Growth and Expansion in Civilization III

The Apolyton University

September 9, 2003

Contents

Chapter 1

Introduction and Basics

1.1 Introduction

This article is designed to be a guide to how to go about developing a strong empire in *Civilization III*, starting from the beginning of the game, and focusing on growth in the ancient era. The game mechanics will be described, and from these various schemes will be developed to try and create as powerful an empire as possible in the early game. The focus of this article is primarily on economic factors, generating money and manufacturing power. Warfare may be mentioned a few times, but this is not going to be a guide on how and when to go to war in *Civ III*, and nor is it going to have too much to say about diplomacy. Scientific research will be covered to some extent, but a better discussion of that will involve a great deal about trading with the AI, war (again), and knowledge of the AIs habits regarding research and cash flow. That is all beyond the intended scope of this article. Questions of what to build in cities, and analysis of Great Wonders, different civ traits and civ unique units are also largely beyond the scope of this article.

The first chapter is mostly about game mechanics rather than strategy, and as such it can probably be skipped without too much trouble. It is mostly here to help people who know almost nothing about the game mechanics, and to serve as a reference in case the reader needs to look something up later.

1.2 Food, Shields and Trade

1.2.1 The Basics of City Management

Most of this can be found in the game manual, but we all know how often people like to skip all that stuff and get on with the game...

The fundamental tools of the game are cities and military units. Military units are produced by cities; in fact, everything in the game is produced by cities. Cities deal with three basic quantities: food, shields and trade. These are generated by labourers, and by the city square. Each city occupies one square, and can assign labourers to one of the 20 surrounding squares. The squares potentially available to a city (its *city radius*) are shown in figure 1.1.

Initially a city only has the 8 tiles adjacent to the city square tile, until

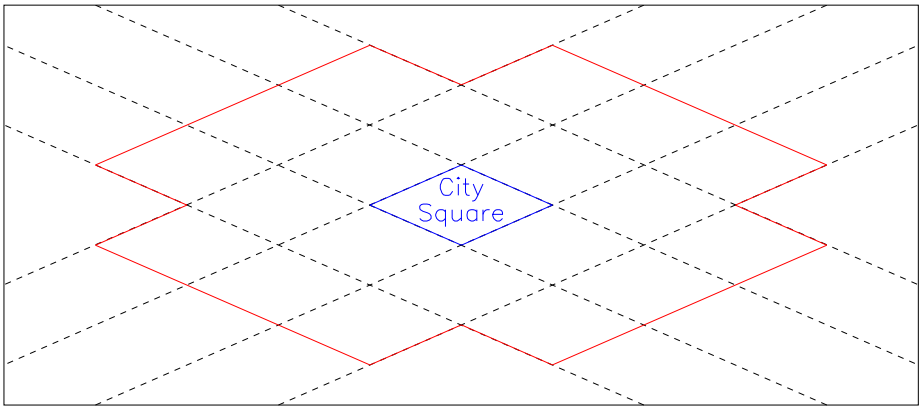

Figure 1.1: The layout of tiles in the city radius

it has produced enough culture for its cultural borders to expand for the first time, at which point it has access to the full 21 tile region. A city will always work the city square tile. It can work one extra tile in the city radius for each point of population in the city, which is the city size number seen on the main game screen. The computer-controlled city governor will normally decide which tiles are being used. You can stop a population point (also called a *labourer*) from working by clicking on a square that is being worked, while in the city view screen (double click on a city to get to this screen). The labourer on that tile will then become a specialist, an entertainer by default. Entertainers produce one happy face for that city (see section 1.3). Clicking on the entertainer (located in the row of heads at the bottom of the city radius section of the screen) will cycle it through the alternative specialists available: tax man (generates one gold per turn) or a scientist (generates one beaker per turn). If you have a specialist, then clicking on an unworked tile in the city radius will set the labourer to work that tile and stop being a specialist. This allows you to control where your labourers are working. To move a labourer from one tile to another you have to click on the tile you want to stop working on (to create a specialist) and then click on the new tile you do want to work. Simply clicking on an unworked tile without creating a specialist usually does something you won't want - that tile will be worked, but the governor will decide which tile is no longer being worked. Generally, this won't be what you wanted. Finally, clicking on the city centre square returns you to the default position where all the labourers are allocated by the governor.

1.2.2 Food

Each square that is worked will produce a certain number of food points (bushels of wheat). The city square produces two food per turn. Each point of population consumes two food per turn. Excess food goes into the food box. When the food box fills up, the city grows in size, gaining a new population point. For size 1-6 cities, the food box needs 20 food to fill it. 'Typically' a size 1 city will have its one labourer working a tile that generates 2 food per turn. Combined with the city square, this is a total of 4 food. The single population point eats

one food, giving an excess of 2 food per turn. This fills up the food box in 10 turns, so the city will take 10 turns to grow to size 2. Once it reaches size 2, the food box is emptied, and has to be filled again to get to size 3. If there is insufficient food from the tiles being worked to feed all the population in that city, food comes out of the food box to make up the shortfall. If there is no food in the food box, and food is being taken out of it, the city starves and loses a population point.

Things are slightly different when the city has a granary (which can be built once you have the pottery tech, or if you have built the Pyramids). When the city changes size, it starts the new size with its food box half full (with 10 food points for size 1-6 cities). This allows a city to grow much more quickly - twice as quickly in the best case. An exception to this is going from size 6 to size 7, where you start size 7 with an empty food box. At sizes 7-12 the food box requires 40 food to fill it (and the granary provides you with 20 food, except at size 7). At sizes above 12, the food box needs 60 food to fill it.

1.2.3 Shields

Each city can work on one building project at a time. Each project requires a certain number of shields to complete it. The city square generates one shield per turn normally, although this can change due to certain resources being located in the city square, or due to golden ages, or for large cities for industrious civs. Each tile being worked by a labourer generates a certain number of shields per turn. The total number produced is put into the project shield box, and when this is full, the project is complete, and something is built. Excess shields are wasted. Example: a city is generating 4 shields per turn, and is building a warrior, which requires 10 shields. This will take 3 turns to build, and the city generates 12 shields in this time. The extra 2 shields are lost, and the next build project has to start from zero.

It is sometimes possible to reassign labourers near the end of a project to reduce the number of shields generated and boost the food or trade production, although this depends on what tiles are available for your labourers to use. As a rule, unless you are extremely dedicated to doing everything in excruciating detail, this is only going to be viable (and fun) very early on, when you only have one or two cities to manage, and not much else going on.

1.2.4 Trade

Each tile that is being worked can generate trade, although most don't by default. Tiles adjacent to rivers generate one trade. A tile with a road on it generates one trade. Most types of resources generate some trade. City squares produce two trade by default (and are assumed to already have a road built on them), which may be boosted by resources, golden age, or the commercial trait. The total trade produced is divided up between taxes, science and luxuries, controlled by three sliders. Example: 50% tax, 40% science and 10% luxuries would divide 10 trade up in to 5 gold in your treasury, 4 beakers toward your current research goal, and 1 trade going to luxury, which generates 1 smiley face.

1.2.5 Terrain

The various terrain types, plus their default food, shield and trade values are shown in table 1.1, along with possible resources and the effects of mining, irrigation and roads. The modifications to these values for different resources are in tables 1.2, 1.3 and 1.4.

Table 1.1: Basic Terrain Types

Terrain	Production			Improvements			Bonus	Luxury	Strategic
	F	S	T	I	M	R	Resources	Resources	Resources
City square	2	1	2	-	-	-	Same as underlying terrain		
Flood Plains	3	0	0	+1	-	+1	Wheat	-	-
Grassland	2	0	0	+1	+1	+1	Cattle, Wheat	Wine	Horses
Bonus Grassland	2	1	0	+1	+1	+1	-	-	-
Plains	1	1	0	+1	+1	+1	Cattle, Wheat	Wine, Ivory	Horses, Oil, Aluminium
Hills	1	1	0	-	+2	+1	Gold	Wine, Incense	Horses, Iron, Coal, Saltpetre, Aluminium
Forest	1	2	0	-	-	+1	Game	Fur, Dye, Silk, Spice, Ivory	Rubber, Uranium
Desert	0	1	0	+1	+1	+1	-	Incense	Saltpetre, Oil
Tundra	1	0	0	-	+1	+1	Game	Fur	Oil
Mountains	0	1	0	-	+2	+1	Gold	Gems	Iron, Saltpetre Coal, Uranium
Jungle	1	0	0	-	-	+1	-	Dye, Spice Silk, Gems	Coal, Rubber
Lake	2	0	2	-	-	-	-	-	-
Coast	1	0	2	-	-	-	Fish	-	-
Sea	1	0	1	-	-	-	Fish, Whale	-	-
Ocean	1	0	1	-	-	-	Fish, Whale	-	-

The 'F', 'S' and 'T' columns are respectively the base food, shield and trade produced by that terrain type. This can be modified by resources, tile improvements, city improvements, rivers, and the general status of your civ (government, golden age, mobilisation).

Tile Improvements

The 'I' column lists the change to the food production if the square is irrigated. To be irrigated, a square needs access to fresh water, from a lake or a river, or from another irrigated square. A city centre square is considered irrigated automatically if it has access to fresh water, although this doesn't affect its food production, just the supply of fresh water to surrounding squares. The 'M' column indicates the change in shield production if the square is mined. A square cannot be both mined and irrigated. Mining an irrigated square will produce a mine but destroy the irrigation, and vice versa. The 'R' column gives the change in trade if a square has a road on it. The '-' entries indicate when it is not possible to produce that a certain kind of improvement on the terrain type in question (you can't irrigate hills, for example).

Rivers

Rivers run along tile edges, rather than through tiles. Tiles that are adjacent to rivers get one trade added to their production. Note that you can't have desert next to a river - a river in a desert region produces flood plain tiles next to the river instead. A flood plain is essentially a desert plus a river. In practise, this means that all flood plains will generate at least 1 trade.

Despotic Penalty

Certain government types modify the tile production. Despotism introduces a tile penalty, where any tile producing 3 or more of food, shields or trade has one subtracted from its production. So a flood plain in despotism, which has a base food production of 3, will only produce 2 food. If it is irrigated it's 'true' food production would be 4, so this is reduced to 3. This also means that irrigating normal grassland under despotism doesn't make any difference, since it changes the food production from 2 to 3, which is then reduced back to 2 by the despotic penalty.

Republic and Democracy Trade Bonus

Republic and democracy both have a trade bonus, where any tile that is producing at least one trade gets an extra trade as a bonus. So building a road on a normal grassland will move it from 0 trade to 2 (1 for the road, 1 for the trade bonus). Building a road on a flood plain however will change the trade from 2 to 3 - the trade bonus is already there since the river produces one trade in the flood plain tile.

Golden Age

Being in a golden age produces an effect similar to the republic and democracy trade bonus: all tiles producing at least one trade get one more trade added to it while the golden age lasts, and each tile producing at least one shield gets an extra shield. Food production is nor affected. Government effects are added after this (the republic and democracy trade bonus and the despotic penalty). This means that having a golden age whilst in despotism can seriously reduce its effect - roads next to rivers, producing 2 trade normally, get it boosted to 3 by the golden age and reduced back to 2 by the penalty. Similarly for shield production from, for example, mined plains or bonus grassland.

Mobilisation

Mobilisation (available once you have the nationalism tech) allows you to mobilise your economy for war. This prevents you building non-military buildings, but gives you a bonus to shield production for building military units and certain military-related improvements (details are beyond the scope of this article). The bonus is like the golden age shield bonus - each tile that produces one or more shields gets an extra shield bonus, but only if it being used by a city producing something that qualifies for the bonus (mostly military units). If you are have mobilisation and golden ages at the same time, the bonuses add up - you get 2 extra shields per tile that is initially producing at least 1 shield.

City Improvements

A few city improvements can be built to increase the output from your tiles. The notable one in the early game is the harbour, which produces one extra food per coast, sea or ocean tile. Other ones come late in the game, such as commercial docks (one extra trade in each coast, sea or ocean tile) and offshore platforms (one extra shield in each coast, sea or ocean tile). Other improvements such

as libraries, marketplaces, etc. don't affect the production from the tiles, but boost the overall production of money, science or shields from the city.

Resources

Different types of resources can be found in different terrains as listed in table 1.1. Bonus resources just produce extra food, shields or trade in that tile. Luxury resources do the same but also produce happiness in your cities - one smiling face for each *type* of luxury that you have connected to that city. Luxury resources can also be traded to and from other civs. Strategic resources also give production bonuses, but also are needed to produce many types of military units, and some city improvements. These can also be traded. Each strategic resource remains invisible (and produces no effects) until a certain tech is discovered, as listed in table 1.4. The bonuses for the various types of resources can be found in the following tables.

Table 1.2: Bonus Resources

Resource	F	S	T	Terrain
Cattle	+2	+1	-	Grassland, Plains
Fish	+2	-	+1	Coast, Sea, Ocean
Game	+1	-	-	Forest, Tundra
Gold	-	-	+4	Hills, Mountains
Whales	+1	+1	+2	Sea, Ocean
Wheat	+2	-	-	Floodplains, Grassland, Plains

Table 1.3: Luxury Resources

Resource	F	S	T	Terrain
Dyes	-	-	+1	Forest, Jungle
Fur	-	+1	+1	Forest, Tundra
Gems	-	-	+4	Mountains, Jungle
Incense	-	-	+1	Hills, Desert
Ivory	-	-	+2	Plains, Forest
Silk	-	-	+3	Forest, Jungle
Spice	-	-	+2	Forest, Jungle
Wines	+1	-	+1	Grassland, Plains, Hills

Table 1.4: Strategic Resources

Resource	F	S	T	Tech	Era	Terrain
Aluminium	-	+2	-	Rocketry	Modern	Plains, Hills
Coal	-	+2	+1	Steam Power	Industrial	Hills, Mountains, Jungle
Horses	-	-	+1	The Wheel	Ancient	Grassland, Plains, Hills
Iron	-	+1	-	Iron Working	Ancient	Hills, Mountains
Oil	-	+1	+2	Refining	Industrial	Plains, Desert, Tundra
Rubber	-	-	+2	Replaceable Parts	Industrial	Forest, Jungle
Saltpetre	-	-	+1	Gunpowder	Medieval	Hills, Desert, Mountains
Uranium	-	+2	+3	Fission	Modern	Forest, Mountains

[b]Strategic[/b] resources have another feature in that they can become depleted. Once a resource is connected by road to a city, it is being used. Then there is a certain chance per turn (depending on the resource) that the resource will be depleted, and will vanish from that tile. When this happens, a new

resource of the same type will appear somewhere else in the world. Horses and rubber are exceptions to this, in that neither resource ever depletes.

For resources appearing in forests and jungles, which can be cut down, the initial placements follow the initial distribution. This is pretty obvious in the case of the bonus and luxury resources, but for coal, uranium and particularly rubber, it is significant. Rubber only appears in jungles and forests, and only appears mind-way through the industrial era, when most of those terrain types are likely to be gone from a well-managed empire. But the tiles on which rubber is found will be those with forests or jungles at the [i]beginning[/i] of the game, not the current distribution. For coal and uranium, which can be depleted and hence reappear elsewhere on the map, the initial distribution depends on the initial placement of forests and jungles, but when they are depleted, the evidence seems to say that where they reappear depends on the [i]current[/i] distribution of terrain, so having no forests and jungles can hurt you slightly by reducing the odds of your getting a new coal or uranium resource. Generally, this isn't enough of a problem to warrant planting (or keeping) forests and jungles to increase your odds. The benefit of having better tiles to work with is almost always far, far higher.

1.3 Happiness

One vitally important thing in *Civ III* is keeping your citizens sufficiently happy. A city can be in one of three states: normal, civil disorder, and 'We love the King day' (WLTKD). The state of a city is determined by the happiness of the citizens in that city. Citizens can be either happy, content or unhappy. At the start of the game, your only citizen is content, and your city is in a normal state of affairs. You get a certain number of content citizens in each city, depending on the difficulty level; at emperor or deity, only the first citizen in each city is content. After that, all further citizens are unhappy. If you ever have more unhappy citizens than happy ones, your city falls into disorder. If you have no unhappy citizens and at least half the population of the city is happy, you get WLTKD. In civil disorder, all production of shields and trade ceases. The chance that the city might defect to another civ is increased. If disorder lasts for two or more turns, there is a chance that some city improvements will be destroyed. None of this is good, so avoid letting your cities fall into disorder if you can. This can be done by generating happy faces and content faces.

1.3.1 Content Faces

Each content face makes one unhappy citizen content. If there are no unhappy citizens, it has no effect. Content faces can be generated by building city improvements (temples generate one content face, cathedrals generate three), by some Great Wonders, or, under some governments, by martial law. With martial law, each military unit (non-zero attack and defence values) in the city generates one content face, up to the maximum allowed by the government type. Despotism allows up to two content faces from military policing, monarchy allows three and communism allows four. Republic, democracy and anarchy do not allow military police, so units in cities don't have any effect on happiness levels.

1.3.2 Happy Faces

Each happy face makes one content citizen happy. If there are no content citizens, in makes one unhappy citizen content. If all citizens are happy, there is no effect. Happy faces can be generated by luxury spending, luxury resources or some Great Wonders. Having another civ declare war on you can also cause some extra happy faces for a short time for republics and democracies (although you don't see these faces anywhere, just the results in terms of extra happy and content citizens). For each point of trade that is spent on luxuries in a city, that city gains one happy face (this is done by using the luxury slider, to reduce the amount of trade going into taxes or science, and put some into luxuries instead). Each type of luxury resource that is connected to that city generates one happy face (four of the same resource, such as furs, is only one type, and so only one happy face). If you are trading with another civ to import a luxury resource, each city that is connected to your capital is connected to that resource. Having a market place in the city improves the effects of multiple luxuries, as shown in table 1.5

Table 1.5: Luxuries and Happy Faces with Marketplaces

Number of luxury resources	Number of happy faces from this resource	Total number of happy faces
1	1	1
2	1	2
3	2	4
4	2	6
5	3	9
6	3	12
7	4	16
8	4	20

The effect of happy faces isn't always obvious at first glance. As an example, assume you have a city with four citizens - one content and three unhappy. And you have three happy faces from luxury spending. The first happy face makes the content citizen happy. The second makes one of the unhappy citizens content, and the third makes that one happy. So you end up with two happy and two unhappy citizens, which stops the city falling into disorder. Many players expect the effect of happy faces to make more of the unhappy citizens content, but this isn't the way it works. If you have 5 happy citizens, one content, and three unhappy, you might think that three happy faces could make all unhappy citizens content, and put the city into WLTKD. In fact you need 6 happy faces to do this, as you can work out from the rules above.

1.3.3 WLTKD

A city with more happy than content citizens, and no unhappy citizens, goes into 'We love the King day'. This causes fireworks to appear on the screen above the city in question. WLTKD reduces the amount of waste in the city, which is to say that the number of shields lost to corruption is reduced, thus making the city more productive. WLTKD has no effect on trade. The specifics of the reduced corruption due to WLTKD can be found in section 1.4.2

1.3.4 Specialists

There is one important feature to note with regard to specialists and happiness. When you create a specialist (tax man, entertainer or scientist) the computer will take the least happy citizen first, and make them a content specialist. So if you have one unhappy citizen among several content ones, such that disorder would normally occur, creating a tax man would leave you with a content tax man and several content citizens, and no disorder problem. The entertainer specialist also produces a happy face, with the result that creating an entertainer can in fact negate the effects of two unhappy citizens (one gets turned into the entertainer, the other either gets made content by the happy face, or has his unhappiness counteracted by another content citizen being made happy). If you have to use specialists to contain unhappiness, don't use an entertainer when a tax man or scientist would do the job, since with those you get one extra gold or beaker per turn.

1.4 Corruption

1.4.1 Corruption Basics

The vast majority of what is known about corruption in detail is due to the huge amount of work put in by alexman. Many thanks to him. There is no guarantee that this is exactly correct, but it is very close, and is certainly good enough for an understanding of how it affects strategy. The most important lesson is this: there are two types of corruption. There is 'distance corruption' (C_D) which is corruption due to the distance between a city and your capital. And there is 'OCN corruption' (C_{OCN}), which is due to the number of cities closer to the capital than the city under consideration. OCN corruption is usually larger than distance corruption. The total corruption (C_T) is given by the sum of these:

$$C_T = C_D + C_{OCN}$$

For the following discussion, we will also use the term 'efficiency', which is the complement of corruption. If the total corruption is C_T and the efficiency is E, then:

$$C_T + E = 100\%$$

So a city with 36% corruption has 64% efficiency, for example.

Here are some basic rules about corruption. The total calculated corruption for a city can exceed 100%, but the amount actually seen in a city can never exceed 95%. The shields produced by a city per turn are found by taking the sum of the number of shields produced by each tile being worked by the city, and multiplying by the efficiency. This number is rounded off to the nearest integer (3.4 is rounded off to 3, 3.6 is rounded up to 4). Then the effects of factories, etc. are added to this result. Factories don't reduce corruption, although they appear to. A city producing 12 raw shields per turn with 15% corruption will have 2 shields waste, and generate 10 shields per turn that are used. With a factory, this 10 shields is boosted to 15 per turn, but the waste is still 2 shields per turn. So it appears to the casual observer that the city is producing 17 shields per turn raw but losing 2 to waste - 12% corruption. But this is not the case. Corruption works the same with trade. The total trade from all tiles being

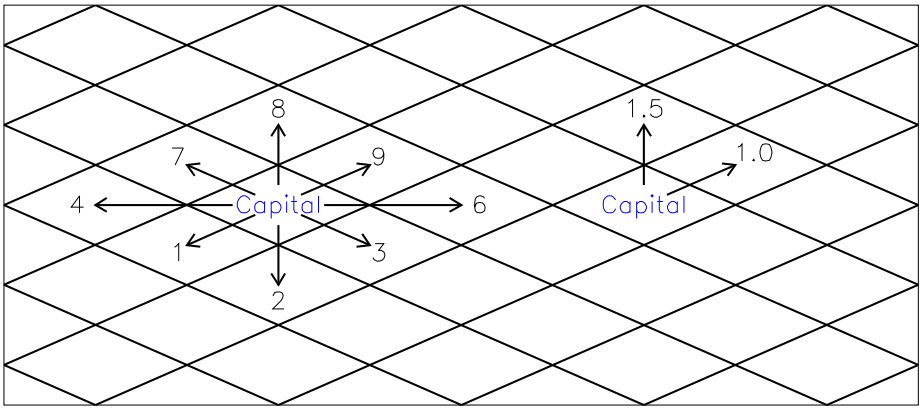

Figure 1.2: Directions in the *Civ III* world

worked is summed up, multiplied by the efficiency, and rounded to the nearest integer. Then it is divided into taxes, luxuries and science, and the taxes and science are then modified by marketplaces, libraries, etc. in the same way that the shields are modified by factories.

1.4.2 Distance Corruption

The first component of corruption is due to the distance of the city from the capital (the city with the palace). The distance used is a rather strange one. Figure 1.2 shows (for convenience later) the directions associated with the numeric keypad, which will often be used to describe directions later, and the 'distance' associated with the two types of direction.

The left hand diagram shows the keypad directions. The right hand illustrates that for the N,E,S and W directions (alternatively the 8, 6, 2 and 4 directions) the distance is 1.5, while for the NE, SE, SW and NW directions (9, 3, 1 and 7) the distance is 1.0. The distance to a city is the distance associated with the shortest route, unsurprisingly.

The distance corruption is given by:

$$C_D = D * F_D * G * 0.5^N * F_C$$

for non-communist governments, and by:

$$D_D = 0.3 * 0.5^N * F_C$$

for communism.

D is the distance, as defined above. D_D is a factor that depends on the map size, and is equal to 3.6 divided by the map size (so for a $60 * 60$ map is it $3.6/60 = 0.06$, while for a $100 * 100$ map it is $3.6/100 = 0.036$). The distance doesn't enter into the corruption calculation for communism; in essence, all cities are assumed to be at the same distance from the capital. G is the government factor. This is 1.0 for despotism, $\frac{2}{3}$ for republic and monarchy, and $\frac{4}{9}$ for democracy. N is the number of corruption reducing city improvements in that city (courthouse or police station in the standard game). WLTKD also counts as a corruption improvement here for calculating shields wasted

due to corruption, but **not** for calculating trade lost to corruption. So each such improvement (and WLTKD for shields) halves the amount of distance corruption. F_C is the 'connection' factor, which is 0.85 for a city connected to the capital, and 1.0 for a city that is unconnected. Connected means that the cities are joined by a valid trade route, through roads, or by sea routes (with harbours) or airports.

The capital is a special case. Normally it has 4% corruption. With a courthouse or police station it drops to 2% (or WLTKD for shield waste), but can never get below 2%.

The total distance corruption is rounded off to the nearest 2% before being added to the OCN corruption.

1.4.3 OCN Corruption

The optimal city number is a quantity found in the editor, which depends on the map size. Broadly speaking, a large OCN allows you to build more cities before corruption becomes a problem. For the purposes of corruption, the OCN (N_{opt}) is modified by a factor F_{OCN}, which is given by:

$$F_{OCN} = \frac{d}{100\%}(1 + g + f_p + (i * N) + c)$$

d is the difficulty level modifier to the OCN found in the editor (as a percentage). g depends on the government type, and is 0.2 for communism, 0.1 for democracy and republic, and 0 for all other government types. f_p is the forbidden palace factor, which is 0 if the forbidden palace hasn't been built, 0.1 if it has, and 0.2 if it has and your government is communism. N is the same as in the previous section, the number of corruption reducing improvements (including WLTKD for shield waste calculations). i is the reduction per improvement, 0.1 for communism and 0.25 for all other government types. c is for the commercial civs - it is 0.25 for commercial civs and 0 for all other civs.

Cities are assigned a rank (R) in order of distance from the capital. For the capital, $R = 0$, for the nearest city $R = 1$, next nearest $R = 2$ etc. Basically, R for a given city is the number of cities closer to the capital than that city (including the capital itself in the count). Cities at the same distance get the same value of R, which depends on the number of cities *closer*. Hence if your capital is surrounded by a ring of 6 cities all at the same distance, they all get $R = 1$, and the next city furthest out gets $R = 7$, since there are 7 cities (including the capital) closer in. The definition of 'same distance' is pretty broad. The distance is calculated according to the definition given previously, and rounded down to the next lowest integer (6.0 stays as 6.0; 6.5 becomes 6.0).

For non-communisms governments, the corruption due to OCN is then:

$$C_{OCN} = \frac{R}{2 * F_{OCN} * N_{opt}} \quad (\mathrm{R} \leq \mathrm{F_{OCN}} * \mathrm{N_{opt}})$$

$$C_{OCN} = \frac{R}{F_{OCN} * N_{opt}} - 0.5 \quad (\mathrm{R} > \mathrm{F_{OCN}} * \mathrm{N_{opt}})$$

For communism, the city rank isn't used, and instead T, the total number of cities in the empire, is. The corruption is then

$$C_{OCN} = \frac{T}{10 * F_{OCN} * N_{opt}}$$

1.4.4 The Forbidden Palace

All of the above ignores the primary effect of the forbidden palace, which is to act as a second capital as far as corruption is concerned. Once the FP is built, each city calculates it's corruption as determined by the palace, and its corruption as determined by the forbidden palace, and the lower corruption value is used. I don't know if anyone has determined whether this is only done for the total corruption, or whether it is done separately for distance and OCN corruption, which could lead to a city having its distance corruption based on the distance to the palace, but its OCN corruption based on the rank centred on the forbidden palace.

In any event, although each city is 'assigned' to either the palace or the forbidden palace for its OCN corruption, it counts *all* the cities closer to the palace or FP to determine its rank, not just the cities assigned to the same corruption centre. Hence having the FP very close to your palace will not produce a big reduction in production, since most of the cities won't have their distance or rank to a corruption centre reduced very much. The best benefit of a forbidden palace is seen when it is a long way from the palace, so that the spheres of influence of both do not overlap with each other, giving you in effect two independent empires. The problem with this is trying to build the FP a long way from the palace (or moving the palace once you've built the FP close to your original capital). The easiest way to do this is using a great leader to rush the project, but another option is the 'palace jump' (see section 3.2.5).

1.4.5 Uses of the Formulae

The first observation is for communism. It spread corruption out more or less evenly over the empire, but corruption in each city continues to increase as you add more and more cities, until you reach the point where every city is 95% corrupt. Communism doesn't do well in very small or very large empires, but can be reasonable in average sized ones. Of the others, democracy is the best. Republic and monarchy have the same distance corruption, but republic gets lower OCN corruption (and also generates more trade than monarchy due to the trade bonus). Despotism is the worst in every regard.

Once you have cities whose rank is more than 50% above the modified OCN ($F_{OCN} * N_{opt}$) it is almost impossible to make them productive. Their calculated corruption can be way more than 100%, and even building all corruption reducing improvements may not be able to bring it back above the crucial 95% mark. Such cities will always be maximally corrupt.

Courthouses and police stations don't do a great deal to address corruption. They make a difference, but not a huge one. Any city showing significant ($> 10\%$) corruption will probably gain some benefit, although only once it is producing enough trade and/or shields to offset the cost of building the courthouse and paying upkeep. The cities in the $10 - 90\%$ corruption range are the ones that benefit most from a courthouse or police station. Cities that are 95% corrupt can benefit, but in reality are never likely to produce more than 1 shield and 1 or 2 trade per turn, and it probably isn't worth the effort of building courthouses in these cities.

Chapter 2

Rapid Early Expansion

2.1 Why Expand?

Ultimately in *Civ III* population is power. If you want to win, you need to have the largest population. Having the highest score is another matter - that depends more on the amount of territory you control. But if you want to keep your territory you need good defences, and a good economic base, which can only come from having population. The more population points you have, the more tiles you work, and the more shields and trade (taxes and science) your civ will generate, which is how the game is won.

A city will work one tile for every population point, plus the city square for free. The free square is one of the factors that makes it better to expand than to try and accumulate population in one city. Consider a scenario where all cities always have 2 excess food per turn (they are all founded on a vast sea of grassland, for instance). Your first city takes 10 turns to grow to size to, and will normally grow a size (gain a population point) every 10 turns after that as well, until reaching size 7 (which it can't do without an aqueduct, or being built adjacent to a lake or river). However, there is also the option of building a settler once you get to size 3, which takes two population points, and can wander off to found a new town, which will be size 1. For the purposes of illustration, the new town will be assumed to be founded immediately. The settler can be timed to be produced the same time as growth to size 3 occurs, so that the city goes from being size 2 one turn, and about to grow, to being size 1 with a settler that goes to form another size 1 city. Table 2.1 gives a comparison of the number of tiles used for different strategies. For each strategy, the size of each city is given, and the total number of tiles being worked by all cities. The first strategy is simply to let the single city grow until it hits the size 6 limit. The second strategy is to produce a settler as early as possible and then let both cities grow to the limit. The third strategy is to produce two rounds of settlers, an then let all four cities grow to the limit.

This table illustrates the two reasons why expanding is good. Firstly, it is clear from studying the number of tiles being worked at a given point in the game for all the scenarios, that the scenario where the greatest number of settlers is produced (and the greatest number of new towns founded) is the one that has the highest number of tiles worked (and therefore the highest income

Table 2.1: Comparison of Single City with Multiple Cities

Turn No.	Single City Only		Single New City			Multiple Cities				
	Size	Tiles	Sizes		Tiles	Sizes				Tiles
1	1	2	1	-	2	1	-	-	-	2
11	2	3	2	-	3	2	-	-	-	3
21	3	4	1	1	4	1	1	-	-	4
31	4	5	2	2	6	2	2	-	-	6
41	5	6	3	3	8	1	1	1	1	8
51	6	7	4	4	10	2	2	2	2	12
61	6	7	5	5	12	3	3	3	3	16
71	6	7	6	6	14	4	4	4	4	20
81	6	7	6	6	14	5	5	5	5	24
91	6	7	6	6	14	6	6	6	6	28

and total shield production). Although producing settlers does cost you slightly in population, this loss is very quickly made up by the fact that you now have an extra city generating new population.

The second reason is that your cities can't grow indefinitely, and will eventually hit the size 6 limit (or size 12 limit if they are next to a lake or river, or once you have built an aqueduct). The single city scenario above stops growing completely after turn 51, while the scenarios that produce more cities can have them all grow to the size 6 limit. Obviously 4 size 6 cities are better than a single size 6 city.

Cities take up room in your empire, so you can't just cram as many as you want into a small space. To have more cities, you need more territory. This is the logic that drives the early land grab in *Civ III*. Each civ tries to claim as large an area of land as possible, so as to have as many cities as possible.

2.2 Early Priorities

From the start of the game, you have several important goals that compete with each other for your civs resources, namely expansion (the founding of new cities), developing terrain (building roads, irrigation, mines), defence (military units) and developing cities (building improvements). All of these take shields to do, and expansion and developing terrain also require population, as can the others at the start when you can hurry production by sacrificing population.

2.2.1 Expansion

As mentioned above, the most important goal in the early game is expansion. You want to claim as much territory as possible, founding cities that are small and not worth a great deal immediately, but which will soon grow into powerful production centres. The AI (and other human players) will be doing the same thing, so if you are slow in expanding, you will find yourself trapped in a very small territory compared to the other civs, have very few cities, and be too weak to be competitive.

2.2.2 Defence

The second priority, nearly as important as expansion, is defence. It is no use throwing up cities everywhere if they are undefended, because your neighbours will just walk in and take the cities themselves. Don't build cities for your opponents. Expansion isn't about throwing cities all over the place, it is about claiming land, and for that to happen you need to be able to keep the land you claim. Don't expand far beyond your ability to defend yourself, or you'll find that the shields and population you put into settlers are wasted, and you are in a worse position than if you'd expanded more slowly but with better defences.

2.2.3 Developing Terrain

The third priority, developing terrain, is a little lower than the first two. Working tiles developed by your workers gains you more gold and shields, which can drive expansion more efficiently, but developing tiles is also something that can be done once expansion is over to make your cities into something impressive. But to some extent, the first two priorities are helped by developing your terrain. Although it costs population and shields to create new workers, the effects of building mines and irrigation (to boost military and settler production) and roads (gold, but more importantly, mobility for your units) can increase the speed at which you expand, and also your ability to defend yourself. You can get by with a smaller army if you have a good road network to get them to where they are needed quickly. If you have higher production, you can produce more military to defend your territory whilst waiting for your cities to grow enough to produce another settler. It is usually worth the investment in workers to develop terrain pretty early on.

2.2.4 City Improvements

The last priority, city improvements, is pretty low down in comparison to the others. Most improvements take a large investment of shields, which will detract from your defence and expansion. The time for improvements is once your expansion is over (all the available land is taken by one civ or another). There are situations where city improvements are useful early on though. Barracks, especially for militaristic civs, can be built quickly, and the benefit of having veteran units rather than regular ones can be worth the investment. A granary can likewise boost the rate at which a city grows, enabling it to pump out settlers at a higher rate. Temples can be useful (especially for religious civs) in some towns to allow their cultural borders to expand quickly to claim strategically important tiles. City walls can occasionally be valuable in border towns that are in danger of being attacked. Generally though, most improvements should wait until the rapid early expansion (REX, at it is usually known) is over, or at least until that town is no longer contributing to it.

2.3 How To Expand

2.3.1 Identify Powerful Tiles

Your very first task is to found a city. Generally it is best to found the city just where you find your settler at the start, although you may see a better sit on one of the adjacent tiles. But build your city early. It is better to plonk a city down, and scout around a bit whilst building your first settler, and then find the optimum site for your second city, than to wander around with your first settler for 10 turns before finding a good spot for your capital.

Once you have your city down, you need to identify which are the most powerful tiles around for you to use with your labourers. As a general rule, any tile with cattle or wheat is very good, as are bonus grassland tiles. These are the tiles you want your starting worker to move to and develop quickly. **PAY ATTENTION TO THE DESPOTIC TILE PENALTY**. Don't waste time irrigating a bonus grassland, or mining a plains tile with cattle. The benefits of the improvement are eaten up by the tile penalty. Equally, understand that plains with cattle, although only showing 2 food, is really 3, so irrigating it will make a difference. Irrigating flood plains makes a difference. Concentrate your efforts on food and shields, rather than trade, which is much easier to come by. The most powerful kind of tile you can get is one that gives 3 food and 2 shields per turn. Next best are 3/1 and 2/2 food/shields per turn. 2/1 tiles are reasonably. 3/0 and 1/2 tiles are useful in conjunction with each other, or with other good tiles.

Look at which tiles you have, and what they can be developed into with mining and irrigation. Then plan your worker's route to develop those tiles. Planning to do them in the right order can save you a few turns of moving your worker around. Understand how long worker jobs take. See table 2.2

Table 2.2: Time Taken for Worker Tasks

Task	Normal Turns	Industrious Turns
Build Road	3	2
Build Road (hills, forest)	6	3
Build Road (mountain, jungle)	9	5
Mine	6	3
Mine (hills)	12	6
Mine (mountains)	18	9
Irrigate	4	2
Chop Forest	10	5
Clear Jungle	24	12

Clearing jungle is very time consuming. If you are unfortunate enough to have a starting position that abounds in jungle, you are going to need a lot of workers, and a lot of time before you get a good civ organised.

2.3.2 Scouting and the Map Generator

Expansionist civs get the advantage of having a scout from the start, which can quickly explore new territory. The more of the world you can see before you build your second city, the better you can plan your empire for long-term potential. You will always want to produce some units to explore (and some to guard your capital) before you start producing your first settler. Identify powerful tiles for your next cities. Locate luxury resources. You will want to place cities initially in three types of locations: to use powerful tiles, to claim luxury or strategic resources, and to claim strategic territory (particularly narrow necks of land that can be blocked to claim the whole territory on your side of them). Good scouting will give you information early on about where important city locations are going to be, so you can try and beat the other civs to them.

Understanding the Map Generator

Understanding the kinds of worlds the map generator throws out is important to scouting efficiently. And most of this section is going to taken directly from an article written by Aeson.

When starting a game you get information about 9 tiles most of the time, and a location from the mini map. This gives you your latitude and longitude right off, and an idea as to what type of environment you're in. From this information it's often possible to figure out what type of game style will work best, where the AI's are likely to be hiding out, and where natural barriers (coastline specifically) are going to reside.

This is all possible because the map generator, while not as consistent as some would like (getting stuck on that small island on a Pangaea game will do it for most of us), follows definite rules for tile placement. Understanding these rules can give a generalised knowledge of the map even before it's uncovered. The best way to get a feel for the map generator is to just look at a ton of maps... but here are a few guidelines.

Maps generally follow gradients from tundra near the poles, grassland, plains, desert, plains (not as often), grassland, and jungle at the equator. These are of course horizontal bands, and their widths vary according to the weather settings. When you notice these bands tilted one way or another it's almost always because of a shoreline east or west (roughly mimicking the tilt of the terrain band). If you're on grassland, middle latitudes, with plains showing southeast, it's a good bet there is a northwest coastline nearby. Vertical bands are especially easy to spot. Another tell tale sign is starting where there should be jungle (equatorial) and seeing a lot of grassland/forests. Every once in a while there are gaps in jungles, but most of the time it means you have a coastline opposite the jungle that you do see. It's also a good sign that the Pangaea you're expecting isn't, or is of the long snaking variety.

AI placements are even easier to deal with and predict. Starting near the poles in the grassland belt is very common, as is just north or south of the equatorial jungle. The longitude is anyone's guess, but the latitude in this case seems relatively stable. For scouting purposes this is very important. The sooner contact is made the better the chance that your starting techs will be worth something in a trade. The AI's will do their trading without you if they make contacts first, leaving you out of the loop from the very start.

(end of Aeson section).

The generator's algorithms for resources can also be informative. Bonus and strategic resources are fairly evenly distributed within their terrain types. Luxury are usually clumped together. Typically you will find most of the world's supply of a given resource in a pretty small area, with a small number of individual luxury resource tiles scattered elsewhere. In an eight civ game, this usually gives each civ a near monopoly on one luxury. It is worth bearing in mind that on 5 billion year old maps you will often find very few gem resources, or even none at all.

How to Scout

(Another paragraph from Aeson)

My first scouts (whether that's a scout, warrior, or whatever) almost always take off east and west, unless bounded by coastline. Once they run into an AI, then they head north or south (whichever has more potential) until they get to the jungle barrier, then follow along that edge to preserve movement points for mobile units, and to make contacts in any case. I try not to run into coastlines too much, and use the aforementioned terrain hints to better direct the scouts.

Goody Huts

Although you don't control what comes out of a goody hut when you enter it, you can influence the chances of getting a settler to some extent. You will not get a settler from a goody hut if you already have a settler wandering around, have a settler in production, or have more than the average number of cities. Short of deliberately slowing your expansion, you can't do anything about the last one, and founding fewer cities in the hope of getting a single settler is obviously not a good idea. But you can work with the first two. If you already have a settler, wait until it reaches its new city site before opening the hut. And before entering a hut, make sure that none of your cities are building a settler. If some are, you can switch them to something else, open the hut, and switch them back with no problems at all. This doesn't guarantee you a settler, but you will find yourself getting noticeably more out of huts than if you don't follow these guidelines.

2.3.3 Settler Pumps

One of the useful ways to get a better REX is to specialise cities for specific tasks. The first such task is the production of settlers. The 'standard' rate of settler production is essentially one every 20 turns, since it typically takes 20 turns to grow the two sizes necessary to produce enough population for the settler. In practise it is quite easy to produce towns dedicated to settler production that can produce settlers every 10 turns or less, and as such it is sometimes worth spending a bit of time to develop them, delaying the first settler, since they quickly make up for it once they are in full flow.

Normally, producing settlers as quickly as possible from the start, means that the city producing them spends all its time at sizes 1 and 2, producing settlers just when it reaches size 3. Sometimes letting the city grow to a larger size may help it make settlers more quickly. A size 4 city could be working 2

tiles with 3 food but no shields,, and two good production tiles, giving enough population (and shields) to produce a settler every 10 turns, with the city always being size 4 or 5. The first settler is delayed by 10 or more turns, but produces settlers much more quickly after that.

The second option is to build a granary, if you have the pottery tech (which expansionist civs start with). With a granary, you start each size with the food of the city already half full, so you only need an additional 10 food for the city to grow, which essentially means that it grows twice as quickly as a city without a granary. The down side is that you need 60 shields to build a granary in the first place, which can take quite a long time. Industrious civs have a distinct advantage here (and industrious expansionist civs have the best combination for a good REX) since they can build mines and irrigation more quickly, and can chop down forests in only 5 turns. This gives 10 shields to the nearest city, and can shave a few turns of the time to build a granary. With some good tiles and one forest to chop down, an industrious civ can build a granary and get a settler out only a few turns later than if it built the settler as soon as possible, and then has the big advantage of producing subsequent settlers almost twice as quickly.

But in all honesty, you usually have to work at finding good settler pumps. Sit down with some paper, look at the tiles available to you, and how you are going to develop them. Look at which tiles you are going to use for each possible city size. See if you can get a combination going that gives you rapid growth combined with enough shields to build a settler. See how long it will take to build a granary, and how quickly you can produce settlers with a granary, as opposed to without one.

If you can't be bothered to do all of that, because you want to have fun playing a game rather than spend time adding up numbers, then as a rough guideline, if you can produce far more shields than you need for a settler in the time it takes your city to grow two sizes, then you'll benefit from a granary (since you won't take long to build it, and you will be able to take full benefit of the shorter time taken for the city to grow).

As an obvious footnote, a city can also be set up as a worker pump, to produce a lot of workers in a short time. These can either be used to develop terrain, or to add population to more slowly growing cities - an indirect way of exporting food from a city which has plenty to a city which doesn't have very much. Later in the game you can get a lot of value from producing workers in small cities (which need 20 food to grow) and adding them to large cities (which need 40 food to grow).

2.3.4 Barracks Cities

A pretty simply idea. Build most of your military units in a small number of cities that produce nothing but military. They can build a barracks early on, and then produce lots of veteran units. Since they are not producing settlers, these cities will tend to grow, and produce units quite quickly, although you may run into happiness problems if a barracks city is much larger than the settler and worker pumps. This works best in conjunction with settler and worker pumps, which then don't need to build any military units (or barracks). By specialising, you minimise the number of improvements you need to build in each city, and make each city more efficient at what it is producing. In this case you can have

one city producing settlers, while the one next to it is a barracks city producing spearmen to defend the new settler as they go and found new towns. The size of a barracks city can be trimmed if need be by producing occasional workers (or settlers, if your defence production is outstripping your settler production).

One increasingly used strategy is to build barracks cities as temporary military camps, which build a barracks, followed by a stream of units, and then gets disbanded later on, preferably by converting all of the population into workers or settlers. More on this can be found in section 3.2.3.

2.3.5 Wonder Cities

You won't want many of these. But generally, out of the first four cities you build, it is worth setting one of them to work on a great wonder, or something that can be switched to a great wonder later (such as the palace). You don't need to build the wonder you are aiming for straight away. Just build any wonder, and when the one you want becomes available, switch the production to that wonder. On the higher levels you have to start pretty early to have a chance of grabbing one of the ancient era wonders, unless you are lucky enough to get a great leader early in the game.

2.3.6 Production Cities

Not really a specialist city at all. Once you get near the end of the REX, when you are running out of room to expand in to, you probably won't need any more settler pumps or barracks cities, so you can start the new cities on developing infrastructure, notably temples, libraries and market places, plus occasionally useful things like workers and more units.

2.3.7 How Many Workers

Different people prefer different numbers of workers. My rule of thumb is if I find a city that is working tiles that aren't developed and don't have a worker heading there already, then I need more workers. Usually it is the newly founded cities, which can't produce much of use immediately, that do produce one shield and two food per turn, and so can turn out a worker in 10 turns in order to connect that city to the road network and develop its tiles.

Other people prefer rules like one city per worker for industrious civ, 1.5 per city for non-industrious (also depending on how many slaves you've managed to capture).

2.3.8 The Road Network

Roads are vital for many reasons. Firstly, they give you extra trade, which means quicker research or more science. Secondly, once a city is connected to the capital by road, corruption in that city decreases (the distance portion of the corruption drops 15%).

The third reason requires planning roads more carefully. This is to build the military road network. You need a good setup of roads to move your troops around. Of particular importance is to take account of rivers. Before you get engineering, roads that cross rivers don't have bridges, and crossing them costs

one movement point (as though the tiles weren't roaded). When you are building roads to allow troops to get to your frontier towns as quickly as possible, try and plan them so that units will cross the river on their third move, so you still get all three moves along the roads and also cross the river. Sometimes this means you need to build roads along both sides of a river for a bit, to allow troops to move in either direction without being slowed down. Build roads that go from A to B by the shortest route. Don't make a road wander off to the side to connect up a luxury - connect the luxury by all means, but still build the shortest road possible between cities. It can make the difference between reinforcements arriving on time and a turn too late. Look at how units are going to move from city to city, and plan your network accordingly.

2.4 City Sizes, Happiness and the Luxury Slider

As discussed in section 1.3, the bigger you cities get, the more likely they are to fall into civil disorder, and stop producing anything. When you have more unhappy citizens than happy ones, disorder occurs. Unhappy citizens can be made content by a variety of means. The problem is that once you are at the maximum military police (2 under despotism), have connected all the luxuries you can find, and possibly built temples, there is a strong tendency to then control unhappiness by making the unhappy citizens into specialists, which makes the city content, but stops it from growing. The reasoning is usually that we are happy stopping the city's growth to prevent unhappiness becoming even more of a problem. This overlooks the benefits of one of the most powerful and underused tools in the game: the luxury slider.

The luxury slider uses trade to create happy faces, which of course help with unhappiness. But why is it worth doing this? First of all, it's not if you don't have good tiles, or haven't developed the normal tiles around you. At the very least, you want every tile you are working to be producing one trade. That is the 'break even' scenario.

Suppose you have a city, all of whose tiles produce 2/0/1 F/S/T. It can get to size 3 without any unhappiness. At size 4, you can make a citizen a tax man, stopping the town's growth. The town then produces 2/1/2 from its centre square, 2/0/1 from the 3 tiles being used by labourers, and 1 gold from the specialist. This is enough food to keep it stable, and 6 gold per turn. The other option is to increase the luxury slider enough so that 1 trade is diverted to luxuries. This way you keep producing enough food to keep growing, generate 6 trade per turn, 5 of which come to you as gold and one of which is spent on luxuries. At size 5 you can adjust the slider to give 2 trade to luxuries, keeping the city stable, generating 5 gold and 2 luxuries per turn.

In this scenario, using the slider gives you a slightly lower income than using specialists to limit the growth, but with the big advantage that once extra luxuries are found, you already have a city big enough to take advantage of them to the full, rather than having to wait for it to grow.

This is a worst case scenario though. Even in despotism, any tile can be improved to give either 1 shield and 1 trade, or 0 shields and 2 trade at the very least (the only tiles that don't produce any shields and can't be improved by mining are flood plains, and they always have at least 1 trade without roads from the river). So faced with an unhappy worker when your city grows, you

can either make him a specialist, or spend one trade on luxuries, and set him to work a tile that produces more than that; you will either get the 1 trade back from the new tile plus one or more shields of production (so no reduction in trade, but more shields), or get more trade back than you are spending (spend 1 trade on luxuries, and get 2 more back as gold or science. Table 2.3 compares the production in shields and trade of cities working the city square (2/1/2) and either 2/1/1 or 2/0/2 tiles. The cities compared are for a size 4 city with 1 tax man, vs a size 6 city with 3 trade spent on luxuries (i.e. comparing stopping a city's growth once unhappiness starts to show vs letting it grow and controlling it with luxury spending). The 'Adjustment' column is the money from the tax man or lost to luxuries.

Table 2.3: Luxury Slider Analysis

City Type	2/1/1 Tiles					2/0/2 Tiles				
	Initial		Trade	Final		Initial		Trade	Final	
	S	T	Adjustment	S	T	S	T	Adjustment	S	T
Size 4 with Tax man	4	5	+1	4	6	1	8	+1	1	9
Size 6 with Luxuries	7	8	-3	7	5	1	14	-3	1	11

In the 2/0/2 case we end up with more trade, and in the 2/1/1 case we trade off 1 trade per turn for 3 extra shields. Considering that rush buying (when available) costs 4 gold per shield, giving up 1 gold for 3 shields is an absolute bargain.

In reality you will frequently have better tiles to work than those give here. Particularly when you get to republic, and get the trade bonus, you worst tiles will be producing 1 shield and 2 gold, and many will produce more than this. Using the luxury slider like this will increase the output of your empire in every way, period.

One extra complication arises in that you can't set the slider level separately for each city, and your cities will likely be different size and have different happiness needs. This is actually less of a problem than it first appears to be. Luxuries are produced as a certain percentage of the trade in that city. As a rule, the cities that need help from the luxury slider are the large ones that are producing more trade, and so will produce more luxuries, while smaller ones might produce no luxuries. Broadly speaking, luxuries will be generated more or less where they are needed. In a despotism, with the option of military police, units can be moved from cities with more luxuries than needed to ones with fewer luxuries than needed, which allows you a certain leeway in fine tuning things. As you get more cities built, and more improvements such as temples in some cities, you might find yourself wasting some luxuries in one town, while another town needs an entertainer to keep it happy, without being able to do anything about it. That's life. Overall, your empire will still be vastly more productive that if you left the luxury slider at zero for the entire game.

One final note of caution: It isn't worth using the luxury slider unless the majority of the extra citizens you can support will be working on developed tiles (road with mine or irrigation). If you don't have enough workers, so that your labourers are using unimproved tiles, don't bother with the slider: control happiness by building more workers in the large cities until you are ahead of the game in tile improvements.

Chapter 3

City Placement

3.1 The Three Phases of the Game

One of the most important aspects of getting an efficient empire is how you place your cities in relation to each other and the map. Good city placement makes the best use of the available land. Bad city placement will leave you generating only a fraction of the income from your territory compared to what it is capable of. First you have to understand the three factors that limit your production, and how they come in to play.

3.1.1 Population

Early in the game, you are heavily limited by population. You have a finite number of population points with which to work tiles, and a lot of tiles to chose from. If you only have 5 population points in your empire, you want them to be working the five best tiles available, and you want them to be fully developed tiles. Unless there is a pressing strategic reason to do otherwise, you first cities should be founded in sites where they can work powerful tiles and quickly contribute to your empires production in a big way. The population limited part of the game lasts until the end of the REX, and probably for a bit after that. But the biggest impact is with the first few cities. Found these well and you will be able to claim a lot of territory with your REX.

3.1.2 Land Area

Once you have finished REXxing, you begin to enter the second phase of the game, where the territory available to your civ is fixed (in the absence of wars to expand your empire, that is). To start with you will still be population limited, but the limit you eventually come up against is the amount of land you have, when all your cities are close to their maximum size (12 or 6, depending on aqueducts, rivers and lakes). The more you emphasise growth (and use the luxury slider) the earlier this occurs. In this phase of the game, you want to use as many tiles as possible within your borders. This can actually mean packing cities in very close together. Specifically, using a 'no overlap' city spacing (so each city has access to all 21 tiles in it's radius, and doesn't share any with other cities) will mean that you are only using 13 out of every 21 tiles when all

your cities are size 12, or only 62% of the tiles in your empire. It is possible to vastly improve on that with a closer spacing. You only have so many tiles in your empire, and you want to use as many of them as possible.

3.1.3 Corruption

The final limiting factor to your empire's production is corruption. Cities further away from your palace or FP are increasingly corrupt, until you reach the point where all cities beyond a certain distance are 95% corrupt. Compared to the production you will have in your core cities by this time, these outer cities contribute very little to your empire. You only really reach this stage by going to war several times, and conquering a few of your neighbours to take all their land. When you are corruption limited, you can maximise your output best by aiming for large (size 20) cities that don't overlap and use the full 21 tiles of the city radius per city. Having smaller cities will mean that you get more cities in a given area, but those on the edge suffer greater OCN corruption. So the tiles in that area worked by the smaller cities suffer have more of their output lost to corruption. Larger cities means that those tiles are being worked with a city with lower OCN corruption, and so are having more efficient use made of them.

3.2 City Placement Strategies

3.2.1 City Rings

One (ab)use of the OCN corruption formula is the fact that cities at the same distance from the capital share the same rank R, and so have the same OCN corruption. What this means in practise is that rather than having lots of cities at different distances from the palace, it is worth planting them in slightly different positions so that they fall on rings of equal corruption. This is helped by the fact that the distance algorithm used appears to round distances down to the nearest integer. This gives quite some flexibility in placing cities while still taking advantage of the ring bonus. Figure 3.1 shows the rings of equal distance from the capital.

Figure 3.2 shows the same thing with a 'typical' city arrangement overlaid, where the red circle indicates the palace city, with the thick red lines indicating the city radius, and the black circles and think lines indicating the positions and radii of other cities. This is an idealised 'optimal city placement' (OCP), which in reality isn't optimal for most of the game. It *is* the kind of placement that works best in the corruption limited phase of the game. It is a pattern designed to use all the tiles (no tiles fall outside a city radius) with the minimum of overlap. In this case, each city can use 20 of the 21 potential tiles. There is a similar pattern with no overlap, but which leaves one tile gaps around such that there is one unusable tile for each city, but each city can use its full quota of 21 tiles.

One thing to notice is that the six cities in the inner ring around the capital all fall at the same distance. This means that they all have the same rank for the corruption calculation ($R = 1$ in this case). The second ring however lie at a variety of distances, from 8 to 11 tiles (2 at 8, 2 at 9, 6 at 10, 2 at 11). In terms of values of R, this means we have 2 cities with $R = 7$, 2 with $R = 9$,

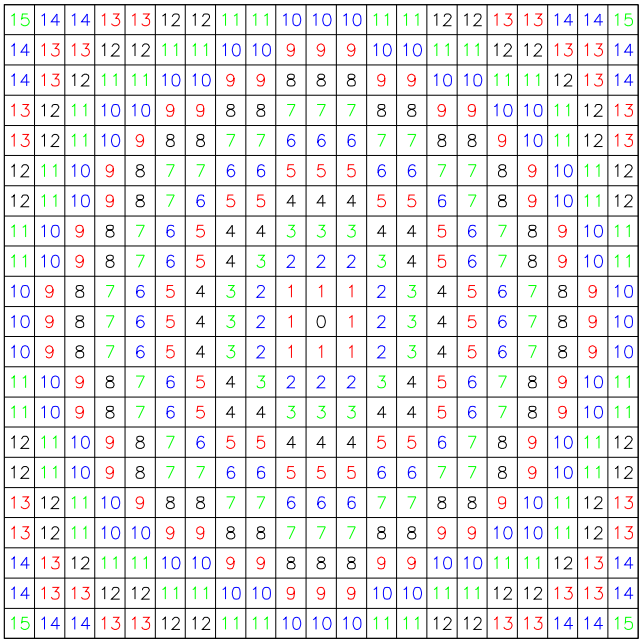

Figure 3.1: Distances of cities from the palace

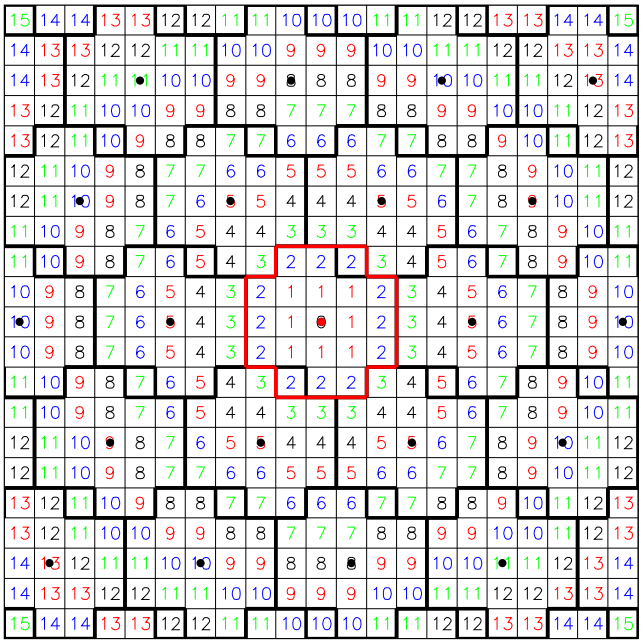

Figure 3.2: An example of city placement

6 with $R = 11$ and 2 with $R = 17$. If it were possible to get them all at the same distance, they would all share the same value of R, namely $R = 7$. On a standard map (OCN=14), that corresponds to an average corruption in these cities of about 40% in the OCP case, and 25% in the ring city case. The ring city placement (RCP) scenario won't be able to use the 'optimal' 20 tiles per city, but the decrease in corruption more than compensates for that.

The OCN case has 12 cities, average corruption 40%, working 20 tiles each, for an effective production of $12 \times 0.4 \times 20 = 96$ tiles. To do better than that, each city in the RCP scenario has to work 11 or more tiles, which is extremely easy. In practise they can work around 17 tiles, for an effective production of $12 \times 0.75 \times 17 = 153$ tiles, 60% more than in the OCP scenario. So in this idealised scenario where you can build cities wherever you want in any direction, RCP offers a huge advantage over OCP. The advantage in real games, where lakes, coastline and mountains can get in the way of putting cities where you want them, can reduce the benefit, but planning rings can still offer a substantial improvement over just putting down cities without careful planning. And you can often improve the situation by careful use of the forbidden palace and palace jumping (see section 3.2.5).

3.2.2 Borging

This section is actually misnamed. I'm using Borging to refer to a strategy of building cities more closely packed than the OCP strategy. As noted above, the OCP strategy reaches peak efficiency in the late game, but is rather wasteful in the early game, where you end up using about half of the tiles available to you on average for 2/3 of the game or more. And the early parts of the game are the most critical. Fall behind too far in the ancient era, and you'll usually fall further behind and be vulnerably to invasion from your technologically superior neighbours. Borging is a pretty simple strategy of building your cities more closely together, to improve your performance in the early game, at the expense of a worse performance later on, when you are usually marking time until you can reach one of the victory conditions. Rather than building cities with 5 spacing (the OCP approach - cities are generally 5 moves apart), build them with 4 or three spacing - i.e. with considerable overlap. With 4 spacing, each city has 16 tiles to work, and with 3 spacing each city has 9 tiles. Of course, you can also use a mixture of these, and don't have to stick to any kind of regular grid. But the basic idea of building cities with lots of overlap, figuring that they are going to be sizes 6-12 for the most crucial parts of the game, can greatly improve your production in the ancient era and middle ages.

Obviously, this can also be combined with the RCP strategy to reduce corruption. You'll get fewer cities in each ring for obvious reasons, as you go for more dense placement patterns.

3.2.3 Ralphing

Ralphing (named after Sir Ralph, although he denies being the one who first came up with this) is an attempt to get the best of all possible worlds. The crucial idea is one of disposable cities. You want to lay out your permanent cities in some kind of OCP pattern, but then to make use of the otherwise redundant tiles by founding temporary cities in the gaps between them, giving a very dense

collection of cities. Since the temporary cities are going to be abandoned in the long run, they don't build any improvements apart from barracks, and basically are used to churn out military, workers and settlers (even when you've finished expanding, you'll still need settlers to found cities after wars, since some cities will get razed, opening up space for new cities). This allows you to make the best use of limited land in the Land Area limited phase of the game (much like the Borging strategies). Once you reach the corruption limited stage, or once you are able to start building hospitals, then you start to disband the camps, preferably into workers which can be added to the cities with new hospitals to quickly get them up to size 20 or so. In this way you very quickly switch from making the most of the Land Area limited phase with a dense build, to making the most of the corruption limited phase with an OCP-type build.

It has to be said that this strategy requires careful planning and discipline. It's advisable to give your temporary cities names that indicate they are temporary (calling them all 'Fort ¡something¿' is one way of doing it). And it is very easy to give in to the temptation to build some other improvements in these towns, and then to end up not abandoning them when you should (or at all). Even not abandoning them is better than going for a pure OCP build in practise, but it is better to bite the bullet and do it. Also, be aware that disbanding camps close to your capital might need to be done rather early - due to the way OCN corruption works, disbanding a camp that works 5 tiles near your capital might lower corruption in another 20 cities, each working 10 tiles further out. If disbanding the camp reduces corruption by 5% in each of those cities (which is entirely plausible), then you lose the 5 tiles for the city you've abandoned, but gained in effect 10 tiles from the decrease in corruption in the further out cities. So if your empire is reasonably large, don't keep temporary cities close to the centre; get rid of those and keep the ones further out.

3.2.4 Putting It All Together

Obviously there is no reason why these strategies cannot be combined, beyond the fact that in practise it can be quite hard to do, and takes a lot of planning. But some kind of RCP/Ralphing strategy (Rings of Ralph?) - building your permanent cities and camps in rings to take advantage of the RCP method, is the best current guess for some kind of optimal approach to city placement in *Civ III*. Not everyone is prepared to put in the work to do this; after all before you found your second city, you have to look at the terrain you've explored, decide where you want your palace or forbidden palace to end up, and plan a set of rings of permanent and temporary cities, taking account of the geography of coastlines, lakes and mountains where you can't build. You could quite easily spend hours studying bits of paper at this point, trying to find a scheme that works on the map in front of you. For some people, that's part of the fun. For others, it's just a game dammit, and they just want to get on with it. Do whatever gives you the most fun.

Back to the plot, figure 3.3 gives an example way of organising your cities in the Rings of Ralph (RoR) configuration. There is absolutely no claim that this is the best way to do it, it just happens to be one way that incorporates both the temporary camps and the ring cities. The star indicates the position of the capital. Filled circles indicate permanent cities, while open crosses indicate the positions of temporary cities. Colours are used to indicate the tiles available to

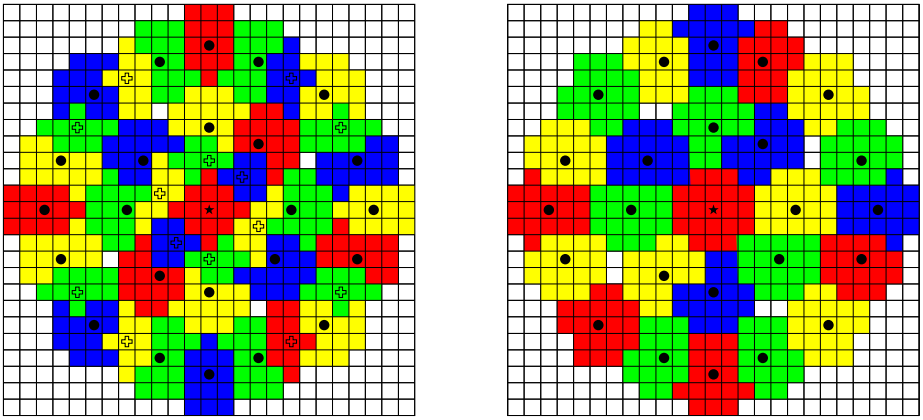

Figure 3.3: An example of the RoR strategy

each city (if you can't see the colours, well they are there, but some postscript viewers have trouble showing them. Print it out and see).

This example uses three rings in the early to mid game. Permanent cities all have 12 tiles to work in addition to the city square. Temporary camps are used to work the remaining tiles (some camps have to go over size 6 to make full use of the available tiles). The inner ring of 6 camps are all at distance 3 from the capital. The middle ring of 8 permanent cities are all at distance 5. The outer ring - 16 permanent cities and 8 camps - are all at distance 10. It may well be possible that even early in the game the production of the whole empire is better without the inner temporary ring. (The 6 camps use 44 tiles between them. The 32 outer cities and camps use 362 tiles between them, and have their R decreased by 6 when all the inner camps are disbanded. If they reduce corruption by 12% when the cities are disbandedm you make a net gain in empire production). The right hand picture shows just the permanent cities and the tiles they use once the camps are all gone. There are some gaps with tiles that can't be used, but also some overlap between cities, such that each one can get to size 16 or 17. Moving the cities slightly further out would reduce the overlap at the expense of leaving more unusable space. As said above, there is no guarantee that this particular layout optimises land use.

Some people might be concerned about the waste involved in building settlers for temporary cities. There are a few reasons why this isn't too much of a problem. Firstly, a settler pump can produce settlers very efficiently (far more efficiently than it can produce anything else). Secondly, cities at size 6 can also produce settlers efficiently. When the city has a full food box, produce a settler. The city drops to size 4 with a full food box. It grows to size 5 next turn, and you can add a worker to bring it straight back up to size 6. Producing workers for this can be done easily enough for the same reason - you only need 10 shields and 1 turn when you drop back down to size 5. It costs you a few shields, but very, very little growth, since the population is coming from cities that otherwise cannot grow. Worker pumps that grow extremely quickly and can produce workers every 2-3 turns can be set up to provide a good supply of population to make other cities grow more quickly, and to boost settler production. The third reason is that the settlers can be regained when

the city has to be disbanded (although that comes at a time when settlers are less critical than in the early game). To disband a city into a settler, you have to finish building the settler when the town is at size 2, with one citizen a specialist so the town isn't growing. When the settler is finished, the town disbands.

3.2.5 Placement, Palaces and Palace Jumps

It isn't necessary to plan your city placement based around your current capital. Much of the time your starting city will be on the coast, or near the end of a peninsula. In short, it won't be in a place where you can take full advantage of the corruption-reducing effects of the palace. To that end, you will want to focus your empire around an intended future palace site, and the planned forbidden palace site. As a rule, you want to look where you want your two groups of cities to be, and stick the forbidden palace in the middle of one, and the palace in the middle of the other.

To that end, you should usually plan on building the forbidden palace not too far away from your initial palace, and setting your initial cities out in rings based on the intended position of the FP. The FP can be built quite easily this way because it is built in a moderately productive city, and so can be finished in a reasonable time. The palace can be moved by using the 'palace jump' technique (or by using a great leader, if you have one handy).

Palace Jumps

The palace jump formula was discovered by DaveMcW. If you disband your capital (or have it razed by another civ, or captured), a new palace is built for free in another city, giving you a new capital. It is possible to manipulate the mechanism so that you can move the palace to the city that you want it to be in, so you can move the palace anywhere you need it, without using a leader, as long as you are prepared to give up the current capital. If you plan from the start for your capital to be a temporary city, then this shouldn't be too much of a problem for you, and the benefits of getting a well placed capital are far more than the problem of losing a small town.

Once the capital is disbanded, each of your towns is assigned a score.

- 1 point for each native citizen in the town (i.e. 1 point per city size if all citizens are from your own civ).
- $\frac{1}{3}$ point for each foreign citizen in the town
- $\frac{1}{3}$ point for each 'neighbour' town (size 1-6)
- $\frac{2}{3}$ point for each 'neighbour' city (size 7-12)
- 1 point for each 'neighbour' metropolis (size 13+)

A city's 'neighbours' are any cities within 8 tiles, namely those cities in a 17×17 square centred on the city in question. The old capital doesn't count here; it is disbanded before the calculation takes place. The city with the most points becomes the new capital. In case of a tie, the city which is higher up the city list becomes the new capital. Normally this will be the oldest city, but if some cities have been razed in the course of the game, there is no guarantee what will happen in the case of a draw.

To get the palace to jump where you want it, you need to boost the size of your target city with native population (settlers or workers), and reduce the population of other large cities (by building workers or settlers) until the target has the highest score. Once the palace jump is complete, the workers are settlers can be added back in to the cities, to bring them back up to the size they were before the palace jump was done.

The same formulae can obviously be used to predict where an enemy's capital will move to when you take the old one.

Chapter 4

Making the Most of Your Workers

4.1 Don't Waste Those Moves

It is very easy to throw away a considerable fraction of the efficiency of your workers by using them incorrectly. The easiest way to abuse your workers is to fully automate them so they are under the control of the computer. Never do this. Control them yourself - it doesn't take that much effort.

There is a trade off between finishing jobs quickly, and getting the most out of your workers. Three workers together can finish a road in one turn, which can be necessary sometimes, but three workers working separately will build roads in more tiles in the same amount of time. If you stack the workers, then turn 1 they move on to a new tile, turn 2 they start and finish a road on that tile. Turn 3 they move to the next tile, turn 4 they road that tile, etc. It takes two turns to do one tile in effect, because one turn is spent moving the workers.

If the workers work independently, then turn 1 they all move on to three different tiles. Turn 2, they start work, and at the end of turn 4 they finish the roads, and can move to the next tiles on turn 5. That is 3 tiles roaded in 4 turns, rather than the 2 from stacking the workers - 50% more productivity when it comes to road building. The same is true for other improvements, although the change in productivity depends on how much you stack the workers. This remains true as long as workers have to move to a tile on one turn and start work on the next turn. Moving two workers on to a new tile by road and starting them on a mine on the same turn doesn't cost you any efficiency (although you've probably lost something by building a road there and not building a mine while the worker was still there).

You can also lose out by stacking too many workers on a job. If building a mine requires 6 turns, 3 workers can do it in 2 turns, but 4 workers will also do it in 2 turns. Make sure you know how many workers (and/or slaves) are needed for a job, and don't put on workers that are not going to reduce the time to completion for the task.

There are exceptions to the not stacking workers rule. If a job needs to be finished soon, it might be worth the lost worker turns to get more turns of productive use of a tile by a city. If, for example, you have a city in the middle

of a jungle, clearing a few tiles that can be worked productively in a short time is more useful than clearing all of the jungle simultaneously 20 turns from now. You have to decide, based on the game situation, which are the most important priorities for you, and whether the lost worker turns are compensated for by filling an immediate need for some city.

As hinted at above, you also waste moves by having a worker move onto a tile, do one improvement, and then move somewhere else, only to come back later to finish off the tile. If at all possible, do all the improvements you want on a tile in one go, to avoid losing worker turns in unnecessary movement. The main exception to this is road building. If, for instance, you want to connect up a luxury that isn't near one of your cities, building a road straight to it is more advisable than stopping to mine every square along the way whilst you are building the road.

There aren't any rules set in stone here, just guidelines. Don't stack your workers unless you have some pressing reason to do so. Judging what constitutes a pressing reason is something that you have to do for yourself, based on what is happening in the game at the moment.

4.2 How to Improve Your Tiles

As mentioned in the section on terrain, you need to know what each tile produces, and know which improvements help which tiles (in light of the despotic tile penalty). Tiles with any kind of resource are good, but particularly ones with food or shield bonuses (cattle, game, wheat, furs, wines and iron, from pre-industrial eras). Bonus grasslands are also good. It is helpful to realise that you are allowed to change the improvements on a tile as you go along. Early on, irrigating normal and bonus grassland is pointless (due to the despotic penalty) except as a temporary measure to get irrigation on some tile further away from a river or lake. But later in the game, once you've switched to monarchy or republic, you might want to go back and irrigate some of the bonus grassland tiles to gain more growth. Once you have cities stuck at size 6 or 12, you can change some tiles to mining, since extra food is no use, so you may as well maximise production. Once the city can grow again (aqueduct or hospital) then you will want to re-irrigate some tiles to give quick growth again.

There are two points to remember about improving flood plains, plains, grassland, bonus grassland and deserts. The first one is that irrigating any of them gives +1 food, and mining any of them gives +1 shields (flood plains cannot be mined). And it doesn't matter which is mined and which is irrigated. If you have too little food, irrigating any of the tiles that you are working (from the list above) will give the same result. If you have too much food and too little production, mining any of them will give the same result. An irrigated grassland (3 food, 0 shields) and a mined desert (0/2) gives the same total (3/2) as a mined grassland (2/1) and an irrigated desert (1/1). So on one hand, if you need more food or shields, it doesn't matter which tile you mine or irrigate.

On the other hand is the second point. Golden ages and mobilisation only give a production bonus on tiles already producing at least one shield. So although most of the time, which tiles you irrigate and which you mine is irrelevant, in a golden age it does make a difference. So since it makes no difference most of the time, why not set it up to take advantage of the golden age. To do

this, as far as possible you want each tile to be producing at least one shield. To that end, you almost never want to irrigate simple grasslands. They should be mined. Irrigation should be done on bonus grasslands, flood plains, plains and deserts. You may want to mine most of these as well, depending on the food and shield situation, and early on you'll probably want to get as many shields as possible out of your tiles, which usually means mining anything that stays still long enough. If you are irrigating in despotism, do it to flood plains, plains or deserts. Once you are out of despotism, you can also do it to bonus grasslands. But only irrigate what you need to (+2 or +3 food per turn), and mine everything else.

Another point to bear in mind about tile improvements: improve every tile. Tiles that don't fall under any city's influence should still be roaded, and every other tile should be improved as soon as possible.

4.3 Forestry

4.3.1 Early Game

Forestry is the chopping down of forests to reveal the underlying terrain. The first time this is done on a tile, 10 shields are given to the city that has the forest in its radius (if the forest is within the radius of two or more cities, it goes to the one that has labourers working the forest, or if neither is, to the nearest. If they are at the same distance, I suspect it goes to the one that comes first in the city list (the first one founded usually)). Forestry takes 10 turns for a single non-industrious worker. It is important to time things so that the 10 shields are usefully used. The shields are given before the city adds its own shields for that turn to the construction project. For example, a worker has been working for 9 turns on a forest, and will finish next turn (next turn, you can move it to another square). The city that gets the forestry bonus is due to complete a temple next turn (1 turn left to completion). That city will get the 10 shields from the forestry, and then add it's own shields for that turn to the project, which will be finished in the production phase, and all the excess shields will be wasted. Try and time your forestry operations so that all 10 shields from the chop are put to good use.

You probably shouldn't go around chopping down all forests early in the game. Coupled with a good food tile nearby, they are very powerful as forests, and give a good supply of shields. Also, consider what is under the forest. If it is tundra, then there is no benefit to chopping down the forest until you can replant it - the forest is better than anything the tundra can be improved to until the industrial era, and even then forests are as good as the alternative. If it is plains, you can chop to get the 10 shields, and then mine to get back to producing 1 food and 2 shields per turn in 6 turns (3 if you are industrious), giving a net boost over leaving it as forest. Or you can irrigate the plains for more food if you need to. With grassland, there is a $\frac{1}{3}$ chance of getting a bonus grassland, which can give 2 food and 2 shields once mined (better than the forest, in every way), but the rest of the time you get normal grassland, which becomes 2 food and 1 shield once mined. If you are desperate for food, it is worth chopping them early on to get the extra food (and shield bonus). If you have plenty of food, they are probably worth keeping around for the extra

production when needed.

Early game forestry is all about improving the production of cities. You use forestry to speed up building improvements (it can be very useful to speed a granary along for a settler pump) and to balance the food and shield production for a town. Beyond that, the forests are left alone. Jungles should almost certainly be left alone, unless you start in the middle of a big jungle with nothing else to do.

4.3.2 Middle Game

In this context, middle game refers to the point at which the ability of your workers to improve terrain begins to outstrip the rate of increase of your population. Early in the game, you are likely to lag behind a bit, or just about keep up with the expanding population. Somewhere around turns 60-100 (1500-500 B.C.) you find that new citizens in cities are already working developed tiles, and you can divert workers to other tasks. This happens because a) you keep producing more and more workers, b) some cities will stop growing due to reaching their current maximum size, and c) you may capture slaves through war. This is the time to start moving workers on to strategic forestry work.

Cracker has analysed forestry teams, and come to the conclusion that for normal civs, teams of two workers should work on forests, and teams of three on jungles. For industrious civs, one worker is probably enough for a forest, and two (or one plus one slave) for jungles. This offers a good compromise between getting jobs done quickly, and not wasting too many turns by stacking workers together. It is very likely that Cracker is right in his analysis.

These forestry teams have the goal of first clearing the forest or jungle, and then building a road on the newly cleared terrain. It is obvious that this is a more efficient way to do things than building the road on the forest or jungle before clearing it, although there will be times when you have built a road first, such as when working a forest tile with a city in order to get some commerce, or when connecting up important resources or building a vital road for defence.

Clearing forests is usually more of a priority, since it can be done quickly. The aims at this stage in the game are mostly to do with improving your road network (building roads between adjacent border towns to get units between them more quickly, connecting up new cities which are blocked by forests or jungles), clearing forests in neighbours territory (with a right of passage agreement) to open up invasion corridors for your mounted troops, and providing production boosts to border towns with high corruption to help them build necessary improvements.

Clearing jungles becomes necessary when towns founded on the edge of jungles start to run out of good tiles to work. Jungles always reveal grassland or bonus grassland when cleared, and so are good long term tiles, but entirely useless in the stages of the game considered for this article.

Chapter 5

Credits

The list of people who have contributed to the discussions in the strategy forum on Apolyton and the Civ Fanatics Centre is below. It is currently far from complete. This article has been compiled and edited from their discussions and ideas by vulture.

Aeson	alexman	Arrian	BRC
Catt	chiefpaco	Cracker	DaveMcW
DaviddesJ	DeepO	Dominae	E_T
Franses	Jawa Jocky	jshelr	Lawrence of Arabia
Mountain Sage	NorMe	Theseus	Velociryx
vondrack	vulture	Zachriel	