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Welcome to the world of Galapagos, a unique and challenging adventure game from Anark. You must guide the synthetic life form Mendel through five different worlds to escape the evil science that created it. This escape requires patience, analytical thought, and quick hand-eye coordination. As you may have learned or experienced yourself, Galapagos is quite different from most traditional adventure games in two ways:

- **You do not direct the main character, Mendel. Instead, using the mouse, you manipulate the environment around him. For instance, you can flip switches, activate Poppers, switch the direction of a platform lift, and so forth.**

- **Mendel himself is truly an artificial life form. He uses Non-Stationary Entropic Reduction Mapping (NERM) created by Anark, which serves as his brain (see the Appendix for a discussion on NERM and artificial life). In other words, Mendel moves on his own, analyzing input from several sources and translating this information into behavior or action. Mendel learns from his actions—whether right or wrong—and takes appropriate measures for the future. Although you’ll be unable to control Mendel directly, you can influence his actions and his direction.**
In order for Mendel to escape Galapagos, he first must travel through five separate dimensions, with Galapagos serving as the hub. Each dimension provides a vital link to help Mendel escape, opening a new passageway to another dimension. In fact, getting Mendel through these dimensions safely is an entirely different matter: there are numerous traps and objects to avoid and 36 puzzles to solve in the five dimensions. This is not to say that getting Mendel killed is necessarily a bad thing. I recommend that you have him killed every so often because Mendel learns from death as well as life. But don’t get him killed too many times in a short time span as multiple deaths may render the poor organism a bit neurotic.

The purpose of the Galapagos Strategy Guide, then, is threefold: (1) to provide a complete guide to the game from start to finish, (2) to explain how NERM and Mendel work, and (3) to provide insight on the game and its development through an interview with the lead designers. Because each world in Galapagos is fully three-dimensional—that is, there is no up and down, left or right, but just a reference to where Mendel currently stands; walls can become floors, and floors can become walls. Consequently, producing maps—even hand-drawn ones—would be difficult at best. Therefore, we rely on images with captions to explain and elaborate particularly tricky areas. Finally, the puzzle solutions contained within this strategy guide should be used only as a last resort. One of the fun things about Galapagos is watching Mendel try to turn that one corner, or to time that jump just right, or to scamper past some horrific obstacle—and
to survive and to evolve...if only to a small degree. Sometimes you’ll find yourself cheering the little guy on; other times, you’ll curse his stupidity. Solving a puzzle in Galapagos is sometimes as easy as getting the timing right on two connecting platforms or sequencing a jump perfectly—and it may be staring you right in the face from the very beginning! Galapagos can be frustrating at times too, but frustration is part of the game. The idea behind Galapagos is to find out just what you can do and what Mendel needs to do to reach his destination(s). Of course, if you can’t figure out what to do on your own, you have all the solutions you need in this guide.
Navigating
Galapagos

Chapter Two
The world of Galapagos and its neighboring dimensions are not places for family vacations. Numerous dangers and obstacles abound. Laser mines, lava flows, lakes of ice far below freezing, caustic chemical rivers, and robotic denizens of Galapagos are only the tip of the iceberg. Navigating Mendel throughout these worlds is fairly tricky, so knowing what you will face and how to face it is important.
OBSTACLES

First, many obstacles that Mendel faces are already described in the Galapagos manual, though they may appear in different forms later in the game. Here are some general hints:

• Mendel turns around once he detects that there's an obstacle in front of him. Use this to your advantage. Try to block routes that you don't want Mendel to use, especially if he tends to take those particular routes. For instance on Sine, you can use sliding blocks to prevent Mendel from returning the way he came.

• Use the laser mines to restrict Mendel's movements to a particular area. These provide further obstacles you can manipulate to control his occasionally erratic movements. After being destroyed many times by laser mines, he learns to avoid them.

• Every puzzle has at least one object that can be manipulated by clicking on it. Most objects move in two directions: up and down, left and right, back and forth, and so on. Clicking on a movable object causes Mendel to move in the opposite direction. In other words, if you can't figure out how to get him from one spot to the next, click on everything around him.

• Use the Save Pads every opportunity you get, and give the saved files descriptive names.

• If any object glows and is not on the floor—or is flowing—it's probably lethal to Mendel. Some lethal areas can be crossed for a few seconds before Mendel is destroyed; others destroy him instantaneously.
POPPERS

Poppers come in all sizes, shapes, and colors. They may cover an entire floor, rest on a certain portion of the floor, or lie across certain platforms and bridges. Be careful when you use Poppers, since forward momentum carries Mendel off the edge when he comes down.
GENERAL HINTS

• Poppers can be useful since they propel Mendel up into the air. However, watch out. Don’t let them cause Mendel to fall to his doom.

• The camera has a tendency to shift into annoying, unworkable positions which make it hard to see where Mendel is going. Learn to anticipate what’s next and to deal with it accordingly. The camera always shifts to that position, so use it to your advantage. Note that the camera always remains centered on Mendel no matter what angle the camera uses. Unfortunately, this is more of a trial-and-error method than anything else.

• All of the worlds in Galapagos are fully three-dimensional environments in every sense of the word; it’s quite easy to become disoriented. You can pause the game at any time with the escape key, so try taking notes and making a few rough maps.

• You can “coax” Mendel to change direction, or turn around, by clicking on him rapidly with the right mouse button. (For Macintosh set in preferences.)

• Use NERM to your advantage. Save it whenever Mendel has a certain personality you can use later. In one situation, you may want a headstrong Mendel to charge forward; in others, you may want a cautious Mendel to traverse a line of sliding slabs slowly.
USING THE WORLD SOLUTIONS

The solutions in this guide are provided to help the player solve a particular puzzle area of the game. The text is as descriptive as possible, utilizing screen shots to help illustrate the solution offered. Before delving straight into the solutions, you need to understand just how to interpret them.

First, the solutions are designed in a linear manner although the game is quite non-linear in form. What is described in this book is just one particular way of playing the game; other methods may be used and are described whenever possible. This book differentiates alternative trips back to the Galapagos hub using roman numerals. For example, Chapter Six is titled Galapagos II.

The directional terminology used in the book may cause some confusion. References to "left" and "right" always refer to the left- and right-hand sides of the monitor at that moment in time in the game, not areas on Mendel's left or right. For instance, "move to the left" means "move to the area at the left-hand part of the screen." Examine the images to help you understand what is described in a particular section of the book.

We use terminology from the game's manual as much as possible throughout this guide. Sliding platforms are platforms that slide back and forth on the horizontal plane. Elevators move up and down in the vertical plane, although they can make fairly radical movements, too. "Elevator"
describes anything that moves up and down—including small platforms and the like—even though they may be referred to as platforms or elevating platforms. We use the most descriptive term to designate other objects that can be manipulated, such as sliding blocks, sliding slabs, roller platforms, and so forth.

Finally, Galapagos is a game of critical thinking, fast reactions, and considerable patience. Even though you may know the solution to a puzzle, it may take several tries to get it right. This may be extremely frustrating. If you are in that kind of mood and Mendel is getting under your skin, quit the game and return to it later in the day...or sleep on it. This method works for many games that may frustrate you a lot and helps you increase your gaming pleasure. Galapagos is certainly no different.
The lab on Galapagos serves as the main hub between the four other dimensions. Once a dimension is completed, Mendel returns to Galapagos, where a new dimensional portal is ready to transport him to another world. To establish the path to the dimension portals, however, the player must solve two puzzles in the hub first.

This area is where Mendel winds up when a new game is created. The platform is encased in a protective shield that's not harmful, but Mendel cannot escape from it without help. This is where you come in; at the center of the platform is a blue panel roughly octagonal in shape. Simply click on the octagon switch, and the shield will vanish. Mendel is now free to move off the platform and will eventually fall harmlessly to the area below.

**NOTE**

*Remember, moving to the left refers to the left-hand side of the image, and moving to the right refers to the right-hand side of the image.*
In the center of this particular platform is a Save Pad, although saving the game at this point is not really necessary. Mendel will eventually move to the left, where he'll step onto a platform lift that looks like a large, upside-down pyramid. As soon as he steps onto the platform, click on it, and the platform will rapidly shift to a new location. Notice that the camera angle and position will shift as Mendel works his way into the tunnel.

The tunnel is L-shaped and rather short, with an inactivated laser mine at the corner. Although Mendel will usually avoid activated laser mines, turning it on in this case is counterproductive.

As soon as Mendel steps on the first slider platform, the rest will begin moving in alternating directions. Click on the nearest slider platform when it is closely aligned with the one Mendel is on. When Mendel moves onto the new platform, click on the old platform to move it out of alignment so that he can't inadvertently wander back onto it. Repeat this process until you reach the last horizontally moving slider platform. It is best to align the slider platforms perfectly to give Mendel the best chance of making it across to the next platform.
The trick comes with the last platform, which is actually a slider and a lift that moves in a square-like pattern. Coaxing Mendel onto this platform is rather tricky, because instead of reversing directions when it hits a wall, it simply moves downward. If Mendel is caught between the two platforms, he’ll fall and be destroyed. One way of getting around this problem is to constantly click on the slider/lift so that it can keep changing direction along with the last sliding platform.

Once Mendel is safely on the slider/lift, it will travel downward, then back behind a tall column with a black panel in the center. This panel is another octagon switch that should come alive when you click on it. The switch activates the bridge to the area with the dimensional portals. Once this task is completed, you’re now faced with the task of navigating Mendel back through the various sliders. It’s rather easy going until you reach the last sliding platform, simply because it’s moving while the corridor entrance is not. If you click on the platform constantly, so that it twitches back and forth repeatedly, Mendel will move off the platform and
back into the corridor. When Mendel returns to the platform lift, click on the platform again, and it’ll shift back to the main platform. As Mendel moves right and onto the Save Pad, click on it to save the game.

Mendel will then proceed to the right-hand platform, also pyramid-shaped. Click on it when Mendel gets on the base, and the platform will move to another short, L-shaped corridor. Mendel will traverse over an inactivated laser mine, and you’ll see an energy beam ahead of him. Be sure to activate the laser mine so Mendel won’t backtrack onto the corridor.
One thing to note here is that the camera will shift rapidly depending on where Mendel steps: From behind Mendel, to directly above looking downward when he crosses the laser mine, and then to an oblique side angle when Mendel steps onto the grid. The object is to get Mendel to the platform lift on the other side of the energy beam. This puzzle can be solved in three ways: You can click on any part of the energy beam, and it will reverse direction.

You can also click anywhere on the grid, and it will thrust Mendel into the air for about two seconds (the grid is a Popper). Lastly, you can use the combination of the two to help navigate Mendel around the energy spokes.

Once Mendel is on the platform, click on it; the platform will lower to the next level, where another energy beam awaits. The main difference here is that the energy beam is moving slightly faster
than the one above. The same procedure is required to get Mendel to the platform lift on the other side. Once this is accomplished, click on the lift, and Mendel will be lowered to yet another platform with an even faster-moving energy beam.

After circumnavigating this energy beam to yet another platform lift, Mendel will then be lowered onto a long, bent platform with an octagon switch at the center. Click on the switch and let Mendel mosey over to the platform lift on the other side. Click on the lift when Mendel is on it, and he will be transported upward, directly back to the starting corridor—but be sure to turn off the laser mine first.

How exactly were these two puzzles solved? The switch on the left activated the long green bridge in front of the Save Pad on Galapagos. The switch on the right deactivated a corridor of laser mines at the end of the green bridge, which had previously blocked Mendel's entry.
At the end of the green bridge is another platform lift; click on it, and Mendel will be shipped over to a large platform with a glowing mass at the center.

This is the dimensional portal to the next world, Sine. Once Mendel moves onto it, he’ll automatically be transported, and the time it took him to complete the Galapagos hub will be displayed.
Sine is a huge cloud mine whose atmosphere supports no known life forms. Operated by the rulers of Galapagos, Sine provides the bulk of the natural resources from which these rulers make their chemical weapons. Sine is primarily composed of large, open spaces, various narrow bridges, and sliding platforms. There are five independent puzzles to solve here.

Mendel arrives in Sine at the beginning of an open corridor facing a series of six, colorful, sliding blocks that he must get past. If Mendel is pushed into the blue wall panels by one of the blocks, he will explode. Help Mendel by clicking on the blocks, reversing their direction, and preventing Mendel from being killed. Be careful, the camera angles make this task deceptively challenging. At the beginning of this play area, Mendel materializes on a Popper pad. If you pop Mendel into contact with the green gem above, Mendel's speed will increase dramatically. This can help Mendel make it through the corridor faster, but can make it more difficult to anticipate his behavior.

Steer Mendel to the area where the floor appears to slope upwards. Columns form that block the escape route. Mendel moves into an open-ended area that has a switch on the wall and a pad centered...
on the floor. Once you flip the switch, the pad turns into a teleportation pad for a few seconds. He automatically teleports once he steps on the activated pad. (You can activate the pad as many times as you wish.)

Mendel now stands at one end of a short corridor which opens onto a balcony over an open area. Below through the mist, you should be able to see some moving slider platforms. Click on the balcony to transport Mendel to the first sliding platform in the area below.

The slider platform area consists of nine independently moving slider platforms, all of which are in the raised area except for the fifth, which is below. You can manipulate these platforms by clicking on them, which causes the platform to move in the opposite direction. Starting with the second platform, every other row of platforms has a teleport wall on one end and a row of Poppers underneath. Below this whole structure is a huge diamond-shaped teleport pad.

The first thing to do is to get across the first four sliding platforms. Align them so Mendel can move across each one. (Click on the ones Mendel leaves
so that he does not backtrack to those particular platforms.) The second and fourth platforms slide beneath teleporters. If Mendel hits a teleporter while on one of these platforms, he is taken back to the point of origin (the short, narrow corridor that leads to the open balcony). Note that these teleporters can be deactivated for a short time simply by clicking on their shimmering side. If this happens, Mendel will be pushed off the platform and fall to the row of Poppers below.

Follow the figures above to move down from the fourth sliding platform to the fifth platform below at the same level with the Poppers. Once Mendel is down below, wait until the fifth sliding platform slides by and allows him easy access to it. (This may require rapid clicking to keep the platform in one spot.) Mendel then crosses over to the next row of Poppers. From here, he must get to the sixth sliding platform. Wait until he's near the center of the Popper row and click on the Poppers to propel Mendel into the air. The platform, hopefully, will appear underneath him. You can click on the platform to keep it in place to catch Mendel as he falls downwards.

This particularly difficult move may take several attempts to get it right. One problem is that you have no idea when the platform is overhead (since you cannot see it until you have activated the Popper). If Mendel hits the
angled bottom of the platform, he bounces outward either onto the large teleport pad (which starts Mendel at the beginning corridor again) or into the clouds, which destroys him. If Mendel is not moving straight down the row but at an angle, the forward momentum may carry him off into the teleporter if he misses the platform on the way back down. (Since this is the sixth platform, there is also a teleporter on the right-hand side; the platform may bump Mendel right into it.)

Once Mendel finally gets onto the sixth platform, the next two platforms are basically the same as the first ones. On the ninth platform, Mendel needs to be steered onto a narrow corridor similar to the one at the puzzle's beginning. This short corridor leads to a balcony, which opens up into a wide open area with the familiar nine sliding platforms and teleporters.

This area with the sliding platforms and teleporters is identical to the first area Mendel traversed with two major exceptions. First, the sliding platforms move at different speeds. If you try to align them, they slowly slip by one another. Mendel has to be coaxed across the platforms rather quickly.

The other major difference is that the eighth sliding platform ends in a cul-de-sac of sorts—instead of a narrow corridor—with a switch on the other
end. Hit the switch and Mendel teleports back to the Save Pad area (without the columns this time). Save the game here.

The second puzzle occurs on the opposite side of the first. There are six moving multicolored cubes sliding across the width of the corridor; the cubes are equidistant from each other. These blocks can be manipulated by clicking on them to make them switch directions. Multiple clicks will hold the cubes in place. The blocks themselves are not deadly, but the blue energy field on the walls of each block’s path will destroy Mendel instantly if touched. Keep Mendel from accidentally touching the blue energy field, and watch out—a sliding block can push him into one of these fields.

Navigate Mendel around the six moving cubes and past the deadly walls to safety. Note that every other cube rotates on it’s axis while sliding back and forth, while the others simply slide across the corridor. Don’t be surprised by this rotation.

You must use your mouse quickly in this puzzle. The camera follows behind Mendel until he starts moving past the sliding cubes, at which point the camera rapidly shifts in front of him, changing the perspective entirely. As a particular cube is passed, the camera angle shifts behind Mendel again, and the whole process begins anew.
Once past the six sliding cubes, Mendel next moves down the corridor a bit, over a rounded corner, and eventually falls off a short ledge onto a long, open-ended corridor (or bridge) with a Save Pad in the middle. Save the game.

Depending on where the camera is positioned, you should move Mendel on the left side of the screen, not on the right. If Mendel moves down the right side, he will end up at a dead-end with the bridge rollers puzzle (detailed below). The rollers do not activate until the current puzzle is solved, so there is no way to get across the chasm. There are deactivated laser mines on each end of the Save Pad that you can use to restrict Mendel’s wanderings somewhat.

Puzzle number three consists of a series of sliding platforms and bridges with sliding red pyramids crossing one or both sides of the platforms; these pyramids will destroy Mendel on contact. The pyramids travel perpendicular to the sliding platforms on the sides of the sliding platform’s paths. Like the sliding platforms, the pyramids can be manipulated into the opposite direction by clicking on them. Note that below the sliding platforms is a row of Poppers that you can use to pop Mendel back onto the sliding platforms. Any kind of drop from the Poppers or the sliding platforms into the clouds will destroy him.

The first section of the puzzle consists of three sliding platforms with a pyramid sliding back and forth on the left only. Direct Mendel over the three sliding platforms and onto the small pillar. The pyramid should not be too troublesome. Just be sure he stays on the far end of its track (which ends beside the pillar), or you can change the direction of the sliding platforms to stay out of the pyramid’s track. Two laser mines mark each end of the pillar. You can use these mines to restrict Mendel’s ability to backtrack until he comes back.
From here you will see six more sliding platforms. This time two red pyramids move on either side roughly in conjunction with one another. Keep the pyramids on the far end of their track while Mendel moves across the platforms. At around the third or fourth platform, let the pyramids go by and proceed to the next bridge after the sixth platform. This section may require some fast clicking to keep the pyramids back while manipulating two sliding platforms at the same time. A Save Pad is situated right after a laser mine, so save the game here.

Mendel walks onto a shimmering platform, from which two rows of eight platforms are visible. The platforms will not start moving until Mendel steps onto the first. As soon as he steps on the first, each platform begins to elevate or to descend. If you click on one of the elevators, Mendel will be teleported instantly to that elevator. Unfortunately, the elevator's surface immediately changes into a set of moving rollers, and Mendel quickly rolls right off into the abyss.

The key here is to click on the next available elevator in line, so that Mendel can be teleported to the next elevator before plummeting to his death. The camera angles shift fairly rapidly here, but usually the next elevating platform is visible when Mendel is rolled off a platform. After the
eighth platform, a column with a similar shimmering teleporter is visible. Quickly click on it to teleport Mendel to the top of the pillar.

From here you can see the switch on the back of the pillar. Hit the switch, and you should hear a sound resembling something rolling. Now, go back the way Mendel came, using the same fall-and-click methodology; the elevators will stop moving once he reaches the first platform. Now save the game on the Save Pad at the middle of the central platform.

From here you must navigate Mendel back through the sliding platforms and deadly pyramids, using the same method as before (described above). Keep the pyramids on the far end of their tracks as long as possible. Sometimes you will lose track of a pyramid, so quick mouse-clicking is required to shift the direction of the platform to avoid the pyramids if they surprise you. Once he makes it across these platforms again, save the game using the Save Pad that Mendel used before.

Now Mendel should move in the proper direction across the bridge. After a few moments when he makes his way across the bridge, you should see the rollers moving on the platform at the end of the bridge. These rollers will push Mendel forward as they move at a speed that he cannot possibly counter.
Again this puzzle calls for quick hand-eye coordination. The rolling platforms end abruptly but have similar platforms adjacent to them. Click on these platforms, and they will align with the one Mendel is on. The first is on the left-hand side as soon as he walks onto the first rolling platform. The next is on the right with a third on the left. The camera angles shift constantly from the left to right and back again, so be careful to note where the platforms appear on the monitor. Typically, after the first platform, you will have only a split second (or two at most) to click on the platform to move Mendel onto it. If the platforms are not moved in time, he rolls right off into the clouds to be destroyed.

After the third platform is moved, there is an obvious gap where Mendel will fall onto another set of rolling platforms. Two more platforms must be moved into position from here—the first on the left and the second on the right. Once this is accomplished, he rolls off again onto a new rolling platform, which ends with a laser mine and teleporter. Mendel is teleported to a platform with a switch on either side. In front of him flows a chemical river.
From here, the various chemicals are transported to Galapagos via a waterfall of green fluid. The fluid is extremely toxic and will melt Mendel within a matter of seconds. A Green Crystal floating above the river provides protection for him, but reaching it is the puzzle. First, you must figure out the function of the two switches: one activates and deactivates the river of chemicals while raising and lowering the Green Crystal simultaneously; the other raises and lowers the middle platform once the river is deactivated. First, turn the river off; then, raise the platform so Mendel can get on it. Lower the platform.

Now wait until Mendel is underneath the crystal. Hit the switch to activate the river. If he is in the right position, the crystal will drop onto Mendel, or the current of the green river will force him into the crystal. If Mendel is out of position, quickly click the switch to turn the river off. Remember that he has only a few seconds to survive in the chemicals.

Once Mendel touches the crystal, and is shielded from the chemicals he is carried along by the flow of the river, down the waterfall, and into the dimensional gate—back to Galapagos.
On the return to Galapagos, Mendel moves onto a green bridge that transports him onto a large platform in a huge, hollow chamber. Click on the platform, and Mendel begins to move downwards.

Once the platform reaches the bottom of the shaft, Mendel eventually reaches a Save Pad. Save the game.

Mendel will try to move down the corridor. Activate the laser mine to prevent him from entering the chamber beyond. The chamber houses one of Galapagos's minions, a Guardian Robot, which will destroy Mendel if given the opportunity.

Head back to the platform and click on it once Mendel arrives. The platform moves upward and finally stops, offering two avenues from which to choose (although both courses are guarded by activated laser mines). One corridor is lit at the end; the other is not. Deactivate the laser mine to the unlit corridor and navigate Mendel into the tunnel. He will be transported to one of those familiar pyramid-shaped elevator transports. Click on it to deliver Mendel to the dimensional gate to Plon.
Previously a world of industry and refining, Plon is now in ruins, with electrolyte flows, automated mines, and many other hazards.

The first area of Plon consists of several interconnected rooms with the same basic design. (Refer to the image above for details.) Mendel must cross the bridge and move onto the deck. Both the bridge and the deck move back and forth; clicking on any part of the bridge/deck structure will alter its direction. On one side of the deck is a raised platform that leads to the next chamber. Notice that a red pad occasionally crosses the deck and then disappears underneath the raised platform. This pad is an automatic Popper; Mendel jumps into the air whenever he touches it.

Clicking on the pad will change its direction. You must time the jump so that the deck’s direction is moving towards the raised platform. Otherwise, Mendel jumps backwards or even sideways. Suffice to say that one quick dip in the electrolyte and Mendel is toast.
After Mendel makes it to the top of the platform, you'll notice that the other side is similar to the side you're on, except now Mendel must get off the deck, get on the bridge, then get onto another deck...and the process repeats itself again. There are four rooms connected in this fashion.

After the last room, Mendel comes across a room made up almost entirely of electrolyte with two puzzle options. Be sure to utilize the Save Pad in the center. Navigate Mendel to the path on the left. The entire platform with the Save Pad is an elevator, so click on it to lower the platform to the same level as the path. Mendel makes his way into a small chamber with another elevator. Click on the elevator to lower it, then click on the elevator's floor to raise it once Mendel is off (to prevent backtracking). Save the game.
Most of this puzzle consists of manipulating slabs that slide out from the walls, so Mendel can navigate safely down the hall into the chamber far below. This puzzle requires some ingenuity, fast thinking, and luck. The slabs are hidden within the walls and slide out only when you click on them. The lighter color easily identifies where the slabs are hidden. Once a slab is extended, it stays in that position for a short time (a few seconds) then begins to retract. Here again, you may manipulate the slabs by clicking on them to move them back and forth.

To the left of the starting position on the monitor, three slabs rest at the same level as the platform Mendel's currently on. Note that there's a slab on the other
side of the platform that runs almost the entire length of the platform. You can use this slab to prevent Mendel from moving back onto the platform while you try to move him across the slabs. Move Mendel across to the third slab.

Now drop Mendel off to the slab below. Notice that there’s another slab underneath the slab to which Mendel is dropping; he must reach the lower slab eventually. You can extend either slab, however. Let the slab retract, and Mendel falls onto the extended slab below.

Move Mendel to the left along the row of four slabs. The final slab should have a column of two slabs above for reference.
It now appears that Mendel has nowhere to go... not exactly—there are some slabs opposite him and just below on the other wall. The trick is to get Mendel over to the other side. Be sure that he's on the end of the slab. Extend the slab on the opposite wall you want Mendel to stand on. Now quickly extend the slab just above Mendel while retracting the one he's on currently. The force of the higher slab that pushes Mendel should propel him to the slab below. The slab on the other wall may be retracting, so keep the cursor on it until Mendel reaches it.

**TIP**

Because of the way the camera shifts when the slab is extended, it may be difficult to see the slabs on the opposite wall or far below. Be sure Mendel's on the far end of the slab when it is extended to get a better view. You can position him at the end of the slab by letting the slab retract until he's pushed to the edge and then extending it again (without letting Mendel fall off, of course).
No matter which slab you have extended, the present objective is to get Mendel to a row of three slabs below. Extend the slab below and drop Mendel using the same procedure as before. Mendel should land on the middle slab. Now, move him to the slab on the left.

Extend the slab far below and drop Mendel onto it. Mendel now sits on a stack of three slabs. Drop Mendel to the third slab in the series. You should see another stack of two slabs beneath. Drop Mendel until he is on the lowest slab.

From here you must force Mendel across the chasm to the other side where a column of two slabs await his arrival. After that, drop Mendel onto the second slab and then propel him, once again, across the chasm to a slab on the opposite side. It may be easier to drop Mendel completely onto the row of slabs below, but the camera angles make this alternative plan extremely difficult.
Mendel should now be on the right-hand side of a row of three slabs. Move him to the left and drop him wherever you can onto a slab just below the left-hand slab.

This part takes good timing. You must get Mendel onto the platform on the opposite side and just below the slab he's currently standing on. There's little room for error; if the slab retracts too early or Mendel isn't on the end of the slab, he won't have enough velocity to make it across the chasm. Make sure Mendel is as far out over the electrolyte as possible before pushing him across. After landing on the platform, the corridor turns to the right a bit and ends with a small elevator.

Click on the panel to lower it, and Mendel will end up in a room with a switch on the wall and an electrolyte-filled room beyond. A Save Pad is on the floor. Click on the switch, which should turn from a green light to a red light, and then save the game. The switch lowers the electrolyte level, exposing a Popper that was hidden beneath the surface. The next puzzle area beyond consists of a series of striped platforms and extending slabs; each platform is a Popper. Navigation through this area consists of
using slabs to navigate onto a particular platform, then using the platform to pop to a set of slabs on the other side. You typically won’t see the slabs until Mendel reaches the height of his jump, giving you little time to react and to extend the slab.

**CAUTION**

Forward momentum makes it quite easy to pop Mendel right off the sides of the platforms. Mendel likely will be destroyed if this happens, so watch where he moves before you start popping.

The dark area right next to the electrolyte is an elevator. Once Mendel steps on it, click it and the elevator will rise. At the top, a slab is located adjacent to the elevator. Extend the slab, and let Mendel move onto it. Then lower the elevator to prevent him from going back down. Below this slab is a row of three slabs; the right one is located just above the first Popper Platform. Navigate Mendel across the three slabs, and drop him onto the red- and black-striped Popper Platform.
Let Mendel move down the length of the Popper Platform, then click on it to pop Mendel into the air. At the top of his flight, you should be able to see a slab he can land on. The slab is located adjacent to another red- and white-striped Popper Platform. Wait until Mendel crosses onto the platform and then retract the slab.

Now let Mendel move down the length of this platform and pop him when he nears the end. Extend the slab above once it comes into view. Let Mendel move to the other end of the platform.

Once Mendel is near the end of the platform, click on it to pop him. Here, there’s a group of three slabs, two of which are directly aligned with the current platform. You want Mendel on the top slab above the platform. Pop him onto it
and move him onto the slab on the left. Now let the slab retract just enough so that Mendel's at its tip. Click on the slab quickly to extend it again. On the far side of the chasm you should see a column of four slabs.

Extend the second slab from the bottom. This slab and the slab Mendel is on should form a bridge along the side for one or two seconds. Keep clicking on the slabs when they begin to retract to get Mendel across. Once he reaches the opposite end of the hall, push Mendel off the ledge using the slab above him. You want to push Mendel onto the yellow- and black-striped platform below.
You still use the same slabs, however. When Mendel's on the platform's edge (where you can see the column of slabs on the opposite wall), click on the platform to pop him into the air. Quickly extend the topmost slab on the wall. If done correctly, Mendel should just reach the slab barely. The timing is crucial as the slab may be extended too early or too late, knocking Mendel back onto the yellow- and black-striped platform or, worse yet, into the electrolyte. From here, Mendel moves onto the adjacent red- and black-striped platform.

Wait until Mendel reaches the other end of the platform. Click on it to pop him, then extend the slab right above the platform. Let Mendel move onto the adjacent yellow- and black-striped platform and use the Save Pad to save the game here. Now have Mendel move to the other end of the platform and pop him. A single slab is visible on the other wall. Mendel should fall on the slab once it has been extended. This slab runs adjacent to another yellow- and black-striped platform.

Again, wait until Mendel moves to the opposite end of the platform and then pop him. There is a column of three slabs along the wall. Extend any one of them
to catch Mendel. Now extend and retract the slabs to let him fall onto the lowest slab, which runs adjacent to a red- and black-striped platform.

Once again on the other end of the platform, pop him into the air. You’ll see a square block of four slabs. Extend either the top or bottom slab to catch Mendel. You want to move Mendel over to the slab on the lower left-hand side.

Retract and extend the slab to scoot Mendel at the very end. You should be able to see a slab below on the other side of the hall. Use the normal procedure to push Mendel in that direction: (1) extend the slab Mendel is on, (2) extend the slab onto which you want to push Mendel, and (3) extend the slab right above Mendel while the current slab retracts to propel him across the hall. Be sure that the slab to which you’re sending Mendel remains extended the entire time.

Forcefully push Mendel across the hall to an awaiting slab below.
Extend the slab on the immediate right. It's much shorter than the one Mendel is currently on, so be careful to keep it extended. Now, if you can, immediately pop Mendel. Another platform with a small gap on the end is located directly above him so he can pop through. Once Mendel is through the gap, extend the slabs right above the platform and use the slabs to push Mendel onto the new yellow- and black-striped platform.

Let Mendel reach the other end of the platform and then pop him into the air. High up you'll see a row of four slabs; the rightmost one must be extended to catch Mendel. This move requires a bit of timing as Mendel lands on the slab at the very peak of his jump. Upon landing, have him move left across the three slabs and, then, down one row on the left.

Now use the familiar method of propelling Mendel across the hall between two slabs. Once across, extend the slab on the right, which is adjacent to a yellow- and black-striped platform. You want to pop Mendel from this end. The
difficult part is that there's an open gap here. If you pop Mendel off and fail to catch him with the slab above, he’ll fall to his death. Once you pop him, extend the slab that’s adjacent to the new red-and black-striped platform within Mendel’s view and move him onto it. From here move to the other end of the platform and pop Mendel, once again, onto a slab above. Flip the switch and move to the awaiting adjacent slab. Amazingly, you’ve returned to where the slab puzzle first started. Move Mendel right onto the slab that can extend over the length of the stable platform, and let him fall onto it. Now he can return the way he came. You will notice that the level of the electrolyte has dropped and that electrolyte no longer pours into the lake. You have the option of saving the game here, but it’ll be easier to use the Save Pad beyond this point.

Mendel should move to the right-hand path, which leads across a small bridge to a Save Pad. Save the game here. The next set of puzzles resembles a propeller screw on a modern-day ship. Each shaft has four wedge-shaped
platforms at various intervals along the sides of the shaft. The shaft extends from the floor to the visible ceiling. The entire shaft structure rotates at a certain speed, and the entire floor around the shaft is one large Popper. Move Mendel onto the first platform of the shaft.

Each platform on a shaft is a Popper itself, although platforms don’t pop until a few seconds after Mendel lands on them. Once a platform on the shaft is popped, none of the Popper Platforms can be popped again until it’s “recharged.” (The platform makes a distinctive sound and lights up when it’s charged.) The shaft system also reverses direction in the following two situations:

- When Mendel is not on any part of the shaft system; and,
- When one of the platforms on the shaft is popped.

The objective is to pop Mendel to the highest available platform on the shaft system and then, pop him onto a ledge with a Save Pad to access the next slightly more complex shaft system. This puzzle is not entirely safe, however, and the margin for error is quite small. Along the sides of the shaft structure is a huge crevice that opens up into a lake of electrolyte. The fall from the shaft alone probably would kill Mendel before he ever reached the electrolyte.
Pop Mendel onto the lowest platform and work your way from there. The platforms on the shaft are staggered so that, once you pop from one platform, the shaft reverses course, and the next highest platform automatically comes into view. Remember that you can click on any part of the shaft when Mendel is not physically on it to reverse its course. This feature comes in handy when a platform is not where you need it when Mendel is in the air.

Once Mendel is at the top, watch the ceiling where it appears to curve away upwards. This is where you want Mendel to go. You want to pop Mendel off of the top wedge to get him onto the platform. Be sure that he's on the end of the topmost platform when you try this; otherwise, Mendel will bounce off the low overhang ceiling, and you may have to start all over again. If done correctly, he'll deflect upward off the sloping ceiling onto a platform with a Save Pad. Save the game here. Now move on to the second "propeller." The key differences between the six propellers are the locations of their four platforms, the camera angles the game uses, and the strength of the pop from individual platforms. The following is a set of notes on each propeller after the first:
• The second propeller is nearly identical to the first, except that the first platform can pop Mendel to the third platform. The camera angles also differ somewhat.

• The third propeller has a lower platform that propels Mendel high into the air like the first platform on the second propeller. The big difference here is that the second and third platforms are adjacent to one another (like two adjacent propeller blades), and the platform on the left (when facing towards the camera) is a weak Popper, unlike the one on the right. Be sure that you pop Mendel onto the right platform, then up again onto the fourth platform.

• The fourth propeller is arranged with the platforms staggered in groups of two: a low group and a high group. Pop Mendel onto the highest of each group from the lowest of each group.

• On the fifth propeller the first two platforms are aligned with one another. The next two platforms at the other side of the shaft are aligned with each other as well. When popping to a platform directly above the one he's on, be sure that Mendel's on the platform's edge, moving generally in the same direction as the shaft's rotation. When the shaft reverses, Mendel will not hit his head on the bottom of the next platform. This also means you must reverse the action once he's clear—if you still want to see him in one piece.

• The sixth propeller has all of its platforms aligned directly underneath one another, and the third and fourth platforms are extremely close together. Pop Mendel up to the second platform, then pop him up to the fourth platform. There is no sure way of getting to the fourth platform from the third because of their proximity. If Mendel gets stuck on the third platform, pop your way off and try again.
Once you reach the top of the final propeller puzzle, Mendel moves down a small corridor. Flip the switch to teleport him back to the familiar chamber you encountered before. The elevating platform does not move now, and the chamber no longer has electrolyte. You don’t have to use the Save Pad here. Mendel eventually falls off the platform and makes his way to the other end of the room, where a corridor leads to the dimensional gate back to Galapagos.
On the return to Galapagos, Mendel moves onto a green bridge which moves him down a long corridor and finally drops him onto a narrow ledge.

The green ledge itself pushes Mendel to the left while the blocks that make up the wall try to push Mendel off the ledge into the coolant below, shattering him like glass struck with a hammer. There doesn’t appear to be any place to go, but there is—the walls along the left side are moveable blocks as well.

Click on the blocks to move them back so that Mendel can gain some breathing room. Move him down the length of the wall, moving blocks back and letting them return to their original positions behind Mendel, until he reaches an open corridor with a hole in the floor. Mendel will fall through the hole into another corridor with a Save Pad. Save the game here.
Mendel moves down the corridor and drops onto a ledge. A lake of liquid coolant to cool Galapagos’s massive power systems dominates this area. Prolonged exposure—more than three seconds or so—to the surface of the coolant is lethal to Mendel.

The key to navigating the lake is elevating blocks hidden beneath the lake’s surface. For instance, at the very beginning, click on the surface of the lake to the immediate left of the platform on which Mendel currently stands. A silvery block will rise from the surface for Mendel to walk across. The block begins to drop within seconds, so keep blocks raised by constant mouse-clicking. Note that the camera shifts rapidly when Mendel moves across each elevating platform.
As the camera shifts, raise the elevator platform to Mendel's right.

The next platform is on the left.

Now let Mendel move to the next platform on the right.
At this point, there's a visible gap between the two platforms where Mendel must pass. The only way to reach the next platform is to let the platform lower into the coolant and raise the next platform once Mendel has scrambled over to it. This must be done fast. First, be sure Mendel's moving in the direction of the next platform when he's lowered into the coolant. If it looks as though he may turn or do something undesirable, raise the platform immediately to save him. This process may take some practice and a bit of luck to time correctly.

Click on the black and blue column to lower it. Then raise it up to a platform above with another click.
Once you've crossed over, the next block is on the left.

Another gap separates the current block and the new block on the left. Use the same procedure described above.

Click on the black and blue column next to the last block to lower it into position. Then click on it again to raise it to a platform above.
Mendel now moves on to another elevator; click on it to lower him into position to navigate across some more blocks.

Click on the octagon switch to activate the elevator, then save the game on the Save Pad.

On the first block next to the lowered elevator, you can detect faint outlines of the blocks in the coolant.

The next block is on the right.
There's another one on the right again.

Mendel must cross the gap again on the liquid coolant.

The next block is at the bottom of the screen.
The raised block is aligned with a corridor that leads into the wall. Be sure to use the Save Pad as Mendel winds his way through the corridor. Next, he ventures into a wide-open area and falls onto a small platform. Two shafts each with three large rotating spokes dominate this large area. Clicking on the spokes or shafts simply changes the rotational direction of the spokes. The spokes on the shaft closest to Mendel are lower than the spokes on the other shaft. The objective here is to get Mendel to the green bridge on the far side of the room.

First, click on the spoke rapidly when it joins with the outcropping to let Mendel cross safely. Be sure the spokes move counterclockwise; otherwise, Mendel will be pushed off the spokes against the wall and will fall into the coolant below. As the spokes move, you should be able to see the spokes of the other shaft come into the picture.

The spokes in the figure above also move counterclockwise, so be sure to click on them to guide Mendel safely through the spokes. Since the spokes on the other shaft are higher than the ones that Mendel currently stands on, he'll be pushed off prematurely if you fail to time the spokes just right.
Now that Mendel is on the other side, you must get him to the bridge. This last action is mostly a process of trial and error. Reverse the direction of the shaft Mendel is on (to clockwise) to cause the spokes on the opposite shaft to throw Mendel off.

If performed correctly, Mendel will be thrown right onto the bridge and transported down to the familiar pyramid-shaped transport platform.

Click on it and Mendel will be delivered to the dimensional gate of Hellen.
Hellen is a dark, dungeon-like world with lava flows and green sewage-filled rivers running through the landscape. Mechanical wooden constructs creak and groan as they churn in endless circles.

Mendel appears on a long, narrow platform with a Save Pad in the middle. Each end of the platform is actually an elevator in disguise. Let Mendel move to the elevator on the immediate right and click on it. The elevator descends and stops at a river of green sewage. The liquid is deadly to Mendel only if he is submerged completely.

Click on the gate that covers the place where the river slowly flows. Once Mendel goes underneath the gate into the tunnel, the gate slams shut behind him. The tunnel continues for a short distance before opening to a large cavern with Mendel stuck on a ledge. This area of Hellen is occupied by rotating shafts similar to the ones on Plon, except the shafts here are thicker, appear to be made of wood, and do not act as Poppers. You can reverse the course of a shaft by clicking on it. Each shaft has a number of wooden spokes attached to it, so Mendel can get on and off from the different outcroppings and balconies.
There doesn't appear to be anywhere else to go; there are no more balconies on this level. You should notice, however, a spoke attached to the shaft further down. How do you get Mendel onto it? As the shaft winds around, note the large wooden outcropping that juts into the spoke's path. This outcropping will knock Mendel off the spoke unless he is quite close to the shaft itself. Use the outcropping to push him onto the spoke below. A new outcropping leads to a small tunnel that Mendel can now reach.

As Mendel walks down the short tunnel, take note of the piece of wood jutting out of the wall on the right-hand side. The camera then shifts in front of Mendel. Click on the piece of wood to extend it across the tunnel, preventing Mendel from returning the way he came. Mendel is now at the second shaft. Notice how the spoke is different—there's an attachment on the end of the spoke that
looks like a target. If Mendel is on the attachment, click on it to flip the attachment and Mendel over. He now stands on the underside of the spoke. Don’t use the attachment again for now. You want Mendel to reach a dark tunnel along the wall on the other side of the outcropping from which Mendel just came.

Mendel may have to go around another wooden barrier, which effectively blocks the middle areas of the spoke, but not the attachment or the far inside of the spoke near the shaft.

After a short walk in the tunnel, Mendel arrives at a bridge. The bridge itself is segmented into four different parts. The first two segments begin to rotate once Mendel touches the bridge; the last two appear frozen. They also rotate once Mendel gets on them. Manipulate the segments to help Mendel across.

Once Mendel reaches the third segment, it begins to rotate—as will the fourth. After the bridge, there is another short tunnel. Mendel then falls off a short ledge onto a Save Pad.
From the Save Pad, Mendel should be able to get on the spoke immediately. The next shaft has two spokes on one side and one on the other; two of these spokes nearly overlap each other. Be sure that the spoke you get Mendel on is one that nearly overlaps the other. The lone spoke on the other side is located a bit lower on the shaft, and Mendel won’t drop onto it. You need to get him onto the spoke below. Let the shaft rotate counterclockwise. You should see a wooden obstruction protruding from the wall. The obstruction blocks the upper portion of the spoke nearly down to its joint with the shaft.

Now use the obstruction to push Mendel off the upper spoke. Be careful to reverse the direction of the shaft just after Mendel is pushed off to catch him on the lower spoke. If you miss him, he’ll be destroyed. Let Mendel circle around to the other side.
As you may have noticed before, there is a wood-colored section of the wall underneath the outcropping Mendel just came from. If you click on it, a large wooden rod extends out of the wall for a few seconds before retracting into the wall again. Approaching this bar from the left (clockwise), will allow Mendel to be pushed off the spoke. He'll land on solid ground below.

A hole in the wall indicates a vast staircase leading downwards. The staircase turns to the right and ends on a large platform with another shaft construct.

Once Mendel is on the spoke, be sure to notice another spoke below and to the left of the spoke he's currently on.

Another wooden obstruction appears. Use it to knock Mendel down to the lower spoke.
Get Mendel on the spoke.

Now that he's on the bottom spoke, move him through the opening on the wall.

Use the wooden obstruction to get Mendel below.

First, get on the bridge.
After Mendel reaches, and passes through the corridor, it opens to a narrow wooden bridge over a chasm.

Once Mendel starts to cross the bridge, it falls, flips over twice, and lands at the bottom of the chasm near another tunnel. Mendel sticks to one side of the bridge and is unharmed by the fall. After a short walk through the tunnel, Mendel encounters another shaft. A gate closes behind him to prevent him from going back.

Allow Mendel to get onto the spoke and watch the shaft slowly rotate. Once a lit outcropping is visible, allow Mendel to get onto it.

There's a tunnel inside that leads upwards—it's a tough climb, but Mendel can do it. The tunnel curves to the left, and then opens up onto a small platform where, suddenly, a large wooden block comes down on Mendel, pushing him
down a straight, narrow slide. In fact, the slide exits right at the spot where the adventure in Hellen started—on top of the green river of sewage water. When Mendel gets on the elevator, click on it to raise it. Save the game here. Now let's move to the other elevator. Click on it to descend and deposit Mendel once more at the river of green sewage water. Click on the gate to open it, and watch it close shut behind Mendel. The green river flows down the corridor before opening into a large chamber. The next puzzle consists of a series of 14 slider platforms.

The problem with the first two platforms is that they travel through a fairly narrow corridor. The platforms themselves slide under the walls but Mendel won't—he'll be pushed off and destroyed. You must click on the platform often—bouncing it back and forth so to speak—to get Mendel across. The third and fourth platforms are in an open space and pose no problem.
The fifth and sixth platforms are like the first two. The last two platforms are in a very large chamber and take some time to come into view—you’ll have to be patient. Trying to navigate Mendel onto platforms always presents the danger that he’ll backtrack for one reason or another. In this case, it’s quite easy to do since the platforms are so large. Try to keep the platforms he’s already crossed moving in the opposite direction from Mendel. Quickly reverse them if you find they might allow Mendel to backtrack.

Once Mendel is on the seventh platform, let it carry him to the right until a second set of six moving platforms comes into view. Use the same methods as before to cross over these platforms, allow him to fall to the floor below. Click on the bricks and an elevator will carry him to a corridor. Mendel will travel
through this tunnel to a sloping ramp where another block pushes him down to where the green river starts. Take the elevator back up to the Save Pad and save the game.

Notice how the two blocks have fallen to form a bridge to the green river waterfall. Allow Mendel to cross over the two wooden blocks and up the path of the river. This continues for a few moments before the tunnel opens into a larger chamber. Mendel steps onto a ledge. Click on it to make it fall.

Mendel goes down a series of large steps and winds up on top of a Save Pad. Save the game here.

The next puzzle contains a series of harmonic gems. The gems are usually dark. When they are "charged" they turn light blue. When a gem changes color, you can click on that gem to teleport
Mendel there. The problem is that, a few seconds after the gem charges, it vibrates violently and destroys Mendel in a flash if he is on that platform. You will be able to hear it quite nicely. The gem loses its charge and begins its cycle again. The gems are located at different altitudes—there's no way to cross them in any normal fashion. You must wait until a gem is charged before you can teleport to it. Teleport from gem to gem. The tallest gem, which appears on the right, is your objective in this puzzle. It is next to a balcony that Mendel can step onto and moves toward a large bridge.

After the puzzle with the harmonic gems, Mendel walks across a long bridge overlooking a huge lava fall and lava lake. The bridge narrows to a large platform beyond. When Mendel steps onto the bridge, it suddenly fragments into nine independently moving segments rotating on their own axes. Clicking on any
segment reverses its course. Clicking on the segment Mendel is on will change the speed of rotation. Use this method to cross over all nine segments. Note the effect is rather disorienting—the segments can rotate at a high rate of speed and the walls flash by very quickly.

The ninth segment is much slower than others—Mendel can get off of it quite easily. Note that the stable platform beyond has two sides—a top and a bottom, so to speak. One side goes to the next chamber—don’t go there yet. The other side is a short platform with a Yellow Crystal. Mendel needs this first. Once he touches the crystal, he moves much faster for a short period of time. Wait until the ninth platform rolls around and navigate Mendel onto it. Let the platform roll back around, to the platform on the opposite side and let him fall off into the hall.

This next hall appears to be a straight corridor bordered by blue gem columns. The corridor’s floor is actually made of metal plates that buckle and drop shortly after Mendel steps onto them. Without the speed crystal,
Mendel will be caught on the first plate and will fall into a pool of lava. With the speed crystal, however, Mendel should zip right through the hall to the Save Pad beyond. There’s an elevator platform just after the Save Pad. Click on it and the elevator descends to the next location.

The remaining puzzles on Hellen have those familiar sliding platforms...but with a new twist: some platforms now have energy bolts that shoot across the platform’s path and will destroy Mendel instantly. The bolts shoot out of gargoyles on the walls at even intervals. If you watch, you can tell which platforms need to be crossed quickly.

**TIP**

Mendel can sometimes wait at the edge of the platform without being struck by an energy bolt but don’t count on this happening too often—remember that you can’t control his actions.

**TIP**

Line up the platforms Mendel must cross quickly before he reaches them—the straighter the line, the shorter the time Mendel takes in crossing them. Line them up early and often.
The first set consists of three platforms, the second of which shoots energy bolts. If you line the three platforms up, it should be fairly easy to get across. There's a short tunnel beyond the third sliding platform, which ends at another descending elevator.

The second set consists of five platforms, the second and fourth of which fire the deadly energy bolts. After Mendel crosses the fifth platform, there's a short corridor with a Save Pad. Beyond the Save Pad, there is another descending elevator.

The third set consists of seven platforms, and numbers two, three, five, and six shoot energy bolts. Again, line them up before Mendel crosses so that he won't spend too much time on any platform. After the seventh platform, there is another small corridor and elevator.

The fourth set consists of six platforms; the last platform is adjacent to the dimensional gate out of Hellen. The problem here is that energy bolts cross every other platform. Line them up quickly and try to get Mendel across. If you can, time it so that Mendel moves across the second platform right after a bolt is shot. Once Mendel touches the dimensional gate, he is taken back to Galapagos.
Instead of a bridge, as in the previous return to Galapagos, there's a transport platform which, if you click on it, takes Mendel to the large elevator you saw in Galapagos II. Click on the elevator to take Mendel down to the ground level.

Once the elevator has come to a complete stop, take a quick look around. If only one travel option off the elevator is available, click on the elevator to take Mendel to another sector of Galapagos.

This section of Galapagos has two open corridors to choose from. One path is red and moves towards Mendel, the other pathway is green. Have Mendel take the green pathway. Mendel has already been down the red pathway.

Mendel will be transported along a series of green transport paths and into a large control sector. The transport path will toss Mendel across the depths of the sector and onto a narrow blue pad.

Once Mendel lands on the pad the large blue blocks in front of him begin to move. Click on the blocks to keep Mendel from being pushed off into the depths. There are three of these platforms, each with six blocks, that Mendel must cross. With each new platform the blocks move
faster, therefore you must click quickly to get Mendel across. Continue to click on the blocks to coax Mendel across the walkway. Allow him to be pushed off by the sixth block at the end of the first and second walkways to a green bridge below.

Be sure to avoid being pushed onto the roving blue platform below. This platform will take you back to the elevator. On the third platform allow Mendel to be pushed off by the fifth moving block. From the third green bridge Mendel moves on to a new area with a Save Pad. Save the game here.

Mendel is now in a large, elongated, hexagonal room. There is a blue pathway in front of him covered by green lasers. To the left of the pathway is an inactivated blue triangle. The object here is to get Mendel across the pathway and activate the triangle. The blue pathway serves as one large Popper. Pop Mendel over the lasers and onto a transport elevator. Be careful not to pop too soon or the laser will deactivate the platform and allow Mendel to fall to his death onto a floor of deadly, red lasers. The elevator will take Mendel to a small platform with a triangular shaped control panel overhead. Click on the control panel and return Mendel to the popper platform
with the lasers. Mendel must cross the platform again and click on the activated blue triangle on the wall. Once this is done save the game. Now the Popper Platform has transformed into a green transport path. Again take the elevator to the next platform. Cross under the control panel and onto another elevator. This elevator will take Mendel to the next sector of Galapagos. It's important that the blue triangle is activated before arriving here, or Mendel will face certain death from one of Galapagos' security features. Mendel will enter another hexagonal room very similar to the previous one. The only difference here is that Mendel must cross the room using three Popper Platforms that are moving back and forth in opposite directions.

Once Mendel is on the first platform he needs to pop to the second. The second platform is above the first. Timing is crucial. Only pop Mendel when he is on the forward edge of the platform and the two platforms are moving toward each other. Be sure Mendel is not standing at an angle to the platform edge, or he is liable to jump off into the deadly lasers below. The third platform is below the second. This platform may take a few attempts because
of the camera angles. Once Mendel has reached the third platform he must pop one last time. This time Mendel must reach the green platform high above. The green platform serves as a transporter. Click on it and Mendel will be transported to a long corridor that leads back to the blue platforms with the moving blocks.

Mendel has arrived at the second level of the blue platforms. The object here is to allow the blocks to push Mendel off at precisely the right time so he lands on the roving blue platform. After Mendel lands on the roving platform it transforms into a flight apparatus and carries him away to the large elevator at the beginning of this section. Click on the elevator and Mendel will be transported to yet another sector of Galapagos.

Saving the game at the Save Pad is optional. Instead of saving here, move beyond the Save Pad into the next room.

As before, don’t open the door and allow Mendel to proceed to the balcony beyond. The guardian robot will destroy him here. Instead, navigate Mendel through an opening in the wall on the
right-hand side of the room. Remember, this opening appears only after deactivating the cooling system in Galapagos III. Click on the triangle-shaped panel on the wall above the opening to activate the green transport path. Mendel will encounter the transport path below.

You should save the game here at the Save Pad.

Next, have Mendel move onto the green-lined pad beyond the Save Pad. Click on this pad to teleport Mendel to the main chamber.

Mendel now appears on a one-way green traveling pathway, which transports him around an approximate circumference of the main chamber. There’s nothing to do here until he’s forced off the pathway at the end.

In the meantime, the guardian robot tries to destroy Mendel, but the pathway moves too fast for its weapons to catch him. Unfortunately, you still have plenty of chances to dodge the guardian robot.

The platform’s entire floor on which Mendel now stands is one large Popper. On the other end of the platform is a tall pillar with another green traveling pathway that will carry Mendel out of the chamber...if you can get him up there! The difficulty here is that the guardian robot, still lurking, will try to eliminate Mendel.

The guardian robot shoots packets of energy that home in on Mendel. Each energy packet lasts about six seconds. If you click on a packet, it will
disintegrate. With this kind of strategy, however, the guardian robot will shoot Mendel sooner or later. Mendel has no defenses capable of stopping an energy packet and travels much too slowly to outrun one. The only option is to use the Popper to send Mendel out of the way of the energy packets.

While they are somewhat guided, these energy packets are not "smart missiles" and won't follow Mendel directly. Nonetheless, dodging these packets is not a simple task. Wait until the packet is near the ground before popping Mendel into the air. This step requires some practice to complete successfully and may frustrate you since Mendel doesn't always go where you want him to go. Be careful not to pop Mendel over the sides of the platform; the floor below functions as one large laser mine.

After you successfully pop Mendel to the green traveling pathway, he's transported from the pathway to a transport platform, which takes Mendel to the dimensional gate to the last world, Lumen.
Lumen World
Solutions

Chapter Ten
Lumen's previous inhabitants built a huge solar-powered reactor to provide power for their world before the minions of Galapagos had wiped them out. Now if you can manage somehow to turn on and redirect the solar energy provided by two enormous suns into Galapagos itself, you may be able to deal the rulers of Galapagos a deadly blow from which they will never recover.

Mendel first appears on a three-pronged lens with a Save Pad in the middle. Save the game here. The lens rotates on its axis fairly slowly, and you can change the rotational direction by clicking on any part of the lens. On each side of the chamber is an outcropping or balcony that Mendel can cross if one of the spokes is aligned with the balcony. It doesn't matter which outcropping Mendel takes.

After a short distance, Mendel drops off the edge of a short balcony on the other side and lands on top of a series of multicolored, propeller blades. There are four blades that rotate slowly around a center axis and serve as short-range Poppers. (They only pop vertically over a very short distance.) The blades alternate between blue and green, and turn yellow after they are used. The objective here is to drop Mendel onto the fourth propeller far below in a
fashion that is nearly the exact opposite of the engine screw puzzle on Plon. The task is difficult for two reasons: (1) the propellers move slowly at slightly different speeds relative to each other and (2) the camera angles make it difficult to see where Mendel will go when he falls. Also, note that the top propeller rotates directly underneath the balcony—Mendel can be pushed off as well as popped off.

**TIP**

Try not to pop Mendel off near the center of the blades but, instead, at the edges where you have a less obstructed view of the propeller blades below.

**CAUTION**

In this area, falling farther than the distance between two propeller blades will kill Mendel—mistakes are costly!

Once you reach the fourth propeller, you can navigate Mendel onto an outcropping balcony which extends out to the propeller. Mendel's timing to get over to the balcony is critical since you can accidentally pop him over the side of the balcony if you reverse the propeller's direction. Once across, use the Save Pad to save the game.
Almost identical to the first puzzle, the second propeller puzzle is only a short distance from the first. This time Mendel won't fall onto the first propeller; you must be sure that the propeller is positioned to guide Mendel onto it from the balcony.

Once on the first propeller, have Mendel make his way down to the fourth propeller using the procedure described above. Mendel must be popped up to allow him to drop onto the bridge below. Be sure to use the Save Pad while he's still in the corridor.

Farther along is an unavoidable diamond-shaped depression in the bridge. Mendel will fall into it and be trapped. Note that the floor of the depression is yellow. Click on it, and the bridge will split in half across the width of the diamond. No matter which side Mendel is on when the bridge falls, he will land unharmed on the next propeller puzzle below. Mendel is now sitting on a Popper overlooking the first propeller which is now upside-down from his initial approach.

Mendel won't fall off the balcony by himself, so click on the colored floor of the balcony (or depression) again and it pops Mendel into the air for a short
distance. This distance should be great enough to carry Mendel onto the first propeller. The third propeller puzzle is virtually the same as the first described above. When Mendel reaches the bottom of this puzzle, after leaving the fourth propeller, be sure to save the game.

The significant difference in this last propeller puzzle is the fact that the bottom-most propeller is unlike the rest in its color (yellow) and its slow movement. Its direction can neither be reversed nor manipulated until Mendel touches it. Once you have Mendel on the third propeller down, you'll have to time the pop so that he lands directly onto the propeller or onto the bridge that stretches underneath. Remember that the fourth propeller moves as the others do once Mendel touches it. No matter how Mendel comes down the propellers, get him onto the bridge and have him pass through the opening where the Save Pad is. Save the game here, and then let Mendel go to the next balcony. You will see the spoke move by here. Click on it so Mendel can get on. Mendel is now upside-down, so allow him to walk onto the bottom of the lens that he started on. From here the entire lens will shoot upwards through the large central tunnel and stop eventually at two more balconies, which are now accessible.
Move Mendel to the closer balcony. There's a Save Pad in the middle of the opening, but be sure to look at the other side first. If you see a ring of green, Mendel is on the right track. If you see another rotating lens with a big red blade rotating above it, then Mendel has gone the wrong way. Once you know you are on the correct balcony, save the game.

Mendel will move to a balcony and fall off onto a circular green platform rotating around an invisible center axis. The entire room is one large cylinder with platforms rotating along a horizontal plane inside of it. There are six horizontal planes with platforms rotating about them, including the circular one at the bottom. The levels of platforms alternate between green and blue. Each platform serves as a Popper, whether it be the circular doughnut at the bottom or the fast-moving ones at the top Popper. When the platform is yellow, the pop mechanism is still being "recharged."
Now click on any part of the doughnut. Mendel is propelled upwards through the air. The second line of platforms (blue) is made up of what looks like blue rocky outcroppings, and they all move in one direction. Clicking on any one of them causes all of them to reverse course. As Mendel moves upwards, you'll notice that there are fewer and fewer platforms near the top, which rotate faster than their lower counterparts. For instance, the topmost group consists of two blue platforms which travel nearly twice as fast as the platforms below. Unfortunately, you can't see directly above Mendel, so you don't know when a platform is directly overhead. If Mendel hits the bottom of a platform, he bounces off the angled surface and falls. The best thing about the Popper Platforms is their power. If Mendel glances off the side of a platform, he will end up alongside the walls of the cavern from which point you can easily maneuver a platform to catch him.

**CAUTION**

While platforms travel along the sides of the cavern, a platform's edges do not necessarily slide along the cave's walls. In fact, there is a gap—it's small but large enough for Mendel to slip through if he falls at the right angle. (Occasionally, this helps you if Mendel is popped up through the gap.) This gap with the circular platform is especially dangerous. If Mendel falls towards the bottom circular platform, click on it to reverse its course. This reversal seems to help keep Mendel from falling through this last gap.
Okay, Mendel has reached the top platform in spectacular fashion. Observe the walls of the cavern while the platforms rotate and you'll notice the following two distinct features: (1) a strange outcropping of gold metal with a repeating pattern, which is otherwise harmless; and (2) a solid block white balcony located slightly above the track of the platforms. When Mendel is directly beneath the gold outcropping, click on the Popper. Mendel will strike the beveled surface of the outcropping and sail across the chamber, landing on the top of the balcony. This works best if Mendel is turning around and not walking forward. Do note that Mendel flies extremely high off this Popper, so recovery from a mishap may be a bit problematic on the way down. If Mendel is anywhere in the block's vicinity, he'll probably land on it.

On the other side of the balcony is a staircase of sorts leading downwards and
to the left. Let Mendel drop onto each step until he reaches the green platform below the last step.

The green platform ends overlooking a strange upside-down, spinning, red pyramid surrounded by a hollow spinning blue triangle. You want to pop Mendel off the end of the platform like a diver and onto the top of that pyramid.

This pop should be easy enough—just be sure that Mendel is at the end of the platform or is moving towards the end when you pop the platform. Once he’s on the pyramid, click on it. It’ll sink down into the chamber where it embeds itself into a lens you’ve used before.

The pyramid now appears as a red triangle at the lens’s center with the blue hollow triangle floating above. Maneuver the lens so Mendel can reach the other lens that we had him avoid earlier. (Don’t go back to the chamber with the spinning platforms in it.) Save the game here at the Save Pad. The next set of puzzles involves a series of three rotating lenses, each with two larger spokes and accompanying smaller spokes or blades. The blades travel just above the surface of the lens and are harmless themselves; however, they’ll push Mendel over the spoke’s edge to his death. The blades move independently of the lenses and at different speeds. Simply click on a blade to change its rotation. As Mendel crosses more lenses, the blades move faster and lengthen in size.
Multiple independent blades also will appear. The objective is to get Mendel to the next outcropping or elevator platform (described below).

The very first lens Mendel will encounter has a single red blade rotating with it. It's not too fast and is relatively short; the blade doesn't extend the length of the spoke.

As the hub rotates, you should see an elevator platform set in a large gouge in the chamber’s wall. It may take a few seconds to coax Mendel onto the elevator, so watch for the blade as it sweeps back across the spoke. Once Mendel is on the elevator, click on it and the elevator will move up to the next lens.

The second lens is just like the first, except that the blade is yellow and perhaps, slightly faster. Again, move onto a spoke and then leave it where the next elevator platform goes up.
The third lens has a moderately paced blue blade rotating nearby. Instead of another elevator platform, your objective is to get Mendel onto a balcony that leads to a short, narrow corridor. There is a Save Pad in the middle of the corridor. Beyond the corridor is another balcony, which leads to yet another lens.

With the new lens comes another problem: there are now two independent blades to deal with. The first lens has an internal blue blade that extends to about half the length of the spoke, while an external red blade fills the rest of the space on the outside. Both move at a moderate pace, so watch for the red blade swinging around when you're trying to get Mendel onto the first elevator platform, which again rises once you click on it.
The second lens in this two-blade sequence is similar to the first, except that the inner blade is yellow and both blades move somewhat faster. Get to the elevator and go up.

The very last lens has a singular blue blade that's extremely short on one end and long on the other; there's a wide gap in the middle of the blade. Instead of taking an elevator, Mendel crosses over an outcropping with a Save Pad just beyond.

Right next to the Save Pad is a green balcony stretching over an abyss. Once Mendel moves onto the balcony, click the platform to flip it over.

Now beneath Mendel you'll see something that resembles a volcano. This is the Lumen beam emitter, the place
from which the beam is projected at the end of the level. Click on the center and the entire crater enlarges considerably. Lumen now has its power. Click on the platform to flip it over again, save the game, and return to the main lens. You have to cross the same six lenses again, going down the elevator platforms this time. Be sure to save your game halfway between the lenses.

By clicking on the floating blue triangle a signal flare is sent upward. If the emitter is open the Lumen beam will fire. A dimensional gate forms underneath the lens. Navigate Mendel onto the lens and then use an extending spike to knock him onto the dimensional gate. It's time for one last visit to Galapagos.

This power storage facility open for business.

Now that Mendel is back at the lens, click on the center triangle on the lens to have the power system started.

With the power activated, Mendel must now return to Galapagos.
GALAPAGOS V
Solutions

Chapter Eleven
As Mendel arrives from Lumen, the power beam you activated surges through the dimensional portals. There's a deep rumble as though an earthquake had just struck. It's definitely time to get Mendel out of Dodge. He moves onto a pyramid-shaped transport platform, which takes him to a long translucent bridge. (The bridge is upside-down initially, but the camera rights itself after a few moments.)

Along the bridge, there are five machines that produce electrical discharges between themselves and the bridge. Mendel cannot survive even one discharge. The objective is to prevent the two blue diamond-shaped platforms from touching the slits on either the left or right wall. When they do strike a side, the electrodes on that side will discharge. By preventing them from touching, the electrodes will not fire. Careful, don't accidentally click on the bridge until Mendel is at the end, otherwise you will inadvertently pop him into the air. Once
Mendel is at the other end, click on the bridge to pop Mendel off and onto the green transport corridor below.

The transport corridor abruptly ends with a short drop to the last Save Pad in the game. Save the game here—you won’t regret it later. Now Mendel will drop onto another green transport corridor. In many ways, the next hall is similar to the sliding slabs puzzle on Plon, with a few exceptions:

- The slabs don’t appear as lighter-colored sections on the wall but are indicated by two red circles.
- The slabs are translucent.
- When the slab retracts, clicking on it to extend it again automatically pops Mendel off the slab. In other words, you can’t let Mendel linger on the same slab for long. There’s only enough time to get your bearings. If the slab retracts completely, Mendel simply will fall straight down.
You're forced to think quickly from the beginning here. The transport corridor ends at the wall, and Mendel is shot outwards. A slab is right in front, so extend it to catch Mendel. Your objective now is to go down to the chamber beyond. There are three different entrances to the chamber—a green transport pathway and two small balconies that flank the pathway.

The camera angle prevents you from going straight down (and surviving). It's wise to pop Mendel across the chasm while extending a slab.

You're now presented with three options. Just below Mendel is a wedge-shaped outcropping that will force him either to the left or to right. Note the two slabs along each side of the wedge. Choosing either path (which, by the way, is entirely up to Mendel) eventually leads to one of the two balconies—if you're successful.
The other way is to take the center route, popping Mendel across the chasm to another slab and again, to a new slab. Afterwards, you drop him onto another slab and finally onto the transport pathway.

If you take one of the regular corridors, Mendel will cross over a bridge and then walk onto a green transport pathway that turns in an L-shaped corner to the left or right (depending on which corridor Mendel takes). This is the object of your quest. Just beyond the corner Mendel will be pushed off a ledge.

Mendel is drawn into a funnel-like structure with a slab in the middle. Extend the slab before Mendel falls through and is lost. Pop Mendel as the slab retracts, and he will land on a green transport pathway.
Both pathways will dump Mendel off onto the first of three translucent C-shaped platforms that circle Galapagos’s gate cutter, the device that creates dimensional gates. The platforms move slowly, but once again, they also serve as low-powered Poppers. Navigate Mendel through the three platforms by popping him off the inside edge of the platform crescent and landing him at the center of the one below. Be sure that Mendel doesn’t pop into a gap. Your chances are better if he’s near the inside part of the platform closest to the shaft when he pops off it.

Once Mendel is at the bottom, click on the panel. The gate cutter beam fires, creating a dimensional gate to some unknown dimension. The drain from creating the dimensional gate will cause a chain reaction in the failing Galapagos power systems. This will cause Galapagos to explode. Pop Mendel off the platform through the dimensional gate. You must act quickly because your time is short. Galapagos explodes just after Mendel escapes!
Interview with the Minds Behind Galapagos

Chapter Twelve
Galapagos is definitely one of the unique gaming adventures designed in the past few years. It combines true three-dimensional environments, 3D acceleration, interactive environments, and one of the most advanced artificial life/artificial intelligence constructs ever designed for a computer entertainment product. But who are the guys that thought it all up? How did Galapagos come into being? I asked Scott Collins, Stephen Collins, Justin Ebert, and Mattias Fornander from Anark—the creators of Galapagos—for some answers.

**QUESTION:**

How did Anark get started?

**Answer:**

Anark was started in 1994 by Justin Ebert, Scott Collins, and Steve Collins—cousin and brothers—in the Philadelphia area. The plans to start the company began prior to the three being roommates in college. After gaining a few years of post-college experience, Scott and Justin came up with the initial idea of developing an advanced adaptive controller technology that could be applied to numerous commercial applications. We thought Galapagos would be a fun way to introduce the technology to the consumer market in a non-critical application. For example, we wouldn’t have wanted NERM [Non-Stationary Entropic Reduction Mapping] to be used to control a fuel injection system as its first application...too risky. So, Anark was founded around the concept of our adaptive controller technology, NERM. We made our plans, created a proof of concept
for the technology, raised capital, quit our jobs, and brought on the fourth partner in our company, Mattias Fornander. He started working for us through a college co-op program and later began working with us full-time. Scott, Justin, and Mattias were responsible for technology and product development. Scott focused most of his attention on developing NERM, and Justin and Mattias concentrated more on creating our development tools and the early game development. Steve was responsible for business development and marketing. The small company relocated to Boulder, Colorado in early 1995, after searching the U.S. for all of the places we could base our company. Since being in Boulder, a few other people have worked on the Galapagos project. Alex Lindsay was with us for a year—now happily working in the film industry. Alex modeled Mendel and did the animation work, created a lot of the textures and other graphical components of the game, and he created our Anark symbol. George Orthwein and Gavin Kistener of Image Refinery Productions—friends from Pennsylvania—spent two months in Boulder helping with the creation of some of the worlds in Galapagos. Don Metzler, a Boulder-based programmer, helped create the Windows 95 shell for *Galapagos*, as the game was developed on the Macintosh platform. In July of ’96, Shawn Heinrichs—a CPA at Arthur Andersen and another Pennsylvania friend—moved out to take over the financial management of Anark as our CFO. We started Anark Game Studios, a subsidiary of Anark Corporation, to become our game development company. Anark is now pursuing other NERM applications and will be releasing some very powerful development tools.
QUESTION:
Where did the original idea for Galapagos come about?

ANSWER:
Galapagos was Scott and Justin's idea. It was born out of a concept they had for a real robotic "pet" using NERM. It was called Darwin and was the physical inspiration for Mendel. Initially, Galapagos was going to be much more of an edutainment title, emphasizing experimentation with artificial life (NERM), etc. Eventually, we decided that we wanted Galapagos to be the first game that implemented the artificial life concept in a form that would appeal to real gamers. Galapagos is obviously a metaphor for the Galapagos Islands where Darwin did a lot of his research for Origin of Species, evolution, etc. Mendel is a synthetic organism that has to learn and adapt to survive. Mendel is named after Gregor Mendel, the monk that did genetic research with his pea plant experiments.

QUESTION:
What were some of the hurdles you had to overcome to develop Galapagos?

ANSWER:
Developing a game, or any other product, with a lot of unknowns is always going to have obstacles. First, we didn't absolutely know that Mendel would behave properly. He is not pre-programmed, and therefore, he's unpredictable. Luckily, the dynamics of his behavior worked out as we anticipated, more or less. Another issue was developing game content around an autonomous character.
What is fun in a 3D game where you control the character is not necessarily fun in a game where your character has freedom to "roam" in any direction. A lot of content was developed, altered, or thrown out because it wasn't appropriate in the Galapagos context.

**QUESTION:**
Were there delays?

**ANSWER:**
We definitely had some delays. Partially from the issues mentioned above, but we also found ourselves with the unanticipated project of developing our own 3D rendering engine. It turned out to be much better than the one we were using, allowing us to do effects like fog, clouds, shadowing, transparencies, etc., but it did add time to the project. We also had not planned for 3D hardware acceleration. The game looks much more beautiful in hardware acceleration, but it also added time to the project.

**QUESTION:**
What's involved in the development of one of the worlds, and what kind of process was it to incorporate the puzzles into them? Was there a certain mindset?

**ANSWER:**
A Galapagos world may seem structurally similar to a first person 3D world like *Quake* or *Marathon* since they all have walls and a moving viewpoint of the world, but behind them are some different considerations. The main issues during the development of our
worlds were puzzle design, logic analysis, structure creation, motif and camera assignment. We spent quite some time trying to imagine how puzzles would be seen from Mendel’s perspective and this radically changed the design of the puzzle environment. With most 3D worlds you have to take into consideration how the player sees the world and that it is enjoyable and makes sense to him or her. During the early stages we discovered that we had to carefully take into account how Mendel’s sensors are wired and how he sees things. To describe how worlds are built I should explain a bit further how Mendel is wired. Humans have relatively advanced vision that can process images and make out structural details and visual cues. Mendel doesn’t have a simulated human eye but rather a system that works much like a bat or a laser-detection system. Six beams or pulses are sent out from his eyes and bounce back when they hit an obstacle. He can lengthen and shorten the range or strength of the pulses by raising and lowering his body, but all he gets is the general distance to objects left and right. To get a better feel for how he sees, imagine that you have a bright light bulb on your head and that you are looking through a pair of tubes with a table tennis ball covering the end of each tube. (You’d look really silly but that’s okay.) You can now point the tubes by turning your head, but all you get is the general brightness coming from that direction now that the table tennis ball lets through some light but is blocking any detail. Now imagine that you have to walk through Galapagos like that, and you start having some pity on the poor little creature. When conjuring up these moving structures and strange devices called puzzles we always had to check that our game logic could handle it. The core game logic engine is fast since every object in the world executes its own little program. Some devilish creations of ours had to be modified to fit inside our engine since something
that is easily explained in English or with moving gestures may not be easily explained in game logic. The basic structures such as walls and platforms have many design criteria. Mendel’s visual system and motor output were a major factor here. For example, the width of a floor structure is critical with Mendel’s acquired fear of heights. A catwalk that is too narrow may seem impossible to Mendel, who will then promptly refuse to go near it. That’s a slight problem if that catwalk is the only way to the next section. Other structural issues involve synchronizing or carving out moving and rotating elements so that they do not collide; the fitting of elements so that Mendel can walk across them, and the calculation of distances so that Mendel doesn’t die when he drops down to the next section. The motif—the look and feel of the world—is considered and discussed from the beginning but is completed after the structural (what is happening), logical (why something is happening), and dynamic (how something is happening) issues are sorted out. The ambient sounds are activated; the look and scale of surface textures are chosen; the sound effects are assigned; and the lights are set up. This is where the plastic walls turn into rock; the elevators activate the pulsating anti-gravitation unit; and lava starts rumbling behind the back wall. Camera placement is usually done last and needs a lot of fine tuning. The camera style seen in Galapagos was designed with many things in mind. Usually the user will be very busy keeping Mendel alive, and having to navigate the camera manually was not a good solution as seen in early tests. In addition to this we get a significant speed increase by selectively turning off sections when the camera is not looking in that direction. This speed increase results in a much more fluid camera experience. You sit down in a virtual director’s chair when assigning the different camera positions. Mendel’s position triggers new camera locations; but since he more
or less chooses where to go, you have to anticipate all possible camera transitions, so that they do not slam into walls or pass through objects. In addition to helping the user play the puzzles, we chose to create both overview camera positions that show the world and close-up positions of Mendel. Picture a web of lines connecting all possible camera locations in a section. Now imagine that you found a better spot for one camera location, and you start moving one of the web points. Since all the connecting lines also start moving, it is up to you to choose a spot where the lines do not cross structural elements since that would mean that the camera could potentially pass though these elements when moving between points. Things get interesting when some cameras are relative to Mendel and track him wherever he goes. To make things even more interesting, all cameras are so-called "preemptive," meaning they do not have to arrive to the new spot before heading to a different spot. A dynamic web of logic, structure, and motion indeed.

**Question:**
When was it realized that you wanted to use artificial life—NERM specifically—for Mendel? Early on? Was it extremely difficult to do so in terms of keeping the game on schedule?

**Answer:**
NERM was our initial idea, so we knew from the beginning that it would control the character (Mendel) in the game. As discussed earlier, it did make the predictability of the development schedule somewhat tricky.
QUESTION:
What's your relationship with Electronic Arts? Has it been beneficial?

ANSWER:
Electronic Arts is our distribution partner, and it has been an extremely beneficial relationship. Being a small company, it helps to have the distribution strength and resources of EA available. The team that we work with within EA Distribution is very supportive of the game and has been helpful to us as we go through the unknown process of releasing our first product. They have been great to work with and are doing a great job of helping us to establish an Anark-brand identity in the game market.

QUESTION:
Is there anything else being worked out? Any possible expansions for Galapagos?

ANSWER:
It is quite likely that there will be a sequel to Galapagos, but the game itself is done. A lot of people are asking if there will be level editors so they can create their own levels, but the worlds are much too complex—and the way Mendel interacts with the worlds is much too complex—for this to be practical.
INTRODUCTION TO COMPLEXITY

APPENDIX
Here's an inside look at the theory and ideas behind the development of NERM technology and *Galapagos* directly from the developers at Anark.

**COMPLEX SYSTEMS**

A coral reef is a fantastically complex system on all scales of space and time, both large and small. What does it mean to say that a system is complex? Complexity refers to relationships, or correlations, that come into existence across relatively remote portions of a system. For example, the byproducts of a certain type of rain forest plant that flow into a local river may have some distant "effect" on the form and color of a particular coral. Collectively, these relationships "cause" the very form of a coral reef. Looking at a complex system through the tiny window of our comprehension presents opportunities for gross misinterpretation. The most obvious problem with understanding a complex system is recognizing its scope. At the level of observation, complex systems are made up of, and formed by, other complex systems. These systems are best described in terms of complexity theory—a relatively new unified way of looking at seemingly unrelated fields of research. It is an unusual mixture of probability theory and non-linear dynamic systems—two discrete fields in mathematics. By understanding complexity theory, you can form models that will help you understand things as different as human language, ecosystems, or the technology that allows Mendel to learn.

**SELECTION**

All real-world systems change through time. Some changes occur very slowly on time scales larger than recorded human history, while others change on scales of time that are imperceptibly small. A real-world system is the product of initial conditions and the constraints that act on this system, causing it to evolve in a particular way. Human societies demonstrate a high degree of organization. The organization in human societies illustrates the effects of
constraints acting on real-world systems. Most humans choose to exist in societies with other humans. What shapes a socio-political complex system? What gives rise to the formation of governments, commerce, and religious institutions? Clearly, these forms evolved as they did in response to a myriad of constraints. A complex system evolves in a manner consistent with the nature of its constituent systems and with the systems with which it interacts. Definitions of any particular system is entirely subjective. An observer must accept a reductionist perspective to identify any discrete system. Reductionist science attempts to remove the unknown, the unmeasurable, and the messy complications that tend to break simple models down. Do we remove the rain forest from our analysis of a coral reef? Do we remove the composition of the soil from our analysis of the weather? The identification of all the constraints in any real-world complex system is impossible. To examine any real-world system, we must accept a significant reduction of the problem. A system can be described by specifying a range—everything that operates inside a theoretical boundary is considered part of the system, whereas everything outside the boundary is part of the system's environment. Any exchange of matter, energy, or information across this boundary is known as a flux. If the exchanges between the system's environment and the system cancel each other, then there is no net flux—the system is said to be identified with its environment. A sustained net flux across this boundary is known as a constraint. If a system's constraints change, the form of the system also may change. Constraints "select" forms that the system can or cannot assume. For this reason, constraints can be referred to as selectors. Exactly how a system can change, and at what rate, depends entirely on the nature of the constraints and the system's internal properties, including its current state. Charles Darwin identified "natural selection" as the basis for the origin of species. He suggested that a species' environment determined the changes that would occur on a species over time. By specifying what constitutes a species and what constitutes a species' environment, Darwin reduced a real-world complex system to a specific, albeit arbitrary, model.
PROBABILITY

It may seem unlikely that the random behavior exhibited by a system could ever yield anything except chaos. If you look at such a system on different temporal and spatial scales, however, you may find that its random behavior in fact contributes or defines stability on some other scale. Does this imply that order can rise from chaos? For example, your desktop may appear completely solid from your optical perspective. If you were to move much more closely (microscopically) until you were looking at the molecules that make up your desktop, you would see that your desk is actually moving. You would see the atoms that make up the cellulose or wood molecules. If you were to slow time, you might see charged particles called electrons orbiting those atoms. They would appear to be dancing around the atoms in a semi-random fashion. How could such wild behavior ever yield something as perfectly motionless and deterministic as your desktop? As electrically charged electrons move around an atom, the charge of the atom shifts spatially on some temporal scale. If you were to observe their semi-random motion over some period of time, you would begin to notice that the electrons spend more time in certain regions of space than in others. Imagine that you could pluck a single atom out of your desktop and place it in a very small box with clear sides. On all of the sides of this box, you might draw a grid with dashed lines to denote volumes of space—or little boxes—that exist inside of your atom container. Now, if you record the location of the electrons flitting about your atom at regular intervals in time, you would find that certain electrons “visit” certain boxes frequently, while other boxes are not visited at all. If you observed this for some time, you could express the number of times an electron visited each box as a percentage of your total number of observations. For example, if little box number seven was visited 14 times out of 100 observations, then the electron was inside box seven 14 percent of the time. This percentage is called the relative frequency. Each little box could be assigned a relative frequency with the total of all relative frequencies equal to 100 percent. Assuming that the general behavior of the electrons does
not change—which may be a great assumption itself—you could have more and more accurate results by decreasing the size of the little boxes and by increasing the number of observations you make. Someone may ask you what the likelihood or probability is that an electron is contained inside a specific box. You could reply, with some uncertainty depending on the accuracy of your experiment, that you believe the probability was a fraction of the total number of observations represented by a number from zero to one. What does all of this tell you about your atom? Remember that electrons moving around your atom are electrically charged and that the charge of the atom shifts according to the locations of the electrons. Your atom had volumes that were preferred, or visited more frequently, by its electrons. This suggests that these “preferred” volumes tend to have a greater charge than do volumes less frequently “visited” by electrons. What are the implications of a such a specific charge distribution around your atom? Charge determines how atoms will behave around other atoms. An atom’s charge distribution affects how it can bond with other atoms. Everything you see around you is made of atoms, bonded together in specific ways—including your desktop. Imagine if the charge distributions of all your body’s atoms suddenly changed form. It would become readily apparent that order can and does arise from chaos.

**ARTIFICIAL LIFE VS. REAL LIFE**

Artificial life is a field of scientific research that attempts to simulate or model the complex behaviors and forms found in natural systems. There is a great deal of misinformation about the term “Artificial Life.” It seems to mean very different things to different people. In fact, some people believe that software running on a computer can be alive. Clearly, this is not the case. Real living systems are byproducts of complex systems that seem to have boundless depth—scales of time and space that are incomprehensible and impossible to explore due to our inability to measure or observe them.
effectively. As science pushes the bounds of our ability to observe real systems with faster and more advanced instruments, more is uncovered with no end in sight. And while complex systems presented by certain computer programs can be quite amazing, they are nothing compared to the “real thing.” When we use the term “Artificial Life”, we refer to simulations or algorithms that run on a computer and exhibit adaptive characteristics; that is, characteristics that change through time due to certain external constraints. We generally do not use this term but, instead, refer to complexity theory as a more universal language for describing how systems interact and change through time.

HOW MENDEL WORKS

MENDEL’S SENSORS

Mendel is a software simulation of an autonomous robot. He “sees” through infrared lasers that radiate from his face. When one of these lasers strikes an object, some infrared radiation reflects back toward Mendel's face. An array of infrared sensors allows him to measure the intensity of the reflected radiation, estimating for him his distance from that object. Certain objects radiate infrared without being illuminated by Mendel—such as a hot panel on the wall or a lava pit. Mendel has three lasers that radiate from the left and right sides of his face for a total of six infrared lasers. These lasers project upwards and downwards, allowing him to see objects above and below. As Mendel raises and lowers his body, the intensity and angle of the lasers change. As he stands up taller, the lasers become more intense and the angle between the left and right laser arrays decreases. As he squats, the intensity of the lasers decrease, while the angle between the left and right laser arrays increases. Mendel also has tactile or touch sensors concentrated in the front of his body. If he collides with an object, these sensors are triggered. All of these sensors values are fed into Mendel’s three NERM controllers. The NERM controllers, in turn, produce outputs values or commands that are fed to Mendel’s three servo motors.
MENDEL'S MOTORS

Mendel has three fully simulated servo motors that move his body. If you have never seen a servo motor, simply press the OPEN button on a music CD player repeatedly. A servo motor controls the movement of the CD tray. The lens on an autofocus camera is controlled by a tiny servo motor as well. Servo motors come in various shapes and sizes. In general, a servo motor accepts a command that tells it the angle to which it should rotate. The servo motor then tries to rotate the motor to that angle. Depending on the load or rotational inertia on the servo, the torque output of the servo, and the maximum rotational speed of the servo, it may take some time for the servo to respond to a command. This is why Mendel sometimes has trouble stopping if he is running towards a nearby edge. He cannot stop his forward momentum instantaneously. The three servo motors receive their commands directly from the three NERM controllers inside Mendel. Based on these commands, the servo motors respond, and Mendel moves his body.

As a technical note, the form that Mendel's body assumes on your computer screen is derived from the current angles of his three servo motors in each and every frame. Mendel's polygonal model is not precalculated animation—this is why he can display such life-like motion.

MENDEL'S NERM CONTROLLERS

Non-stationary Entropic Reduction Mapping (NERM) is a new form of adaptive controller technology developed by Anark. Mendel has three NERM controllers to accept input from sensors and to produce outputs for his three servo motors. Just as the human brain accepts input from the eyes and sends output signals to muscles to perform certain tasks, Mendel's NERM controllers figure out how to control the servo motors' action, which is based on sensory input received from the environment. NERM is the technology that allows the robotic Mendel to adapt like a living organism. Before a NERM controller
has learned anything, it creates input-to-output mappings that look like random noise. When Mendel is first born, his NERM controllers have not yet figured out how to control his servo motors' responses to sensory input. This is why a newborn Mendel moves so spastically and randomly. A NERM controller learns or evolves through time and through use. What defines how a NERM controller will change form? Much like a real-world complex system, a NERM controller has constraints or a selector that causes it to change form. This selector is a number that is fed back to the NERM controller that tells it how well it is performing. This number is also known as an error. NERM controllers evolve or change the way they map input to output to minimize this error. In Mendel's case, the errors fed back to his NERM controllers are expressions of servo activity, infrared exposure, and tactile feedback. Mendel's NERM controllers would receive a very large error if they told his servos to do something that caused him to walk into walls, to jump off of cliffs, or to engage in other activities that cause intense exposure to infrared radiation. The error decreases as his controllers figure out how to control his motors in such a way that he avoids infrared radiation. A NERM controller is completely malleable. Because it learns how to control something optimally in response to its input, does not mean that it cannot learn something new and different in the future. If the form of the constraints or error fed to the controller changes form, so will the NERM controller's response. How is this kind of adaptive control different from traditional rule-base Artificial Intelligence? In general, traditional AI requires a detailed understanding of the system that it controls or simulates. This is quite problematic: it may be difficult or even impossible to understand relatively complex systems without significantly reducing or simplifying the problem, especially if the system's form changes through time. Unfortunately, this simplification of the problem may lead to an invalid or incomplete understanding of the structure or behavior of the system. NERM also offers
significant advantages over other adaptive, controller-oriented technologies. It allows controllers to produce multiple outputs or solutions for the same inputs. For example, NERM allows Mendel to express many different behaviors although he receives the same stimuli within a given environment. In general, NERM has the flexibility to create input-to-output relationships of a form, which are impossible with other technologies such as Neural Networks.

**MENDEL IN GALAPAGOS**

Mendel learns without your intervention. If you leave a newborn Mendel alone for several hours, you will return to find him significantly different from the Mendel you left. Certain areas are better for letting a newborn Mendel learn than others. If a play area provides sparse sensory stimulation—such as wide open spaces or impossibly tight spaces where Mendel cannot escape infrared exposure—Mendel may not be able to adapt properly. Why does this happen? Mendel's NERM controllers are responsible for creating optimal outputs based on sensory input. Mendel can receive a wide combination of sensory values that describe his current sensory context. The set of all the combinations of possible sensor values forms the NERM controllers' input domain. If Mendel is not allowed to experience a reasonably wide range of sensory stimuli, then the NERM controllers will form optimal mappings for only those portions of the input domain that have been experienced. When a Mendel with such lopsided sensory experiences is exposed to an entirely different sensory environment, he will appear to behave strangely—even though he is well-adjusted in his previous environment. His NERM controllers have not yet learned how to create optimal mappings with this part of his sensory input domain. Of course, such partial retardation is not permanent—simply place Mendel in a stimulating environment, and the NERM controllers will figure it all out.
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