is not free), Horsemen are certainly a reasonable choice and can hardly be criticized as a bad choice. If you're at higher difficulty/higher barbarian activity levels or are playing to "out-Mongol the Mongols," or anticipate early war because you know your opponents, Horsemen are definitely the better choice, making pursuit of that tech reasonable. If you do get into an early war, you'll be very glad to have Horsemen instead of Warriors. But, if you are more interested in building than in conquest, and especially if you are in very tough terrain, Warriors are definitely more cost effective and can provide a reasonable defensive perimeter against Horsemen. A fortified Warrior on a hill or mountain is not lightly attacked. In future I will definitely skip the Horseback Riding tech to pursue Republic ever more quickly, because getting Republic four or five turns earlier will win me more (multiplayer) games.

VI.3. Exploration Under Republic: Diplomats or Explorers?

Since I never go for Pottery until I need Navigation, and I generally go for Navigation primarily to get Physics and the Steam Engine, and because I don't do much exploration after I get about 15 cities built, I've rarely built more than one or two Explorers. Even if I got Seafaring very early, I'd still be likely to go for Horses or Warriors to explore. However, under a Republic, Explorers don't cause unhappy citizens, a big plus; but then, neither do Diplomats. I'd be more inclined to build Diplomats to do the exploring for my Republic, because they can establish embassies, steal tech, and bribe barbarians, turning them into support-free explorers and pillagers. Explorers at 2x movement, however, can move 6 through any terrain, and so can run away from trouble (barbarians). I suspect, too, that an Explorer could capture a barbarian leader for ransom, which a Diplomat could not do. At 2x movement I would consider building a few explorers, but in the past I've seldom done much late exploring except with warships. Once I've built a minimum of 15 cities I am generally content to occupy whatever land is readily available without crossing the ocean, preferring to concentrate on tech, city growth, and defense.

VI.4. Goody Huts

It probably doesn't need mentioning, but I will anyway. When taking a "goody hut," try to do it so you will have at least 1 movement point left. The point is that if you "release hordes of barbarians," you'll have time to get in the first attack. If you are exploring with a Warrior, even a fraction of a movement

point will allow you to fortify.

If you're playing against the computer, you can always save the game before taking the hut. That way you can reload the game and try for a better result the second time. This is, I suppose, cheating; but it is mentioned in the manual.

The worst thing in the world to get from a goody hut is free tech that you don't have use for, such as Pottery. This makes your own research go more slowly. Your first tech requires ten beakers. If you get Pottery from a goody hut, your first tech will require twenty beakers. I believe this will be true whether you get the goody hut before building your first city.

That's another question that one must consider in the early game. Do I build my capital or take the goody hut first? In general, I always take the goody hut at 2x movement; at normal movement, it depends on how many turns it would take. Getting a support-free unit for exploration is great.

What do you get from goody huts? At King level, playing 4 civs, with barbarian activity set to "huts only," taking 20 huts (from the start of the game) resulted in the following:

- * 7 military units (3 Archers, 3 Horse, 1 Chariot)
- * 5 tech advances (Warrior Code, Warrior Code, Pottery, Alphabet, Masonry); I was playing 4 civs, hence the duplication
- * 4 advanced tribes or wandering nomads
- * 2 gold caches (150 total)
- * 2 empty huts
- * 0 barbarians

Playing one civ at King level with barbarian activity set to "raging hordes," taking 20 huts produced the following:

- * 4 military units (3 Chariots, 1 Archers)
- * 4 tech advances (Masonry, Pottery, Mapmaking, Seafaring); no duplication because I was playing 1 civ
- * 4 advanced tribes or wandering nomads
- * 5 gold caches (275 total)
- * 0 empty huts
- * 3 barbarian Horsemen.

VII. Efficiency and Micromanagement

There are many opportunities to save: save time, save money, save wheat. By micromanaging production you can garner extra wheat or trade. By judicious rush building you can expand your civ more quickly. By paying attention to the geometry of exploration and taking advantage of 2x movement you can save time and improve your game. Good players are efficient.

VII.1. The Economics of Rush Building

The goal of spending money to rush build units or improvements should be to save the maximum number of turns for your money. The following points may help. Note that city improvements are the cheapest thing you can rush build, so this discussion focuses on how to rush units (military or civilian) as economically as possible.

* Where to build? When you get some gold to spend, look for large cities with low production (few shields). Under Despotism, a city can support, without cost, as many units as the city has population, so if some cities must pay to support units, see whether new units can be rushed in underproducing cities. A city supporting fewer units than its population is a good place to rush build units. This assumes that all other factors are equal, naturally. You don't want to rush build a catapult far behind the lines where it will take twenty turns to get to where it's needed.

* What to build? City improvements are the cheapest thing to rush build, wonders the most expensive, military and civilian units somewhere in between. Of course, there's a 2 times penalty if the box starts empty. Here's a comparison:

Rush Build	Cost per Shield	Formula for Cost
City Improvements	2 gold	2 x Shields
Units (including military and civilian, such as Settlers) built "stepwise"	2.5 gold (building in steps of 10)	Sliding scale (see next table) 10 Shields cost 25 gold
Wonders	4 gold	4 x Shields

Shields to Rush Build Unit (size of "step")	Cost per Shield	Formula for Cost
1 to 4	2 gold	2 x Shields
5	2.2 gold	11 gold

6 to 14	2.17 to 2.64 gold	(3 x Shields) - 5 gold
15	2.73 gold	41 gold
16 to 24	2.75 to 3.16 gold	(4 x Shields) - 20 gold
25	3.24 gold	81 gold
26 to 34	3.27 to 3.68 gold	(5 x Shields) - 45 gold

The second table reveals that it is cheapest (per shield) to buy units 1 to 4 shields at a time, but of course that doesn't give you much of a "rush." Next best is to buy in steps of ten; each step then costs 25 gold. If you have to buy a step of 20, that costs 60 gold, or 10 more than if you could have done it in two steps. A step of 30 costs 105 gold, or 30 more than building in steps of 10. Larger steps are naturally even more expensive. Note that the rate per shield goes up at 5, 15, 25, etc.

* When to build? The ideal situation is to spend 2 to 8 gold to save 1 turn of a build. Suppose a city is adding five shields to the production box each turn, the box contains 28 shields, and you're building a Settler. It will take 3 turns to produce the settler. But if you switch to a Diplomat or Archer, you can pay 4 gold to add two shields to the box. Then switch back to Settler, and you'll get that Settler one turn sooner. This is the ideal way to rush build. What if you wait a turn? The box will then contain 33 shields and require two more turns to produce the Settler. If you rush build now, it will cost 16 gold. You squandered 12 gold to get the Settler in the same number of turns, and you wasted the city's last turn of production by filling the production box. Rush carefully.

* How to build? Stepwise, naturally. To rush build a Settler, first rush build a Warrior, then a Phalanx or Horseman, then an Archer or Diplomat. You'll save money rather than building the Settler in one step. And, of course, you need some shields in the box before starting to buy more; this avoids a 2x penalty at the first step. If you have to start with an empty box, either disband a unit or, if necessary, buy the cheapest unit you can and work upward from there.

* How to build, again? Don't think you have to rush build to completion. Look ahead. If you can spend gold to save one turn, do it. That's the way. Be looking for these opportunities constantly. Scan all your cities in the F1 production display to spot such opportunities. Filling up the production box is always inefficient, because you lose the city's last turn of shield production. If the city is producing 5 shields per turn, spending to put a total of 10 shields in the box to rush a Phalanx is fine; spending to put 20 in the box wastes the 5 the city will produce even though the box is full (1 turn of micromanagement can reduce the waste). Suppose you are rush building Factories, which require 200 shields. Suppose also that you don't need them to come on line in a single turn, but rather, you are interested in getting your whole civilization fully "Factorized." You can rush build to completion, but it is more economical to switch to a University (which costs 160 shields), rush that, then switch back to Factory. Each time you

do this you will save that city's last round of shields instead of wasting them. You can do similar things with wonders, also. If you rush build a University, then switch to the wonder, you'll have an 80-shield start (you lose 50% on the change from city improvement to wonder). This means in effect that you paid 4x gold for those shields you bought, the same as a wonder ordinarily costs. Add a couple of caravans and you have 180 shields, maybe enough to get you a 200-shield wonder on the next turn. If you start with the wonder, add the caravans, and rush build to completion, you'll have paid gold for the 20 shields the city will produce anyway. This is sort of thing comes up often, and the more your thinking is correct, the more you'll save.

VII.2. Production Micromanagement

By paying close attention to each city's resources you can get more out of each city. This is because growth and production occur by filling rigid boxes with batches of units of wheat or shields. As each box is filled, there is a chance that some units in a batch will be wasted. You can minimize that waste, switching excess citizen productivity to something else. For example, suppose you have a 3 point city producing 8 shields per turn (2x production), you are building a Settler, and the production box contains 35 shields. On the next turn 5 shields will go into the box and 3 will be wasted. Before that next turn occurs, you can switch a citizen from working in forest to working in ocean, thus getting more trade arrows and reducing the shield waste. When the Settler is produced, the citizen working the ocean square may disappear or be reassigned by the computer, or you can reassign him yourself.

Alternatively, if your city is producing 8 shields per turn and you can increase that to 10 by sacrificing some wheat income, you can build a new Settler (from scratch) in 4 turns instead of 5. You have that choice. By micromanaging the tradeoff among wheat, shields, and trade, you can get the most out of your cities. Naturally, this attention to detail takes time and can be tedious, but the more of it you can do, the faster your civilization will grow.

Reviewing your cities periodically is important, because the citizen assignments made by the computer are sometimes grossly inefficient. It often happens that the computer will assign a citizen to a hill, producing 2 food (at 2x production), where that same citizen could get 2 food and 2 trade by working an ordinary ocean square. In cities where every square is being worked, extra citizens are set to entertainers by the computer, where they could be tax collectors or scientists.

If you have to fill the production box by a rush build, consider rearranging the city resource squares to maximize food or trade and reduce shields for one turn. You can do this sort of thing with the food box also, because any wheat beyond that needed to fill up the box (the turn before city growth) will be wasted. The more of this kind of micromanagement you can do, the more games you should win. It's especially important in the very early stages of the game, where every savings (and every inefficiency) will be compounded in later years, and easier to do because you have fewer cities to watch. Naturally,

after such rearrangement you need to go back to that city on your next turn and fix what you did, putting the city resource squares back to what you consider optimum.

VII.3. "Free" Roads!

The following considerations apply to double movement only, and only on terrain that costs 1 MP to enter, such as grassland and plains.

It often happens that you want to build a city on a site two squares away from the Settler. You can move onto the square this turn and build the following turn. Or you can move onto the square in between, and build a road. On the following turn you move onto the city site and build the city. By taking the latter course, you have gained a free road.

Then a second Settler comes along. With 1 MP he moves next to the road just built. You intend to move him past the new city into the unexplored territory beyond. With your remaining 1 MP you can move him onto the road, or you can build a road where he stands. If you choose the latter course, on your following turn it costs 1/3 MP to move the Settler to the square where the previous Settler built the "free" road. Thus it cost you 1/3 MP to build the road you just built.

You move that Settler into the city for another 1/3 MP, and then out of the city on the other side (1 MP), leaving you 1/3 MP to either move or build a road. If you try to move, you have a 1/3 chance of moving and a 2/3 chance of getting nothing. If you build a road, you get it for 1/3 MP.

You have two Settlers that are moving together across plains, grassland, or desert. They move 2 squares per turn. But, suppose one Settler builds a road where he stands, and the other moves one square ahead and builds a road. On the following turn, the trailing Settler moves onto the road the other Settler built (1/3 MP), then goes on ahead 1 square (1 MP), and with the remaining 2/3 MP he builds a road. The other Settler then does the same thing, moving onto the road just built, going one square past, and building a road. You can continue this procedure indefinitely, moving each Settler 2 squares, and building a road for free, provided the terrain costs only 1 MP to enter.

You are moving a unit along a road through a forest. With some MP remaining the unit encounters a Settler building a road in the forest or on a hill (or etc.). What do you do with the unit moving along the road? (Wait. There is a chance that the Settler will finish the road he's building this turn, allowing the other unit to move along that road and thus save 1-2/3 MP.

It is tedious to think about all this in the beginning, but once you've learned good habits, it becomes automatic and painless.

VIII. Raids and Invasions

If you know where a city is that has wonders, or if you know where an opponent's capital is, you can try to make a raid to capture that city. It is often worth capturing a city even if you can't hold on to it permanently. Capturing a capital throws a civ into disarray and can cost a bundle in lost trade and wasted production until a new Palace is built. Capturing a city that holds Leonardo's Workshop will instantly upgrade your military units. Don't overlook the possibility of selling off captured city improvements if the city is likely to fall back to the enemy. And, if you want to see that city destroyed because of the wonders it contains, be sure to sell off city walls, if they're still standing. In addition, if the population is reduced to 1 when you capture it, you can rush-build a Settler to make the wonders disappear forever. Be aware, a 1 point city won't necessarily be destroyed upon its being occupied.

The important thing about a raid against a human-controlled civ is to make sure it succeeds the first time, because a later attempt is likely to be more difficult or impossible. Don't squander the element of surprise because you're impatient to start the attack. (On the other hand, even an ineffective raid can cause a human opponent to change his plans, spending more resources on defense and less on growth, which works to your advantage if you aren't planning further invasions.) So, have more than enough military units, Spies or Diplomats, Engineers or Settlers, and transport. Be prepared for city walls, either by having enough Diplomats to destroy them, or having sufficient firepower to overcome them. Also, it is helpful to isolate a city you are attacking by interdicting roads and shipping lanes. I failed to capture a minor, though large, city in a recent game because it was located on a narrow island and the foe was able to bring a transport full of Fanatics in through the other side. If I'd planned more carefully, I could have stationed a Cruiser at that key point. (This game is described more fully below.)

If you have stronger units than your opponent but not enough of them to take on his cities, pillaging can be effective. Don't overlook this possibility when you have bombers but not enough materiel to cross a body of water for an invasion. This is probably going to be more effective and certainly less dangerous than simply attacking his military units. Partisans, if they have a use at all, would be excellent for pillaging raids.

Bombardment by ships may be an important tactic. Don't let Battleships and Cruisers sit around doing nothing in particular, especially if the enemy doesn't have them. Scour his shoreline relentlessly, picking off vulnerable units, especially Settlers, Engineers, Caravans, Freight, Cannons, and Artillery. If no units are exposed, use ships to explore, defend your coastline, watch shipping lanes, or (does this work? not with Triremes) park them on a whales or fish resource to deny the value to the enemy.

VIII.1. Engineers in War

When faced with a strong line of forts defending another civ, use Spies to move Engineers and troops

through the enemy zone of control. Build roads (and railroads, if desired) to allow penetration of more spies and troops. To defend Engineers, bring in additional Engineers to build forts, then bring in defensive units. This tactic requires a minimum of two Engineers per square of "penetration" (for road and fortress, or three Engineers if railroad is also built). This method would be useful to bypass a strong fort, e.g., on a mountain, particularly for a capital raid, pillaging raids, or to set up nuisance defensive units to interdict troop movements. This tactic is much more effective at 2x movement, another reason to dislike 2x movement. With normal movement, the tactic will work only if the Engineers can have movement points left after moving onto the square where a road or fort is desired. In other words, it only works on 1 MP terrain.

A quick road and fortress is a good way to attack a strong city with ground units, even if you expect to take the city in one turn. The point is that even if the city is captured, a big stack of attacking units is vulnerable to counterattack until dispersed or inside the city. Building a fort allows you to stack your attacking units on the one square without losing them all to a counterattack. Again, you need sufficient movement points to do all this; it's easy at 2x movement with Engineers, because you can always move 1 square and still have 1 MP left, even moving onto a mountain. Also, this is easier when you have Transports available (for seaborne invasion) because you'll have more room available for Engineers. This may seem like an obvious tactic, but I've seen seemingly good players lose stacks of units through failure to adopt it.

VIII.2. An Example Invasion with Marines and Spies

A recent (May 2001) 2x2x King game with several AI and a "no bribery" rule played against human nev21 went like this. He had been in Monarchy most of the game, and had the Pyramids and Sun Tzu and some other wonders. I had run a PDS and had Michelangelo's Chapel and Leonardo's Workshop and others. Once I got the Espionage advance, I changed to Communism (using Statue of Liberty), set taxes to 80%, and started building spies. I was also building Marines. He went to Fundamentalism. I had about 15 cities (mostly sizes 8 to 14) to his 30+, he was leading in population and production. He invaded three times with transports full of Diplomats, and stole at least 6 or 7 tech, but failed to get Espionage or Machine Tools (Artillery), though he got Steel (Cruisers) and Amphibious Warfare (Marines, Port Facility). His later attempts were foiled by spies and the railroad routes were blocked by new forts. I attacked two of his cities that were located on small islands, attacking with spies and bombardment and (hasty) just 2 Marine units. These attacks failed to capture the cities, but prompted him to reinforce the cities with troops from the mainland. I felt bad about this, because I could have guarded against this possibility with my Cruisers, but a later attack on the mainland succeeded easily, in part because he had ferried troops away to those islands.

When I had control of the sea with (mostly) veteran Cruisers, and had enough units, I invaded with three Transport loads of units. Eventually about 10 veteran spies, maybe 15 veteran Marines, 3

Artillery, and two Engineers were involved. My first action was to unload an Engineer and build a fort next to a walled city of size 8 or 9. I then unloaded all troops and spies into the fort, and explored and sabotaged a bit with the spies but made no attacks that turn. I didn't attack because the city I had built next to was not my main target, and I needed the additional MP to get there. My opponent attacked with veteran Cannon and Cavalry, but the 3 or 4 attacks failed to destroy even a single Marine. I focused on his two cities that had all his wonders. On my next turn I used his roads (he had built no railroads) to send spies to destroy his city walls, then used Marines to attack his cities, which were generally defended by 3 veteran Riflemen or Fanatics. Once I captured one of his cities, my spies were returned there after successful missions, rather than across the ocean to my homeland. The Marines were very successful attacking the cities (it's comparable to Elephants against Phalanxes) and over the next few turns I captured his wonders, and he gave up. If the cities had been on rivers, adding a 50% defensive bonus, these attacks would mostly have failed.

My opponent had a far-flung empire (that was one of his problems). But I had control of the sea, or at least my own coastline, with ten Cruisers guarding the channel between us, so he was unable to mount an effective attack. Also, I had a several more wonders, including Mike's Chapel and Bach's Cathedral, Leonardo's Workshop, the Statue of Liberty, Colossus, all the research wonders except the Great Library, plus Women's Suffrage and the Marco Polo Embassy. All but Suffrage and one other were in my capital, which I turned into a "super fortress" by building forts with veteran Riflemen on 5 sides (it was on a pond so 3 squares were inaccessible). I felt this was necessary to protect Leonardo's Workshop. He had 6 wonders including the Pyramids, Lighthouse, Great Wall, the very important Sun Tzu, plus Magellan's and Adam Smith. My 11-point capital was producing 300+ research beakers a turn under Democracy before I went to Communism, so I had a substantial tech lead and factories and railroads everywhere. I also had city walls on all big cities. Pollution was keeping my Engineers pretty busy, though I was also working on transforming some sites to start new cities. I had several cities producing a veteran Marines unit each turn or in 2 turns, and the smaller ones building spies, so I was able to take about two more transport loads (after the initial 3) to press the attack. I had followed an early PDS strategy and was leading in all demographics for a while, but I stopped expanding (crowded by AI neighbors) and concentrated on building wonders, railroads, factories, trade routes, etc. I won this game because my tech advantage overpowered his growth advantage--I lost no more than 1 or 2 Marine units, and 2 Artillery to a counterattacking Partisan unit. He lost about 20 units. Control of the sea was critical for my defense and attack both, and veteran spies were absolutely vital in destroying city walls. Another factor was the Statue of Liberty, allowing "free" timely changes to Democracy and Communism. I never needed Armor or Bombers, and never got to the Hoover Dam, things I've always previously used to conquer the world versus the (deity) computer.

VIII.3. Bone in the Throat

Occupying a strong defensive point inside an enemy civ with a strong defensive unit (e.g., veteran

Phalanx) can be very disruptive and troublesome. This is particularly so for mountain squares with a road, gold, or iron. A computer opponent might waste many units in ineffective attacks, and will be unlikely to effectively go around. Such units are vulnerable to bribery, so it would be necessary to stack with another unit or agree to no bribery (in multiplayer). It can also be effective to station a warship to control or observe a waterway, like guarding the Panama Canal.

AI civs are likely to waste a lot of units attacking too-strong positions. I've seen AI use Horsemen repeatedly to attack Riflemen fortified in a city, and they attack Destroyers with Triremes.

IX. Defensive Techniques

I generally play a defensive game and try to win by outbuilding and outgrowing my opponents. Once I've built a minimum of 15 cities I am mostly content to occupy whatever land is readily available without crossing the ocean, and I concentrate on tech, wonders, city growth, and defense. Forts and ships are critical elements of my defensive plans. I usually hope to defend my coastline with Ironclads against a technology-poor opponent. Sometimes I have suffered attack from triremes and catapults before I get Ironclads. In that case I may build triremes or caravels to attempt to keep enemy ships away, or I may just lose.

I position forts along my railroads to prevent groups of diplomats from roaming free, stealing tech at will. A few strategically-placed forts can add much to the defense of the realm. Before railroads, I may build one or two particularly critical forts, but that's about it. Later I'll give more serious thought to the problems, usually after my opponent has stolen half a dozen tech by a well-planned raid. In almost all my extended multiplayer games I've had a strong lead in tech because I've pursued a PDS strategy. Once I get Espionage I build about two spies per city for defense against tech theft. Because a Diplomat is left exposed when tech theft is foiled, it doesn't take too many of these losses for the opponent to stop trying.

Defense is a lot harder later in the game, when spies, transports, and stronger units become available. A port city is very vulnerable; critical wonders and the capital should be landlocked. Consider building a super fortress around any city containing Leonardo's Workshop; you don't want to lose this wonder to surprise raid, because the enemy's units will all be upgraded before you recapture it. A super fortress is simply a city surrounded on all sides (including diagonally) by occupied forts. Forts are good because, unlike city walls, they can't be destroyed by spies or diplomats; they're not so good because an empty fort can be used by anyone. Once Leonardo's expires (when Armor comes on the scene), the forts can be removed if desired; at least, you certainly don't want them left unoccupied, lest the enemy use them against you.

Once factories come on line, against a human player I usually try to build city walls for all cities. Even

though these are vulnerable to destruction by spies, at least I force the enemy to have those spies if he wants to invade. Walls can also be sold in time of urgent need for gold, such as to beat an opponent to a critical wonder like the Hoover Dam. I don't build city walls against AI, considering them a ridiculous waste, but then I'm usually so far ahead of AI civs by the time I get factories that defense isn't much of a factor in my decisions.

Don't rely on zones of control to keep enemies out (except early in the game when a single Warrior or Phalanx may be a vital defense) because Diplomats will provide a gate through which vast hordes of enemies can pour. I wouldn't bother with "heroic" defensive measures such as a super fortress for just the capital, though a city with multiple wonders might be worth such a defense. If the critical city is a port, I'd consider stationing a strong ship in any square that might serve as a site for an amphibious assault when Marines become available to the enemy. This might foil a surprise attack, but it's hardly invulnerable. Again, I find such measures to be unnecessary against AI.

X. Technology Topics

X.1. Trading and Gifting Tech

Your research is affected by technology you acquire through means other than research, such as from goody huts. When you trade technology, your research effectiveness is reduced; that is, it will take more research to get you new technology after you trade than before. It is generally believed that if you trade multiple technologies rather than single technologies, your research rate will take less of a hit than if you trade those same technologies one at a time (i.e., over subsequent turns). I have not checked this out.

The Apolyton web site's "Great Library" provides detailed information on how giving tech to another civ reduces your own research costs. It seems that your research cost is directly affected by how big a lead in tech you have over the other civs in the game, and giving tech to a particular civ reduces your costs more than if you gave to another civ. The Apolyton Great Library is presently at <http://apolyton.net/forums/Forum3/HTML/001819.html>. This web site provides much additional and often surprising information about the game of Civ 2. It is an impressive piece of work.

X.2. Bronze Working

Because a quick start and quick builds of settlers are critical in the early stages, it occurs to me that Bronze should wait. In the spirit of taking reasonable chances, it might be profitable to delay making Phalanxes (even if you have Bronze Working) and just make Warriors for exploration and to keep cities pacified. Later, you build veteran Phalanxes (mostly) for defense, either disbanding the Warriors because they aren't worth supporting (under a Republic) or keeping them just for crowd control

(Monarchy). This plan saves time in two ways:

- * No need to research Bronze Working until you're ready to build Phalanxes or because you want to research Trade. This gets you to Republic quicker for the Early PDS strategy.

- * Warriors are quicker to build, allowing you to build Settlers that much faster under any strategy.

The one disadvantage is fairly obvious: if you are attacked, you are weak, and you may lose a couple of cities before your defense can be strengthened. This is unlikely against an AI civ, though you may have to buy off an aggressive AI ruler with a "gift" of money or tech. Humans, naturally, are less predictable and more dangerous. Systematic exploration and plugging of entry points can reduce this risk.

X.3. Invention or Religion?

Once Literacy has been obtained, there is a choice to push for either religion technologies (leading to Michelangelo's Chapel and Bach's Cathedral) or invention (leading to gunpowder, steam engines, etc.). The two tracks are completely independent except that mysticism is needed for philosophy and religion, as well as for astronomy/navigation/physics/steam engine. My practice in the past has been to push for religion, because the religious wonders allow easy maintenance of a Republic and the increased research this brings. But it might be possible and advisable to hold off on those wonders until factories are built. In any case, when selecting tech to research it is important to have your next big goal in mind.

X.4. Spy Power

Espionage may be the single most important advance in a long multiplayer game except nuclear weapons. A veteran spy is worth two battalions of Marines and costs 1/4 as many shields. Spies are too powerful, in my opinion. Here are some thoughts about spies:

- * Spies produced under Communist government are veterans, more effective both on attack and defense against theft of technology. When playing against human players, I routinely convert my government to Communism to build swarms of veteran spies. In a recent game at one point I had 17 veteran spies and was building more. Changing over to Communism (from Republic or Democracy) when you're going on the offensive makes sense anyway, because unrest isn't a problem. The major drawback is loss of research. Naturally, it helps to have the Statue of Liberty to ease the transition; nothing is more discouraging than to be eager for the attack (after playing a long building and defensive game due to Republic or Democracy government) then have to wait four or five turns to get the right government to build these vital units.

- * Spies are devastating on the attack because they can reveal the precise number of defenders

(allowing you to choose your targets efficiently) and they can destroy city walls. When going for city wall sabotage, unless the situation is critical, allow the spy to choose her own target; you lose far fewer spies that way. Without spies, I would want Bombers to tackle a walled city defended by Riflemen. After spies have destroyed the city walls, veteran Marines become effective attackers, winning almost every battle against veteran Riflemen or Fanatics fortified in cities.

* Spies can destroy Cathedrals, Temples, and Coliseums to try to cause collapse of Democracy (cities and units under Democracy can't be subverted or bribed). To save money, destroy Courthouse before subverting city. Maybe destroy Cathedral to possibly cause unrest, subvert city on following turn. The other player may be able to create entertainers to keep the city from going into unrest; to give him the minimum possible time to react, make this attack the last thing you do on your turn.

* Destroy city improvements in cost-effective trades; e.g., spy costs 30 to build, Library costs 80, and a veteran spy will usually survive the attack.

* There are very limited means to protect your cities against spies. Your own spies in a city can prevent theft of technology by others, but does not retard other spy activities. Completely blocking access is seldom feasible. Courthouse and communist government make a city more costly to subvert; democracy prevents subversion and unit bribes.

* In a multiplayer game, propose limiting or eliminating bribery.

About 6 months ago I was involved in a two player internet game (2x 2x with two AI civs). I thought I could crush my opponent's resistance in one or a few turns, even though he had 30 cities and about 11 million population to my 16 cities and 10 million. We had a narrow front (land), and I had a slight lead in tech and had built many railroads. The big difference, I thought, was that I had the espionage advance, and he did not. I had about 50 spy units and built more, since I wanted to keep about 30 for defense. I had a communist government to get veteran spies.

Plan 1 was to locate his capital and destroy it by repeatedly poisoning his water supply. This would also destroy his 5 wonders. As I later learned, it is not possible to reduce a city below 1 by poisoning; as well, repeated poisonings become more difficult. If I could not locate his capital right away, or after doing so, I could go to plan 2: just destroy as many of his city improvements as I could. If his democracy lapsed into anarchy as a result, I could be able to bribe away many of his cities rather cheaply, and the game would be mine. This overlooked the possibility of his bribing cities back. I tried building courthouses, but this was ineffective because the cities were still bribed.

At 2x movement it is virtually impossible to keep spies (6 MP) out. Even if he had few roads, as I thought, I could use engineers to build roads quickly, using spies to help the engineers through the zone

of control of his cities. In this way I could build roads around any cities or troops that were in the way, all in one turn at a cost of one engineer per road built. I could also send transports loaded with spies and a few engineers around to the other side of his territory and invade on two fronts, though in fact this never happened. It was my hope to make a decisive blow in one turn, rather than going more slowly and so reducing loss of engineers. By going slower, it would have been possible to build a fort wherever an engineer built a road, and then bring in riflemen to protect the fort and (now 2) engineers. At 2x an engineer builds a road or a fort instantly, ready for immediate use. With unlimited engineers (and spies to evade ZOC) it would be possible to move around the world in one turn by building railroads.

This is not a nice way to defeat a good civ2 player. I wonder why it is possible and seemingly so easy. And I worry that there's no practical defense against such tactics. The Gold manual mentions using spies for counterespionage, but spies can only protect against theft of technology, and not against the other horrors spies can inflict. It would certainly be possible to take the fun out of the game simply by destroying factories and cathedrals.

It would be possible to block entry of spies by surrounding every city with a ring of manned forts and occupying every port square with the best available naval vessels, but who has time for such heroic measures? If you have to spend that much effort on defense, you're already dead and the game becomes unplayable. You would have to have a prior agreement among the players not to use spies. Am I wrong?

In this game I learned how easy and cheap it often is to bribe a city to defect. The presence of a diplomat or spy in the target city is no hindrance to such attacks, and indeed just provides another free unit to the bribing player. I was way behind in military units, as usual vs. this player. This is not inappropriate, perhaps, if one is defensively minded; but I was saved from being completely overrun by two events: I was able to "buy back" captured cities (and many of his units along with them) quite cheaply, and the discovery of gunpowder upgraded all my defensive units to musketeers (due to the Workshop wonder). But defense is difficult; it might be better to build less improvements and more military units. Make others defend against you---though this makes it difficult to build wonders.

I left myself vulnerable to the capture of the city that had Leonardo's Workshop, which upgraded his units to musketeers and cannon. As it happened, the result wasn't that significant in the long run, but it was momentarily very discouraging to see my three musketeer units fall to three catapults, not winning a single battle. City walls are needed to protect especially this wonder, because capturing it for a single turn was all that was needed to upgrade his units.

Finally, a diplomat was able to sneak into the heart of my territory (largely due to my railroads) and destroy my in-progress Suffrage wonder, costing me a bundle and resulting in my losing out on

Suffrage. When building a wonder, make sure to keep spies away!

As it happened, I won that game, but though the player didn't say it, I think it may have been that the destruction wrought by spies made the game unpalatable for him.

X.5. Partisans and Alpine Troops

In a stable frontier, no bribery situation, Partisans could invade a strongly-held line of fortifications because they are not restricted by Zone of Control. They could injure or tie up an enemy civ by occupying key points, staging hit and run raids, and pillaging. This could be cost effective tactics unless enemy Bombers are available to slaughter the invaders---which they might well be. If one already had Tactics and wanted Communism to make veteran spies, then Guerrilla Warfare to make Partisans--no, it just doesn't make sense, because Guerrilla Warfare leads only to the Labor Union, which leads to nothing. With 6 MP at 2x Partisans could keep up with spies on raids. But overall, this seems like a feeble and unnecessary unit, too late on the scene and too lacking in firepower. Just build Riflemen, which are cheaper and stronger.

If Partisans didn't require shield support (because they can "live off the fat of the land") or if they didn't cause unhappy citizens under Republic or Democracy (because they're volunteers), either of which seem sensible rule changes, then they would be more useful. Otherwise, I just can't see building the things when it's 10 shields cheaper to build Riflemen.

Alpine Troops, with a 5 defense, are a good alternative to Riflemen, who I mostly use for defense anyway. I generally am glad to build Mech. Infantry (6 defense) when they become available, but I have rarely used Alpine Troops. However, they can make use of otherwise wasted shields. That is, if it takes a city 2 turns to build either Riflemen or Alpine Troops, you build the latter to get free extra defense strength and movement capabilities. Or, build Partisans, I suppose.

XI. Technology for Deity/AI

Goal	Requires	Allows	Leads To
Bronze Working		Phalanx, Colossus	Currency, Trade
Horseback Riding		Horsemen	Polytheism
Masonry		Pyramids	Mathematics
Monarchy	Burial, Alphabet, Laws	Monarchy	Feudalism
Trade	Currency, (Laws)	Caravan	Medicine, Banking
Literacy	Writing, (Laws)	Great Library	Republic

Philosophy	Mysticism, (Literacy)	Free advance	Monotheism, Medicine
Feudalism	Warrior Code, (Monarchy)	Sun Tzu's War Academy	Theology, Chivalry
Monotheism	Polytheism, (Philosophy)	Michelangelo's Chapel	Theology, Fundamentalism
Theology	(Feudalism), (Monotheism)	Bach's Cathedral	
Construction	(Masonry), (Currency)	Aqueduct, Fortress	Engineering, Bridge Building
Invention	Wheel, Engineering, (Literacy)	Leonardo's Workshop	Gunpowder, Steam Engine
Gunpowder	Iron Working, (Invention)		Explosives (w/Univ,Chem), Metallurgy (w/Univ)
Astronomy	Mathematics, (Mysticism)	Copernicus's Observatory	Navigation, Gravity
Navigation	Mapmaking, Pottery, Seafaring, (Astronomy)	Magellan's Expedition, Caravel	Physics, Amphibious Warfare
Steam Engine	Physics, (Invention)	Eiffel Tower	Railroad
Railroad	Bridge Building, (Steam Engine)	Darwin's Voyage	Industrialization
Industrialization	Banking, (Railroad)	Women's Suffrage, Factory	Communism, Corporation
Democracy	(Banking), (Invention)	Statue of Liberty	Conscription, Espionage
Espionage	Communism, (Democracy)	Spies	

Astronomy and navigation may come before invention; literacy may come before trade; feudalism may come before philosophy, or be much delayed; mathematics may come much earlier than as a preliminary to astronomy; trade might well be deferred until philosophy is attained (i.e., go for mysticism ASAP after literacy)

XII. Technology for PDS

Goal	Requires	Allows	Leads To
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Alphabet			Code of Laws, Mapmaking, Mathematics, Writing
Code of Laws	Alphabet		Republic, Monarchy
Writing	Laws	Diplomat, Library	Literacy
Literacy	Writing, Laws	Great Library	Republic, Invention
Republic	Literacy, Laws	President's Day Sale	Philosophy
Ceremonial Burial		Temple	Mysticism
Mysticism	Burial	Oracle	Philosophy
Philosophy	Mysticism, Literacy	Free advance	Monotheism, Medicine
Bronze Working		Colossus, Phalanx	Currency, Iron Working
Currency	Bronze Working	Marketplace	Trade
Trade	Currency, Laws	Caravan, Marco Polo	Medicine, Banking
Horseback Riding		Horsemen	Polytheism, Wheel
Polytheism	Burial, Horseback Riding	Elephants	Monotheism
Monotheism	Polytheism, Philosophy	Michelangelo's Chapel, Crusaders, Cathedral	Theology, Fundamentalism
Masonry		Palace, City Walls, Pyramids, Great Wall	Construction, Mathematics
Construction	Currency, Masonry	Aqueduct, Colosseum, Fortress	Engineering, Bridge Building
Wheel	Horseback Riding	Chariot	Engineering
Engineering	Wheel, Construction	King Richard's Crusade	
Invention	Literacy, Engineering	Leonardo's Workshop	Steam Engine, Gunpowder

It's often advisable to push Bronze Working up in the table, to allow Phalanxes for defense. Trade can be put off until after Monotheism, if desired. A tech in bold is the goal of the sequence of techs listed above it.

XIII. Technology for MGW

Goal	Requires	Allows	Leads To
Horseback Riding		Horsemen	Polytheism, Wheel
Wheel	Horseback Riding	Chariots	Engineering
Masonry		Palace, City Walls, Pyramids, Great Wall	Construction, Mathematics
Alphabet			Code of Laws, Mapmaking, Mathematics, Writing
Code of Laws	Alphabet		Republic, Monarchy
Ceremonial Burial		Temple	Mysticism, Monarchy
Monarchy	Burial, Laws	Better government	Feudalism
Warrior Code		Archers	Feudalism
Feudalism	Monarchy, Warrior Code	Pikemen; Sun Tzu's War Academy	Chivalry
Chivalry	Feudalism, Horseback Riding	Knights	Dragoons

I put the Wheel second because it seems a better choice than going for Polytheism and Elephants. Veteran Chariots should be able to take a city held by non-vet Phalanxes (without City Walls), and that level of force is what is needed. Chivalry won't be that useful if opposing civs are building City Walls or Great Wall. The tech table stops at Chivalry because it is theoretical (not based on experience). Also, you should be getting tech from huts and AI rather than focusing on research. Once Monarchy is attained, I'd be inclined to select my tech based on what kind of attack units I needed, such as Catapults (for walled cities) or Knights, and on whether I anticipate needing to cross open ocean any time soon. Exploration is important to this strategy, but I can't see going for Pottery and Seafaring just to build expensive Explorers when I can build 3 times as many Warriors for the same shields.

XIV. Military Unit Cost Effectiveness

Should I build two Warriors or one Phalanx? This kind of question cannot be answered based on some supposed "cost effectiveness," because a better answer will be based on the immediate and long-term needs of your civilization. If you are in Monarchy and need to control the population of a city that's in unrest, two Warriors might be better than one Phalanx. If you need to defend against attacking

Horsemen, one Phalanx is probably a better choice than two Warriors.

The real question to consider when building military units for war is, "what kind of unit will survive a battle against the kind of units my opponent has?" If your opponent has or is likely to have cities defended by Warriors, all you need is Horsemen to attack him. If your opponent is likely to attack you with Horsemen, you need Phalanxes defending your cities.

All that is needed to win battles is a slight numerical advantage after all factors have been accounted for. If your opponent has veteran Riflemen or Fanatics defending his cities, the defense factor is $4 * 1.5 * 1.5$: 4 is the basic defense factor of the unit, multiplied by 1.5 for veteran status, and multiplied by 1.5 for being fortified. $4 * 1.5 * 1.5 = 9$. Any attacker that gives you an attack greater than 9 should win most of the attacks, while attacking with less than 9 will lose most attacks. Attacking with veteran Marines or Cannon will give you an attack of 12, a nice cushion. Using the same units to attack a vet Rifleman fortified on a river will lose most of the time, because his defense is now $4 * 1.5 * 1.5 * 1.5 = 13.5$. Hit points and firepower complicate the situation; consult the Apolyton web site for more details.

In a test using Horsemen to attack fortified Warriors (numerically 2 vs 1.5), 20 out of 20 attacks resulted in dead Warriors and wounded Horsemen.

The following table shows Cost, Attack, Defense, Movement, Hit Points, Firepower, and Cost Effectiveness results for the military units of Civ 2. See after the table for discussion of the cost effectiveness formulae.

Unit	Cost	A	D	M	HP	FP	Cost Effectiveness 1 [#]	Cost Effectiveness 2 ^{##}
AEGIS*	100	8	12	5	3	2	1.55	5.8
Alpine Trp.	50	5	5	1.5	2	1	0.9	1.75
Archer	30	3	2	1	1	1	0.583	0.833
Armor	80	10	5	3	3	1	0.969	2.813
Artillery	50	10	1	1	2	2	1.2	2.2
Battleship	160	12	12	4	4	2	1.25	4.5
Bomber	120	12	1	8	2	2	0.875	8.083
Cannon	40	8	1	1	2	1	0.75	1.25
Carrier	160	1	9	5	4	2	0.75	1.438

Catapult	40	6	1	1	1	1	0.563	0.875
Cavalry	60	8	3	2	2	1	0.75	1.833
Chariot	30	3	1	2	1	1	0.667	1.167
Cruise Mis.	60	18	0	12	1	3	3.25	54
Cruiser	80	6	6	5	3	2	1.25	4.875
Crusader	40	5	1	2	1	1	0.625	1.375
Destroyer	60	4	4	6	3	1	1.167	3
Dragoon	50	5	2	2	2	1	0.65	1.4
Elephant	40	4	1	2	1	1	0.563	1.125
Fanatic	20	4	4	1	2	1	1.75	3
Fighter	60	4	3	10	2	2	1.417	7.167
Frigate	50	4	2	4	2	1	0.8	2
Helicopter	100	10	3	6	2	2	0.95	6.3
Horsemen	20	2	1	2	1	1	0.875	1.25
Howitzer	70	12	2	2	3	2	1.214	3.857
Ironclad	60	4	4	4	3	1	1	2.333
Knight	40	4	2	2	1	1	0.625	1.25
Legion	40	4	2	1	1	1	0.5	0.75
Marines	60	8	5	1	2	1	0.833	1.5
Mech. Inf.	50	6	6	3	3	1	1.5	3.6
Musketeer	30	3	3	1	2	1	0.917	1.5
Nuclear Mis.	160	99	0	16	1	1	2.047	49.5
Paratroopers	60	6	4	1	2	1	0.667	1.167
Partisan	50	4	4	1.5	2	1	0.75	1.4
Phalanx	20	1	2	1	1	1	0.625	0.75

Pikemen*	20	1	3	1	1	1	0.75	1
Riflemen	40	5	4	1	2	1	0.938	1.625
Stealth Bmbr	160	14	5	12	2	2	0.969	10.813
Stealth Fgtr	80	8	4	14	2	2	1.625	14.5
Submarine	60	10	2	3	3	2	1.333	5.5
Warrior	10	1	1	1	1	1	1	1

Notes to table:

$$\# 2.5 * ((A * FP) + (D * HP) + 2M) / C$$

$$\## 5 * ((A * FP * M) + (D * HP)) / C$$

Factors of 2.5 and 5 allow comparison to Warriors = 1.

* Defense for pikemen is 4 vs. mounted units, 2 vs. others; use 3 for calculation of C.E.

Defense for Aegis is 8 vs. ships, 16 vs. aircraft and missiles; use 12 for calculation of C.E.

Alpine Troops and Partisans get 1 MP but treat all terrain as road. This is less effective than 3 MP because they cannot move and attack at full strength. Hence their M is set to 1.5.

XIV.1. Criticism of Formulas for Cost Effectiveness

* The figures are surprisingly UNinformative! No hidden treasures are revealed, no unsuspected ripoffs are disclosed. More useful would be common comparisons: when an Elephant attacks a city defended by fortified Phalanxes, with no other defensive bonuses, what is the probable result? And so on.

* Dominant terrain affects cost effectiveness of movement. Rough terrain effectively reduces the value of 2 MP to 1, which increases the C.E. of slower units and Explorer-type movement.

* Double movement should reduce the C.E. of units normally having 2 MP. The most important value of movement is when $MP > 2$; then the unit can move and attack (such as unloading from a ship and making an immediate attack, or moving next to a city and attacking). Using 2x movement gives all units this capability, increasing the C.E. of slower units and reducing it for faster units.

* Support affects cost. In support situations, cost effectiveness of costlier units should go up compared to cheaper units, because each requires 1 shield support. Also, bombers, missiles, and other units that cause unhappy citizens are costlier than the mere number of shields required to build them.

* The added cost for support should reflect the expected lifetime of the unit, rather than the per-turn cost. That is, a missile or armor unit will more probably have a shorter life than a phalanx or musketeer, which are used primarily for defense and may sit in a city for a very long time. If a game lasts 100 turns, and a militia is built on turn 3, it could cost 97 in support.

- * Special abilities and limitations of various units not factored into C.E., such as:
 - o Partisans evade ZOC.
 - o Fanatics use no support.
 - o Marines and Paratroops have special capabilities that may or may not come into play in a particular game.
 - o Bomber, Fighter, Helicopter, Howitzer, and Stealth units all ignore city walls when attacking. Missile units also?
 - o Ships which can bombard shore units are comparatively more cost effective than those that can't.
 - o Missiles can be used only once; Fighter can attack multiple targets in a turn.
 - o Some units can spot enemy Subs.

* Hit points and firepower don't really work the way the formula suggests; that is, an attack value of 8 at 2 firepower is not equivalent to attack value of 16 at 1 firepower.

* Veteran units are more cost effective. The costlier the unit, the more it justifies the investment in Barracks or Port Facility.

Unit	Cost	A	D	M	HP	FP	Cap	Cost Effectiveness #
Caravel	40	2	1	3	1	1	3	1.500
Galleon	40	0	2	4	2	1	4	5.333
Transport	50	0	3	5	3	1	8	16.000
Trireme	40	1	1	3	1	1	2	1.000

Note: The formula for all types of transport ships is $6.667 * M * Cap * D / Cost$.

XV. Reconsidering Wonders

I have provided a table of wonders (page 40), which shows "cost effectiveness" of a few of them. This comparison is not very informative, except to show how utterly cheap the Hoover Dam is.

XV.1. The Greatest Bargains

The Pyramids are one of the biggest bargains in the game. For the cost of a mere 3 and a third granaries, you get cost-free, indestructible granaries in all your cities. Michelangelo's Chapel is about as valuable, weighing in at the cost of 3 and a third cathedrals. Bach's Cathedral isn't as good as the Chapel, but still a bargain. And the Hoover Dam wonder is wonderfully cheap, costing a mere 2 and a half Hydro Plants. None of these wonders expires. The Great Library and Leonardo's Workshop are the most important of the wonders that do expire.

I often fail to get the Pyramids because I'm pursuing PDS and I'm angling to get Michelangelo's Chapel and Leonardo's Workshop. When I've built these two, I'll probably have a few extra Caravans coming up, and if the Pyramids are still available I'd snap them up quick with 4 Caravans unless (unlikely) I can get to work on Bach's Cathedral or maybe Sun Tzu's. This assumes the Early PDS strategy, King level, 2x2x; under Monarchy at deity level, I'd go for the Pyramids first and early, starting construction in the capital when I have a total of three cities built. If I don't start as early as that, I'll likely lose out to an AI civ.

Among the wonders that do expire, Leonardo's Workshop is kind of expensive at a time when you'd probably rather be using those Caravans for trade routes, but *don't let anyone else get this wonder if you want to win the game*. The mere upgrading of your dozen or twenty Settlers to Engineers is worth the cost of this wonder, not to mention those Warriors becoming Riflemen. When you're going to get this wonder, sell your Barracks or build units that won't upgrade, such as Riflemen, Alpine Troops, Marines, or Cavalry.

These are the wonders I consider practically indispensable. The Great Library can be just as important as any of the "bargain" wonders, depending on your long-term strategies and the game parameters. Naturally, the more civs in the game, the more valuable the GL will be. My inclination is always to push hard for technology, so for me the Great Library isn't that useful because I usually manage to get a big tech lead. However, if one does build the GL, a strategy worth considering would be to set research at a minimum (taxes at maximum, natch) and push hard for speedy growth, relying on the GL to keep you near the top in tech. When you are ready, you push for advanced tech because you've grown so great. This strategy will cause you to lose out on some wonders, however, and could be a loser overall if one opponent is pushing hard for tech in a PDS strategy. That's because you won't get his tech from the GL until someone else gets it (if ever). So I wouldn't try this except versus the computer.

Most wonders seem fairly attractive, but the ones discussed in the next section should generally be avoided as a matter of course, unless they form the basis of a particular strategy.

XV.2. I Wonder Why: Losers

Which is worth more, a tech advance or the Pyramids? That's what Darwin's Voyage costs, 200 shields per tech gained. For the same 400 shields you could build 5 Libraries, or 3 Libraries and a University, or establish 8 trade routes, or build 13 Diplomats to steal the tech you lust for. Any of these is apparently a better bargain. However, if you've just built all these Factories and there are no other good wonders to be had, it is fun to nab this one and put despair into the hearts of your foes.

The Colossus is a joke, perhaps even if it's going to form the foundation for a super-tech-producing big city (including a Library, University, Copernicus' Observatory, Isaac Newton's College, and carefully-selected trade routes). Two trade routes generally provide as much new trade as the Colossus, and the wonder does expire eventually. I believe it is more cost effective to build trade routes, libraries, aqueducts, and such, to build your city size and trade base, than to go for this wonder. Even if it does cost only 4 Caravans.

The Oracle expires quicker than just about any other wonder, and it's not cheap. Build anything else instead. I can't even think of a game strategy that would make this turkey worth building. Human opponents are likely going for Michelangelo's Chapel; anyone who misses out on it will go for Theology and Bach's Cathedral, and there goes your Oracle. Against AI at deity level it's somewhat better because it's likely to last longer, but I still wouldn't build it.

I gather that the Eiffel Tower and Shakespeare's Theater are *essential if you're playing the One City Challenge*. The Tower might be useful if you've just tried deity level for the first time and the AI are beating you up. *Other than that, these are foolish wastes of time*, unless there are some subtle strategies out there that I'm not aware of. The only excuse I could see for the Eiffel Tower is if you want to wage a bribe-them-to-death campaign against AI. That might make it cost effective, if it makes bribery cheaper (I don't know whether it does). Also, see the "Resource City" strategy below regarding Shakespeare's Theater.

King Richard's Crusade is an extra-expensive factory at a time when factories are not available. Factories cost so much to build (200 shields) and 4 gold per turn I'm often curious whether they're really worth building. (I'm even less sure about Manufacturing Plants, Solar Plants, and the like.) But I keep on building them and keep on gnashing my teeth at how long they take to come on line. The KRC doesn't last very long, and it costs 300 shields. If your city is bringing in 20 shields per turn, the KRC has to last 15 turns just to recover the shields it cost to build! What else could you have done with those 300 shields? I've built it only once, and I doubt I'll ever build it again unless I'm trying to build Magellan's and somebody beats me to it. I suppose if you want to build a whole bunch of wonders in one big, productive city, this thing might just pay for itself; but I doubt it. If it didn't expire, I'd be more enthusiastic about it. If you want more shields, don't start by squandering 300 on this "wonder."

One author at the Apolyton web site suggests using the KRC and other production-enhancing city

improvements, plus Shakespeare's Theater, to build a "Resource City" out of which you base all your non-defensive units under Democracy or Republic, the idea being that Shakespeare's nullifies the unhappiness factor while the production enhancements provide the shields for support. It's a plan with some tradeoffs. I don't like it much because it makes a city, as with Leonardo's Workshop, that one simply can't afford to lose even for a turn. Because if you do, of course, all those supported units disappear. And, if you want to include ships in the strategy, that city is going to be vulnerable because it can't be landlocked.

I always liked to go for the Statue of Liberty because of my usual overall strategy. I pursue Republic and an early PDS as hard as possible, and by the time I want to switch to Democracy I usually have a pretty large civilization. To languish in Anarchy for several turns while waiting for Democracy to come on line is almost intolerable, and almost surely costs as much in corruption and waste as the Statue costs to build. However, information available from the Civilization Fanatics web site (or see page 10, "No More 3-Turn Revolutions") shows how to avoid multiple turns of Anarchy. This knowledge should make the SOL obsolete.

XV.3. Dubious Wonders

Is it important to build any wonders? I find it hard to argue against any of the "bargains," and all wonders are useful for increasing your score against the computer. But many wonders seem pretty darn expensive compared to approximately equivalent city improvements or just building more cities. You need to tailor your wonder building to your reading of how valuable it will be in this game. Some wonders can be worthwhile or losers, depending on your strategy and the game parameters and game situation. Among these I put the Lighthouse, Great Wall, Marco Polo's Embassy, and the United Nations.

The Lighthouse is cheap enough, but if anyone decides to push hard in shipping tech, it's going to expire pretty quickly. I would generally go for the Lighthouse only if I felt a compelling need to cross the seas with Triremes, such as to pursue an early war. You'd do better to push hard in shipping tech yourself, and build Magellan's Expedition. Note that the Lighthouse does provide veteran Triremes (those built after the Lighthouse is built) which can be effective in attacking Caravels.

The Great Wall can be a killer. Conquering a city and getting immediate triple-strength protection is very hard to beat. However: if your opponent is pursuing a PDS strategy, you may find that your Great Wall has become a Great White Elephant, expiring before it ever becomes a factor in the game. I think you would do better to use those 300 shields to build seven more Knights. If your opponent has discovered Invention, count on it, Metallurgy will be in his immediate future if you have the Great Wall. I had one human opponent who was building the GW while I was researching Metallurgy. He completed it after it had expired. I would consider building the GW if I was involved in an early land

war with my one human opponent. For a seaborne invasion, things seem to get under way ever so much more slowly, and I'd be too worried about the tech race making my GW obsolete before it got into play. This is more true of 2x2x King level, where things just go faster, including the discovery of Metallurgy. At normal production, the GW is a much better deal.

Marco Polo's Embassy and the United Nations can be a bargain or a rip-off depending on game parameters and your general strategy. If you're pursuing exploration and expansion at a breakneck pace, and you're in a 3-civ game, the MPE and UN are a big waste. If you're in a 7-civ game and plan to build about 15 big cities and defend, defend, defend, the MPE can be a bargain, and probably the UN as well.

XV.4. Other Wonders

I don't have a lot to say about the remaining wonders. The Hanging Gardens, Sun Tzu's War Academy, Copernicus' Observatory, Magellan's Expedition, Isaac Newton's College, Adam Smith's Trading Co., Women's Suffrage, the Manhattan Project, Apollo Program, SETI Program, and Cure for Cancer all seem to be about worth the effort it takes to build them, and none seems like an out-and-out bargain, though clearly there would be some mismatches. If you're in Fanaticism or Communism and plan to stay there you don't need Women's Suffrage or the Cure for Cancer, eh? For someone with a Republic and a war, Women's Suffrage is pretty important, either cutting unhappiness or allowing change to Democracy. Of course, the Manhattan Project and Apollo Program can be decisive depending on the advancement of the other civs. But ordinarily, these appear so late in the game that the game is already over. Adam Smith's can help a leading civ cement its advantage, but it just doesn't seem that important to me. Presumably it pays for itself eventually, but I wouldn't build it until the game is already looking like a win or perhaps at deity-level Monarchy, when wonders seem easier to get because the pace is so slow. But in general I'd prefer to build Marketplaces and trade routes instead if income is needed.

XV.5. Wonders Comparison Table

Those wonders in bold face are selected by the author as the "Biggest Bargains"; see page 37. The wonders in *italic* are considered losers; see "I Wonder Why: Losers," page 37.

Wonder	Cost to Build	Tech Required	Approx. Equivalent City Improvement	Cost to Build Improvement	Relative Cost (cost1/cost2)
Adam Smith's Trading Co.	400	Economics			
Apollo Program	600	Space Flight			

<i>Colossus</i>	200	Bronze Working			
Copernicus' Observatory	300	Astronomy			
Cure for Cancer	600	Genetic Engineering			
<i>Darwin's Voyage</i>	400	Railroad	Library	80	5.00
<i>Eiffel Tower</i>	300	Steam Engine			
Great Library	300	Literacy			
Great Wall	300	Masonry	City Walls	80	3.75
Hanging Gardens	200	Pottery			
Hoover Dam	600	Electronics	Hydro Plant	240	2.50
Isaac Newton's College	400	Theory of Gravity			
J. S. Bach's Cathedral	400	Theology	Cathedral	120	3.33
<i>King Richard's Crusade</i>	300	Engineering	Factory (in this city only)	200	1.50
Leonardo's Workshop	400	Invention			
Lighthouse	200	Map Reading			
Magellan's Expedition	400	Navigation			
Manhattan Project	600	Nuclear Fission			
Marco Polo's Embassy	200	Trade	Diplomats plus Travel		
Michelangelo's Chapel	400	Monotheism	Cathedral	120	3.33
<i>Oracle</i>	300	Mysticism			
Pyramids	200	Masonry	Granary	60	3.33
SETI Program	600	Computers	Research Lab	160	3.75
<i>Shakespeare's Theatre</i>	300	Medicine			

<i>Statue of Liberty</i>	400	Democracy			
Sun Tzu's War Academy	300	Feudalism	Barracks	40	7.50
United Nations	600	Communism			
Women's Suffrage	600	Industrialization			

XVI. Errors in the Documentation

The following are errors I've found in the Multiplayer Civilization II Gold Edition manual, First Edition, September, 1998.

Page 51: Spies can stop attempted theft of tech only, not attempted sabotage.

Page 89: Aegis cruiser has 2x defense against air units, according to Rules.txt, not 3x and 5x; but other sources (Apolyton) make me wonder.

XVII. Questions

XVII.1. Resources and City Growth

* Figure out a "grassland baseline" of growth, compare with whales, fishes, wheat; decide on the cost effectiveness of exploring to find these resources versus building on grassland.

* At 2x production, what changes?

* What is the percentage of ocean resources to plain ocean squares? What is the expectation of number of squares explored before a resource is found?

* Which is better, build directly on wheat or oasis, or build in knight-move away from the resource?

* If you build on a resource, do you ever get another? (Don't think so) How about ocean-land resource combination patterns?

* Is one knight-move (between city and resource) better than another?

* Consider, in general, how much "good land" is optimum per city versus how close together should cities be built? Try various rules and see how they compare for overall civ growth.

XVII.2. Attack and Defense

Calculate or test odds of attack and defense: 2 vs 1 (A vs D), 4 vs 2, 4.5 vs 2 fortified in city (i.e., veteran Chariot vs. Phalanx). Is 2 vs 1 the same, odds-wise, as 4 vs 2? If both are vets, is this the same as both are non-vets?

Is there a city defensive bonus, or does it depend only on the terrain?

How does firepower/hit points compare to A & D values in odds of results?

Marines in amphib. assault: which is worse, City Walls or Coastal Fortress?

XVII.3. Strategic Questions

When to build your first Barracks? Or save gold for rush build when enemy appears, so Barracks is near front lines?

How does strategy change when you get 15+ cities? Or is the change of government the critical factor?

XVIII. What's So Great about Civ2?

- * Continual new challenges.

- * The ability to try out a new strategy, even radically new, and at the end sometimes not be sure whether it's better or worse than the old strategy. The OCC (One City Challenge) demonstrates that you don't even need a lot of cities!

- * Best laid plans gang aft agley, but you don't feel ripped off (usually).

- * Multiplayer capability.

- * You get a new map every time, and a new mix of opponents (in multiplayer).

- * Depth and breadth.

- * You can study it on your own and learn things about it.

- * I used to get bored with civ2 AI every few months and take a break with Master of Orion, chess, or something else, but it's civ2 that I always came back to with new excitement. Since I got on the net and discovered multiplayer a couple of years ago, I've never gotten bored with it. And with the ability

to change game parameters and create maps and scenarios, you essentially have a lifetime game system.

* Is it the best game (excluding sports) ever invented? Well, chess and go, poker and bridge, and a few others might nose it out of the top spot, but it's darn close.

* Is it the best computer game ever invented? How should I know? But it is my favorite computer game.

Chapter 8
"FIRE! -- Making War in Civilization II

Written by Marc Fisher, Formatted by Thunderfall

"Attrition is not a strategy. It is, in fact, irrefutable proof of the absence of any strategy. A commander who resorts to attrition admits his failure to conceive of an alternative. He rejects warfare as an art and accepts it on the most non-professional terms imaginable. He uses blood in lieu of brains."

-- Dave Palmer, historian and soldier

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Foreword

"There is only one purpose to which a whole society can be directed by a deliberate plan. That purpose is war, and there is no other." - Walter Lippman

I am an ardent Civ2 gamer, and I have a long-standing interest in military history which has been brought to life by the Microprose game, Civilization II. I came to realize that many profound works on the subject of war and history can be applied to playing this wonderful game. Herein is my first attempt at an analytical paper since my college days. The difference (other than my advanced age) is that this seems to have been a great deal more fun!

The first qualifier I must lay out, of course, is that the level of the Civ2 war-planning AI is less than desirable. Mostly, it seems to be pretty straightforward in terms of a "build unit;send unit to nearest threat;attack" loop. You've probably already had good success fighting the AI on its own terms.

So, then, here's the challenge: why stoop to the mindless logic of a machine? You are the cognitive, intuitive human in this equation. You should approach any war with a well-formulated strategy for victory and for an advantageous position once peace breaks out. Unlike the AI, you can plan ahead 10, 20, 50 game years or more. To allow yourself to slip into shoddy strategy or aimless operational planning would be a waste. It would be the hallmark of an amateur gamer.

The second qualifier involves the scope of this piece. You don't have to have wars in Civ 2 (though they're hard to avoid). In fact, in most cases you will have far greater success in the game if you focus on peaceful building and research first, and cope with wars as they happen. But this piece is not about how to build large cities with a lot of happy citizens. It's about war - how to fight it and how to win it.

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(Note: In the following document, I will use the terms "computer player" and "AI" or "AI Civ" interchangeably. AI means "artificial intelligence".)

Chapter 1. The Tools of War

"The best strategy is always to be very strong" - Clausewitz, On War

I've divided the available combat units in Civ2 into three categories for simplicity. The ultimate warfighting style, using maneuver and speed, is difficult to utilize before the player has modern units such as armor, bombers, and battleships. Thus it is imperative to tailor your war decisions to the tools you have available, as much as to your strategic goals.

In the following tables, "Att." means attack value. "Def." means defense value. "HP" is the hit point total, and "FP" is the firepower value of the unit.

1.1. Combat Units:

a) *Ancient-Midieval*

I have always viewed the Ancient-era forces as mere stop-gaps in defending myself until I can discover Gunpowder. The offensive values of some of the above units are respectable, but their defensive quality is abysmal.

Still, due to the overall condition of my civilization during this era I find myself engaging in strategic Defensive War, more often than not. To do that effectively, I rely on settlers building permanent fortresses in key squares along my borders and around my cities. Inside my cities, I use City Walls heavily to enhance my defensive value until the advent of Gunpowder. With such a structure to protect my forces, I can launch short raids and local counterattacks to exact a heavy punishment upon any invaders. Because of the low values of these units, Veteran status can be a nice advantage. I try to build barracks in a few cities, and after I discover Feudalism I build the Sun Tzu wonder to give myself the benefits of Veteran status.

In my opinion, the kinds of units you can build at this stage of the game do not allow sufficient maneuver and striking power to engage in Total War on anything but the smallest maps.

b) *Gunpowder*

Not until you can build gunpowder-based units will you begin to see any significant combat staying power in your military - demonstrated by the Hit Point values above. The catch is that your opponents are likely to discover Gunpowder at about the same time you do, if not before. Note, too, that the Firepower rating of these units is still low. That means that battles are liable to be long and bloody - for both sides.

Dragoons, and later Cavalry, are usually the mainstays of my offensive ground forces in the post-midieval era. I never use these units on defense unless I have no other choice - they are strictly for

offense. Whenever I can, I always have musketeers or riflemen (or fanatics) following up my cavalry closely, in order to hold the ground they've siezed.

I'll mention the Galleon and Frigate here, though we'll delve more deeply into naval strategy later. These two units are worth building in numbers if you have alot of coastline or the enemy is on the other side of an ocean. The frigate is the only combat naval unit you'll get that can carry troops (2), and that's good for sneak attacks behind enemy lines or for siezing ports where his fleet is a-building. High marks for both these units until they're replaced.

On the flip side of that coin, I've never built many Ironclads. By the time they're available, I'm researching Electricity and will be building Destroyers instead.

c) Modern - the Combat Triad

Note that the pattern of higher cost/more power continues in the above chart, but that now the units' defensive values are catching up. Beware of good defensive units dug in on hills or inside cities - you'll need an intelligent plan to eliminate or bypass them, or your forces won't last long.

You begin to receive Modern units at about the time you reach Electricity, Steel, and Combustion. Usually the first truly modern unit you'll get is the Marine - an excellent combat unit except for its low movement allowance. The two best uses for Marines are Amphibious attack (directly off the ship onto the target square) or as defensive forces in fortresses or cities. They are not optimal for the kind of fast-moving mobile campaigns that win large Civ2 wars.

The Alpine unit is an excellent choice in the modern era. They have good attack/defense values, they're relatively inexpensive, and their movement rate makes them better than cavalry when your front line is in heavy terrain. There is no better endorsement of the Alpine unit than the fact that the computer player builds a lot of them.

Artillery suffers from the same weaknesses as its forebears, the cannon and catapult - it is too slow to keep up with mobile combat groups. The Howitzer rectifies this somewhat, though it only appears late in the game after the discovery of Robotics. I often prefer to use Bombers as my "mobile artillery", since they have few limitations as far as keeping up with the front line. Bombers arrive before Howitzers, and they too ignore city walls.

A word about Paratroops. I haven't built alot of these in most of my games, mainly because the way I fight a war moves too quickly for Paratroops to have an effective base from which to launch their paradrop beyond the first turn or two of war. I view them as special purpose units, whose best use may be in isolating target cities by dropping them behind the objective. They are also very effective as

reinforcements in newly-conquered cities, or as "blitz" elements exploiting a nuclear strike.

"The Navy is a machine invented by geniuses, to be run by idiots." - Herman Woulk, 'The Caine Mutiny'.

We've virtually ignored Naval units until now, and the main reason for that is because the Frigate was the only real seaborne combat unit available. But with the advent of the above units, you have an opportunity to develop the second leg of the Modern Combat Triad: Sea.

First, consider the fact that the computer opponent in Civ2 is very limited in planning and executing long range grand strategy (he has a hard time moving units farther than a fourth of the map). He also tends to send his naval units about without much escort, or else he clumps them tightly and presents inviting targets for nuclear missiles.

You, on the other hand, can build invasion fleets of transports escorted by battleships and aircraft carriers that are capable of dominating the oceans of the world.

A tip for you Submariners: The sub's ability to carry missiles makes it an extremely powerful bombardment and sea control system. Just remember that, though your sub is invisible to the enemy, he can still see your missiles! It's a level playing field, though, and you can find his subs the same way. (Note: this "feature" is actually a bug that may be fixed in future versions of Civ 2. As of version 1.09, it remains a part of the game.)

Naval strategy is expensive to implement, but it has the potential of being the key element in fighting and winning a Total War in Civ2. It is the ultimate in strategic mass, speed, and flexibility.

"The third peculiarity of aerial warfare was that it was at once enormously destructive and entirely indecisive." --H.G. Wells

The final leg of the Modern Combat Triad: Air. The Stealth Bomber and Cruise Missile may be the glamor units in Civ2, but I've actually gotten more use out of a fleet of Bombers and a few helicopters since they appear earlier in the game.

Air units (and this includes cruise missiles) provide you with more than hitting power. They also allow you to quickly gather updated intelligence about enemy dispositions and city sizes when you overfly his territory.

When combined with naval force (especially when used with carriers and submarines), air power gives you the final ingredient you need to conduct a true lightning war against your enemies due to its long range, flexible response and high survivability. The only thing Air Power can't do is hold ground, and

thus it serves as a major support element for your groundpounders.

d) *Nuclear Weapons*

"What was gunpowder? Trivial. What was electricity? Meaningless. This Atomic Bomb is the Second Coming in Wrath!" - Winston Churchill, July, 1945

Although nukes aren't as devastating in Civ2 as in reality, they still pack a big wallop. The fact that they don't leave a massive crater at ground zero makes them eminently useful in combat and opens up a whole new vista in war-fighting strategy.

The main thing to remember about nukes is that, while they eliminate all units in a target city and surrounding squares, they also reduce the city population and leave nasty pollution lying around that can take years to clean up. I normally use nukes on well-defended enemy cities that are strategic "keys" (Occupy chokepoints, contain large buildups of enemy forces, etc.). Smaller targets usually get pasted with cruise missiles instead. Nukes are so expensive that I NEVER nuke a target just for the sake of nuking it. I always make sure I have paratroops or armor standing by to move into the post-blast city. It's a very cost-effective way of taking your objective.

There are two different strategies to employ when nuclear weapons are available. Your decision is driven solely by whether your opponent has them as well. If you are the only civilization on the planet with nukes, consider them as just another weapon - albeit a decisive one. They can be the bludgeon your ground forces need to drive their way through the enemy empires quickly at minimum cost to you. You no longer need to worry about attacking his walled cities head on. Just position a paratrooper or armored division at his door, drop a nuke, and walk in. Be sure to follow your armies with plenty of engineers to clean up the mess.

If, however, your enemy has nukes too, then the scenario changes. The AI is not timid about using them. The computer player doesn't even care if he's ready to occupy nuked cities before he drops a few on you.

Nuclear weapons in Civ 2, just as in the real world, change the "mass" equation. You must be concerned with stacking and grouping your forces. Keep your forces dispersed so that a nuke doesn't destroy your entire army or navy, and as soon as you take a target city you need to buy an SDI system for that city or prepare to take a counter strike from his nukes. Preemptive nuclear strikes on any of his cities within range is a wise tactic in this case.

Mutually Assured Destruction in this manner is not very clean, nor is it usually very successful. In fact, nuclear weapons change the strategic landscape to such a degree that I will even delay researching the Manhattan Project if I have a large tech lead over the computer (if I have nukes, the computer can steal

the research and build them too). From my own experience dealing with Civ 2 computer players that are armed with nukes, I would recommend never going beyond Limited War. It can be very suicidal and less than enjoyable. But, if you're into that sort of macabre exercise, have fun.

1.2. The Impact of Technology

"You can't say civilization don't advance. For every war, they kill you a new way." - Will Rogers

"Obsolete weapons do not deter." - Margaret Thatcher

If you've played Civ2 at all, you already know about the Technology tree and the importance of having a good scientific program. If you get too far behind on research you will soon find yourself facing an enemy with overpowering advantages in combat. Even a mediocre strategist like the Civ 2 AI can win with such an advantage.

Of course, research does more than merely provide you with better guns. Many of the problems you'll face in the game that detract from maintaining a large army - citizen unhappiness and food production - can be solved with research.

Your military efforts under a Democracy, for example, are much more successful if you have discovered some of the technologies along the Mysticism/Theology line. Wonders such as the Oracle, Michelangelo's Chapel and J.S. Bach's Cathedral enable you to run a militant Democracy or Republic without the sort of expense and distraction normally associated with those governments.

Economic advancements (Banking, Economics, and Industrialization) provide your empire with the sort of financial and production strength required to carry on a modern war. The Adam Smith Trading Company Wonder alone will save you loads of tax dollars in a large Civilization by paying all upkeep costs of city improvements that equal 1.

If your focus from the start is to build a powerful military with which to conquer the Civ2 world, your best Research strategy starts with Horseback Riding. Then Chivalry & Feudalism, Leadership & Gunpowder, then Tactics & Conscription. This line will take you to the point where Guerilla Warfare, Amphibious Warfare, Mobile Warfare and Machine Tools are all discoverable.

Other major discoveries I would stress include Fundamentalism (the ultimate war-making government) and Invention (Leonardo's Workshop is essential, and Invention leads you to Democracy, Gunpowder, and the Steam Engine). If I'm in a dead heat with the other Civs, technologically, I always try to get to Invention first so as to steal a march on Leonardo's Workshop. If I'm running behind other Civs (which isn't unusual at higher levels like Deity), I don't miss a chance to build the Great Library Wonder. It

expires with the discovery of Electricity, but in the meantime it will provide you with a number of free advances.

So, we have another dilemma for the Civ 2 player. Do I spend heavily on research or do I invest in war? The answer is: without technology, you cannot win a war. And without production and trade you cannot acquire technology. I always put the growth of my Civilization first and foremost. You cannot engage in a war with the Civ 2 AI, given that both sides are reasonably well-matched, without experiencing setbacks and losses. You must be able to replace your casualties (production base) and you must be able to field units that are capable of winning (advanced technology). If you can do neither, then I strongly urge you to sue for peace and set about beefing up your civilization.

While it is certainly possible to win a war with the Civ 2 computer opponent without a technological edge (you are, after all, the one with the brains), I have had good results from playing the first half of the game with the sole objective of gaining an overwhelming research advantage over my rivals. You are capable of building a research program which the Civ 2 AI cannot hope to match!

Some key points to gaining a research advantage:

- Select city sites along or near coasts, or on rivers. Water adds trade arrows, which yield science.
- Enhance trade by constructing roads around your cities and building trade routes. More trade equals more science. Building Superhighways in a city also boosts trade, as does using Airports to establish your trade routes. The Colossus Wonder is a good early trade-enhancer in the city in which it is built.
- Libraries and Universities in each city add 50% each (100% cumulative) to science. The Research Lab adds another 50% if you don't build the SETI program Wonder instead.
- Rush to build research wonders such as Isaac Newton's College, Copernicus' Observatory and the SETI project. If you pick a city that is on a coast and/or river where lots of trade will be generated, designate that as your "Science City". Build both Copernicus (a 50% science bonus in the city it is built), and later Isaac Newton (doubles science in the city it's built) in your Science City. Their effects are cumulative, and will provide you with an immense boost in research. The SETI program Wonder, available after Computers, provides you another 50% boost for all your cities and obviates the need to build Research Labs in every city.
- Move citizens to "Einsteins" in well-developed cities. Each "Einstein" generates a minimum of 3 science beakers. Be sure that the trade you're losing by re-assigning the citizen does not exceed the science gained. Usually, this practice works best after the city is maxed out.

Given a large technological lead, waging war becomes an exercise in the obvious. Once you have armor and aircraft and he is still building musketeers, guard your advantage jealously and strike before he finds a way to draw even with you. Make it your goal to achieve total domination of the game before nuclear weapons are available.

Technology's impact on the way you fight a war is fairly obvious, and we won't belabor the issue any longer. I made a point earlier, in evaluating the different military eras, that the best war-making machine you can build is not available until the modern age. Technology's impact at that point is more than merely firepower and hit points, though. Naval and air units impart new capabilities for intelligence and mobility that allow you to be true to the principles of maneuver, tempo, and preemption laid out in the US Army's AirLand Battle doctrine. You can then truly take warfare into three dimensions.

1.3. Weighing the Odds

"Sir, my strategy is one against ten, my tactics ten against one." - Arthur Wellesley, Duke of Wellington

We couldn't discuss war-fighting strategy in Civ 2 without taking a look at unit values. Unlike real wars, in a game we have known probabilities to work with. Those probabilities are important - without a thorough knowledge of your instrument of war you cannot formulate an effective strategy.

It pays to review the tables I've listed in the previous section on Units. The attack and defense values of each unit are your first consideration, followed by the hit points and firepower of those units. Figure that the minimum number of rounds of combat will equal the hit point total of the weaker unit, divided by the firepower of the stronger unit.

The actual equation used to resolve each combat round is:

$$a / (a+d)$$

where:

a = attacker's attack rating

d = defender's defense rating

The result is a fractional number (percentage). A random number is generated, and if the result is less than the percentage, the defender loses hit points equal to the attacker's firepower rating. The reverse happens if the random number is higher - the defender's firepower rating is subtracted from the attacker's hit point rating.

I have discouraged frontal attacks on enemy units which are fortified in rough terrain or behind City Walls. Here's some examples of what the defensive value would be for different units in such a situation:

(Note that "Fort" above indicates engineer-built permanent fortifications. Unit-dug temporary fortifications allow only a 50% defensive bonus.)

Observe the importance of Veteran status. Its 50% bonus on attack and defense converts a 5/4 rifleman into a 7/6 unit! While you can gain veteran status by building barracks or "bleeding" your units, I try to build Sun Tzu's Academy Wonder as soon as it is available. Barracks are still useful as "instant repair" facilities for damaged units, but that's all you get for the 1-gold per turn upkeep cost. Since Barracks have to be rebuilt after Gunpowder is discovered, and again after Mobile Warfare, I'm reluctant to build alot of them until Sun Tzu expires.

Sun Tzu's Academy will give your units extra punch in the early stages of the game when you're most vulnerable. By the time it expires with Mobile Warfare, you should already have a sizable force of veterans.

In the above table, a single armor unit with an attack value of 10 would have a 23.2% chance of inflicting damage on a Veteran Mech Inf unit that is fortified on a mountain (total Def value= 33)! You will probably lose a minimum of 4 armored units before you eliminate the defender. Even the lowest total, that of a Phalanx fortified on a hill, leaves an Archer with a 33% chance of winning a round; a Knight fares little better at 40%.

Unless you decide to throw nukes or cruise missiles at such defenses, your very best strategy is to bypass them (we'll discuss how to do this later). Move the front line past them and the fortified units will have to come out of their positions. Then they can be killed. Bashing your best units head-on against the bulwark is senseless unless you gain a major advantage by taking the position.

This brings us to the one time when you're normally left with no choice but to attack head-on. That is when you are trying to take an important enemy city. If you have bombers or Howitzers that ignore city walls, build alot of them and use them. If you have diplomats or spies (and the cash) that can be used to bribe the city bloodlessly, so much the better. But if you have to attack, be prepared for heavy losses. Produce large numbers of reserves, and keep them moving to the front. You'll need them.

Chapter 2. Military Doctrine

2.1. War for a Purpose.

"It is fatal to enter any war without the will to win it." - Gen. Douglas MacArthur

If I convey nothing else to you in this paper, please remember this: Never go to war without knowing what you wish to achieve! If you do, you will achieve nothing (or less) at great cost to yourself, and you may risk losing the game. At the very least, you will be ridden with the shame that comes from knowing you weren't much of a general.

Your decision as to war goals is often driven by the current state of your own civilization. A small, primitive Civ can hardly aspire to global dominance, but should be able to mount a credible defense of its borders. On the other hand, a large, vibrant Civ with massive production capacity should have no problems turning out 40-60 (or more!) modern combat units every turn or two. Such power is fully capable of launching a Total War that only ends in Total Victory.

Here are the three basic war types I have identified:

1. You might wish to do no more than defend yourself when a war is forced upon you by a surly neighbor. You can defend yourself from most computer attacks successfully without diverting a huge amount of time and production. This could include local, limited offensives to retake territory or preempt an enemy, or you may only need to establish outposts to keep enemies away from your cities.
2. The enemy is too large and powerful to completely conquer, or you have more peaceful priorities and don't wish to sink all your city development into military force. In this case, you might decide on an offensive war with limited objectives. In many cases, this is the logical choice due to the vast resources required to conduct a prolonged conflict against a well-equipped enemy. Remember that you not only have to produce a lot of units initially, but you have to produce replacements and defend yourself against other Civs. And every city building soldiers is a city that's not building improvements or Wonders. Limited War is a compromise between Defensive and Total War.
3. The third option is Total War. If you've selected "Bloodlust" mode for your game, this is the inevitable choice - it's only a matter of when. If you're not using the Bloodlust option, I would not recommend starting a Total War if the game is well into the Modern era. The war will likely not end before someone's starship reaches Alpha Centauri or time runs out, and all those resources invested in fighting are resources lost!

Once you've elected one of the three war options which fits your situation, decide where your units will be built and which units you will build. Set a general goal as to the size of force required to accomplish your objectives and be careful not to exceed it by too much (allow for replacement of casualties). Try to select building sites that are within reasonable marching distance from the front by road, railroad, or airlift. If you need to improve the road system to the front, do so quickly.

The other task you must perform is intelligence gathering. It is important to know where the enemy is strongest, where his weaknesses are, and which cities are vulnerable to assault. We'll discuss your methods in this area momentarily, but you should be able to look at the terrain and the enemy empire and make a preliminary assessment of where you want your forces to focus their efforts. This last part is perhaps the MOST critical exercise you'll perform when war breaks out. If you don't know where you're going, you'll never get there!

Finally, keep in mind the guiding principle of all war-fighting strategy: massive force applied swiftly and unexpectedly at the enemy's point of greatest weakness.

2.2. Defensive War

"A clever military leader will succeed in many cases in choosing defensive positions of such an offensive nature from the strategic point of view that the enemy is compelled to attack us in them." - Moltke

"The whole art of war consists in a well-reasoned and extremely circumspect defensive, followed by a rapid and audacious attack." - Napoleon

"Build city walls!!" - Civ 2 Military Advisor

The reasons for electing to pursue Defensive War are based on your game goals: (a) Your Civilization is still embryonic and you don't have the economic foundation or research base to field a large army; (b) Your goal is not conquest, but growth and space exploration; (c) You are using Republic or Democracy, and a large field army will cause huge losses in both citizen unhappiness and shield production.

Defensive War is the simplest and least disruptive of the three choices. In a Defensive War, the Settler/Engineer unit becomes as important as artillery or cavalry.

Build enough Engineers to construct fortifications around your major cities - particularly those which are close to the enemy. If the forts are within 3 squares of the city, posting a defensive unit there does not cause unhappiness under Democracy. Your engineer (or Settler) units are also handy for building roads or railroads from your interior to the front (use Airports later in the game), to allow you to quickly move reinforcements to crisis points. During times of peace, I always have crews of engineers at work building roads/railroads - they not only add to the trade (and thus, science) your cities produce, they also enhance your military's mobility.

"Outpost" forts serve an additional purpose even in peacetime. They give you warning and a chance to expel roving diplomats who are out to steal your research or sabotage your cities. I keep mine constantly manned along borders with other Civs. (Remember that Diplomats and Spies can ignore

Zones of Control - your outposts won't stop them unless they form a solid line. They only provide you warning.)

Build your forts in Hills or Mountains if possible. Hills double your units' defensive value, and Mountains triple it. A rifleman entrenched in a Fortification on top of a mountain has a base defensive value of 20! If other units are stacked in the fortification with him, they are only eliminated one at a time, rather than as a stack. The enemy will burn up a lot of attacking units trying to take your mountaintop redoubt. Lacking "high ground", even forests, jungles or swamps will suffice as they impart a 50% bonus to the defensive unit.

If you have the time and the Settler/Engineer units, consider building a "hedgehog" defense along threatened border areas- forts staggered or interlaced in depth so that even if an enemy breaks through one or two, he has to confront the next layer. This method is the most ideal for wearing down and defeating an invading army. The AI in Civ 2 is not smart enough to try an "end run" around your line of forts. He'll bash his own head in on your impenetrable wall.

Of course, a Defensive War doesn't mean you can't take any initiative. If you see the enemy stacking weak defensive units in the open without benefit of fortifications, don't hesitate to strike. If he's not in fortifications you only need to destroy the top unit in order to eliminate the whole stack. You can also arrange your forts in such a way as to channel his units into a trap - at the right moment, launch an overwhelming attack from your surrounding forts and destroy his army.

The only thing I don't do when I'm fighting a Defensive War is attack enemy cities. Doing so can be prohibitively expensive and time-consuming. If I can sneak a diplomat in and bribe enemy units or an enemy city, then I leap at the chance. It's a bloodless and efficient way to counterattack (though it does require a reserve of gold). I will also not hesitate to send mobile units (Cavalry or Armor) into his territory to pillage (Shift+P). Tear up his roads, railroads, and irrigation to set him back a few years. It worked for Sherman.

2.3. Limited War

"We are not at war with Egypt. We are in a state of armed conflict." - Anthony Eden

If you've defined your objectives, and they fall short of completely eliminating an enemy then Limited War is for you. In fact, most wars in Civ 2 are Limited, as they stop short of completely eliminating the opponent.

With Limited War, it is more important than ever to set objectives and focus on achieving them. Nothing is more wasteful than sending your armies helter-skelter against every enemy city, or throwing

the cream of your elite veterans against the high walls of his biggest city. You are operating under a time limit in a Limited War. Identify your objective and seize it quickly.

Choose objectives that are achievable! He will sue for peace just as readily if you take a Size 5 city as if you conquer a Size 20. And you will have expended fewer of your precious resources in achieving your goal.

Choose objectives that will make a difference! Wiping out half of his infantry isn't going to change the course of the game, probably. But taking a city that guards a key strait or isthmus - or one that provides most of his scientific research - will definitely tilt the future odds in your favor.

Raids are a useful tactic in both Defensive and Limited War. Land a group of fast-moving cavalry or armor in a remote area of his empire to pillage terrain and destroy settler/engineer units. Avoid besieging cities - your object here is simply to inflict pain and set your enemy back.

The ticklish part of Limited War isn't how you fight it, it's how and when you end it. If you've experienced unexpected success, you may weigh whether to expand the war and seize further objectives. The computer player in Civ 2 is not the most organized opponent, nor is he quick to adapt to fluid situations. Your initial success may have caught him unprepared, but you won't know unless you press your advantage.

This goes to playing style. I prefer a calculated risk-taking, aggressive strategy in war and it usually pays off against the computer. If you feel you've attained your objectives, then offer (or accept) a cease fire. Just don't leave your "Schwarzkopf" standing idle on the outskirts of Babylon with a full armored corps dressed for war and no place to go!

If you wish to stop the war completely, go for the Peace Treaty and return to your research or starship construction. Above all, stick to your goals in Limited War or face the risk of unwanted expansion into a Total War before you're prepared.

2.4. Total War

"The will to conquer is the first condition of victory." - Marshal Ferdinand Foch
 "There are not fifty ways of fighting, there is only one way: to be the conqueror." - Andre Malraux

The name says it. If you've decided that your goal is the complete elimination of a computer civ (or civs), then mobilize your entire economy for War. Hopefully your own Civ has reached a healthy state where it can support a large field army & navy, and you have enough cities (strategic depth) that the loss of one or two will not cripple your efforts. If these cases apply, determine not to accept cease fires

or treaties. Petition your allies to join your side. Give no quarter until your enemy is obliterated. Push your tanks down his throat and ignore his whimpers.

From many games' experience, I have learned to never embark on a Total War while in a Democracy. Democracy is for growth, not war. Monarchy or Communism are marginally better for fighting, but if you've reached the level of research that allows Fundamentalism I highly recommend it as your official War Fighting Government. There is never any unhappiness and your cities can build up to 10 units each without paying support (a limit I've never hit if I have at least 30-50 cities). Fundamentalism allows you to build the very cheap Fanatic unit, which never requires support regardless of numbers. You will sacrifice some research progress, but I've been able to reach acceptable discovery rates by reducing my luxuries to zero and lowering my taxes to a minimum in order to raise science. Because all those temples, coloseums and cathedrals you built under Democracy now generate additional revenue ("tithes"), you should be swimming in cash very soon. With enough tithes, you may not even need any taxes! Use the cash as a war chest to rush-buy new units, erect city walls where they're needed, and bribe enemy cities away from your opponent.

A personal note: In version 1.07 of Civ 2, Fundamentalism was altered so that, in addition to the 50% science penalty, there was also a 50% cap on science investment. In my opinion, this is a needless double penalty. As of version 1.08/1.09, you can alter the file RULES.TXT to change either/both the science penalty or the cap. I raised the science cap from 50 to 80% to match the default limit on Fundamentalist tax rates, and it works well without unbalancing the game. Lowering the penalty would have a more dramatic effect, but it's too close to cheating for my tastes. Suit yourself.

2.5. Operational Strategy

"Operational: the planning level of war that constructs campaigns and major operations in order to accomplish the theater goals articulated at the strategic planning level." - Robert Leonhard, Art of Maneuver

"Our strategy to go after this army is very, very simple. First we are going to cut it off. And then we are going to kill it." - Gen. Colin Powell, January, 1992

Operationally, I fight both Limited and Total Wars in much the same manner, their differences having to do with war goals rather than troop coordination. I lead with a large force of Cavalry or Armor (supported by battleships or cruisers if on a coast) - my maneuver units. Their task is to isolate the battlefield and prevent enemy reinforcements from reaching the front. I push them around, through, over, and behind the objective. They also serve to deny resources to the target city - he can't get shields out of a square that holds one of your units. Furthermore, if there's a cease fire your troops can stay put and continue to starve him out!

If the enemy has a lot of manned forts in your way, do NOT try to destroy his entrenched positions if you have a choice. They are obstacles, not objectives! Include diplomats, spies, or Partisans along with your maneuver forces. These units can ignore zones of control. Since a unit can always enter a square that contains a friendly unit, slip the diplomat or Partisan into a ZOC and then send the Cavalry or Armor into the same square. You can actually infiltrate your tanks past his forts, which is much smarter than attacking them head-on. If they leave their forts to attack, kill them and occupy their forts.

The infiltration tactic can also work by building "daisy chains" of units, always moving from one friendly-occupied square to the next until you've surrounded your objective. Just remember that if your unit is stacked with another unit it cannot move directly to an empty square that is in an enemy ZOC.

In Limited War, chances are good that a peace treaty will leave him with units inside your city limits. If they're caught in ZOCs, he'll have no choice but to disband them - they're lost and you haven't fired a shot at them! Remember this if you're considering a peace treaty - you could lose units, as well, if they have no way to move.

Closely following my maneuver element is my main attack force. These will usually be musketeers or riflemen with cannon or artillery. Because they have good attack values, I may also include some armor or cavalry with this force if I have the numbers. While foot infantry has a lower attack value, such units are also cheaper with better defensive values, and to take most walled cities you need numbers before quality. I prefer to have Bombers available, if they've been discovered, or even Cruise Missiles. Bombers ignore City Walls, thus reducing the base defensive value of the enemy by 2/3. Using waves of bombers will make the job of your ground pounders much easier.

Once you've cut off the city from both resources and reinforcements, then subjected it to bombardment, the final taking of your objective will be a cakewalk.

2.6. Disruption and Dislocation

"Hannibal... like other Great Captains, chose to face the most hazardous conditions rather than the certainty of meeting his opponents in positions of their own choosing." - B.H. Liddel Hart, Strategy (1954)

"Appear at points which the enemy must hasten to defend, march swiftly to places where you are not expected." - Sun Tzu

In his landmark book, "The Art of Maneuver", Robert Leonhard identifies disruption and dislocation of enemy plans as two key elements in AirLand Battle, the US Army's modern war-fighting doctrine:

"Dislocation is the art of rendering the enemy's strength irrelevant. Instead of having to fight the hostile force on its own terms, the friendly force avoids any combat in which the enemy can bring his might to bear."

You can "positionally" dislocate the enemy, either physically removing him from a decisive point or moving the point of decision away from the enemy force. You can "functionally" dislocate the enemy by playing to your own strengths and to his weaknesses.

Napoleon used positional dislocation in his concept of the "central position". His most successful battles began with him positioned between two separated enemy forces. He used speed to quickly defeat one, then turn and deal with the other. He not only prevented the unification of his enemy, but managed to focus 100% of his force against 50% of the enemy's at any one time.

The Germans used positional dislocation when they advanced through the Ardennes in 1940, dislocating the French Maginot Line rather than shedding their own blood in futile direct attacks on the defensive works.

The perfect use of "functional" dislocation in Civ2 is the construction of forts along key avenues of approach. The Civ2 computer player will stop to attack these forts, spending his offensive momentum, rather than pushing on towards your cities. On the defensive, in prepared positions in favorable terrain, the advantage is all yours. You have dislocated the enemy's strength.

Offensively, by concentrating your strongest force quickly and unexpectedly against the enemy's weakest point, you are practising dislocation. It requires a knowledge of enemy dispositions (intelligence) and it requires maneuver - placing your forces in the most advantageous position before accepting battle.

This precludes "secondary" objectives which split your force and bleed power away from the focal point of your attack. Focus everything you can on your main objective, which should be his weakest defensive point away from the line of direct advance.

Disruption, a related concept, is the practice of defeating the enemy by attacking his center of gravity (or critical vulnerability). You want to avoid having to destroy the enemy's entire army by direct attack when you can create opportunities to render it impotent by attacking its Achilles Heel. In the game of Civ 2, the enemy's center of gravity will always be his cities. His "critical vulnerability", then, will always be those cities which are left poorly defended.

I'll use one of my own recent games to demonstrate this concept. I had spent most of the game at peace with the neighboring Romans. Our empires were connected by a narrow land bridge between two lakes

which was easy to guard with forts. Meanwhile, I became embroiled in a war with the Sioux who occupied the territory next to the Romans. I had nearly conquered all of the Sioux lands when the Romans decided I was a threat and launched a sneak attack.

No one ever accused the Civ2 AI of being a military genius, and the Romans didn't disappoint. They launched Knights and musketeers at my line of fortifications - using the direct method to attack. I marshalled what units I could spare from the conquered Sioux territory, and sent them around one of the inland lakes into the Roman rear. In the space of 3-4 turns, I found most of the inner Roman cities to be poorly defended (their troops were dying in front of my border forts, far away) and succeeded in reducing their empire by nearly half in short order. Even after a cease fire was declared, my units remained within his city radii to disrupt production and growth.

I had functionally dislocated the Romans first by erecting the strong defensive line in rugged terrain - their attack broke down against my forts.

My movement into the Roman rear used positional dislocation by creating a point of decision - the soft belly of his cities - away from the location of his strongest forces. It was nearly bloodless for me, and ended with the enemy's empire disrupted and in ruins.

2.7. Tempo and Preemption

"When the strike of a hawk breaks the body of its prey, it is because of timing." - Sun Tzu

"I can always make it a rule to get there first with the most men." - Gen. Nathan Bedford Forrest

AirLand Battle doctrine also stresses the preemption of enemy objectives. The word "preemption" comes from the Latin "praeemere", to 'buy beforehand'. In military terms, this relates to siezing an opportunity before the enemy does.

Preemptive attacks emphasize speed rather than caution. They strive to snatch a victory impolitely before the game has properly begun. Preemption is inherently unfair and ungentlemanly. The Civ2 AI may have problems with the concepts of dislocation and disruption, but it does practice Preemption.

A critical prerequisite to using preemption wisely is a knowledge of the enemy situation (intelligence). The border between risky and foolhardy is perilously thin. While the window of opportunity for this sort of strategem may be small, you must have good intelligence in order to know when that window is open!

In Civ2, "sneak attacks" are one form of preemption. While they can cost you a reputation hit, that may

or may not be important to you. There are times when the final conquest of your biggest rival and antagonist is more important than the shininess of your reputation. If you have the Eiffel Tower Wonder, you can soften the blow to your reputation somewhat.

Computer civilizations in Civ2 make extensive use of sneak attacks, especially at higher levels of difficulty. Be aware of this and don't be afraid of using it yourself.

Preemption can be more subtle, as well. Building a large transport fleet for your Marines and constructing Airports in major cities to allow swift movement of reserves are both instruments which allow you to preempt the enemy by imparting superior strategic mobility. You can also build railroads inside of his territory during temporary cease fires. Once the cease fire expires, use the railroads to give your forces unlimited movement right into the bowels of his empire.

Preemption is tied intimately to tempo, of course. As any chess player will tell you, tempo is the pace of the game such that the opponent has no time to execute his plan. The player with tempo constantly forces the opponent to react defensively to a series of attacks, threats, and feints, all the while advancing his own plan.

Your first step in siezing the tempo is to never declare war at the end of your own turn. This gives the AI a full turn to take the initiative and force you onto the defensive. If you're going to start a war, start it at the very beginning of your own turn. You then can dictate the opening moves, and the AI will be forced to respond.

The Civ2 computer player is glaringly weak when responding to quick tempo. It does not cope well with fast-moving battle lines and quickly changing situations. If you have deployed a mobile force of sufficient strength, use them to maintain your tempo. Threaten multiple points with one thrust to force your enemy's defenses to spread thin. Force the pace when it's to your advantage, even if your units must attack at less than full strength. Once you lose tempo, the enemy will regroup and his resistance will stiffen. Then, your ultimate victory will be much costlier.

My own experience in games where I've maintained a fast tempo has proven its value to me. The computer will produce new units from his cities as fast as possible, but send them out to battle piecemeal. I will have my mobile forces arrayed next to his cities and along his railroads, and his attacks will threaten one or two of my units at most. If the computer player knew how to form reserves or defend in depth, he would be a much tougher opponent. He doesn't, so take advantage of the weakness. You don't score points for being well mannered.

2.8. Intelligence

"He who knows when he can fight and when he cannot will be victorious." - Sun Tzu

It is difficult, even foolish, to set objectives for a Limited or Total War without having any idea of the enemy's dispositions. Intel in Civ 2 is fairly simple, so I'll touch on a few suggestions.

Your best source of strategic, diplomatic, and technological information comes from embassies. Diplomats and spies perform many functions, but perhaps one of their more effective ones is the simple, non-warlike act of opening an embassy. I try to open embassies with all other Civs early in my games - just move a diplomat into one of his cities and select the "open embassy" option. Once this is done, you can use the "Check Intelligence" button on your Foreign Advisor window (F3) to see what that nation is researching, what they've discovered, what their relations are with other countries, and even see a list of their cities.

Don't forget that your map of enemy territory is only as current as the date your last unit wandered through a square. You may still show a city as Size 3, but perhaps it's grown to Size 12 since then and added forts and roads. You need current information.

A good source of information can be gained by landing explorers, diplomats or spies on his coasts and sending them roaming through his empire - especially before war breaks out. But you don't have to build diplomats/spies. You can also update your map of his city sizes and terrain layout with something as innocent as a trade caravan or freight unit. He won't perceive caravans as threats, so you won't heighten tensions by scouting a little.

Caravans can't "Investigate City" like diplomats/spies can, however. If you have your sights set on a couple of his larger cities, be sure to sneak a spy in first to count defenders. It's worth the cost of losing the unit.

During combat, don't focus on what is happening at the front to the exclusion of everything else. Use fast units (bombers are perfect for this) to scout his territory. Naval units should patrol your shores as well as his, keeping an eye out for sneak attacks. If you're engaging in a little "deep battle" by launching cruise missiles into his rear, try to send your missiles on little detour jaunts - they can "see" as well as a bomber, and update your map for you.

2.9. Naval Operations

"A man-of-war is the best ambassador." - Oliver Cromwell

Just as in the Real World, he who controls the seas of a Civ 2 map also controls the land. And once you've reached the modern era you will also have the types of units at your disposal that will allow you

to exert control over the waves, the air, and the land around the seas.

You cannot aspire to build a powerful navy unless your Civ has been nurtured into producing lots of shields and lots of tax money. Navies are very expensive, and if you're in a Democracy they can also cause unhappiness. Navies are useless unless they're sailing the seas that they're trying to control, so don't keep them home. Do what you need to do to quell unhappiness (including moving people out of the fields into the Elvis business or changing to Fundamentalism). Navies are your key to Civ 2 victory.

My favorite naval unit is the Aegis Cruiser. Since its defensive value is doubled against air attacks, it makes a nice escort for transports. It can also spot subs, which makes it essential to the survival of your carriers.

Battleships are the epitome of mass and speed in one unit. If your amphibious force has a couple of battlewagons in company, they come in handy for bombarding enemy units & cities along the coast, to help soften up objectives or isolate the battlefield. No other sea unit has the Battleship's attack and defense value without missiles.

No unit has the power of a fully-loaded Aircraft Carrier. From the moment you have Fighters, up until you can post Stealth Bombers or Cruise Missiles on the carrier, this is one mean, mobile destruction machine. It's also vulnerable to cruise missile and submarine attacks, so always escort it heavily. It's wise to avoid enemy-held land areas if you can. They tend to hide hordes of cruise missiles. You have a lot invested in the unit - protect it.

Naval strategy in Civ 2 doesn't differ much from real naval strategy. Priority One is to eliminate the opposition's fleets. Priority Two is to project the power of the navy onto enemy shores via your carriers and troop transports. Remember, too, that the mere presence of your fleet off an enemy's coast can force him to react, drawing defensive forces away from other areas. This is a useful method of weakening the point of your true objective.

You acquire naval superiority by massing your fleet, by locating the enemy through aggressive scouting, and by engaging him swiftly and decisively. The aircraft carrier allows you to scout an amazing amount of map with your bombers - finding the enemy before he finds you. He who sees the enemy first, can shoot first and thus have the highest chance of success.

If your enemy has the larger fleet, you'll need to rely on having the better intelligence if you want to beat him. Scout, scout, scout! Try to concentrate your whole fleet against only a part of his, and defeat him in detail. Locate his major ports, where his ships build, and take them by land assault or Marine amphibious attack. If you cut him off from reinforcement, all that is left is to wear him down.

2.10. Special Operations

"Who dares, wins." - Motto of the British Special Air Service regiment.

It's not always necessary to spill blood to conquer your enemies. In Civ 2, there are more ways than one to skin a Khan. Most of them revolve around the Diplomat & Spy units.

If your enemy is not in a Democracy (which is not bribable), I highly recommend bribery and inciting revolts. It costs gold, to be sure, but you will spend the gold on fresh troops anyway. This way, you always get some gold back in plunder of a city and you also receive control of any enemy units that are in the bribed square (or city). If you grab a city, you can also gain tech the enemy has which you don't.

I have won wars in Civ 2 against powerful opponents by building nothing more than a few diplomats and turning them loose on the enemy's shore. Diplomats are very cheap (120 gold), and each one is capable of capturing an entire city for you. Imagine formations of diplomats descending on your enemies! Not even Mongol hordes can match the horror inspired by these powerful units!

The richer the enemy, the closer the city is to his capital and the bigger the city, the more it will cost you to incite a revolt. Cities in disorder cost half price, as do cities without any units present. Spies can get you an even better bargain at 84% of regular price, and veteran spies can do the trick for a mere pittance: 67% of the cost at which diplomats incite revolts.

If bribery isn't possible, acquaint yourself with the other abilities of the spy. Spies can plant nuclear weapons, poison water supplies, and sabotage city production in addition to bribing the enemy. If you're engaged in a Limited War and have neither the forces nor the gold to try conquering or bribing, try throwing waves of spies at a city. If you can coordinate this kind of espionage with roving troops that are pillaging the city radius, you can bring an enemy city to its knees without mounting a full-scale attack on his walls.

Chapter 3. Politics and War

"War is the continuation of politics, intermixed with other means." - Clausewitz

While there may be some debate as to the efficacy or meaning of Clausewitz' statement, there can be no doubt that nations have won wars yet lost the peace. The same can happen to you in Civ 2 unless you meld both political goals and military goals to achieve the same end.

3.1. Cease Fires and Treaties

"Treaties are like roses and young girls. They last while they last." - Charles de Gaulle

I urged you to never go to war without knowing your purpose, and I urge the same thing in considering peace. My blanket rule in Civ 2 is: "If he's down, don't let him up", but I leaven that precept with conditions. Above all, I try to be flexible without losing sight of my general aims.

A computer nation will usually only offer a cease fire if it perceives that it is overmatched and losing. You've no doubt noticed that once you've taken a city of his, he tends to get cold feet about the whole idea of fighting. In a way, a cease fire offer is a good signal to you that you have the advantage. Whether you press that advantage or not should already be determined by your war goals before the first shot is fired.

Cease fire offers are also a method for the computer player to catch his breath and regroup before renewing hostilities. Just because he wants to stop shooting doesn't mean he wants to make friends. You can estimate his reasons by observing his personality and his attitude towards you, beginning long before the war started. Aggressive AI civs will remain that way, even after a cease fire is declared. Watch your back - chances are he'll launch a sneak attack in a few turns.

AI Civs that have had good relations with you, on the other hand, may have been pushed into the war by allies. Or their attitude shifted because you became significantly larger and more powerful than they. These problems can be partly set right, if you wish, by offering tributes of technology or gold and signing a permanent peace treaty. If you want to preserve the diplomatic element of the game after you've become the Number One Civ on the map, I recommend building the Eiffel Tower Wonder and the United Nations. Both are extremely helpful in keeping the peace, especially after you become big enough to inspire jealousy and fear.

Unless the AI is so desperate as to offer a handsome reward in gold for a cease fire, I rarely accept its offer before my armies have taken their objectives. Under Democracy or Republic, of course, you may not have a choice if the Senate is being meddlesome.

Regarding alliances: I take a pragmatic attitude. If I began the game with the goal of conquering my neighbors, then there's little point in joining alliances. In fact, such mechanisms only stand in your way if you intend to keep your reputation intact. It's hard to goad a nation into war if you have a peace treaty - it's nearly impossible if you're allies. Use some foresight and know your own directions before entering into such contracts.

3.2. On Machiavelli

"A real diplomat is one who can cut his neighbor's throat without having his neighbor notice it." - Trygve

Lie

"He lied, I knew he lied and he knew I lied. That was diplomacy." - Adm. William Kimball

Civ 2 isn't just building cities and fighting wars. In history, some of the more dramatic turning points have come as a result of the interaction of cultures, the agreements (or disagreements) that result, and the cementing of long-term alliances.

The 16th-century Venetian Niccolo Machiavelli contended that politics are, by their nature, amoral. Thus, any means (however unscrupulous) are justifiable in achieving political power. His thinking would be viewed today as either immoral or cynically accurate.

In Civ 2, you have no moral constraints placed upon you if you choose to follow Machiavelli's philosophy. For the most part, this will mean playing one computer Civ against another; of making alliances of convenience and using those alliances to strengthen yourself while you weaken your ally. You can actually pay your friends to fight your wars for you! If you don't do these things you're missing one of the real pleasures of playing Civ 2. You're also missing a gold mine of unrealized power.

My own diplomatic philosophy in Civ 2 is to align myself with the weakest Civs, even giving them free tech to win them over. My first objective in any political or military campaign is to eliminate my closest competition, and gaining the trust of my enemy's enemies is a large step in that direction. At some point later in the game, if I'm playing for conquest, even my former allies become fair game.

Be sure to check the Foreign Advisor window (F3) frequently, and monitor other nation's attitudes. Also, gaining embassies with other nations (just run a diplomat into their city and select it as an option) gives you a wealth of important information about who your enemy is fighting, and who he's friendly with. Use this information to your own advantage. If you can stir up trouble between the other Civs while staying out of it yourself, so much the better. Being devious can be fun!

Once you've become significantly larger and more powerful than the other civilizations, they will tend to band together to "contain your aggression". This is how the AI tries to balance the game. The best way to deal with this is to anticipate it. Use the early and middle portions of the game when most Civs are fairly equal to establish a favorable political climate and to weaken your opponents. If you've become so powerful that the outcome is no longer in doubt, then diplomacy is moot. Chuck your reputation and go on the rampage.

3.3. Shorting Out the Senate

"Augustus and Charlemagne, those great restorers, had no faith in democracy; they could not subject

their trained and considered judgements, their far-reaching plans and policies, to carping criticism and inconclusive debate by the corruptible delegates of popular simplicity." - Will & Ariel Durant, The Story of Civilization

I doubt that there's anything as frustrating as mounting a major offensive deep into enemy territory, then just when you have your victim on his back ready to kill he offers a cease fire which your Senate forces you to accept. It's enough to make you want to drive a battalion of M-1s right into the Senate chambers.

I have had Senates back me, however. On a few memorable occasions, my enemy has been a particularly nasty and distrustful sort. He's launched a number of sneak attacks against me during the game until I finally launched a large Limited War to reduce his Civ to its component bricks. When he asked for a cease fire and I refused, my Senate supported my decision. I then made short work of the antagonist. (Note that, usually, if you accept a cease fire your Senate will always force you to also accept a peace treaty.)

Sadly, the circumstances where this happens are few. The first thing I do before starting or joining a Total War is to dump the current Republic/Democracy form of government. I can fight a Defensive War under Republic/Democracy without trouble because I begin the war willing to accept any peace proposal - my war objective was simply to survive. It's a little more difficult in Limited War, but still do-able. But anytime I'm planning a Total War, I do not hesitate to stage a Revolution and move to Fundamentalism. It is, bar none, the most powerful war-fighting government in the game. War is what it is for. You will have no Senate to worry about, little if any support to pay, and no unhappiness to hinder you. The infusion of cash Fundamentalism gives you from tithes will also enable you to crash-build units, city walls, SDI systems, airports, or whatever else you may need on the spot.

If you can't manage Fundamentalism, then I would urge you to pursue the United Nations Wonder as soon as you can. It will allow you to override your Senate 50% of the time and force enemies to accept peace if you offer. The U.N. may be your best answer to the Senate, short of Fundamentalism.

If you're sly enough, you may be able to goad your opponent into taking the reputation hit, thus strengthening your hand with the Senate. It can be done.

3.4. Taunting Your Enemy

"Your mother was a hamster and your father smelt of elderberries!" - John Cleese, Monty Python's "Search for the Holy Grail"

"Nuts!" - Gen. Anthony McAuliffe, Bastogne, Dec. 22, 1944

So you're tired of that neighboring Civ getting in your way and taking all the best city sites? You want to eliminate him, but you don't want to be the one who breaks the peace treaty? Have you tried goading him into war? Here's some tips.

The computer AI goes to war for specific reasons. Those reasons all boil down to Attitude. Every computer civ has an Attitude rating towards you, the human player. It starts with a random setting adjusted for personality, and then fluctuates during the game according to events. The scale extends from 0 ("Worshipful") to 100 or more (Enraged). The attitude rating is affected primarily by a comparison of the individual computer's Civ to yours.

- AI leaders with peaceful personalities tend to like you more.
- You gain attitude points if you trade knowledge or pay tribute.
- AI leaders are friendlier if they're ahead of you in technology.
- AI Civs like you better if you have fewer military units than they do.
- If you are significantly smaller than the computer Civ, it tends not to respect you and is likely to pick on you.
- If you are significantly larger than the computer Civ, it will respect your power (and have a better attitude).
- If you have nuclear weapons, the computer Civ is less likely to pick a fight with you.
- If you have launched your spaceship to Alpha Centauri, all the computer Civs will band together and attempt to interfere with your efforts by capturing your capital city and destroying the ship.

I can tell in the Foreign Advisor (F3) window whether I have a chance of inciting an opponent into breaking a peace treaty or cease fire. If the Civ's attitude is "Uncooperative" or worse, I normally only have to post some troops inside a city radius of his (until he protests), demand gold "for my patience", and/or insist that he withdraw his troops from my territory (even if he has none). If I do this often enough he becomes very testy and is likely to launch a sneak attack. Then he takes the reputation hit rather than me, and if I'm in a Republic or Democracy my Senate is more likely to support my refusals of a cease fire.

Depending on geography, you can also push your opponent into initiating war by building a city very close to one of his, then fortifying it and planting a large number of troops inside. The computer deems

that a direct threat, and cannot force you to pull back diplomatically.

A more subtle method is to make friends with a Civ he is at war with. Give them some technology and sign a peace treaty or alliance. (Before you do this, however, be sure you've opened embassies with both Civs.) Your future enemy will probably come calling on you to cancel your treaty with his enemies. Your refusal will not sit well, and you have the option of bribing your friend into declaring war on the troublemaker.

Chapter 4. Conclusion

"Cease firing, but if any enemy planes appear, shoot them down in a friendly fashion." - Adm. William Halsey

I am neither George Patton nor Clausewitz. I play games for fun, and I like to write for fun. This little thesis is the result.

The allure of Civilization II is in the imagination of the player, and to having a vivid imagination I plead guilty. I have changed the rules and the icons of the game to suit my own particular tastes and spent hours on electronic boards discussing the game while I'm not playing it. I've even been known to dream about it.

Is it addictive? To a history buff and a gamer, it's more dangerous than heroin. Luckily, the only detriments to my health will come from lack of sleep, excessive eye strain, and diminished job performance.

Thanks for reading this. Now go play some Civ 2. Disrupt, dislocate, and preempt! Be imaginative! Most of all, enjoy!

Bibliography

Sid Meier's Civilization II - the Official Strategy Guide - Prima Publishing, 1996

The Art of Maneuver (Maneuver Warfare Theory and AirLand Battle) - Robert R. Leonhard, Presidio Press, 1991

Strategy - B.H. Liddel Hart, Meridian Books, 1954, 1967

How To Make War - James Dunnigan, Quill-William Morrow, 1988

A History of Warfare - John Keegan, Vintage Books, 1994

The Face of Battle - John Keegan, Viking Penguin, 1976

The Encyclopedia of Military History - R.E. Dupuy and T.N. Dupuy, Harper and Row, 1977

The Prince - Niccolo Machiavelli, 1513, trans. by N.H. Thompson, Prometheus Books 1986

On War - Karl Von Clausewitz, London 1908

The Art of War - Sun Tzu, trans. by Samuel B. Griffith, Oxford Univ. Press 1963

Summary of the Art of War - Antoine H. Jomini, Military Service Publishing Co, 1958

The Devil's Horsemen: The Mongol Invasion of Europe - James Chambers, Atheneum Publishing, 1979

Military History of the Western World - J.F.C. Fuller

The Conduct of War, 1789-1961 - J.F.C. Fuller, Da Capo Press, 1992

US Army Field Manual 100-5, "Operations", 1986

The Influence of Sea Power Upon History - A.T. Mahan, London 1965

The Story of Civilization - Will & Ariel Durant, MJF Books, 1975

Chapter 9
The Complete Civilization II Combat Guide
Version 1.1

By: Marquis de Sodaq (a.k.a. Sodak)

INTRODUCTION

This document contains all there is to know about how combat works in Civilization II, by Microprose. Although it claims to be complete, there are some issues that need resolution. An occasional update can be expected whenever significant changes need to be recorded. Included with all of the general topics is the formula for calculating the probability of a unit winning a combat.

While scenario makers push the limits of what is possible by altering the rules.txt, I have strayed only minimally from the default settings. This was to simplify and make general all the topics contained herein. Any alterations to how the game normally works continue to follow the rules explained in this document. However, you may create situations that extend beyond the descriptions provided. For example, applying the "can attack air unit" flag to a naval unit.

I welcome any input to this document. The mathematics has stood up to extensive, rigorous testing. Some multipliers are proven, others are not known. If you discover anything new, or find something described here to be misinformation, contact me with your discovery. My contact information is provided at the end of the document.

Version 1.1 updates and clarifies text regarding domains and details about the "Can attack air units" flag in rules.txt.

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1) BASICS

a) Definition: Combat occurs when a unit with an attack value greater than 0 attempts to enter a square occupied by a unit of another, non-allied, civilization.

b) A battle results in the destruction of one unit or the other. The primary defender is the unit with the greatest modified defense value at the moment of the attack. If the primary defender is destroyed, all other defenders (stacked) in the same square are also destroyed unless:

i) They occupy a city square, or

ii) The square has the fortress or airbase improvement built on it.

c) Units involved in combat usually sustain damage. Damage is shown in the unit's strength bar by color and percentage.

i) Green: 2/3 to full strength,

ii) Yellow: 1/3 to 2/3 strength

iii) Red: less than 1/3 strength

d) Except for air units, damaged units have reduced movement points approximately proportional to the damage. However, land units will never have less than 1 movement point, and sea units will never have fewer than 2. The proportion of damage is rounded to the nearest integer, but never less than the minimum for that unit, using the following formula:

$$\text{CMP} = \text{CHP}/\text{HP} * \text{MP} + 0.2$$

Where

CMP = current movement points

CHP = current hit points

HP = maximum hit points (from rules.txt)

MP = maximum movement points (from rules.txt)

- e) Land units (domain 0) can attack any other unit on a land square, except airborne bombers.
- f) Air units (domain 1) Air units can attack any unit, except airborne bombers, on any terrain. Air units with the "Can attack air units" flag (fighters) can also attack other air units.
- g) Sea units (domain 2) can attack any unit occupying any adjacent square, except for airborne bombers. Units with the "Submarine advantages/disadvantages" flag (submarines, thus) can only attack other sea units. When a sea unit attacks a land unit, it is called shore bombardment (3.j).
- h) Special domain 3 units can attack any other unit, regardless of flags. Domain 3 units can in turn be attacked by any other unit. They ignore city walls, SAMs, and coastal fortresses.
- i) Airborne bombers (any air unit with range > 1) can only be attacked by a unit with the "can attack air units" flag (fighter). This holds true regardless of what domain the attacking unit is.

2) UNIT COMBAT FACTORS

Units have four basic factors figured into the calculation of a combat result: attack strength, defense strength, hit points, and firepower.

- a) Attack strength is the likelihood of inflicting damage when attacking an opponent. Units with an attack strength equal to zero cannot initiate combat.
- b) Defense strength represents the ability of a unit to defend itself when attacked; It is the likelihood that damage will be inflicted on an attacking unit.
- c) Hit points indicate how much damage a unit can withstand before it is destroyed. The true number of hit points is the hit point value x10. A 2hp unit thus has 20 hit points.
- d) Firepower indicates how much damage a unit can inflict in one round of combat. A successful round reduces the opponent's total hit points by the value of the unit's firepower.

3) ADJUSTMENT FACTORS

Many factors affect the four basic Unit Combat Factors, depending upon the circumstance of the battle. All factors that apply are multiplied together, unless otherwise noted.

a) Veteran units receive a x1.5 bonus for both attack and defense strengths.

b) Fortified land units receive a x1.5 bonus for defense strength. This bonus is superceded by fortress improvement (3.c) and city walls (3.e). It can be used in combination with a SAM battery (3.f) or a coastal fortress (3.g).

Notes:

- This bonus applies only on the next turn, after the unit appears with the dirt entrenchment, not while in the process of fortifying.

- It has been suggested, but not tested, that city defenders in multiplayer games do gain the bonus immediately if given the order to fortify with the 'f' key, but not the menu.

- Air and naval units may fortify in a city or air base (or other land square), but do not gain the defensive bonus.

- Land units gain the bonus against an attack by any domain unit.

c) The fortified (3.b) bonus increases to x2 for a land unit occupying a fortress improvement, whether given the order to fortify or not. This improvement gives no bonus against an attack by an air unit. A city built on an existing fortress eliminates that fortress. If a city is built on a square where a fortress is in the process of being built, the fortress will have no effect.

d) Terrain increases defense strength of all units by:

i) x1.5 if on forest, jungle, or swamp

ii) x2 if on hills

iii) x3 if on mountains

iv) +0.5 if on a river, additively enhancing any other terrain bonus. For example, a hill square with a river gives a x2.5 bonus, a $(2 + 0.5)\%$ multiplier.

e) City walls triple the defense value of city defenders against attacks by land units only. This bonus can apply only to land units.

f) SAM batteries double the defense value of city defenders against attacks by air units. This bonus applies to any unit defending a city except a scrambling fighter, which receives a separate defense bonus. Combined with an SDI (3.1), the defense against missiles is quadrupled.

g) Coastal fortresses double the defense value of city defenders against attacks by naval units. This bonus applies to any unit defending a city.

h) Some flags in rules.txt can alter combat calculations as follows:

i) Negates city walls (howitzer): The city walls (3.e) defense bonus is negated.

ii) x2 on defense versus horse (pikemen): This is actually a limited bonus, x1.5 if the attacker is a land unit with move=2, hp=1, and fp=1.

iii) Can attack air units (fighter): The unit can attack air units with range > 1. This also affects other combat circumstances, as follows:

(1) A fighter stationed in a city that is attacked by an air unit with range < 1 scrambles, gaining a x4 defense bonus.

(2) A fighter stationed in a city scrambles and gains a x2 defense bonus when attacked by another fighter.

(3) Any helicopter attacked by a fighter suffers a x0.5 defense adjustment and has its firepower reduced to 1.

(4) A fighter cannot benefit from a SAM (3.f) adjustment unless attacked by a missile. This applies to any domain unit with this flag.

Note: Scrambling applies only to air units with the fighter flag.

iv) x2 on defense versus air (AEGIS): Any AEGIS sea unit gains a x3 bonus when attacked by an air unit, x5 if the attacker is a missile (a unit with the "destroyed after attacking" flag).

v) Can make amphibious assaults (marines): Can attack from the sea (a ship). This does not count as shore bombardment (3.j). The attacking marine does not ignore city walls (3.e).

i) Partisans (or any unit in the partisan slot of units.gif) gain an attack advantage against non-combat units (any with attack value = 0). The partisans' attack value is increased eightfold (x8).

j) Shore bombardment. When a sea unit attacks a land unit, both units have their firepower reduced to 1.

k) Caught in port. A sea unit's firepower is reduced to 1 when it is caught in port (or on a land square) by a land or air unit; The attacking air or land unit's firepower is doubled.

l) SDI defenses thwart any nuclear attack (except those set by spies) within 3 squares of the city in which it is built. A SDI doubles the defense value of city defenders against attacks by missiles. Combined with a SAM Battery (3.f), the defense of a city's primary defender against missiles is quadrupled.

m) Sneak attack! A sneak attack gives an advantage to the attacker. The value of this bonus is currently unresolved. Testing has not yet resulted in a multiplier.

n) Barbarians do not always attack and defend at normal unit strengths. Barbarian archers defend with a base value of 1, not the normal archer defense value of 2. Other barbarian units have normal defense values. All barbarian attack factors are affected by the difficulty level of game being played:

* Chieftan	x0.25	the normal attack value
* Warlord	x0.5	
* Prince	x0.75	
* King	x1	
* Emperor	x1.25	
* Deity	x1.50	

o) Nuclear missiles have a special attack value of 99. Unless thwarted by a SDI, this sidesteps any combat result calculations. If a nuclear missile attacks a unit, a strike results. This kills all units within one square of the strike, causes pollution on land squares, and reduces the population of any city within the radius by half.

4) THE COMBAT FORMULA

First, some background. The manual provides a simplified combat formula to approximate the likely outcome of a combat. This formula states that the total modified attack and defense factors are combined; the chance of victory is approximately the ratio of the unit's factor to the total. In other words,

$$U / (a + d)$$

where:

U = the unit's modified factor,
 a = the attacker's modified attack factor, and
 d = the defender's modified defense factor

This approximation has proven insufficient for many players. Much debate has led in a more detailed formula. First, an explanation of what it entails. For explanatory purposes, a combat is a single round, a battle the cumulative result of all combats.

The attacker and defender each own a portion of the total modified attack and defense values proportional to their value, as the simplified formula, above, expresses. For each combat, a winner is determined by this ratio. In simple terms, the higher modified value is more likely to win a combat. For each combat won, the opponent reduces its hit points by the winner's firepower. This continues until one unit is reduced to zero hit points and is thus destroyed.

Heated discussion about the complex combat formula led to several ideas for a simpler formula being put forth. The one that most closely gives the results of the complex formula is:

$$\text{Odds} = (S + (S - W)) * \text{Shp} * \text{Sfp} / (W * \text{Whp} * \text{Wfp})$$

where:

S = Stronger unit's modified attack or defense value
 W = Weaker unit's modified attack or defense value
 Shp = Stronger unit's hit points
 Sfp = Stronger unit's firepower
 Whp = Weaker unit's hit points
 Wfp = Weaker unit's firepower

No playtesting results to test the accuracy of this formula have surfaced.

On to the real calculation...

Each unit gets a randomly generated number from 0 to its modified value minus one, multiplied by a constant. This constant has been best-guessed (based on play testing) to be 8. The unit with the higher random number wins the combat, ties going to the defender.

*If the defense value is equal to or greater than the attack value, the probability (p) of the attacker winning the combat round is

$$p = (A - 1) / 2D$$

*If the attack value is greater than the defense value,

$$p = 1 - ((D + 1) / 2A)$$

where $A = (a * 8)$ and $D = (d * 8)$. The resulting p is the odds of the attacker winning the combat. This result can be used to determine which unit is likely to win the battle. To calculate the actual odds of the attacker winning the battle, p is plugged into the following equation:

$$P = \sum_{n=dh}^{dh+ah-1} \text{COMB}(n-1, dh-1) * (p^{dh}) * (1-p)^{(n-dh)}$$

where

n is summed from dh to dh+ah-1

ah = Attacker's modified hit points

dh = Defender's modified hit points

p = probability for attacker to win combat round

P = probability for attacker to win battle

Note: Modified hit points: An opponent's total hit points are divided by the unit's firepower. Thus an attacker with 2fp halves the defender's total hit points.

Comments:

This formula accounts for damaged units, as the input is the unit's current hit point total.

In layman's terms, P is the sum of the probabilities of all the possible outcomes of the attacker winning. For example, the odds of the attacker winning ten straight combats, plus that of winning ten out of eleven, plus that of winning ten out of twelve, and so on, added together to produce a grand total. The maximum number of rounds is the attacker's and defender's total hit points minus one. Basically, until the winner is left with a single hit point after destroying the loser. The defender's chance is (1 - winner's probability).

For those unable to decipher the above mathematics,

*An advantage in hit points is slightly more beneficial than an advantage in firepower, other

factors being equal. An increase in HP produces a greater range of values of n to be summed. Because FP is in the denominator of the fraction, its effect is less; Greater HP is all accounted for in the range, half of a greater FP is. The greater range of values means more COMBINations are calculated. COMB values increase at a greater rate than the final exponent $^{(n-dh)}$ reduces the total value in our equation.

*The more total hit points involved in the battle, the more likely the unit with the greater modified value, the stronger unit, in other words, will win.

*With an even attack to defense ratio, the higher the values, the better the odds for the attacker.

Units with 0 defense can occasionally win because it generates a number between 0 and 0 (0, thus), and the attacker can also end up with a 0. The tie goes to the defender, meaning he wins that combat round. A damaged unit, or one attacking at partial strength (after using part of its movement allowance), can on rare occasions end up on the short end of this possibility.

An Example

Veteran Artillery and Armor units attacking veteran Riflemen behind city walls. The formula stacked up to artillery, but was off slightly with the armor results. Marko Polo of Apolyton tested ten sets of ten attacks with each unit. Other tests to verify this formula, excepting one, have used a minimum of 234 attacks.

Artillery (10a, 1d, 20hp, 2fp) vs. Rifleman (5a, 4d, 20hp, 1fp): The formula predicts 82.5% victories, Marko Polo tests resulted in 79%.

Armor (10a, 5d, 30hp, 1fp) vs. Rifleman (5a, 4d, 20hp, 1fp): The formula predicts 45.8% victories, Marko Polo tests resulted in 44%.

Other tests of Cavalry vs. Armor, Fanatics vs. Musketeer, Fanatics vs. Alpine Troops, Warrior vs. Warrior, Catapult vs. Musketeer, and others all matched the formula closely.

5) ADDITIONAL CONSIDERATIONS

- a) A city's population is not reduced if the city has city walls and a defender loses a combat, or if the city was attacked from a sea square.
- b) A sacked city will have its population reduced by one. A size one city will usually be destroyed if sacked. There is unresolved discussion about when size one cities are captured instead of destroyed.

For discussion, see the thread City Razing Problem .

- c) Air units attacking land units ignore city walls and fortresses.
- d) Airbases provide no defense bonus.

6) WHEN THE DUST SETTLES...

After the battle, the victor is usually damaged. Units can heal as long as they are not given the order to move, even along railroad. They heal at varying rates, depending on their proximity to a friendly city or barracks. Settlers and Engineers, the only units incapable of fortifying, heal while working.

a) Land Units:

- i) 100% of total hit points healed every turn in a city with barracks.
- ii) 40% of total hit points healed every turn in a city without barracks.
- iii) 30% of total hit points healed every turn near a city with barracks.
- iv) 20% of total hit points healed every turn near a city without barracks.
- v) 10% of total hit points healed every turn on any square that does not fit the above categories.
- vi) A fortress (3.c) always adds an extra 10% to the normal rate for that particular square.

"Near a city" means no further than 3 squares from a city, i.e. a 7x7 square.

b) Sea and Air Units:

- i) 20%/20% of total hit points healed every turn in a fortress or a city
- ii) 10%/0% of total hit points healed every turn on any other square
- iii) 100%/100% of total hit points healed every turn in a city with port facility/airport, respectively.
- iv) Airbase and barracks have no effect.
- v) Port facilities and airports affect only the city square.

- c) Healing away from a city or fortress (by skipping that unit's turn) occurs immediately, before the next unit is available for an order. Barracks healing occurs at the end of the player's turn.
- d) The rate of healing by "entering" an allied city has not been determined.

7) SHORT HINTS AND TIPS

As a general rule, the unit with the higher modified attack or defense strength will likely win the combat, ties favoring the defender.

Against 1hp defenders:

- *Even strengths or a defensive advantage strongly favor the defender.
- *Even a slight attack advantage means a much greater possibility of winning the battle.

Against 2hp and 3hp defenders:

- *Even strengths slightly favor the defender.
- *Defensive advantages again heavily favor the defender.
- *Attack strength advantage strongly favors the attacker.
- *A 2hp attacker needs at least a fourth again as much strength as the 3hp defender to have even slightly favorable odds.
- *A 1hp attacker needs better than half again as much strength as the 2hp defender, and more than double the 3hp defender to gain slightly favorable odds.

Defenders in a city have the advantage of maximum defense and healing. Also, only a diplomat or spy can see what units reside in an enemy city.

Stacked defenders are immune to bribery unless adjacent to a city that is bribed.

8) LIES, LIES, LIES !!!

Much discussion has surrounded figuring out how combat works. In the process, some misinformation has been spread. This section addresses these incorrect ideas. The following statements about combat in CivilizationII are all FALSE. Where applicable, an outline reference number before the statement directs you to the section where the correct information can be found:

- *The attack strength of the defender is figured into combat resolution.
- *The defense strength of the attacker is figured into combat resolution.
- *The terrain on which the attacking unit begins is figured into combat resolution.
- *(1.d) Damaged units have movement points proportional to their damage.
- *(3.b) The defensive bonus of fortifying a unit enhances the city wall or fortress bonus.
- *(3.b) The defensive bonus of fortifying is immediate.
- *(3.c) A unit must be fortified in a fortress to gain the defensive bonus.
- *(3.d) The defensive bonus of rivered terrain is multiplied along with other adjustment factors.
- *(3.e) City walls increase the defense strength of any unit.
- *(3.h.ii) The pikeman bonus works against all land units with more than one movement point.
- *(3.j) A ship caught in port has its defense strength reduced to 1.
- *The combat formula in the manual is correct.
- *(5.d) Marines attacking from a ship ignore city walls.
- *Defenders attacked by marines on a ship gain the coastal fortress bonus.
- *(6.b.iv) Air units gain a healing bonus in an air base.

9) CREDITS

The first linked thread, discussing the final formula, should be read if any clarification is needed about how it was found and what it means.

Eggman, Buenos, and Euclid provided the bulk of the math in this process. Special thanks to SlowThinker and others for extensive testing to verify suspicions and ideas!

The following discussion threads contributed to this topic:

The Civ2 Battle Equation Solution

Defense Multipliers

AI cheats on naval bombardment

The Pikeman's defense

Modifiers for Attack/Defense

What is the difference between firepower and attack points?

Barbarians and level of play

Veteran units... (Healing)

Hit points and firepower

Fortification bonus within walls or fortress

Defensive terrain for air and water units

Fighter vs. SAM

Civfanatics combat odds discussion and testing

The Marquis de Sodaq can be contacted at sprout@bitstream.net

Chapter 10
Words of Wisdom: Military Quotations

- * Supreme excellence consists of breaking the enemy's resistance without fighting. (Sun Tzu)
- * Dulce bellum inexpertis [War is delightful to those who have no experience of it] (Erasmus)
- * Men willingly believe when they want to. (Julius Caesar)
- * Death is lighter than a feather; duty, heavy as a mountain. (Emperor Meiji)
- * Never forget that no military leader has ever become great without audacity. (Karl von Clausewitz)
- * The best strategy is always to be very strong. (Clausewitz)
- * God is always with the strongest battalion. (Frederick the Great)
- * Go Sir, gallop and don't forget that the world was made in six days. You can ask me for anything but not time. (Napoleon)
- * Soldiers usually win the battles and the generals get the credit for them (Napoleon Bonaparte)
- * Every French soldier carries in his cartridgepouch the baton of a marshal of France. (Napoleon Bonaparte)
- * Time is everything. Five minutes makes the difference between victory and defeat. (Nelson)
- * War makes the victor stupid and the vanquished vengeful. (Nietzsche)
- * To be prepared for war is the most effective means of preserving peace. (George Washington)
- * Minds are like parachutes. They only function when they are open. (Sir James Dewar)
- * The most solid moral qualities melt away under the effect of modern arms.
- * The will to conquer is the first condition of victory. (Foch)
- * My centre gives way, my right is pushed back, situation excellent, I am attacking. (Foch)

- * Fighter pilots rove in the area allotted to them in any way they like, and when they spot an enemy they attack and shoot them down. Everything else is rubbish. (Baron von Richtofen)
- * The urge to gain release from tension by action is a precipitating cause of war. (Liddel Hart)
- * External peace lasts only until the next war. (Russian proverb)
- * Russians, in the knowledge of inexhaustible supplies of manpower, are accustomed to accepting gigantic fatalities with comparative calm. (Barbara Tuchman)
- * A single death is a tragedy, a million is just a statistic. (Stalin)
- * The unleashed power of the atom has changed everything save our modes of thinking, and we thus drift toward unparalleled catastrophes. (Einstein)
- * Above all personal feelings and considerations and above all selfishness stands the iron law to which we everywhere must always remain true. (Theodore Eicke)
- * A piece of spaghetti or a military unit can only be led from the front end. (Patton)
- * We can still lose this war. (Patton, during the Battle of the Bulge, December, 1944)
- * Hit hard, hit first, hit often. (Admiral Halsey)
- * Leadership is intangible and therefore no weapon ever designed can replace it. (Bradley)
- * Logistics is the ball and chain of armoured warfare.
- * When the situation is obscure, attack.
- * New weapons require new tactics. Never put new wine into old bottles. (Guderian)
- * You can't say civilization don't advance. For every war, they kill you a new way. (Will Rogers)
- * There is only one purpose to which a whole society can be directed by a deliberate plan. That purpose is war, and there is no other. (Walter Lippman)
- * Professional soldiers are sentimental men, for all the harsh realities of their calling. In their wallets and in their memories they carry bits of philosophy, fragments of poetry, quotations from the Scriptures,

which, in times of stress and danger speak to them with great meaning. (Ridgway)

* At last we are eye to eye with death. We must renounce all hopes of freaks and fortunes. Sacrifice to the last drop of blood is demanded of us. Surrender would paralyse and sap our race for generations. (German Army's radio spokesman in a broadcast to German troops during the battle for Hungary, October, 1944)

* There is only one right in the world and that right is one's own strength. (Adolf Hitler)

* The last battle has begun. Enormous masses of troops, tanks and aircraft are being hurled together against us in the East. The Russians are out there for the final decisions. (Berlin Radio, January 12th, 1945)

* No one can guarantee success in war, but only deserve it. (Winston Churchill)

* War is fear soaked in courage.

* War is a crime. Ask the infantry and ask the dead. (Hemingway)

* War is only fun when you are winning. (Star Trek)

* It is fatal to enter any war without the will to win it. (Douglas MacArthur)

* Confuse the enemy. Keep him in the dark on your intentions. Sometimes what seems a victory isn't really a victory and sometimes a defeat isn't really a defeat.

* Whether in attacking, counterattacking, or defensive tactics, the idea of attacking should remain central, to always keep the initiative. (Nguyen Giap)

* It is impossible for Westerners to understand the force of the people's will to resist, and to continue to resist. The struggle of the people exceeds the imagination. It has astonished us too. (Pham Van Dong)

* The bastards have never been bombed like they're going to be bombed this time. (Nixon, during the 1972 North Vietnamese Easter Offensive)

* I have asked General Westmoreland what he needs to meet this mounting aggression. He has told me. And we will meet his needs_ We will stand in Vietnam. (Lyndon B. Johnson)

* I always thought we could go on like this. I didn't think these people had the capacity to fight this way_to take this punishment. (Robert McNamara)

* The politicians in Washington just had no idea about the complexity of the situation in South Vietnam. (General Westmoreland)

* In all honesty, we didn't achieve our main objective. As for making an impact on the United States, it had not been our intention--but it turned out to be a fortunate result. (General Tran Do, on the 1968 Tet Offensive)

* It's a small war, God, but it's the only one we've got. (Anonymous sign over a chaplains bunker at Con Thien, 1967)

* It is a sensation of life. A human being is never so alive as he is in combat. He may feel terror, or he may not, but the prospect of losing his life makes it surge and flare within him. At no other time do his nerves fire with such spark. Never again will he feel as tight an emotional bond to others around him. (Philips Edwards)

* War is like love; it always finds a way. (Bertolt Brecht)

* That brother should not war with brother, And worry and devour each other. (William Cowper)

* War is a trade of kings. (John Dryden)

* As long as there are sovereign nations possessing great power, war is inevitable. (Albert Einstein)

* There never was a good war or a bad peace. (Benjamin Franklin)

* I have never advocated war except as a means for peace. (Ulysses S. Grant)

* I'd like to see the government get out of war altogether and leave the whole feud to private industry. (Joseph Heller)

* War is, at first, the hope that we will be better off; next, the expectation that the other fellow will be worse off; then, the satisfaction that he isn't any better off; and, finally, the surprise at everyone's being worse off. (Karl Kraus)

* It is well that war is so terrible--we shouldn't grow too fond of it. (Robert E. Lee)

- * The belief in the possibility of a short decisive war appears to be one of the most ancient and dangerous of human illusions. (Robert Lynd)
- * War hath no fury like a noncombatant. (C.E. Montague)
- * Diplomats are just as essential in starting a war as soldiers are in finishing it. (Will Rogers)
- * As long as war is regarded as wicked, it will always have its fascination. When it is looked upon as vulgar; it will cease to be popular. (Oscar Wilde)
- * The mounted knight is irresistible; he would bore his way through the walls of Babylon. (Anna Comnena)
- * The patriot volunteer, fighting for country and his rights, makes the most reliable soldier on earth. (Stonewall Jackson)
- * Honor to the soldier, and Sailor everywhere, who bravely bears his country's cause, Honor also to the citizen who cares for his brother in the field, and serves, as he best can, the same cause--honor to him, only less than to him, who braves, for the common good, the storm of heaven and the storms of battle. (Abraham Lincoln)
- * The soldier, above all other men, is required to perform the highest act of religious offering--sacrifice. In battle and in the face of danger and death he discloses those divine attributes which his amke gave when he created in his own image. No physical courage and no brute instincts can take the place of the divine annunciation and spiritual gift which will alone sustain him. (Douglas MacArthur)
- * An atheist could not be as great a military leader as one who is not an atheist. (Thomas H. Moorer)
- * Then was een with what a strength and majesty the British soldier fights. (William Napier)
- * It is foolish and wrong to mourn the men who died. Rather we should thank God that such men lived. (George S. Patton)
- * The soldier's body becomes a stock of accessories that are not his property. (Antoine de Saint-Exupery)
- * In the great hour of destiny they stand, Each with his feuds, his jealousies, his sorrows. Soldiers are

sworn to action; they must win Some flaming, fatal climax with their lives. Soldiers are dreamers, when the guns begin They think of firelit homes, clean beds, and wives. (Siegfried Sassoon)

* You can always tell an old soldier by the inside of his holsters and cartridge box. The young ones carry pistols and cartridges; the old ones, grub. (George Bernard Shaw)

* He who defends everything, defends nothing. (Fredrick The Great)

* I can picture in my mind a world without war, a world without hate. And I can picture us attacking that world because they'd never expect it. (Jack Handey)

* No poor bastard ever won a war by dying for his country. He won it by making other bastards dying for their country. (Patton)

* There are very few personal problems which cannot be solved by the suitable application of high explosives.

* The quickest way to end a war is to lose it. (George Orwell)

* War does not determine who is right, only who is left. (Bertrand Russell)

* If the radiance of a thousand suns were to burst at once into the sky, that would be like the splendor of the Mighty one... I am become Death, the shatterer of worlds. (J. Robert Oppenheimer at the first nuclear explosion "Trinity")

* Anyone can become angry. That is easy. But to be angry with the right person, to the right degree, at the right time, for the right purpose and in the right way - that is not easy. (Aristotle)

References:

Dewar, Michael. An Anthology of Military Quotations. Robert Hale Limited, 1990

Foley, Charles. Commando Extraordinary. Batnam Books, 1989

Macdonald, Peter. Giap. Fourth Estate Limited, 1993

Moore, Harold G., Galloway, and Joseph L. We Were Soldiers Once_And Young. Airlife Publishing, 1994

Submit a military quotation

Inspired by these wise words, you pondered deeply about the many aspects of war...

Chapter 11
Master Sun Tzu's Lectures on

THE ART OF WAR

Lectures

1. Estimates
2. Waging War
3. Offensive Strategy
4. Dispositions
5. Posture of Army
6. Void and Actuality
7. Maneuvering

Lecture 1 : Estimates

War is a matter of vital importance to the state; a matter of life or death, the road either to survival or to ruin. Hence, it is imperative that it be studied thoroughly.

Therefore, appraise it in terms of the five fundamental factors and make comparisons of the various conditions of the antagonistic sides in order to ascertain the results of a war. The first of these factors is politics; the second, weather; the third, terrain; the fourth, the commander; and the fifth, doctrine. Politics means the thing which causes the people to be in harmony with their ruler so that they will follow him in disregard of their lives and without fear of any danger. Weather signifies night and day, cold and heat, fine days and rain, and change of seasons. Terrain means distances, and refers to whether the ground is traversed with ease or difficulty and to whether it is open or constricted, and influences your chances of life or death. The commander stands for the general's qualities of wisdom, sincerity, benevolence, courage, and strictness. Doctrine is to be understood as the organization of the army, the gradations of rank among the officers, the regulations of supply routes, and the provision of military materials to the army.

These five fundamental factors are familiar to every general. Those who master them win; those who do not are defeated. Therefore, in laying plans, compare the following seven elements, appraising them with the utmost care.

1. Which ruler is wise and more able?

2. Which commander is more talented?
3. Which army obtains the advantages of nature and the terrain?
4. In which army are regulations and instructions better carried out?
5. Which troops are stronger?
6. Which army has the better-trained officers and men?
7. Which army administers rewards and punishments in a more enlightened and correct way?

By means of these seven elements, I shall be able to forecast which side will be victorious and which will be defeated.

The general who heeds my counsel is sure to win. Such a general should be retained in command. One who ignores my counsel is certain to be defeated. Such a one should be dismissed.

Having paid attention to my counsel and plans, the general must create a situation which will contribute to their accomplishment. By "situation" I mean he should take the field situation into consideration and act in accordance with what is advantageous.

All warfare is based on deception. Therefore, when capable of attacking, feign incapacity; when active in moving troops, feign inactivity. When near the enemy, make it seem that you are far away; when far away, make it seem that you are near. Hold out baits to lure the enemy. Strike the enemy when he is in disorder. Prepare against the enemy when he is secure at all points. Avoid the enemy for the time being when he is stronger. If your opponent is of choleric temper, try to irritate him. If he is arrogant, try to encourage his egotism. If the enemy troops are well prepared after reorganization, try to wear them down. If they are united, try to sow dissension among them. Attack the enemy where he is unprepared, and appear where you are not expected. These are the keys to victory for a strategist. It is not possible to formulate them in detail beforehand.

Now, if the estimates made before a battle indicate victory, it is because careful calculations show that your conditions are more favorable than those of your enemy; if they indicate defeat, it is because careful calculations show that favorable conditions for a battle are fewer. With more careful calculations, one can win; with less, one cannot. How much less chance of victory has one who makes no calculations at all! By this means, one can foresee the outcome of a battle.

Lecture 2 : Waging War

In operations of war-when one thousand fast four-horse chariots one thousand heavy chariots, and one thousand mail-clad soldiers are required; when provisions are transported for a thousand li; when there are expenditures at home and at the front, and stipends for entertainment of envoys and advisers-the

cost of materials such as glue and lacquer, and of chariots and armor, will amount to one thousand pieces of gold a day. One hundred thousand troops may be dispatched only when this money is in hand.

A speedy victory is the main object in war. If this is long in coming, weapons are blunted and morale depressed. If troops are attacking cities, their strength will be exhausted. When the army engages in protracted campaigns, the resources of the state will fall short. When your weapons are dulled and ardor dampened, your strength exhausted and treasure spent, the chieftains of the neighboring states will take advantage of your crisis to act. In that case, no man, however wise, will be able to avert the disastrous consequences that ensue. Thus, while we have heard of stupid haste in war, we have not yet seen a clever operation that was prolonged. For there has never been a protracted war which benefited a country. Therefore, those unable to understand the evils inherent in employing troops are equally unable to understand the advantageous ways of doing so.

Those adept in waging war do not require a second levy of conscripts or more than two provisionings. They carry military equipment from the homeland, but rely on the enemy for provisions. Thus, the army is plentifully provided with food.

When a country is impoverished by military operations, it is due to distant transportation; carrying supplies for great distances renders the people destitute. Where troops are gathered, prices go up. When prices rise, the wealth of the people is drained away. When wealth is drained away, the people will be afflicted with urgent and heavy exactions. With this loss of wealth and exhaustion of strength, the households in the country will be extremely poor and seven-tenths of their wealth dissipated. As to government expenditures, those due to broken-down chariots, worn-out horses, armor and helmets, bows and arrows, spears and shields, protective mantlets, draft oxen, and wagons will amount to 60 percent of the total.

Hence, a wise general sees to it that his troops feed on the enemy, for one zhong of the enemy's provisions is equivalent to twenty of one's own and one shi of the enemy's fodder to twenty shi of one's own.

In order to make the soldiers courageous in overcoming the enemy, they must be roused to anger. In order to capture more booty from the enemy, soldiers must have their rewards.

Therefore, in chariot fighting when more than ten chariots are captured, reward those who take the first. Replace the enemy's flags and banners with your own, mix the captured chariots with yours, and mount them. Treat the prisoners of war well, and care for them. This is called "winning a battle and becoming stronger."

Hence, what is valued in war is victory, not prolonged operations. And the general who understands how to employ troops is the minister of the people's fate and arbiter of the nation's destiny.

Lecture 3 : Offensive Strategy

Generally, in war the best policy is to take a state intact; to ruin it is inferior to this. To capture the enemy's entire army is better than to destroy it; to take intact a regiment, a company, or a squad is better than to destroy them. For to win one hundred victories in one hundred battles is not the acme of skill. To subdue the enemy without fighting is the supreme excellence.

Thus, what is of supreme importance in war is to attack the enemy's strategy. Next best is to disrupt his alliances by diplomacy. The next best is to attack his army. And the worst policy is to attack cities. Attack cities only when there is no alternative because to prepare big shields and wagons and make ready the necessary arms and equipment require at least three months, and to pile up earthen ramps against the walls requires an additional three months. The general, unable to control his impatience, will order his troops to swarm up the wall like ants, with the result that one-third of them will be killed without taking the city. Such is the calamity of attacking cities.

Thus, those skilled in war subdue the enemy's army without battle. They capture the enemy's cities without assaulting them and overthrow his state without protracted operations. Their aim is to take all under heaven intact by strategic considerations. Thus, their troops are not worn out and their gains will be complete. This is the art of offensive strategy.

Consequently, the art of using troops is this: When ten to the enemy's one, surround him. When five times his strength, attack him. If double his strength, divide him. If equally matched, you may engage him with some good plan. If weaker numerically, be capable of withdrawing. And if in all respects unequal, be capable of eluding him, for a small force is but booty for one more powerful if it fights recklessly.

Now, the general is the assistant to the sovereign of the state. If this assistance is all-embracing, the state will surely be strong; if defective, the state will certainly be weak.

Now, there are three ways in which a sovereign can bring misfortune upon his army:

1. When ignorant that the army should not advance, to order an advance; or when ignorant that it should not retire, to order a retirement. This is described as "hobbling the army."
2. When ignorant of military affairs, to interfere in their administration. This causes the officers to be perplexed.

3. When ignorant of command problems, to interfere with the direction of the fighting. This engenders doubts in the minds of the officers.

If the army is confused and suspicious, neighboring rulers will take advantage of this and cause trouble. This is what is meant by: "A confused army leads to another's victory."

Thus, there are five points in which victory may be predicted:

1. He who knows when he can fight and when he cannot will be victorious.
2. He who understands how to fight in accordance with the strength of antagonistic forces will be victorious.
3. He whose ranks are united in purpose will be victorious.
4. He who is well prepared and lies in wait for an enemy who is not well prepared will be victorious.
5. He whose generals are able and not interfered with by the sovereign will be victorious.

It is in these five matters that the way to victory is known.

Therefore, I say: Know your enemy and know yourself; in a hundred battles, you will never be defeated. When you are ignorant of the enemy but know yourself, your chances of winning or losing are equal. If ignorant both of your enemy and of yourself, you are sure to be defeated in every battle.

Lecture 4 : Dispositions

The skillful warriors in ancient times first made themselves invincible and then awaited the enemy's moment of vulnerability. Invincibility depends on oneself, but the enemy's vulnerability on himself. It follows that those skilled in war can make themselves invincible but cannot cause an enemy to be certainly vulnerable. Therefore, it can be said that, one may know how to win, but cannot necessarily do so.

Defend yourself when you cannot defeat the enemy, and attack the enemy when you can. One defends when his strength is inadequate; he attacks when it is abundant. Those who are skilled in defense hide themselves as under the nine-fold earth; those in attack flash forth as from above the nine fold heavens. Thus, they are capable both of protecting themselves and of gaining a complete victory.

To foresee a victory which the ordinary man can foresee is not the acme of excellence. Neither is it if you triumph in battle and are universally acclaimed "expert," for to lift an autumn down requires no great strength, to distinguish between the sun and moon is no test of vision, to hear the thunderclap is no indication of acute hearing. In ancient times, those called skilled in war conquered an enemy easily

conquered. And, therefore, the victories won by a master of war gain him neither reputation for wisdom nor merit for courage. For he wins his victories without erring. Without erring he establishes the certainty of his victory; he conquers an enemy already defeated. Therefore, the skillful commander takes up a position in which he cannot be defeated and misses no opportunity to overcome his enemy. Thus, a victorious army always seeks battle after his plans indicate that victory is possible under them, whereas an army destined to defeat fights in the hope of winning but without any planning. Those skilled in war cultivate their policies and strictly adhere to the laws and regulations. Thus, it is in their power to control success.

Now, the elements of the art of war are first, the measurement of space; second, the estimation of quantities; third, calculations; fourth, comparisons; and fifth, chances of victory. Measurements of space are derived from the ground. Quantities, comparisons from figures, and victory from comparisons. Thus, a victorious army is as one yi balanced against a grain, and a defeated army is as a grain balanced against one yi.

It is because of disposition that a victorious general is able to make his soldiers fight with the effect of pent-up waters which, suddenly released, plunge into a bottomless abyss.

Lecture 5 : Posture of Army

Generally, management of a large force is the same as management of a few men. It is a matter of organization. And to direct a large force is the same as to direct a few men. This is a matter of formations and signals. That the army is certain to sustain the enemy's attack without suffering defeat is due to operations of the extraordinary and the normal forces. Troops thrown against the enemy as a grindstone against eggs is an example of a solid acting upon a void.

Generally, in battle, use the normal force to engage and use the extraordinary forces to win. Now, the resources of those skilled in the use of extraordinary forces are as infinite as the heavens and earth, as inexhaustible as the flow of the great rivers, for they end and recommence - cyclical, as are the movements of the sun and moon. They die away and are reborn - recurrent, as are the passing seasons. The musical notes are the passing seasons. The musical notes are only five in number, but their combinations are so infinite that one cannot visualize them all. The flavors are only five in number, but their blends are so various that one cannot taste them all. In battle, there are only the normal and extraordinary forces, but their combinations are limitless; none can comprehend them all. For these two forces are mutually reproductive. It is like moving in an endless circle. Who can exhaust the possibility of their combination?

When torrential water tosses boulders, it is because of its momentum; when the strike of a hawk breaks

the body of its prey, it is because of timing. Thus, the momentum of one skilled in war is overwhelming, and his attack precisely timed. His potential is that of a fully drawn crossbow; his timing, that of the release of the trigger.

In tumult and uproar, the battle seems chaotic, but there must be no disorder in one's own troops. The battlefield may seem in confusion and chaos, but one's array must be in good order. That will be proof against defeat. Apparent confusion is a product of good order; apparent cowardice, of courage; apparent weakness, of strength. Order of disorder depends on organization and direction; courage or cowardice on circumstances; strength or weakness on tactical dispositions. Thus, one who is skilled at making the enemy move does so by creating a situation, according to which the enemy will act. He entices the enemy with something he is certain to want. He keeps the enemy on the move by holding out bait and then attacks him with picked troops.

Therefore, a skilled commander seeks victory from the situation and does not demand it of his subordinates. He selects suitable men and exploits the situation. He who utilizes the situation uses his men in fighting as one rolls logs or stones. Now, the nature of logs and stones is that on stable ground they are static; on a slope, they move. If square, they stop; if round, they roll. Thus, the energy of troops skillfully commanded in battle may be compared to the momentum of round boulders which roll down from a mountain thousands of feet in height.

Lecture 6 : Void and Actuality

Generally, he who occupies the field of battle first and awaits his enemy is at ease, and he who comes later to the scene and rushes into the fight is weary. And, therefore, those skilled in war bring the enemy to the field of battle and are not brought there by him. One able to make the enemy come of his own accord does so by offering him some advantage. And one able to stop him from coming does so by preventing him. Thus, when the enemy is at ease, be able to tire him, when well fed, to starve him, when at rest to make him move.

Appear at places which he is unable to rescue; move swiftly in a direction where you are least expected.

That you may march a thousand li without tiring yourself is because you travel where there is no enemy. To be certain to take what you attack is to attack a place the enemy does not or cannot protect. To be certain to hold what you defend is to defend a place the enemy dares not or is not able to attack. Therefore, against those skilled in attack, the enemy does not know where to defend, and against the experts in defense, the enemy does not know where to attack.

How subtle and insubstantial, that the expert leaves no trace. How divinely mysterious, that he is inaudible. Thus, he is master of his enemy's fate. His offensive will be irresistible if he makes for his enemy's weak positions; he cannot be overtaken when he withdraws if he moves swiftly. When I wish to give battle, my enemy, even though protected by high walls and deep moats, cannot help but engage me, for I attack a position he must relieve. When I wish to avoid battle, I may defend myself simply by drawing a line on the ground; the enemy will be unable to attack me because I divert him from going where he wishes.

If I am able to determine the enemy's dispositions while, at the same time, I conceal my own, then I can concentrate my forces and his must be divided. And if I concentrate while he divides, I can use my entire strength to attack a fraction of his. Therefore, I will be numerically superior. Then, if I am able to use many to strike few at the selected point, those I deal with will fall into hopeless straits. The enemy must not know where I intend to give battle. For if he does not know where I intend to give battle, he must prepare in a great many places. And when he prepares in a great many places, those I have to fight in will be few. For if he prepares to the front, his rear will be weak, and if to the rear, his front will be fragile. If he strengthens his left, his right will be vulnerable, and if his right, there will be few troops on his left. And when he sends troops everywhere, he will be weak everywhere. Numerical weakness comes from having to guard against possible attacks; numerical strength from forcing the enemy to make these preparations against us.

If one knows where and when a battle will be fought, his troops can march a thousand li and meet on the field. But if one knows neither the battleground nor the day of battle, the left will be unable to aid the right and the right will be unable to aid the left, and the van will be unable to support the rear and the rear, the van. How much more is this so when separated by several tens of li or, indeed, be even a few! Although I estimate the troops of Yue as many, of what benefit is this superiority with respect to the outcome of war? Thus, I say that victory can be achieved. For even if the enemy is numerically stronger, I can prevent him from engaging.

Therefore, analyze the enemy's plans so that you will know his shortcomings as strong points. Agitate him in order to ascertain the pattern of his movement. Lure him out to reveal his dispositions and ascertain his position. Launch a probing attack in order to learn where his strength is abundant and where deficient. The ultimate in disposing one's troops is to conceal them without ascertainable shape. Then the most penetrating spies cannot pry nor can the wise lay plans against you. It is according to the situations that plans are laid for victory, but the multitude does not comprehend this. Although everyone can see the outward aspects, none understands how the victory is achieved. Therefore, when a victory is won, one's tactics are not repeated. One should always respond to circumstances in an infinite variety of ways.

Now, an army may be likened to water, for just as flowing water avoids the heights and hastens to the

lowlands, so an army should avoid strength and strike weakness. And as water shapes its flow in accordance with the ground, so an army manages its victory in accordance with the situation of the enemy. And as water has no constant form, there are in warfare no constant conditions. Thus, one able to win the victory by modifying his tactics in accordance with the enemy situation may be said to be divine. Of the five elements [water, fire, metal, wood, and earth], none is always predominant; of the four seasons, none lasts forever; of the days, some are long and some short, and the moon waxes and wanes. That is also the law of employing troops.

Lecture 7 : Maneuvering

Normally, in war, the general receives his commands from the sovereign. During the process from assembling his troops and mobilizing the people to blending the army into a harmonious entity and encamping it, nothing is more difficult than the art of maneuvering for advantageous positions. What is difficult about it is to make the devious route the most direct route and divert the enemy by enticing him with a bait. So doing, you may set out after he does and arrive at the battlefield before him. One able to do this shows the knowledge of the artifice of diversion.

Therefore, both advantage and danger are inherent in maneuvering for an advantageous position. One who sets the entire army in motion with impediments to pursue an advantageous position will not attain it. If he abandons the camp and all the impediments to contend for advantage, the stores will be lost. Thus, if one orders his men to make forced marches without armor, stopping neither day nor night, covering double the usual distance at a stretch, and doing a hundred li to wrest an advantage, it is probable that the commanders will be captured. The stronger men will arrive first and the feeble ones will struggle along behind; so, if this method is used, only one-tenth of the army will reach its destination. In a forced march of fifty li, the commander of the van will probably fall, but half the army will arrive. In a forced march of thirty li, just two-thirds will arrive. It follows that an army which lacks heavy equipment, fodder, food, and stores will be lost.

One who is not acquainted with the designs of his neighbors should not enter into alliances with them. Those who do not know the conditions of mountains and forests, hazardous defiles, marshes and swamps, cannot conduct the march of an army. Those who do not use local guides are unable to obtain the advantages of the ground. Now, war is based on deception. Move when it is advantageous and create changes in the situation by dispersal and concentration of forces. When campaigning, be swift as the wind; in leisurely marching, majestic as the forest; in raiding and plundering, be fierce as fire; in standing, firm as the mountains. When hiding, be as unfathomable as things behind the clouds; when moving, fall like a thunderbolt. When you plunder the countryside, divide your forces. When you conquer territory, defend strategic points. Weigh the situation before you move. He who knows the artifice of diversion will be victorious. Such is the art of maneuvering.

* END OF LECTURES *

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