

Notes from Hades

The rush to get orders in last time was due to a trip I had to take. This was a two-week trip to Japan, so I couldn't push the deadline back one week as I normally would. The trip itself went well. The first week was spent in Sapporo, on the northern island of Hokkaido. Unfortunately, I did not get to see much of the city, since this was one of those meetings where I was buys from about 8:00 am until 7:00 pm most days. Our hosts did provide us a gala dinner one evening, with entertainment provided by a local drum and dance troop. It was quite entertaining, and described by one of my colleagues as "traditional Japanese meets Eurovision".

The second week, I was in Tokyo, and I was able to do a bit more sightseeing there. I flew down on the Saturday, so I had all of Sunday to explore. I went to the Imperial Palace, but unfortunately, the palace itself was closed to the public. The gardens around the palace were quite stunning. Later on, we went to Asakusa, which is a large shopping district near a Shinto shrine. I was able to pick up quite a few gifts there.

The real excitement of the week, however, was Typhoon Melor, which hit Japan toward the end of the week. It made landfall near Nagoya, and came up through central Honshu to the east and north of Tokyo. It affected us late Wednesday night and Thursday morning, but by the time it got to us, the winds were not that bad, and on Thursday, only a few bands of rain were left. Later that day, we went up in the Tokyo Tower (which I could see from my hotel room), and the winds were still enough to cause noticeable movement in the tower. The view was fantastic, however, since the rain had swept through and cleared away any haze. Mount Fuji was easily visible.

I actually got to experience Melor twice, since it caught the jet stream end hit California after I had come home. By the time it got to us, however, it was a fairly unremarkable storm.

Overall, Japan was very nice, and the hospitality was exceptional. I would recommend it to anyone.

Two games end this issue. First, Terrier ends on schedule with congratulations due to Dave Hooton. Hunter will start next issue to replace it. Secondly, Doberman finally ends with a last minute surge by Eric Brosius to take the victory. It will be replaced by Boston Terrier.

The next deadline is **Tuesday, December 15 at 5:00 p.m. Pacific Time. Please do not call or fax orders after 10:00 p.m. Pacific time.** My wife and I tend to retire early. Also, if you want to fax in orders, call first. We hang up on unannounced faxes.

Contents

Dog Park	Machiavelli	Page 2
Barking Up...	Machiavelli	Page 3
Doberman	Industrial Waste	Page 4
Terrier	Silverton	Page 4
Cats and Dogs	History of the World	Page 5
Greyhound	Age of Renaissance	Page 6
Robover	Robo Rally	Page 7

Husky

Pateel

Frontier Dog

Procyon

Basset

Pedagoguery

Power Grid

Kremlin

Gunslinger

Merchant of Venus

Outpost

Page 8

Page 9

Page 9

Page 11

Page 12

Page 13

Game Openings

Hunter. Silverton. Will start after Terrier ends. Have Dave Partridge, Michael Longdin, Ward Narhi, Cary Nichols, Bill Scharf, and Dave Hooton. This game is full. **Starts next issue!**

Dogbreath. History of the World. Have Chris Geggus, Dave Partridge, Andy Lewis, Kevin Wilson, Dave Anderson, Paul Bolduc, will take up to 1 more.

Bolognese. Machiavelli. Gunboat. This game will start after the next Machiavelli game ends. Have 5, will take up to 3 more. You are signed up: .

Boston Terrier. New World. This will use the exploration variant, plus the Non-Player Nations variant in the event I get less than 6 players. Have Andy York, Andy Lewis, Dave Partridge, Bob Robles, and Dave Hood, will take up to 1 more.

Starts next issue!

Purebred. Machiavelli. This game will start after the second Machiavelli game ends. Have Ward Narhi, Bob Robles, Pasquale Giovine, Dave Partridge, and Walt O'Hara, Mike Scott, will take up to 2 more.

Golden Retriever. Seafarers of Catan. Have Chris Geggus, Dave Partridge, Dave Hooton, Mike Scott. Will take up to 2 more.

Wish List

Industrial Waste. Have Andy York and Dave Partridge, will take up to 2 more.

Silverton. Will start after Hunter ends. Have Eric Brosius, Dave Partridge, and Dave Hooton, will take up to 3 more.

Kremlin. Will start after Pateel ends. Have Walt O'Hara, Mike Scott. Will take up to 4 more.

Outpost. Will start after Basset ends. Have Eric Brosius, Andy York, will take up to 8 more.

Goa. Have Brad Martin, will take up to 3 more.

Puerto Rico. Have Chris Geggus, Andy York, will take up to 3 more.

In general, game ownership is recommended, but not required.

Note that a subscription to S.O.B. is not required to play in a game run by flier, but that a game fee will be charged to non-subscribers.

S.O.B. is a zine of unusual postal games, and anything else I feel like including. Your publisher is:

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Subscriptions cost \$2.50 per issue (\$3.75 overseas).

Dog Park

Fall 1055

Miller Number 20077Apw10

**Advanced Rules, Natural Disasters, Special Military Units, Moneylenders, Conquest, Gray Press, Ultimate Victory
Deadline for Winter/Spring 1056 12/15, Tuesday**

Pisa nearly eliminates the Holy Roman Empire while the Byzantines dislodge that pesky Norman fleet and take Rome. Venice's help to the Holy Roman Empire goes for naught.

Outstanding Loans

Spring 1056: 17 ducats due from the Holy Roman Empire (11 borrowed)
 Summer 1056: 15 ducats due from the Byzantines (10 borrowed)
 Fall 1056: 5 ducats due from the Holy Roman Empire (3 borrowed), 12 ducats due from the Papacy (8 borrowed), 24 ducats due from Pisa (16 borrowed)
 Spring 1057: 6 ducats due from the Byzantines (4 borrowed)
 Summer 1057: 26 ducats due from the Pope (17 borrowed), 17 ducats due from the Holy Roman Empire (11 borrowed)

PAP	Mantua, Bologna, Florence, Urbino, Arezzo, Perugia, Patrimony, <u>Spoletto</u> , Capua, <u>Aquila</u> , Bari	10
PIS	Turin, Milan, Fornova, Parma, Cremona, Modena, Lucca, <u>Pistoia</u> , Pisa, Piombino, Sienna, Corsica	11
VEN	<u>Trent</u> , Ferrara, Padua, Treviso	3

Seas

BYZ	Venice, Upper Adriatic, Lower Adriatic	3
NOR	Ionian Sea	1
PIS	Tyrrhenian Sea	1

Orders

BYZANTINES (Giovine): A (EP) Spoletto to Rome, A ALBANIA supports F Durazzo, F UPPER ADRIATIC supports F Ragusa to Lower Adriatic, F DALMATIA supports F Ragusa to Lower Adriatic, F Ragusa to LOWER ADRIATIC, F DURAZZO supports F Ragusa to Lower Adriatic

HOLY ROMAN EMPIRE (Partridge): A Parma to Milan (DISLODGED, retreat Pavia, OTB), A (EM) Cremona supports A Parma to Milan (DISLODGED, retreat Bergamo, garrison, OTB)

NORMANS (Horsley): A ANCONA convert to G, A PALERMO holds, F SARDINIA holds (rebellion suppressed), F SALERNO holds (rebellion suppressed), F OTRANTO supports Papal F Bari to Lower Adriatic, F IONIAN SEA supports Papal F Bari to Lower Adriatic, F (EM) Lower Adriatic to Ragusa (DISLODGED, retreat Aquila, Herzegovina, OTB)

PAPACY (Roalstad): A FLORENCE supports A Bologna, A BOLOGNA supports A Mantua, A (EM) MANTUA supports Pisan A Milan to Cremona, F BARI to Lower Adriatic

PISA (Scott): A Milan to CREMONA, A Pavia to MILAN, A Modena to PARMA, A FORNOVA supports A Modena to Parma, A Genoa to MODENA, F Ligurian Sea to TYRRHENIAN SEA

VENICE (Wilson): A FERRARA supports Holy Roman Empire A Cremona to Mantua (nso)

Note

The Holy Roman Empire is eliminated if A Parma retreats anywhere but Pavia, so I will assume it does.

Spring 1055 Famine

Poor Year – Row Only: Ragusa, Carinthia, Bergamo, Pistoia, Spoleto

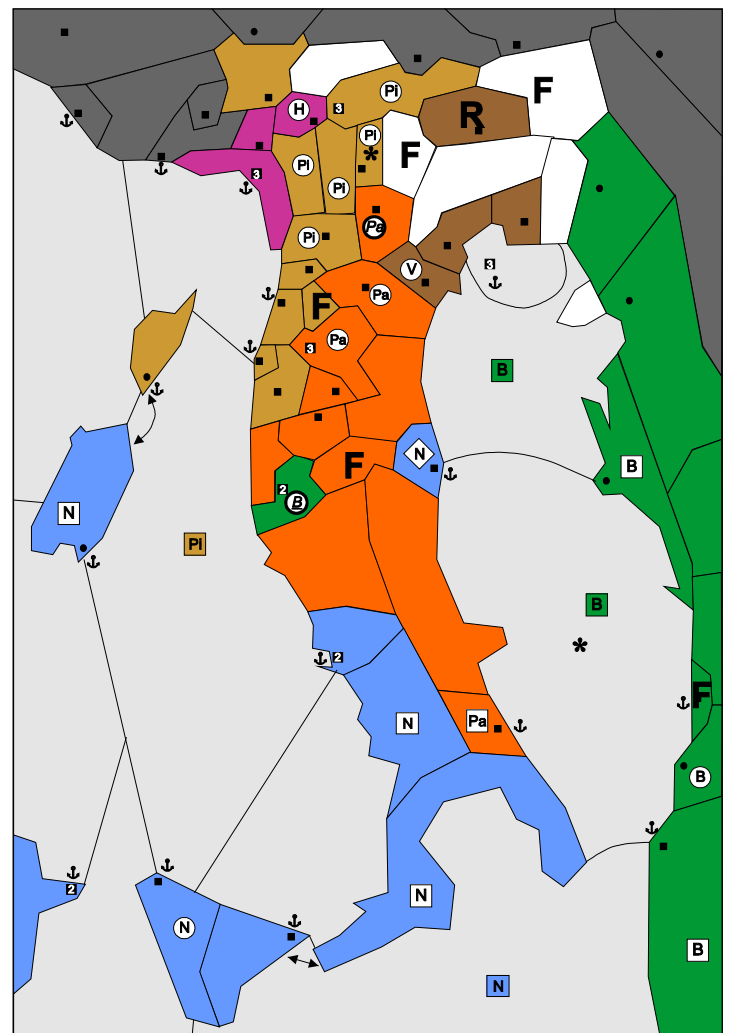
Spring 1055 Income

Provinces and cities that are underlined do not produce income while those that are in italics could change hands depending on retreats.

Provinces

BYZ	Carniola, Croatia, Dalmatia, Bosnia, <u>Herzegovina</u> , <u>Ragusa</u> , Albania, Durazzo, Rome	8
HRE	Genoa, Montferrat, Pavia	3
NOR	Sardinia, Tunis, Palermo, Messina, Otranto, Salerno, Naples, Ancona	8

Dog Park



○ Army □ Fleet ◇ Garrison ◆ Autonomous Garrison ◇ Besieged Garrison
Cities

BYZ	Carniola, Croatia, Dalmatia, <u>Ragusa</u> , Albania, Durazzo, Rome (2), Venice (3)	10
HRE	Genoa (3), Montferrat, Pavia	5
NOR	Sardinia, Tunis (2), Palermo, Messina, Naples (2), Ancona	8
PAP	Mantua, Bologna, Florence (3), Arezzo, Perugia, Bari	8
PIS	Turin, Milan (3), <u>Cremona</u> , Modena, Lucca, Pisa, Piombino,	11

Sienna, Corsica
 VEN Trent, Ferrara, Padua, Treviso

Totals

Variable income die roll was 3.

	Variable	Provinces	Seas	Cities	Total
BYZANTINES:	3	8	3	10	24
HOLY ROMAN EMPIRE:	3	3	0	5	11
NORMANS:	6	8	1	8	23
PAPACY:	3	10	0	8	21
PISA:	3	11	1	11	26
VENICE:	3	3	0	3	9

Your total after income:

Game Summary

	1051	1052	1053	1054	1055	1056
Byzantines:	3	6	7	7	7	8
Holy Roman Empire:	3	6	6	6	4	3
Muslims:	3	3	0	0	0	0
Normans:	1	2	5	5	6	6
Papacy:	3	5	6	7	7	6
Pisa:	3	5	7	7	7	9
Venice:	3	4	5	4	4	4

Barking Up the Wrong Tree

Spring 1255

Miller Number 2007Bpw10

**Advanced Rules, Natural Disasters, Special Military Units, Conquest, Gray Press, Ultimate Victory
 Deadline for Summer 1255 12/15, Tuesday**

Milan makes major advances against Avignon and Venice advances against Florence. Aragon and the Pope play defensive. Plague hits Milan and Florence hard.

Builds

		Cost
Ara	Maintain F Gulf of Lions, F Corsica, F Tyrrhenian Sea, F Ionian Sea, F Durazzo, builds F Tunis	18
Avi	Maintains all, no new builds	9
Flo	Maintains all, no new builds	9
Mil	Maintains A Turin, A Savoy, A Parma, A Tyrolea, F (EM) Ligurian Sea, builds A Genoa, A Pavia, A Milan, A Cremona	30
Pap	Maintains all, builds A Perugia	18
Ven	Maintains all, no new builds	24

Orders

- ARAGON (Scharf): F Tunis to WESTERN MEDITERRANEAN, F IONIAN SEA supports F Durazzo, F DURAZZO supports F Ionian Sea, F TYRRHENIAN SEA supports F Corsica, F CORSICA supports F Tyrrhenian Sea, F Gulf of Lions to Ligurian Sea (DISLODGED, retreat Sardinia, OTB)
- AVIGNON (Nichols): A SWISS to TURIN, A AVIGNON supports A SWISS to Turin, E MARSEILLES to Gulf of Lions
- FLORENCE (Whyte): A URBINO supports A Bologna (cut), A Bologna holds (DISLODGED, retreat Mantua, Florence, garrison, OTB), A Florence to PISTOIA
- MILAN (Renken): A SAVOY to PROVENCE, A Turin to MONTFERRAT, A Tyrolea to SWISS, A PARMA supports A Genoa to Modena, A Genoa to MODENA, A PAVIA to MILAN, A Milan to CARINTHIA, A Cremona to BERGAMO, F (EM) Ligurian Sea to GULF OF LIONS
- PAPACY (Robles): A ROME holds, A ANCONA holds, A PERUGIA holds (u), A Naples to AQUILA, A SALERNO supports Venice F Lower Adriatic to Otrango (nso), A BARI supports Venice F Lower Adriatic to Otranto (nso)
- VENICE (Partridge): A LUCCA support A Ferrara to Bologna, A Verona to FERRARA, A PADUA supports A Verona to Ferrara, A Ferrara to BOLOGNA, A RAGUSA to Urbino, F UPPER ADRIATIC transport A Ragusa to Urbino, F LOWER ADRIATIC transport A Ragusa to Urbino, F ALBANIA supports F Lower Adriatic

Treasury:

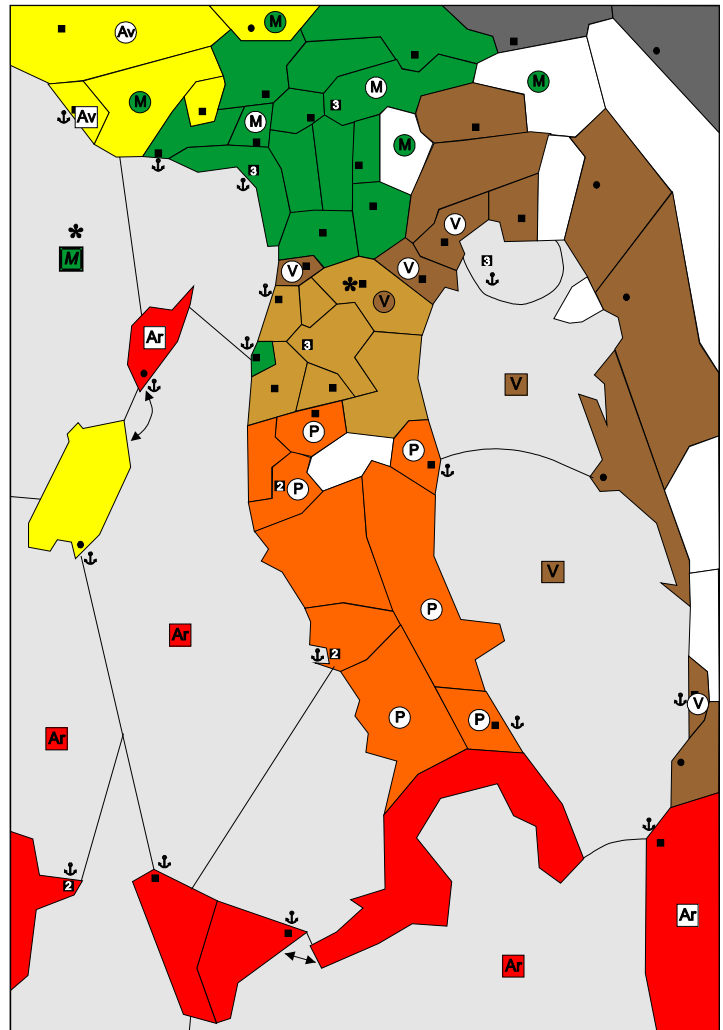
Spring 1255 Famine Losses

Autonomous garrison in Saluzzo, autonomous garrison and Avignon A Turin, Florence A if retreated to Mantua or Florence.

Summer 1255 Plague

Poor Year – Column Only: Friuli, Sienna, Albania (Venice F destroyed), Modena (Milan A destroyed), Parma (Milan A destroyed), Urbino (Florence A destroyed), Pistoia (Florence A destroyed)

Barking Up the Wrong Tree



○ Army □ Fleet ◇ Garrison ◆ Autonomous Garrison ◇ Besieged Garrison

Doberman
Turn 15b
End of Game Statements due 12/15, Tuesday

Cards

100%Trash	BIBCO	PIT	GOO
Waste Disposal	Waste Disposal	Order	Waste Disposal
Growth	Bribery	Innovation	Order
Advisor	Growth	Growth	Growth

PIT plays Growth, increasing his Growth to 20, and triggering the end of the game.

GOO plays Growth, increasing his Growth to 20.

100%Trash plays Waste Disposal with an Advisor to reduce his waste to 6.

BIBCO plays Waste Disposal, reducing his waste to 7.

PIT plays Innovation, paying \$5 to improve Rationalization to 1/15.

GOO processes an Order, using 2 raw materials and gaining \$20 and 1 waste.

100%Trash plays Growth, increasing his Growth to 15..

BIBCO plays Growth, increasing his Growth to 18.

PIT processes an Order, using 5 raw materials and gaining \$20 and 1 waste.

GOO plays Waste Disposal, reducing his waste to 0.

100%Trash passes.

BIBCO passes.

PIT passes.

GOO passes.

100%Trash passes.

BIBCO passes.

Maintenance: 100%Trash pays \$5 (taking out a loan), BIBCO pays \$4, GOO pays \$3, and PIT pays \$2.

Final Accident: Only PIT is affected: Growth reduced to 19 and \$5 paid.

Press

PIT Boss to (Industrially) Wasted GM: Eric should end the game as the victor. I will end the game also, despite finishing in 3rd place, because to do so gives me slightly more points, but does not change my position. Thank you for GMing what I believe is the IW game that has had the most turns played. I think I am also the first player to be first to get to 19 VP and not win.

PIT Boss to BIBCO: I didn't think you were ever going to get caught. Great game.

PIT Boss to GOO: Great way to hang in there, change strategy, and get over the hump. Congratulations on winning!

PIT Boss to 100% Trash: We were in the bottom half. Thank you for hanging in and doing your best. Once the money gets negative, dang bad things happen.

The Players

Player	Company Name	Play Order	Money	Loans	Raw Material Supply	Growth	Co-workers	Saved Card
Michael Longdin	100%Trash	3	\$7	70	2	15	5	Order
Dave Partridge	BIBCO	4	\$26	0	1	18	4	Bribery
Richard Weiss	PIT	1	\$18	10	2	19	2	Order
Eric Brosius	GOO	2	\$55	10	0	20	3	Order

GOO stands for General Olfactory Organization. BIBCO stands for Big Industry Buying Congressmen Outright

Player	Rationalization	Raw Materials	Waste Reduction	Waste Disposal	Victory Points
Michael Longdin	5/1	1/15	3/6	6	-28
Dave Partridge	3/6	1/15	1/15	7	67
Richard Weiss	1/15	5/1	1/15	9	49
Eric Brosius	3/6	2/10	1/15	0	70

Congratulations to Eric Brosius on his victory!

Terrier
Silverton
Turn 24 Phases IV- VI
End of Game Statements, 12/15, Tuesday
Turn 24

Operations

Brown (Partridge) operates #127 (\$20, depletes). Delivers 1 silver from Westcliffe to Denver for \$240. Gains \$130 in passenger revenue.

Blue (Bolduc) places snowplows on the Rollinsville to Hot Sulphur Springs and Walsenburg to Alimosa lines. Operates #132 (\$50, 4 coal), #131 (\$20, depletes).

Snowplows fail to clear the Rollinsville to Hot Sulphur Springs (dr = 1) and Walsenburg to Alimosa (dr = 2) lines. Delivers 4 coal from Steamboat Springs to Salt Lake City for \$400. Gains \$20 in passenger revenue.

Red (Scharf) places his +2 snowplow on the Silver City to Pinos Altos route, and the +5 snowplow on the Pinos Altos to Mogollon route. No operation. Snowplow clears the Silver City to Pinos Altos route (automatic) and the Pinos Altos to Mogollon route (dr = 5). Delivers 7 silver from Mogollon to El Paso for \$1680 and 6 copper from Santa Rita to El Paso for \$1440. Gains \$60 in passenger revenues.

Aqua (Lewis) operates #130 (\$80, 1 copper), #54 (\$40, 4 lumber), #26 (\$40, 2 gold), #34 (\$40, 4 silver). Delivers 4 gold from Bingham to Salt Lake City for \$800, 4 lumber from Steamboat Springs to Salt Lake City for \$1200, 4 silver from Heber City to Salt Lake City for \$960, and 9 coal from Coalville to Salt Lake City for \$900. Gains \$410 in passenger revenue.

Green (Longdin) places the +2 snowplow on the Gunnison to Buena Vista line and the +5 snowplow on the Lake City to South Fork line. Operates #61 (\$20, 2 lumber) and #90 (\$40, 3 coal). Snowplows fail to clear the Gunnison to Buena Vista (dr = 2) and Lake City to South Fork (dr = 1) lines. Delivers 3 coal from Trinidad to Denver for \$300. Gains \$120 in passenger revenue.

Orange (Hooton) places snowplow on Durango to Silverton line. operates #63 (\$50, 2 lumber), #58 (\$40, 2 lumber), #84 (\$20, 3 coal), #55 (\$50, 2 lumber), #87 (\$30, depletes), #129 (\$40, 1 copper), #50 (\$50, depletes), #49 (\$40, depletes), #64 (\$40, 3 lumber). Snowplow successfully clears Durango to Silverton line (automatic). Delivers 2 silver from Silverton to Santa Fe for \$480, 5 lumber from Lumberton to El Paso for \$500, 3 lumber from Dolores to El Paso for \$300, and 6 coal from Durango to Santa Fe for \$720. Gains \$360 in passenger revenue.

The Players

Player	Color	Starting Location	Money	Trains	Snowplows	Personnel
Dave Partridge	Brown	Denver	\$13,035	9, 15, 42, 42		S+2, S, P, P+2
Paul Bolduc	Blue	Denver	\$12,300	9, 15, 72, 72	+5, +5	S, S+1, P+2
Bill Scharf	Red	El Paso	\$27,375	9, 24, 72	+2, +4	S+1, S, P+1
Andy Lewis	Aqua	Salt Lake City	\$21,840	9, 15, 42, 72		S, S, P+2
Michael Longdin	Green	Pueblo	\$10,260	15, 24, 42, 72	+2, +5	S+2, S, P+1
Dave Hooton	Orange	Santa Fe	\$30,760	24, 42, 42, 42	+5	S, S, P, P+2

Personnel in **Bold** are in jail.

Notes

Congratulations to Dave Hooton on his victory!

Purchased Claims

#	City	Owner	Type	Goods	Operation
79	Bowie	Brown	Coal	0	\$40
78	Bowie	Brown	Coal	0	\$40
132	Steamboat Springs	Blue	Coal	0	\$50
125	Capitan	Red	Coal	6	\$20
109	Pinos Altos	Red	Copper	1	Depleted
124	Magdalena	Red	Coal	5	\$40
103	Hillsboro	Red	Silver	2	\$30
107	Santa Rita	Red	Copper	0	\$50
68	Scofield	Aqua	Coal	2	Depleted
74	Elk Springs	Aqua	Coal	13	\$20
70	Price	Aqua	Coal	2	\$40
130	Bingham	Aqua	Copper	1	\$80
54	Steamboat Springs	Aqua	Lumber	0	\$40
26	Marysvale	Aqua	Gold	4	\$40
34	Heber City	Aqua	Silver	0	\$40
61	South Fork	Green	Lumber	2	\$20
90	Trinidad	Green	Coal	0	\$40
63	Lumberton	Orange	Lumber	0	\$50
58	Dolores	Orange	Lumber	1	\$40
82	Crested Butte	Orange	Coal	9	\$20
84	Durango	Orange	Coal	0	\$20
55	Walden	Orange	Lumber	13	\$50
87	Alamo	Orange	Coal	14	Depleted
129	Dillon	Orange	Copper	3	\$40
115	Paxton Springs	Orange	Lumber	0	\$40
120	Cuba	Orange	Coal	0	\$30
64	Lumberton	Orange	Lumber	0	\$40

Purchased Passenger Lines

#	Type	Route	Payoff	Owner	Notes
3	A	Denver – Colorado Springs	\$50	Brown	
5	A	Denver – Pueblo	\$80	Brown	
12	B	Pueblo – Grand Jct.	\$150	Brown	Discard when 20 is taken. Good for \$150 toward card 20 or 21
1	A	Denver – Boulder	\$20	Blue	
10	B	Denver – Aspen	\$130	Blue	
17	C	Denver – Santa Fe	\$420	Blue	
7	A	Pueblo – Santa Fe	\$120	Blue	
22	C	Denver – Salt Lake City	\$800	Blue	
23	C	Salt Lake City – Santa Fe	\$900	Blue	
4	A	El Paso – Deming	\$60	Red	
18	C	Gallup – Santa Rosa	\$500	Red	
2	A	Salt Lake City – Provo	\$20	Aqua	
11	B	Salt Lake City – Grand Jct.	\$140	Aqua	Discard when 20 is taken. Good for \$140 toward card 20 or 21
9	B	Denver – Leadville	\$120	Green	
6	A	Santa Fe – Albuquerque	\$90	Orange	
13	B	El Paso – Santa Fe	\$140	Orange	
14	B	El Paso – Albuquerque	\$220	Orange	

Cats and Dogs

Epoch VII Empire Selection and Russia

Deadline Epoch VII Manchu Dynasty, Netherlands, and France, 12/15 Tuesday

Epoch VII Empire Selection

Arachnids (Bolduc) keep

100% Pussycats (Longdin) passes to the Time Traveler

Systematic Chaos (Cain) passes to 100% Pussycats

The Time Traveler (Anderson) passes to Royal Manticoran Historical Society

The Questioner (Partridge) passes to Systematic Chaos

Marching Through the Ages (Lewis) keeps

Royal Historical Manticoran Society (Wilson) passes to The Questioner

Epoch VII

100% Pussycats (Longdin): Plays Kingdom in the Gold Coast (Army, city, and fort Gold Coast). RUSSIA: Army and Capital North European Plain (Timurid army retreats to Western Steppe), army Western Steppe (vs. Timurid Emirates; R: 5, 2; T: 4; R: 5, 2; T: 5; R: 5, 5; T: 2; wins), Turanian Plain (vs. Timurid Emirates; R: 3, 3; T: 2; wins, Capital reduced to city), Tarim Basin (vs. Timurid Emirates; R: 6, 2; T: 5, 3; wins), Wei River (vs. Ming Dynasty; plays Treachery, wins), Szechuan (vs. Mongols; R: 3, 1; M: 1; wins, city eliminated), Irrawaddy (vs. Mongols; R: 3, 3; M: 1, 1; wins), Ganges Delta (vs. Mughals; R: 6, 2; M: 5, 1; wins), Ganges Valley (vs. Mughals; R: 4, 1; M: 2; wins, Capital reduced to city), Upper Indus (vs. Mughals; R: 3, 1; M: 3; R: 1, 1; M: 5; loses), Upper Indus (vs. Mughals; R: 3, 1; M: 6; loses), fleet North Sea (vs. Arachnids: 100: 5, 2; A: 4; wins). Points: Dominance in China (6), Southern Europe (4), Northern Europe (8), Eurasia (4), Presence in Middle East (1), India (3), Southeast Asia (2), Sub-Saharan Africa (2), 2 Capitals (4), 5 cities (5), 1 Sea (1), and 5 Monuments (5) for 45 points.

Players

Player Name	Player Faction Name/Color	Empire Strength Points	Victory Points
Paul Bolduc	Arachnids (blue)	50	89
Dennis Cain	Systematic Chaos (black)	54	133
Dave Anderson	The Time Traveler (orange)	59	167
Dave Partridge	The Questioner (yellow)	61	124
Michael Longdin	100% Pussycats (green)	63	157
Andy Lewis	Marching through the Ages (red)	65	152
Kevin Wilson	Royal Manticoran Historical Society (purple)	65	139

Positions

Systematic Chaos: Fleets South China Sea, Sea of Japan. HAN DYNASTY: Army and city Yellow River, army East Indies. MALAYAN KINGDOM: Army, city, Fort, and Monument Malayan Peninsula. MING DYNASTY: Army, Capital, and Monument Chekiang, army and Monument Great Plain of China, army Mongolia.

100% Pussycats: Fleet North Sea. CIVIL WAR: Two armies and city Morea. CELTS: Two armies and a fort Albion. KHMERS: Army Si-Kyang. SELJUK TURKS: Two armies Hindu Kush. OTTOMAN TURKS: Army and Capital Western Anatolia, army, city, and Monument Central Europe, army and Monument Southern Appenines; armies Danubia Baltic Seaboard, Lower Rhein, Balkans, Dalmatia, Pindus, Northern Appenines. GOLD COAST KINGDOM: Army, city, and fort Gold Coast. RUSSIA: Army and Capital North European Plain, army and city Turanian Plain and Ganges Valley, army and Monument Wei River, Tarim Basin, Ganges Delta, armies Western Steppe, Szechuan, Irrawaddy.

Marching Through the Ages: Fleets Western Mediterranean, Eastern Mediterranean, Atlantic Ocean, Indian Ocean, Red Sea. MAYANS: Army and Capital Central America, army Guiana Highlands. HUNS: Army Dniepr. SOUTHERN IBERIAN KINGDOM: Army Southern Iberia. FRANKS: Three armies and Capital Northern Gaul, three armies Central Massif. SPAIN: Army, Capital, and Monument Pyrenees, army and Monument Nile Delta, Nubia, Levant, Upper Tigris, Arabian Peninsula, army Zagros, Congo Basin.

The Time Traveler: INDUS VALLEY: Army Western Ghats. CARTHAGINIA: Two armies, Capital, and Fort Shatts Plateau, armies Libya, Western Gaul. HIGHLAND KINGDOM: Army, city, and Fort Highlands. ARABS: Army Middle Tigris. CRUSADERS: Army Crete. INCAS: Army and city Northern Andes, army Southern Andes. AZTECS: Army and Capital Mexican Valley, army Pacific Seaboard.

Royal Manticoran Historical Society: Fleets Black Sea, Bay of Bengal. SUB-SAHARAN MIGRANTS: Armies East Africa and Madagascar. BYZANTINES: Army Eastern Anatolia. MONGOLS: Army, city, and Monument Hokkaido, army and city Yangtse Kian, Mekong, armies Manchurian Plain, Korean Peninsula, Honshu, Chekiang. MUGHALS: Army and Monument Upper Indus, Persian Plateau, armies Persian Salt Desert, Lower Indus, Eastern Deccan.

The Questioner: GUPTAS: Army Western Deccan. TIMURID EMIRATES: Army Eastern Steppe.

Arachnids: Fleets Atlantic Ocean, Indian Ocean. NORTH AMERICAN MIGRANTS: Armies Great Lakes, Great Plains. GOTHs: Army Caucasus. VIKINGS: Armies Scandinavia, Ireland, West Indies. PORTUGAL: Army, Capital, and Monument Western Iberia, army and Monument Eastern Ghats, armies Ceylon, South Africa, Brasil.

Event CardsEpoch VII Empire DrawGreyhound

**Turn 6, Phase 7 and Turn 7, Phases 1 through 3
Deadline Turn 7, Phases 3 through 6, 11/2 Tuesday**

Phase 3 – Play Cards

London cedes Edinburgh and Iceland to Genoa as part of the peace treaty.

Phase 4 – Purchases

Paris buys Cathedral (H, 60 credit from Religion, \$60, Misery increases to 200), Printed Word (O, 30 credit for Communication, 20 credit for William Caxton, \$10), Overland East (R, \$40), and stabilization for \$1. Misery Relief reduced Misery to 150.

Venice buys Holy Indulgence (F, 10 credit for Religion, \$50, Misery increases to 70) and stabilization for \$1.

London buys a ship upgrade for \$10, Overland East (R, 40 discount for Exploration, \$0), Laws of Matter (C, 40 credit for Science, 20 credit for Isaac Newton, 10 credit for Institutional Research, \$20), Enlightenment (D, 40 credit for Science, 20 credit for Isaac Newton, 10 credit for Institutional Research, \$50), Improved Agriculture (J, 10 credit for Commerce, 10 credit for Institutional Research, \$20, Misery drops to 300), and stabilization for \$15. Misery Relieve reduces Misery to 200.

Genoa buys Printed Word (O, 30 credit for Communication, 20 credit for William Caxton, \$10), The Heavens (A, \$30), and stabilization for \$3.

Hamburg buys Human Body (B, 20 credit for Science, \$40, Misery drops to 150), Patronage (E, 40 credit for Religion, \$0, Misery increases to 175), Proselytism (G, 40 credit for Religion, \$50, Misery increases to 200) and stabilization for \$6.

Barcelona buys Laws of Matter (C, 40 credit for Science, 20 credit for Isaac Newton, 10 credit for Institutional Research, \$20), Ocean Navigation (T, 40 credit for

Exploration, 10 credit for Institutional Research, \$70), no stabilization, Misery increases to 175. Misery Relief reduce Misery to 100.

Phase 5 – Expansion

Paris expands to Lyon (5, vs. Genoa, automatic victory with Proselytism), Lisbon (7, vs. Barcelona, automatic victory with Proselytism), Toulouse (2, vs. Barcelona, automatic victory with Proselytism), and buys a card (3, vs. Barcelona, automatic victory with Proselytism).

Venice expands to Prague (5, vs. Hamburg, dr = 4, 5, 3; wins), Belgrade (4, vs. Barcelona, dr = 1, 6, 5; wins), Rome (9, vs. Genoa, dr = 4, 4, 2; wins), Bari (3, vs. Genoa, dr = 2, 4, 4; loses)

London expands to the East Indies (5), Erzerum (5, vs. Barcelona and Hamburg, dr = 6, 2, 3; wins), Crete (6, vs. Barcelona, dr = 1, 6, 3; wins), Angora (4, vs. Hamburg, dr = 2, 6, 3; wins), Levant.

Hamburg expands to Poti (2, vs. Barcelona, dr = 3, 5, 1; wins), Erzerum (6, vs. London, dr = 1, 5, 4; wins), Salzburg (2, vs. Venice, dr = 6, 3, 3; wins), Vienna (8, vs. Venice, Cathedral victory), Strasburg (7, vs. Paris, dr = 6, 1, 5; wins)

Barcelona expands to India (5), Belgrade (5, vs. Venice, Cathedral victory), Sicily (5, vs. Genoa, Cathedral victory), Alexandria (10, vs. London, dr = 2, 4, 5; loses), Salonika (6, vs. London, dr = 5, 3, 5; loses).

Genoa expands to Florence (7, vs. Venice, dr = 3, 1, 6; loses), Florence (7, vs. Venice, dr = 4, 2, 3; loses), Florence (7, vs. Venice, dr = 2, 3, 1; wins), Dubrovnik (5, vs. Venice, dr = 1, 4, 2; wins), Rome (7, vs. Venice, dr = 2, 5, 4; wins).

Hamburg gains

Phase 6 – Income

Enlightenment reduced London's Misery to 175.

Paris gains \$99

Venice gains \$39

London gains \$129

Genoa gains \$69

Hamburg gains \$111

Barcelona gains \$69

Shortage of Wine (Paris gains

), Shortage of Grain

Turn 8, Phase 1 – Draw Cards

Your card is:

Phase 2 – Buy Cards

Barcelona buys

Genoa buys

The Players

Player	Country	Misery	Tokens	Money	Order	Dominance	Ships	Cards	Advances
Michael Longdin	Venice	70		\$47		4	4	2	A, B, C, E, F, N, O
Dave Partridge	Hamburg	200		\$125		16	4	5	A, B, E, F, G, H, I, N, O, R
Bob Robles	Paris	150		\$163		14	8	4	A, B, E, F, G, H, I, J, N, O, R, V, W
Dave Hood	London	175		\$155		19	O-2	6	A, B, C, D, E, F, H, I, J, N, O, R, S, T, V, X
Steve Koehler	Barcelona	100		\$70		9	O-1	6	A, B, C, E, F, H, I, J, K, N, O, P, R, S, T, V, W, X
Robert Koehler	Genoa	250		\$64		9	4	4	A, E, F, I, N, O, V, W

Players are listed in reverse tie breaking order.

Commodity Log

Commodity	Michael	Dave P.	Bob	Dave H.	Steve	Robert
Stone (2)	1	2	4	--	--	1
Wool (3)	--	--	1	4	1	2
Timber (4)	--	3	1	2	--	1
Grain (5)	--	2	2	1	2	--
Cloth (6)	2	1	1	--	--	3
Wine (7)	--	1	3	2	1	--
Metal (8)	--	1	1	4	--	--
Fur (9)	--	3	1	--	--	--
Silk (10)	--	1	--	4	1	--
Spice (11)	--	1	--	4	1	--
Gold (12)	1	1	--	--	1	--
Ivory (12)	--	--	--	--	2	2

Cards

Shortage, Surplus

Robover

Turn 8

Turn 9, 12/15 Tuesday

Program Robots

Robot	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
DizzyBot	Move 3 (820)	Move 2 (680)	U-Turn (40)	Back Up (470)	Rotate Right (90)
Slambot 9000	Rotate Left (210)	Move 1 (500)	Rotate Right (140)	Move 2 (670)	Move 3 (790)
Jeeves	Move 1 (610)	Rotate Left (150)	Move 2 (760)	Move 2 (690)	Rotate Right (340)

Robot	Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
THX 1139	Move 2 (700)	Rotate Left (370)	Back Up (460)	Rotate Right (180)	<i>Move 1 (490)</i>
Dalekbot	Move 1 (620)	Rotate Left (70)	Rotate Left (130)	Rotate Left (230)	<i>Rotate Right (420)</i>
Narbot	Rotate Right (160)	Rotate Left (290)	Rotate Right (320)	Back Up (450)	Rotate Right (200)
100% Robotomy	Move 2 (740)	Move 1 (580)	Move 1 (600)	Rotate Right (380)	Rotate Left (190)
Protomax	Rotate Right (220)	Back Up (430)	Move 3 (840)	Move 2 (710)	Move 1 (560)

Locked registers are in italics.

Phase 1

DizzyBot dashes ahead 3 to C17, 100% Robotomy moves ahead 2 to D10, THX 1139 moves ahead 2 to E7, pushing Slambot 9000 to D7, Dalekbot moves ahead 1 to B16, Jeeves moves ahead 1 to I7, touching flag 1 and transferring his archive, Protomax rotates right to face west, Slambot 9000 rotates left to face north, and Narbot rotates right to face south. Conveyor belts: Dalekbot is moved to B14 and rotated to face south and DizzyBot is moved to C16. THX 1139 and 100% Robotomy both fire on Slambot 9000, taking out both options and locking its last register and Protomax shoots Narbot.

Phase 2

DizzyBot moves ahead 2 to C14, 100% Robotomy moves ahead 1 to D9, Slambot 9000 moves ahead 1 to D6, Protomax backs up to L13, relocating his archive, THX 1139 rotates left to face south, Narbot rotates left to face east, Jeeves rotates left to face west, and Dalekbot rotates left to face east. Conveyor belts: DizzyBot is moved to E14 and Dalekbot is moved to D14. Jeeves shoots THX 1139, Dalekbot shoots DizzyBot, Narbot and Protomax shoot each other, and 100% Robotomy shoots Slambot 9000, eliminating it.

Phase 3

Protomax dashes ahead 3 to I3, Jeeves moves ahead 2 to G7, relocating its archive, 100% Robotomy moves ahead 1 to D8, THX 1139 backs up to E6, Narbot rotates right to face south, Dalekbot rotates left to face north, and DizzyBot makes a U-turn to face south. Conveyor belts: DizzyBot is moved to G14 and Dalekbot is moved to F14. Protomax shoots Narbot.

Phase 4

Protomax moves ahead 2 to G13, Jeeves moves ahead 2 to E7, DizzyBot backs up to G13, pushing Protomax to G12, Narbot backs up to D12, 100% Robotomy rotates right to face east, Dalekbot rotates left to face west, and THX 1139 rotates right to face west. Conveyor belts: Dalekbot is moved to H14, Narbot is moved to D11 and rotated to face west. DizzyBot is not moved.

Phase 5

Protomax moves 1 to F12, THX 1139 moves 1 to D6, Dalekbot rotates right to face north, Jeeves rotates right to face north, Narbot rotates right to face north, 100% Robotomy rotates left to face north, and DizzyBot rotates right to face west. Conveyor belts: Dalekbot is moved to J14 and rotated to face east, DizzyBot is moved to G12, and Narbot is moved to E11. DizzyBot shoots Protomax, 100% Robotomy shoots THX 1139, locking register 5, and Narbot is shot by the on-board laser.

Cleanup

Slambot 9000 reappears in F7, facing whatever direction desired. If he so chooses, he may reappear shut down, but he does not have to do so.

Players

#	Player Name	Robot Name	Color	Options	Position	Flags	Lives	Damage
1	Dave Partridge	DizzyBot	Blue		G12>W		3	3
2	Bill Scharf	Slambot 9000	Pink		F7>?		2	2
3	Chris Geggus	Jeeves	Yellow		E7>N	1	3	0
4	Dave Hooton	THX 1139	White	Recompile, Double-Barreled Laser, Brakes, Radio Control	D6>W	1	3	5
5	Andy York	Dalekbot	Silver		J14>E		3	5
6	Ward Narhi	Narbot	Red	Fourth Gear	E11>N		3	4
7	Michael Longdin	100% Robotomy	Dark Green		D8>N		1	2
8	Cary Nichols	Protomax	Green	Abort Switch	F12>W		3	3

Your Program Cards:

Husky

Turn 3, Phase 2

Turn 3, Phases 3 through 5, 12/15 Tuesday

Players

Order	Player Name	Company Name	Color	Power Plant 1	Power Plant 2	Power Plant 3	Cities	Money
4	Michael Longdin	100% Power Mad	Green	04 Coal 2→1 (2)	24 Trash 2→4	30 Trash 3→6	2	8
5	Dave Hooton	Volkisch Tzapverein (VolT)	Orange	08 Coal 3→2 (3)	22 Eco X→2	32 Oil 3→6	2	6
1	Dave Partridge	Spewing Massive Oid Gasses (SMOG)	Red	05 Hybrid 2→1 (10)	13 Eco X→1	27 Eco X→3	3	11
2	Andy York	Deutsches Elektrisch Arbeit Direktor (DEAD)	Yellow	07 Oil 3→2	11 Nuclear 1→2		3	31
3	Brad Martin	Renewable Energy Matters (REM)	Blue	10 Coal 2→2	28 Nuclear 1→4		2	41

Segment 3

- Old Man:** Card (8) – Head Out (in F18), turn 2 of 2
- Shaggy:** Card 5 – Cock/Aim/Shoot (AIM at E17), turn 2 of 2
- Banker:** Card 1 – Advance (straight ahead to J15), turn 2 of 2
- Smith:** Delay
- NCO:** Card 6 – Cock/Aim/Shoot (AIM at F18), turn 1 of 2

Segment 4

- Old Man:** Card 5 – Cock/Aim/Shoot (Aim at E17), turn 1 of 2
- Shaggy:** Card 7 – Shoot (at N), turn 1 of 1, AIM time 3, range 3, card drawn 78, result MISS
- Banker:** Card 2 – Run (ahead right to J16), turn 1 of 2
- Smith:** Delay
- NCO:** Card 6 – Cock/Aim/Shoot (AIM at F18), turn 2 of 2

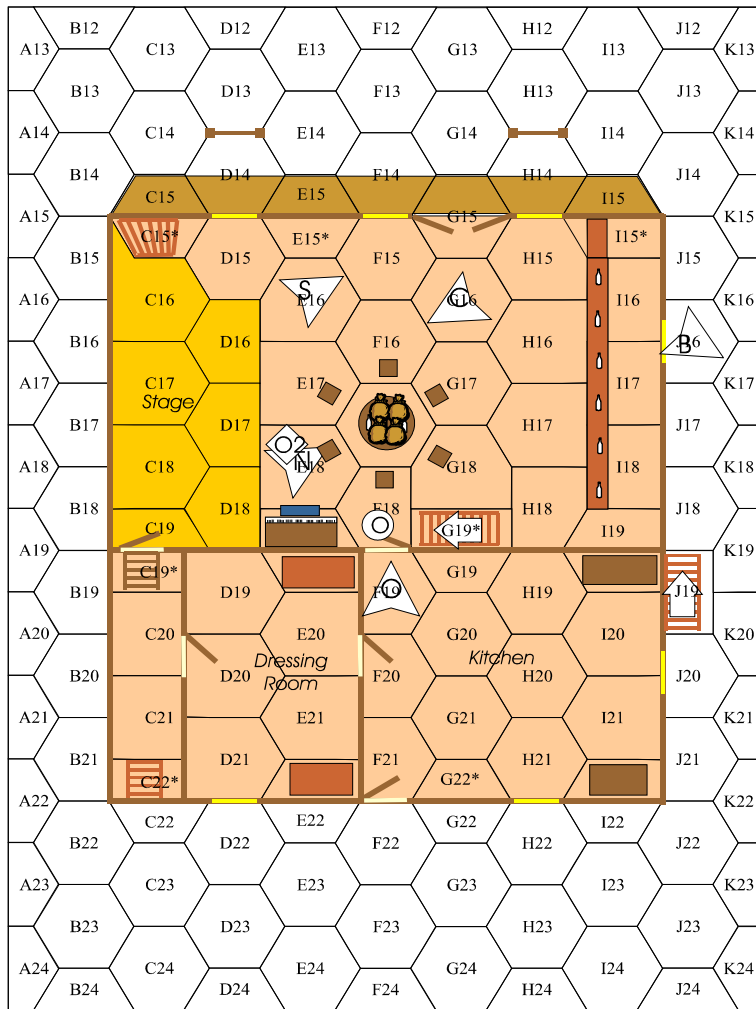
Segment 5
















- Old Man:** Card 5 – Cock/Aim/Shoot (Aim at E17), turn 2 of 2
- Shaggy:** Card (4) – Leap/Drop (Leap), turn 1 of 1, delay cards drawn: 90, 97 (LOSE AIM, LOSE AIM)
- Banker:** Card 2 – Run (ahead right to J16), turn 2 of 2
- Smith:** Card (3) – Turn (left front to face F15), turn 1 of 1
- NCO:** Card 7 – Shoot (at Old Man), turn 1 of 1, AIM time 5, range 2, card drawn 67, result MISS.

End of Turn

Smith loses 2 delay points. At the start of Turn 4, Smith draws cards 92, 42, and 106 for the SERIOUS 3, resulting in LOSE AIM and 2 delay points.

Frontier Dog



		
Hitching Post	Door	Bottle
		
Stairs	Window	Money Bag
		
Player (up)	Table	Player (dead)
		
Gun	Chair Head	Aim Points
		
Knife	Player (down)	Player (down)

Westerners

Side	Player	Character	Location	Bonus Cards	Skills	Delay	Endurance	Comments
A	Paul Bolduc	Old Man (O)	F19>F18	5, 7, 8	BR +1		25	HEAD OUT in F18, 2 AIM points in E18
B	Andy Lewis	Shaggy (C)	G16>F16				20	
C	James Pratt	Banker (B)	J16>K16				20	
D	Mike Scott	Smith (S)	E16>F15	8	BR +2	4	20	SERIOUS 3
E	Chris Geggus	NCO (N)	E18>F17	9	BR +1		20	

Weapons

Character	Holstered	Gun Hand	Other Hand	Both Hands	Ammo
Old Man	Knife	Empty	Empty	C36c, cocked	C36c: △△△△△△
Shaggy	Knife	C45, uncocked	Empty	Empty	C45: ○○○○○○
Banker	SW45	Empty	Empty	Empty	SW45: ○○○○○○
Smith	C45c, Knife	Empty	Empty	Empty	C45c: △△△△△△
NCO	SBR	C41, uncocked	Empty	Empty	C41: ○○○○

Procyon

Turns 3.3 through 4.3

Turns 4.4 through 5.4, 12/15 Tuesday

Turn 3

3rd: **Bob Robles (Eeepeeep/Bender's Freedom Brigade) Rolls Used: 1 3 4**

Rainfall (s) – Rainfall (o) – B – B – Rumble Port (o) – R – B – Y.

4th: **Andy York (Qossuth/Qossuth Entrepreneur Division) Rolls Used: 6 * 3**

Multi-Generation Ship – NC6 – Y – B – R – A – ? (it's an Open Port) – R20 – Y – B – R – B – Y – B – R – Poisonport (o) – Poisonport (s).

Sells Megalith Paperweight for \$160 (from the cup: Demand for Grease at 9a). Buys Voll Silk for \$140.

5th: **Chris Geggus (Niks/Ganymede Enterprises Going South) Rolls Used: 3**

4 4

Moonport (s).

Barter's Gate Lock relic for \$50 credit and with that and \$70 buys Rock Videos.

6th: **Dave Partridge (Whynoms/Venus-Orion Oligarch Merchantile) Rolls Used: 1 3 5**

Terror Station (s) – Terror Station (o) – R20 – Open Port – A – R – B – Y – NC5.

Turn 4

1st: **Andy Lewis (Humans/Mystery Machine 5) Rolls Used: 2 5 5**

Open Port.

Trades om IOU for one Mulch Wine and a Shield.

2nd: **Dennis Cain (Dell/Step 3 – Profit!) Rolls Used: 5 * 3**

Multi-Generation Ship – R20 – NC5 – R – Y – R – Space Station –

TeleGate 5 – NC5 – B – Y – A.

Picks up Mulligan Gear.

3rd: **Bob Robles (Eeepeeep/Bender's Freedom Brigade) Rolls Used: 3 4 4**
Y – B – R – B – Y – NC4 – B30.

Notes

Dennis Cain is resigning from the game. **Will Paul Bolduc please take over for Step 3 – Profit!**

Current status:

1a (Nillis): 4 Bionic Perfume

1b (Volois): Nothing

2 (Graw): 3 Space Sice

3 (Niks): Demand for Voll Silk (+\$60), Demand for Space Spice (+\$60), 2 Mulch Wine

4a (Dell): 3 Finest Dust, Demand for Mulch Wine (+\$60)

4b (Humans): Demand for Space Spice (+\$40), 1 Rock Videos, Demand for Bionic Perfume (+\$60), Gate Lock Relic

4c (Wraiths): Demand for Bionic Perfume (+\$60), Demand for Voll Silk (+\$60)

5 (Shenna): 2 Demand for Mulch Wine (+\$40), Fare to Base (\$140), 1 Melf Pelts

6 (Yxklyx): 4 Immortal Grease

7a (Zum): 4 Chicle Liquor, Fare to 4c (\$110), 2 Demand for Finest Dust (+\$50)

7b (Eeepeeep): 2 Demand for Immortal Grease (+\$50), 2 Demand for Finest Dust (+\$50), Servo-mechanism, Fare to Base (\$110)

8 (Whynoms): 1 Impossible Furniture, Demand for Chicle Liquor (+\$60)

9a (Chola): 2 Designer Genes, Life Project, Demand for Chicle Liquor (+\$60), Demand for Immortal Grease (+\$50)

9b (Wollow): 1 Megalith Paperweight

10 (Qossuth): Demand for Designer Genes (+\$60), Psychotic Sculpture

Base: Fare to 9a (\$110), Switch Switch Relic

1. Mystery Machine 5 Scout \$0
5: 2 4 4

Hold1	Hold2	Hull
Mulch Wine 3/\$60	Mulch Wine 3/\$60	Shield (\$60)
Cholos \$200		

2. Step 3 – Profit! Needle \$8
5: 3 6 (use 1*3)

Hold1	Hold2	Hull
Megalith Paperwt. 9b/\$160		7b \$100
		RELIC Mulligan Gear \$120

3. Bender's Freedom Brigade Scout \$50
5: 2 5 6

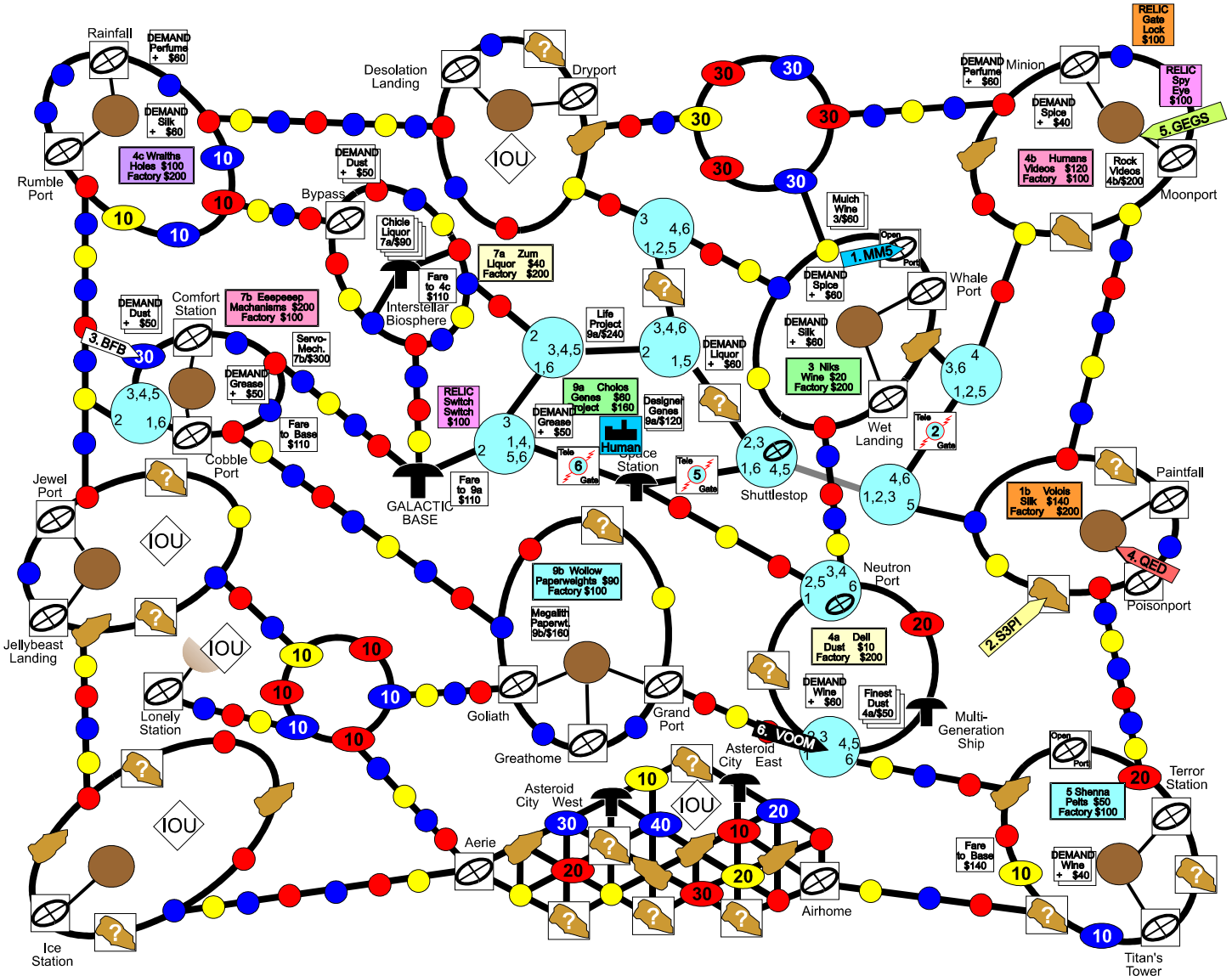
Hold1	Hold2	Hull
Chicle Liquor 7a/\$90	Visible Holes 4c/\$170	7a \$80

4. Qossuth Entrepreneur Division Needle \$120
4: 3 5 // 5: 1 6 (use 1*3)

Hold1	Hold2	Hull
Voll Silk 1b/\$220	Fare to Base \$180	4a \$60

5. Ganymede Enterprises Going South			\$40
Scout			
4: 1 5 6			
Hold1	Hold2	Hull	
Rock Videos 4b/\$200	Red Tape (\$120)		

6. VOOM			\$100
Scout			
4: 2 5 5			
Hold1	Hold2	Hull	
Voll Silk 1b/\$220	Melf Pelts 5/\$110		



Basset
Turn 1
Turn 2, 12/15 Tuesday
Commander Actions

- Lowreyville** buys a water factory (Or3, Or5, Or5, Wa7) and a population factory to man it (Or2, Wa9).
- HBDC** opens the bidding on a Data Library at 15 and gets it (Or2, Or3, Or5, Wa5).
- Cosmic Nomads** buys a water factory (Or3, Or3, Or4, Or4, Wa6) and moves a population factor from an ore factory to man it.
- ShaggyMobile** buys a water factory (Or3, Or4, Or5, Wa4, Wa5) and moves a population factor to man it.
- BarterTown** opens the bidding on Heavy Equipment at 32 and gets it (Or3, Or3, Or4, Or5, Wa7, Wa10).
- Little Green Men** buys a water factory (Or2, Or3, Wa7, Wa8) and moves a population factor from an ore factory to man it.
- MMC** buys a water factory (Or2, Or4, Or5, Wa9) and a population factor to man it (Or3, Wa7).
- Hootonia** opens the bidding on a Nodule at 25 and gets it (Or2, Or3, Or5, Wa5, Wa10).

The Players

	Outpost Name	Commander	Factories	Upgrades	VP
1	Hootonia	Dave Hooton	OrF, OrF, WaF	No	5
2	HBDC	Kevin Wilson	OrF, OrF, WaF	DL	4
3	Lowreyville	Michael Lowrey	OrF, OrF, WaF, WaF		4
4	MMC	Eric Brosius	OrF, OrF, WaF, WaF		4
5	BarterTown	Andy York	OrF, OrF, WaF	HE	4
6	Cosmic Nomads	Cary Nichols	OrF, OrF, WaF, WaF		3
7	ShaggyMobile	Andy Lewis	OrF, OrF, WaF, WaF		3
8	Little Green Men	Dave Partridge	OrF, OrF, WaF, WaF		3

HBDC is Heavenly Bodies Development Corporation. MMC is Mud Mining Corporation.

Available Upgrades

Production Cards

New Arrivals: 1 Data Library, 1 Warehouse, 1 Nodule

Upgrade	Minimum Bid	Available	Not Yet Delivered
Data Library (DL)	15	4	0
Warehouse (Wa)	25	1	4
Heavy Equipment (HE)	30	1	3
Nodule (No)	25	2	2

Pedagoguery

There is strong evidence that the expansion of the universe is expanding. The reason for this fact is uncertain, but the leading candidate for the explanation is dark energy. The question then becomes, what is dark energy? That is a question that is much more difficult to answer.

The main question about dark energy is does it vary over space and time. If so, then it takes the form of a *cosmological constant*, as described in general relativity. If not, it is called *quintessence*. Those names are simply labels – scientists do not know the physical basis for either phenomenon. But observations can help us distinguish between them. All we have to do is to observe how the expansion of the universe has changed over time.

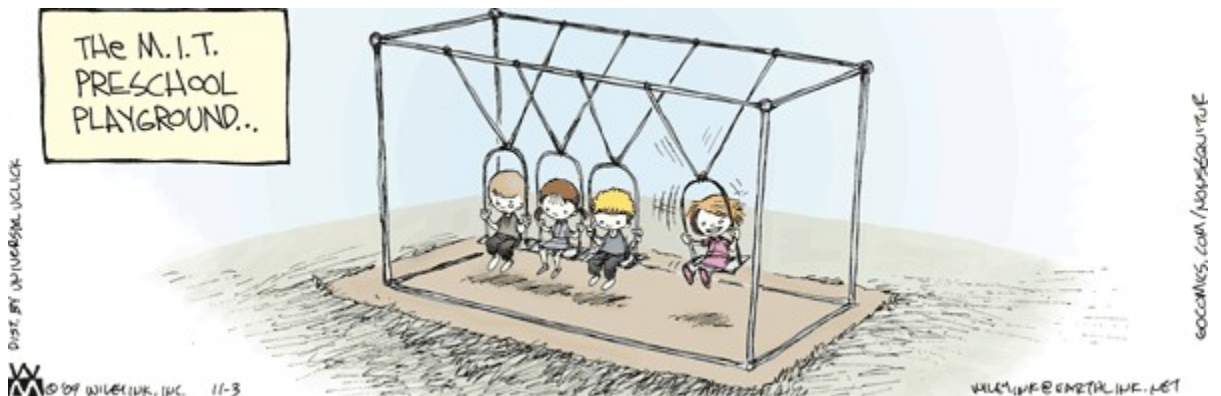
There are several ways in which to observe the expansion of the universe over time. The first uses the same mechanism that discovered the acceleration to begin with – Type Ia supernovae. Type Ia supernovae result when a white dwarf acquires enough mass to push it over the Chandrasekhar limit, disrupting the electron degeneracy pressure that holds it up against gravitational collapse. This results in a runaway nuclear reaction that blows the star apart. Because of this, it is believed to be a good “standard candle”, in that all Type Ia supernovae would have the same intrinsic brightness, and thus by measuring that brightness, you can tell how far away it is. This is a good mechanism, but it rests on several untested assumptions. Does a white dwarf composed primarily of helium act the same way as one composed primarily of carbon and oxygen? How does a potential asymmetry in the nuclear reaction affect the brightness of the supernova? These uncertainties mean that this mechanism by itself is not sufficient to do the job.

A second mechanism relies on sound. In the very early universe, the hot gas that filled the universe was suffused with sound waves. These sound waves became amplified during the inflation epoch and resulted in areas that were over- or under-dense with density peaks starting at around 436,000 light years apart.. As the universe continued to expand, the areas of overdensity tended to be where galaxies and galaxy clusters formed. By mapping the clustering of galaxies over time, we can track how these *baryon acoustic oscillations* evolved over time.

A third mechanism deals with the size of galaxy clusters. The more slowly the universe expands, the larger galaxy clusters can grow. So by observing the growth of galaxy clusters over time, we can get a handle on how the expansion of the universe has changed over time. There are a couple of ways this particular observation can take place. The first is by observing gravitational lensing of galaxies. The second is to observe the effect that the hot, x-ray emitting gas that clusters are embedded in affects the cosmic background radiation.

All of these observations are designed to yield a parameter called the equation of state of dark energy. If the value of this number is precisely -1, then dark energy is a cosmological constant. Any other value and it is quintessence. So far, observations of all three mechanisms have yielded a value from -0.85 to -1.1, which is not good enough to give us a definitive answer, but the results are tantalizing, since they neatly bracket the magic value of -1. More observation is needed, however.

Next time, naked singularities.



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Standbys

Anybody who gets onto my standby list automatically receives one free issue of *S.O.B.* In addition, if you actually submit standby orders, you get another free issue. So, let's get those people standing by. The current standby list is:

Machiavelli (gunboat and regular): Steve Koehler, Bill Scharf, Bob Robles, Mike Scott, Ward Narhi, Paul Bolduc, Pasquale Giovine, Andy York, Cary Nichols, Lee McConnell, Dave Partridge, Dale Horsely, Brad Martin **Dune:** Steve Koehler, Paul Bolduc, Kevin Wilson, Ward Narhi, Andy York, Cary Nichols, Bill Scharf, Dave Partridge, Brad Martin **New World:** Andy York, Bill Scharf, Cary Nichols, Dave Partridge, Brad Martin **Merchant of Venus:** Paul Bolduc, Carrie Lewis, Bob Robles, Andy York, Cary Nichols, Dave Partridge **Outpost:** Michael Lowrey, Kevin Wilson, Andy York, Cary Nichols, Bill Scharf, Dave Partridge, Brad Martin **History of the World:** Andy Lewis, Paul Bolduc, Kevin Wilson, Chris Geggus, Andy York, Cary Nichols, Dave Partridge, Brad Martin **Stellar Conquest:** Paul Bolduc, Kevin Wilson, Andy York, Cary Nichols, Dave Partridge, Brad Martin **Liftoff!:** Dennis Cain, Andy York, Cary Nichols, Bill Scharf, Dave Partridge, Brad Martin **Age of Renaissance:** Bob Robles, Michael Lowrey, Cary Nichols, Dave Partridge, Michael Longdin, Brad Martin **Kremlin:** Andy York, Andy Lewis, Pasquale Giovine, Cary Nichols, Bill Scharf, Dave Partridge, Michael Longdin, Brad Martin **Silverton:** Cary Nichols, Bill Scharf, Dave Partridge, Brad Martin, Andy York, Eric Brosius **Settlers of Catan:** Michael Lowrey, Chris Geggus, Cary Nichols, Dave Partridge, Brad Martin, Andy York **Gunslinger:** none **Industrial Waste:** Michael Longdin, Brad Martin **Puerto Rico:** Brad Martin, Andy York **Power Grid:** Brad Martin, Andy York **Robo Rally:** Andy York

Standby Calls

Will Paul Bolduc please take over for Step 3 – Profit! in Procyon.