

Notes from Hades

I believe that in the past I have mentioned that in our back yard, we have a blackberry bramble. It is relatively low maintenance – the main thing is to keep it from taking over the entire garden, and to cut back canes that have already borne fruit. It is a pretty heavy bearer, and in past years we have typically had no shortage of fruit. This year, for whatever reason (I think our exceptionally wet winter had something to do with it), however, has been exceptional. Over the last five or six weeks, we have gotten over 60 pounds of fruit – and it's not done yet. So, the issue becomes: what to do with all those blackberries? I have made jam, ice cream, and sorbet, among other things. Celeste and I have each taken 8 to 10 pounds into work – where they disappeared in short order. We still had an overabundance of blackberries until a co-worker of mine suggested that I try making blackberry wine. Now, wine making is something I have wanted to try for a while, so this was the perfect excuse to acquire a new hobby. As I write this, I've got my first batch in secondary fermentation, my first batch in primary fermentation, and a third batch planned to start this weekend. I have found a website that has dozens of wine recipes, including a blackberry port recipe that I want to try out. In addition, we also have a chardonnay and a merlot vine in our back yard, and both vines are covered in grapes, so I foresee some more traditional wine in my future. I'll let you know how it turns out, when the wine finishes sometime next year.

The next deadline is **Tuesday, July 19 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.

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Game Openings

Doberman. Industrial Waste. This game will start after Junk Yard Dog ends. Have Eric Brosius, Dave Partridge, Richard Weiss, and Michael Longdin. This game is closed, but Dave and Eric are willing to defer to anyone who is not in Junk Yard Dog.

Dog Chow. Age of Renaissance. Have Bob Robles, Cary Nichols, Caleb Cousins, Steve Koehler, Paul Bolduc, and Dennis Cain.

Outlaw Dogs. Gunslinger. A game of shootouts in the old West. The exact scenario to be determined. Have Chris Geggus, Paul Bolduc, Dave Partridge, Andy Lewis, and Mike Scott, need up to 2 more.

Jackal. New World. A game of colonization in the Americas. Have Dave Partridge, Andy Lewis, Bob Robles, and Andy York, will take up to 2 more.

Sled Dog. Kremlin. Have Chris Geggus, Bill Scharf, Andy Lewis, Dennis Cain, Bob Robles, and Mike Scott.

Sirius. Merchant of Venus. We will use the Fast Setup, Lost ? Box, Own Species Bonus, Customized Spaceships, and the Agents, Bases, and Second Ships optional rules. Victory will be \$4000. Have Chris Geggus, Dave Partridge, Andy Lewis, Dennis Cain, and Bob Robles, will take up to 1 more.

Wish List

Dune. We will use the optional Lansraad, Ixians, and Bene Tleilaxu powers. Have Kevin Wilson and Bob Robles, will take up to 4 more (5 if one player plays the Bene Tleilaxu).

Silverton. We will play the advanced game with the Hiring and Advancement optional rule. Have Dave Partridge, Bill Scharf, and Andy Lewis, will take up to 3 more.

Outpost. Dave Partridge, Bill Scharf, Kevin Wilson, and Andy Lewis, will take up to 6 more.

History of the World. Have Andy Lewis and Kevin Wilson, will take up to 5 more.

Seafarers of Catan. We will be playing the Oceans scenario. Have Mike Scott, need up to 5 more.

Machiavelli. Rules determined by player vote as usual. Have Kevin Wilson, Lee McConnell, Bob Robles, and Dale Horsley, will take up to 4 more.

Age of Renaissance. This game will start when Dog Chow finishes. Have Michael Longdin, need up to 5 more.

Kremlin. This game will start when Sled Dog ends. Have Michael Longdin, need up to 5 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-subbers.

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 \$2.00 per issue (\$3.00 overseas).

Howling at the Moon The S.O.B. Letter Column

Off the Leash

Advanced Game, Plague, Famine, Special Military Units, Conquest, Moneylenders, Gray Press, Ultimate Victory, Gunboat
Miller Number 2001Fpw10

Spring 1465

Deadline for Summer 1465: 7/19 Tuesday

France and Venice continue their northern stalemate, while Naples withdraws from Arezzo. Famine and plague hit Florence hard.

Fall 1464 Retreats

France retreats A Tyrolea to Turin

Naples retreats A Urbino to Spoleto and Sienna to Patrimony

Builds

		Cost
Florence	Maintains A Bologna, A Urbino, A Florence, A Sienna, F Piombino	18
France	Maintains all, builds A Pavia	27
Naples	Maintains all, builds A Naples, F Bari	18
Venice	Maintains all, builds A Padua, A Dalmatia	36

Expenditures

France spends 3 ducats for famine relief in Parma, and 12 ducats to disband

Venice A Tyrolea

Venice spends 3 ducats for famine relief in Bergamo

Outstanding Debt

Summer 1465: 15 ducats due from Venice.

Orders

FLORENCE ☞: A BOLOGNA SUPPORTS A URBINO, A URBINO SUPPORTS A FLORENCE TO AREZZO, A (EM) FLORENCE TO AREZZO, A SIENNA SUPPORTS A FLORENCE TO AREZZO, F PIOMBINO SUPPORTS A SIENNA

FRANCE ☞: [A TURIN to Tyrolea], A COMO supports A Turin to Tyrolea, [A MILAN to Cremona], A PARMA supports A Milan to Cremona, [A PAVIA to Milan], [F GENOA to Ligurian Sea], [F GULF OF LIONS to Ligurian Sea], G MILAN supports A Pavia to Milan, G CREMONA supports A Milan to Cremona

NAPLES ☞: A PATRIMONY supports A Arezzo to Perugia, A SPOLETO supports A Arezzo to Perugia, A (EM) Arezzo to PERUGIA, A Naples to CAPUA, F TYRRHENIAN SEA supports F Western Mediterranean, F WESTERN MEDITERRANEAN supports F Tyrrhenian Sea, F Bari to LOWER ADRIATIC

VENICE ☞: [A (EM) TYROLEA TO COMO (NSU)], [A AUSTRIA TO TYROLEA], A HUNGARY TO SLAVONIA, A CARINTHIA SUPPORTS A AUSTRIA TO TYROLEA, [A TRENTO TO MILAN], A BERGAMO SUPPORTS A CREMONA, A CREMONA BESIEGES, A MANTUA SUPPORTS A CREMONA, A DALMATIA TO HERZEGOVINA, A PADUA TO FERRARA, F FERRARA TO UPPER ADRIATIC

Your treasury:

Notes

The draw fails with 1 no vote and 1 abstention.

Spring 1464 Famine Losses

Florentine A Urbino eliminated.

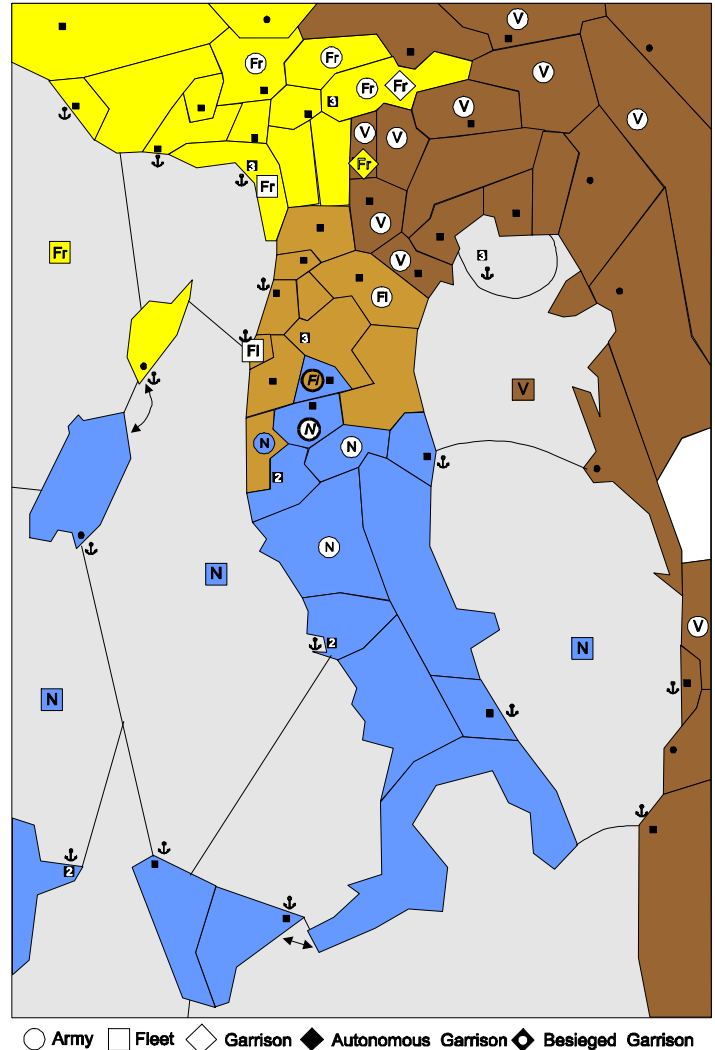
Summer 1464 Plague

Poor year: Column Only: Friuli, Sienna (Florentine A eliminated), Albania, Modena, Parma (French A eliminated), Urbino, Pistoia

Press

France – Naples and Florence: I accepted the four-way draw, but probably it was a bluff of Venice. In this case, I must again ask your help against Venice: as you can easily see, he overwhelmed me in the north and my last resources are at the end.

Off the Leash



France – Venice: Well, I don't know why you proposed the four-way draw, being on the way of victory: it seems a bluff of yours instead! Any way I accepted it.

Naples – France: Thank you for the long sermon, but as I see it, the main points are these:

1. Florence attacked me, I'm fighting him off.
2. I was just ready to attack Venice when Florence came at me, thus I was unable to move on Venice as you've so often politely asked.
3. I have not attacked you, nor will I while Florence is on the board.
4. I suggest that Florence attack north, to get him away from attacking south which is where I am. I know that you are in the north, but so is Venice, and Florence has attacked only me, not you or Venice. Florence doesn't need to attack you, just quit attacking me and go somewhere else.

5. About the 1d, yes I am aware one can send it along during any season. I was just answering your request in a manner that was a bit nicer than saying "No Way Don Jose!"

6. As the GM's turn count shows, you are running a close 2nd to Venice, once Florence is better reduced, then maybe I can work with you on going after Venice; till then..... should I remove all my units and let Florence walk in? His 7 and my 10 would put him in the lead. Is that what you would do?

Venice – France: No matter what I do, your position always seems stronger than mine. Why do I feel like I am always playing defense against you? Plus, I know you have some ducats saved up now so you are a major threat to peace.

Venice – Naples: I hope we still see eye to eye in the Adriatic. I am rearranging forces a bit to try and get better leverage for a push against France. Those silly famines got in my way.

Dirty Deeds Done Dirt Cheap

Advanced Game, Plague, Famine, Special Military Units, Conquest, Moneylenders, Strategic Movement, Black Press, Standard Victory

Miller Number 2000Fpw10

Fall 1054

Deadline for Winter/Spring 1055 7/19, Tuesday

Papacy crushes one Byzantine fleet, buys another to convoy Venetian army to Croatia while receiving funds from Venice, Pisa. Muslims move fleets east to Boot heel; Pisa sends armies north.

Summer 1054 Retreats

Holy Roman Empire retreats A Montferrat to garrison
Venice retreats F Dalmatia to Lower Adriatic

Expenditures

Venice repays 6 ducats to the moneylenders.

Outstanding Debt

Summer 1055: 6 ducats due from Pisa (4 borrowed), 6 ducats due from Venice (5 borrowed)

Summer 1056: 15 ducats due from the Papacy (10 borrowed)

Orders

BYZANTINES (Risner): A DALMATIA supports A BOSNIA, A BOSNIA supports A DALMATIA, A ANCONA converts to G

HOLY ROMAN EMPIRE (Nichols): [A CREMONA to Parma], [G MONTFERRAT converts to A]

MUSLIMS (Wilson): A NAPLES besieges (Norman garrison eliminated), F GULF OF NAPLES supports A Naples, F TYRRHENIAN SEA supports F Sardinia to Corsica, F Sardinia to CORSICA, F Otranto to LOWER ADRIATIC, F IONIAN SEA supports F Otranto to Lower Adriatic

NORMANS (Whyte): [G Naples holds (ELIMINATED)], **OUT!**

PAPACY (Scott): A Bologna to URBINO, A Urbino to ANCONA, A SPOLETO supports A Urbino to Ancona, A Perugia to PATRIMONY, A Aquila to BARI, A ROME holds, F UPPER ADRIATIC supports Venetian A Croatia

PISA (Roalstad): A COMO supports Venice A Pavia to Milan, A MONTFERRAT besieges, A FORNOVA supports A Modena to Parma, A Modena to PARMA, A SIENNA supports F Piombino, F PIOMBINO supports F Genoa to Ligurian Sea, F Genoa to LIGURIAN SEA, [F Corsica supports F Genoa to Ligurian Sea (DISLODGED, retreat Gulf of Lions, OTB)]

VENICE (Partridge): A Pavia to MILAN, A Treviso to PADUA, A CROATIA holds, F Lower Adriatic to ALBANIA

Your treasury:

Notes

Paul Risner was unable to continue on as the Byzantine player, so the position has been taken over by Bob Robles. The Norman player has been eliminated and his country conquered by the Muslims. The Muslim player may now build in Naples and collects the Norman variable income.

Press

Pisa – Muslims: No longer will your infidel heathen ships foul these good Christian Waters! By the decree of the Pope, I will rid your Fleets from our Waters!

Spring 1055 Famine

Poor Year – Column Only: Piombino, Ragusa, Bari

Spring 1055 Income

Provinces and cities that are underlined do no produce income while those that are in italics could change hands depending on retreats.

Provinces

BYZANTINES:	Aquila, Dalmatia, Bosnia, <u>Ragusa</u> , Durazzo	4
HOLY ROMAN EMPIRE:	Turin, Pavia, Cremona	3
MUSLIMS:	Corsica, Sardinia, Naples, Salerno, Otranto, Palermo, Messina, Tunis	8
PAPACY:	Mantua, Bologna, Florence, Urbino, Ancona, Spoleto, Perugia, Arezzo, Patrimony, Rome, Capua, <u>Bari</u>	1
PISA:	Como, Montferrat, Genoa, Fornova, Parma, Modena, Lucca, Pisa, Sienna, <u>Piombino</u>	9
VENICE:	Milan, Trent, Ferrara, Padua, Treviso, Friuli, Carniola, Croatia, Albania	9

Seas

MUSLIMS:	Tyrrhenian Sea, Gulf of Naples, Ionian Sea, Lower Adriatic	4
PAPACY:	Upper Adriatic	1
PISA:	Ligurian Sea, <i>Gulf of Lions</i>	2
VENICE:	Venice	1

Cities

BYZANTI NES:	Dalmatia, <u>Ragusa</u> , Durazzo	2
HOLY ROMAN EMPIRE:	Turin, Pavia, Cremona, <u>Montferrat</u>	3
MUSLIMS :	Corsica, Sardinia, Naples (2), Palermo, Messina, Tunis (2)	8
PAPACY:	Mantua, Bologna, Florence (3), Perugia, Arezzo, Rome (2), <u>Bari</u>	9
PISA:	Genoa (3), Modena, Lucca, Pisa, Sienna, <u>Piombino</u>	7
VENICE:	Milan (3), Ferrara, Padua, Treviso, Carniola, Croatia, Albania, Venice (3)	2

Totals

Variable income die roll was 2.

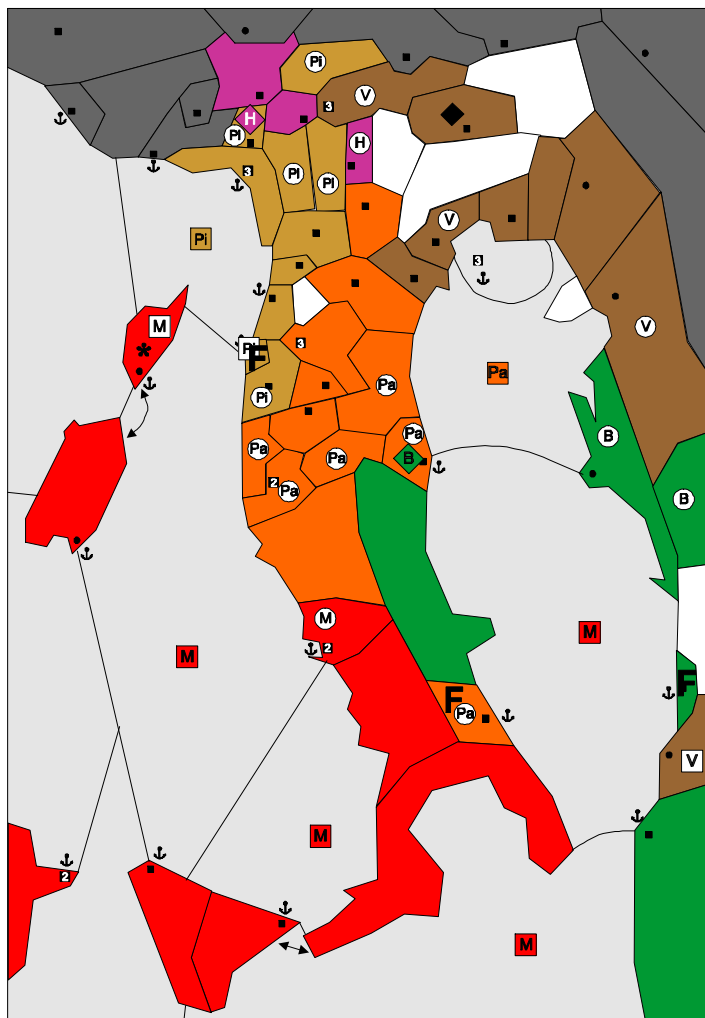
Country	Variable	Provinces	Seas	Cities	Gross
BYZANTINES:	3	4	0	2	9
HOLY ROMAN EMPIRE:	2	3	0	3	8
MUSLIMS:	4	8	4	8	24
PAPACY:	3	11	1	9	24
PISA:	2	9	2	7	20
VENICE:	3	9	1	12	25

Your total:

Game Summary

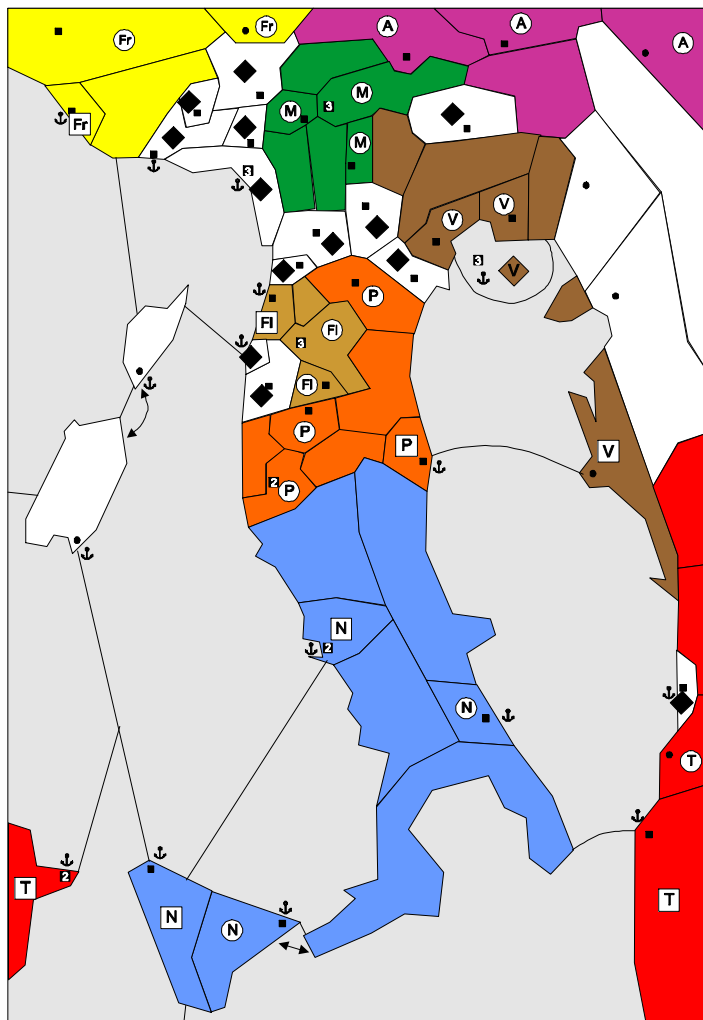
	1051	1052	1053	1054	1055
Byzantines:	3	4	5	6	4
Holy Roman Empire:	3	4	4	4	3
Muslims:	3	3	4	4	6
Normans:	1	2	2	1	0
Papacy:	3	4	6	6	7
Pisa:	3	5	7	8	6
Venice:	3	6	6	6	8

Dirty Deeds Done Dirty Cheap



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

Dogfight



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

Dogfight

Gunboat Gamestart

Miller Number 2005Apw10

Deadline for Spring 1454 7/19, Tuesday

The Positions

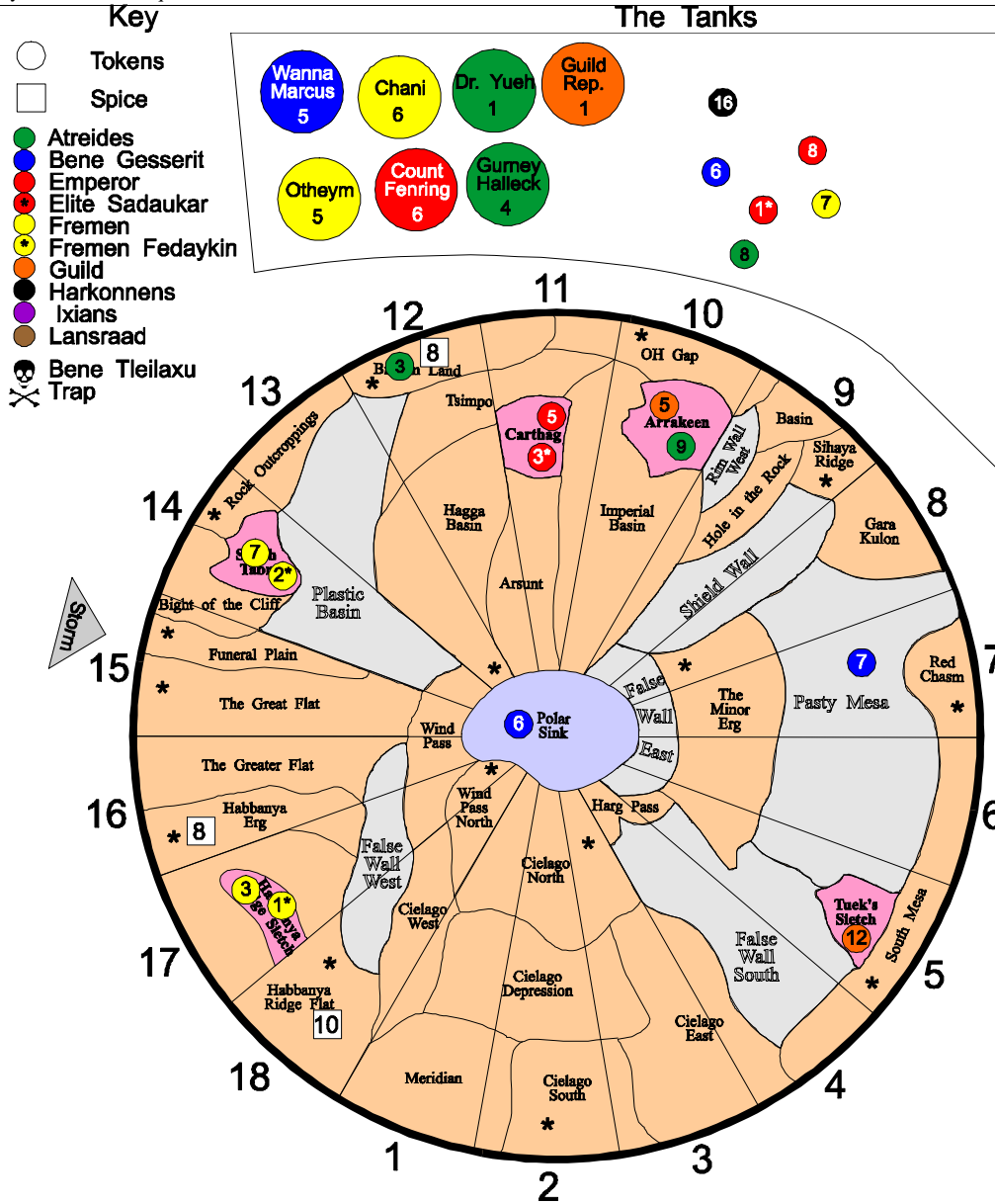
- Austria 🏹: A Tyrolea, A Austria, A Hungary, 1 ducat
- Florence 🏹: A Florence, A Arezzo, F Pisa, 6 ducats
- France 🏹: A Swiss, A Avignon, F Marseille, 2 ducats
- Milan 🏹: A Cremona, A Pavia, A Milan, 6 ducats
- Naples 🏹: A Bari, A Messina, F Naples, F Palermo, 4 ducats

- Papacy 🏹: A Bologna, A Perugia, A Rome, F Ancona, 4 ducats
- Turks 🏹: A Albania, F Durazzo, F Tunis, 4 ducats
- Venice 🏹: A Padua, A Verona, G Venice, F Dalmatia, 9 ducats
- Autonomous Garrisons: Savoy, Saluzzo, Montferrat, Genoa, Lucca, Mantua, Trent, Piombino, Sienna, Ragusa, Ferrara, Modena

Notes

Here's a recap of the rules we'll be using. First, all advanced rules are in use, including assassination. Each player starts with one assassination chit for each other player. In addition, the following optional rules are in use: Natural Disasters, Special Military Units, and Conquest. Press will be White. We are

playing this one to Standard Victory Conditions: 15 cities. The house rules are available on the website. If you have any other questions, feel free to ask. And so, without further ado, I'll let you get on with your dagger work.



Pavlov
Turn 13 Bidding and Movement
Turn 13 Combat due: 7/19 Tuesday

Players

ATREIDES:	Cary Nichols	BENE GESSERIT	Bob Robles	BENE TLEILAXU	Paul Bolduc	EMPEROR	Bill Scharf
FREMEN	Steve Koehler	GUILD	Kevin Wilson	HARKONNENS	Ward Narhi	GAME MASTER	Chris Hassler

Bidding

The Bene Tleilaxu give () to the Harkonnens
 CARD 1 () goes to the Guild for 3 spice
 CARD 2 () goes to the Guild for 3 spice
 CARD 3 () goes to the Fremmen for 3 spice.
 CARD 4 () goes to the Fremmen for 3 spice
 CARD 5 () goes to the Bene Tleilaxu for 2 spice.

Revival and Movement

Guild move last. Bene Gesserit coexist everywhere.

Revival

Atreides revive 2 tokens
 Bene Gesserit revive 2 tokens (2 spice to the Bene Tleilaxu)
Emperor revives 3 tokens (1 Elite Sadaukar, 4 spice to the Bene Tleilaxu)
 Fremmen revive 3 tokens
 Guild revives 3 tokens (4 spice to the Bene Tleilaxu) and the Guild Representative
 Harkonnens revive 2 tokens and Feyd Rautha

Shipping

Atreides ship 2 tokens to Arrakeen (1 Bene Gesserit token accompanies to the Polar Sink, 2 spice to Guild)
Fremmen ship 3 tokens to False Wall West
Guild ships 5 tokens from Shield Wall to Arrakeen (5 spice to the bank)

Movement

Your Spice: _____

Your Intrigue cards: _____

Atreides move 3 tokens Imperial Basin – OH Gap – Broken Land (12)
 Bene Gesserit move 7 tokens False Wall South – Pasty Mesa (7)
Fremmen move 3 tokens False Wall West – Habbanya Ridge Flat – Habbanya Ridge Sietch

Combat

Guild versus the Atreides in Arrakeen (Atreides are the aggressor, available leaders: Atreides: Thufir Hawat, Lady Jessica, Duncan Idaho, Guild: all).

Positions

Atreides: 9 tokens Arrakeen, 3 tokens Broken Land (12), 8 tokens, Gurney Halleck, and Dr. Yueh in the tanks. Kwisatz Haderach available.
Bene Gesserit: 6 tokens and Wanna Marcus in the Tanks, 6 tokens Polar Sink, 7 tokens Pasty Mesa (7), 1 token off-planet
Bene Tleilaxu: *Traps:* none
Emperor: 8 tokens (3 Elite Sadaukar) Carthag, 9 tokens (1 Elite Sadaukar), and Count Fenring in the Tanks, 3 tokens (1 Elite Sadaukar) off-planet
Fremmen: 9 tokens (2 Fedaykin) Sietch Tabr, 4 tokens (1 Fedaykin) Habbanya Ridge Sietch, 7 tokens, Chani, and Othym in the tanks
Guild: 12 tokens Tuek’s Sietch, 5 tokens Arrakeen, 3 tokens and the Guild Administrator in the Tanks
Harkonnens: 16 tokens in the Tanks, 4 tokens off-planet

 Your traitor(s): _____

Guard Dog

Turn 10 Cure through Health

Turn 10 Funeral Commission through Parade due: 7/19 Tuesday

Cure Phase

Petr Niewitko goes to the Sanatorium and Wassily Protzky returns to work.
 UNCLE plays Miracle Drug (21) on Niewitko, removing his +. Niewitko ages to 86, Protzky to 75, and Strychnin to 61.

Purge Phase

Protzky attempts to purge Natasha Nogoodnik (dr = 4) and fails. Ages to 78.

Spy Investigation Phase

LVC plays 4 IP on Strychnin and Strychnin condemns R. Strychnin ages to 63.

Health Phase

Petr Niewitko (dr = 5) gets sick.
 Wassily Protzky (dr = 15) remains sick.
 Tigran Zenjarplan (dr = 5) falls ill.
 Mikail Strychnin (dr = 15) remains sick.
 LVC plays Flu Epidemic, applying -2 to all remaining rolls. MLI plays Vaccination (34) on Putschnik and Bungaloff, negating the modifier.
 Ludmilla Patina (dr = 1 – 2) falls ill.
 Natasha Nogoodnik (dr = 12 – 2) remains healthy.
 Ulan Putschnik (dr = 18) remains healthy.
 Leonid Bungaloff (dr = 11) remains healthy.

Politburo

Office	Politician	Condition	Influence
Party Chief	Petr Niewitko (D)	87, +	1 (LVC), 6 (UNCLE)

Office	Politician	Condition	Influence
KGB Head	Wassily Protzky (U)	78, +	10+ (LVC)
Foreign	Tigran Zenjarplan (Q)	79, strong, ++	2 (LVC)
Defense	Mikail Strychnin (T)	63, +	5 (LVC) , 4 (TCC), 3 (HLS)
Ideology	Ludmilla Patina (S)	63	1 (TCC), 2 (TI)
Industry	Natasha Nogoodnik (V)	55	10+ (TI)
Economy	Ulan Putschnik (Y)	57	1 (MLI), 2 (UNCLE)
Sport	Leonid Bungaloff (W)	54, strong	2 (MLI)

Politicians listed in **bold** are in the sanatorium. Influence in **bold** indicates controlling faction.

Candidates: X
People: M (70, ++), Z (55)
Siberia: J (76, ++), G, H, L, N, R
Kremlin Wall: A, I, C, B, F, K, E, P
Retired: O

Players

Andy Lewis Trotskyite Internationalists
 Pasquale Giovine Marxist-Leninists Integralists
 Mike Scot The California Connection
 Ward Narhi Underground Neo-Communist Liberation Effort

Bob Robles Hard Line Stalinists
 Chris Geggus Lubianka Visitors Club

Undeclared Influence

MLI have one wave, TCC have one wave, LVC have one wave, UNCLE has one wave.

Intrigue Cards

Dogged

Turn 21, Phases IV-VI and Turn 22, Phases I-III
Turn 22 Phases IV-VI and Turn 23 Phases I-III due: 7/19 Tuesday
Turn 21

Construction and Operation

Red (Scharf) buys claim #108 for \$140, operates #49 (\$40, depletes), #50 (\$50, 2 silver), and #79 (\$40, 4 coal), delivers 12 silver from the three Silverton claims to Denver for \$4800 and 2 lumber from Lumberton to Salt Lake City for \$600. Gains \$1330 in passenger revenue.
Green (Nichols) operates #38 (\$40, 2 silver) and #80 (\$30, 5 coal), delivers 2 lumber from Walden to Denver for \$400 and 2 silver from Leadville to Denver for \$800. Receives \$20 in passenger revenue.
Orange (Narhi) operates #107 (\$50, 2 copper) and #124 (\$40, depletes), delivers 2 coal from Magdalena to El Paso for \$280 and 3 copper from Santa Rita to El Paso for \$480. Receives \$510 in passenger revenue.
Blue (Bolduc) operates #130 (\$80, 1 copper), #71 (\$20, 4 coal), and #36 (\$50, 1 silver), delivers 1 silver from Eureka to Salt Lake City for \$400, 6 copper from Bingham to Salt Lake City for \$960, and 4 coal from Sunnyside to Denver for \$560. Receives \$1720 in passenger revenue.
Purple (Partridge) operates #61 (\$20, depletes), #118 (\$20, depletes), #62 (\$30, 1 lumber), #66 (\$30, 4 lumber), and #100 (\$40, 1 gold). Delivers 1 lumber from Taos to Pueblo for \$200, and 4 lumber from Vallecitos to Pueblo for \$800. Pays \$200 to bail prospector out of jail. Receives \$2050 in passenger revenue.

Determine Price Changes

Gold: Remains at \$225 Copper: -3 to \$100 Silver: -7 to \$160

	Denver	Salt Lake City	Pueblo	Santa Fe	El Paso
Lumber:	-1 to \$160	Remains at \$300	Remains at \$200	+2 to \$160	+1 to \$160
Coal:	Remains at \$140	Remains at \$100	Remains at \$80	Remains at \$120	Remains at \$140

Turn 22

Move Prospectors and Surveyors

Red (Scharf) dismantles Coalville to Salt Lake City and Durango to Pagosa Springs, prospects #132 and #81
Green (Nichols) surveys Walden to Steamboat Springs and Raton to Cimarron, prospects #132
Orange (Narhi) no surveying, prospects passenger line #18.
Blue (Bolduc) dismantles Salina to Thistle, surveys Price to Hiawatha, prospects #73.
Purple (Partridge) surveys Elizabethtown to Cimarron, prospects #121.

Dispute Resolution

Red and Greed have a dispute over claim #132. Red has a net +4 (+1 prospector, already in the city) versus Green's +2 (+2 prospector). Red dr = 7 + 4, Green dr = 7 + 2. Red wins (prospector becomes +2). Red pays \$50, Green pays \$320, Orange pays \$660, Blue pays \$60, Purple pays \$200.

The Players

Player	Color	Starting Location	Money	Trains	Snowplows	Personnel
Bill Scharf	Red	Denver	\$15175	15, 42, 72, 72	+4, +5	P, P+2, S+2, S+1
Cary Nichols	Green	Denver	\$2530	9, 15	+3	P+2, S, S
Ward Narhi	Orange	El Paso	\$16250	9, 24, 42, 72		P+1, S, S
Paul Bolduc	Blue	Salt Lake City	\$16225	24, 72 72, 72	+5, +3	P+1, S, S
Dave Partridge	Purple	Pueblo	\$20260	24, 42, 72, 72	+4	P, P+2, S, S

Personnel in **bold** are in jail.

Purchased Claims

#	City	Owner	Type	Goods	Operation
50	Silverton	Red	Silver	0	\$50
79	Bowie	Red	Coal	4	\$40
108	Lordsburg	Red	Copper	N	\$40
81	Crested Butte	Red	Coal	N	\$40
132	Steamboat Springs	Red	Coal	N	\$50
38	Aspen	Green	Silver	2	\$40
80	Aspen	Green	Coal	5	\$30
55	Walden	Green	Lumber	1	Depleted
42	Leadville	Green	Silver	0	\$40
53	Lake City	Green	Silver	N	\$30
107	Santa Rita	Orange	Copper	0	\$50

#	City	Owner	Type	Goods	Operation
114	McGaffey	Orange	Lumber	2	Depleted
130	Bingham	Blue	Copper	0	\$80
71	Sunnyside	Blue	Coal	0	\$20
36	Eureka	Blue	Silver	0	\$50
73	Hiawatha	Blue	Coal	N	\$20
97	Elizabethtown	Purple	Gold	5	Depleted
118	Cimarron	Purple	Lumber	3	Depleted
62	Taos	Purple	Lumber	0	\$30
66	Vallecitos	Purple	Lumber	0	\$30
100	White Oaks	Purple	Gold	1	\$40
121	York Canyon	Purple	Coal	N	\$30

Purchased Passenger Lines

#	Type	Route	Payoff	Owner	Notes
3	A	Denver – Colorado Springs	\$50	Red	
5	A	Denver – Pueblo	\$80	Red	
21	C	Salt Lake City – Colorado Springs	\$600	Red	
20	C	Salt Lake City – Pueblo	\$600	Red	
1	A	Denver – Boulder	\$20	Green	
4	A	El Paso – Deming	\$60	Orange	
6	A	Santa Fe – Albuquerque	\$90	Orange	
14	B	El Paso – Albuquerque	\$220	Orange	

#	Type	Route	Payoff	Owner	Notes
13	B	El Paso – Santa Fe	\$140	Orange	
18	C	Gallup – Santa Rosa	\$500	Orange	
2	A	Salt Lake City – Provo	\$20	Blue	
22	C	Denver – Salt Lake City	\$800	Blue	
23	C	Salt Lake City – Santa Fe	\$900	Blue	
8	A	Denver – Leadville	\$260	Purple	Discard after 2 more Leadville depletions
10	B	Denver – Aspen	\$130	Purple	
7	A	Pueblo – Santa Fe	\$120	Purple	
9	B	Denver – Leadville	\$120	Purple	
17	C	Denver – Santa Fe	\$420	Purple	
24	C	Denver – El Paso	\$1000	Purple	

Available Claims

#	City	Type	Claim	Operation
113	Porter	Lumber	\$60	\$30
120	Cuba	Coal	\$40	\$30
67	Coalville	Coal	\$60	\$30
125	Capitan	Coal	\$80	\$20
41	Leadville	Silver	\$120	\$50
115	Paxton Springs	Lumber	\$100	\$40
86	Canon City	Coal	\$40	\$20
101	Lake Valley	Silver	\$140	\$20

Available Trains

Type	# Available	Cost
9	4	\$80
15	4	\$120
24	5	\$200
42	5	\$320
72	0	\$500

Available Snowplows

Type	# Available	Cost
Die +2	3	\$40
Die +3	2	\$80
Die +4	3	\$140
Die +5	4	\$200

Available Passenger Lines

#	Type	Route	Payoff	Cost	Notes
19	C	Salt Lake City – Albuquerque	\$600	\$975	

Notes

Deck was reshuffled, then claim #106 was placed at the bottom of the deck.

Junk Yard Dog

Turn 10a

Deadline Turn 10b 7/19, Tuesday

Available Cards

Set 1	Set 2	Set 3	Set 4	Set 5
Order	Advisor	Order	Waste Disposal	Raw Materials
Growth	Order	Raw Materials	Waste Removal	Growth
Bribery	Raw Materials	Advisor	Growth	Waste Disposal

Cary selects set 4

Eric selects set 2

Dave selects 3

Andy selects set 5

The Players

Player	Play Order	Money	Loans	Raw Material Supply	Growth	Co-workers	Saved Card
Eric Brosius	2	\$26	0	10	17	4	Advisor
Dave Partridge	3	\$4	10	9	18	3	Advisor
Andy York	4	\$51	10	10	17	4	
Cary Nichols	1	\$6	20	5	15	4	Order

Player	Rationalization	Raw Materials	Waste Reduction	Waste Disposal	Victory Points
Eric Brosius	4/3	5/1	3/6	1	40
Dave Partridge	3/6	2/10	2/10	4	36
Andy York	5/1	3/6	2/10	12	49
Cary Nichols	4/3	3/6	4/3	13	10

S.O.B.Cards

Eric	Dave	Andy	Cary
Advisor	Order	Raw Materials	Waste Disposal
Order	Raw Materials	Growth	Waste Removal
Raw Materials	Advisor	Waste Disposal	Growth

Deck will be reshuffled before next card draw.

Discards

Order	Bribery	Innovation	Waste Disposal	Waste Reduction	Hiring/Firing	Raw Materials
Raw Materials	Raw Materials	Waste Disposal	Order	Growth	Order	Order
Accident						

Laika**1971****1972 due: 7/19 Tuesday**Event Card Resolution/Saved Cards

JOE Fortunate Accident: Habitation Module. Fortunate Accident: Space Station. Accepts government order to launch a manned mission as his next planned mission.

Cain Program accepts the government order to place man on the moon by 1972. Fortunate Accident: Module.

Republic of Texas: Astronaut recruitment is 1MB apiece. Pays 10MB to resolve minor problem.

Romulus Project: One launch facility damaged. 15MB must be spent before it can be used again.

Purchase Hardware

Republic of Texas buys two launch facilities for 60MB, 6 two stage rockets for 72MB, 2 three person capsules for 24MB.

JOE buys the Two Person Mars Lander program for 50MB, 1 Mars probe for 8MB, 1 docking module for 2MB, 2 kickers for 6MB, 1 solid rocket booster for 5MB, and 1 three person space station for 20MB.

Cain Program buys the Kicker program for 12MB and 1 two person module for 8MB.

Romulus Project buys the Habitation Extender Program for 30MB, 2 habitation extenders for 6MB, 2 three stage rockets for 36MB, 1 one stage rocket for 3MB, and 1 three person capsule for 12MB.

Conduct Research

Republic of Texas n: 1 die (4) +4% to Max R&D. 5MB spent. 5: 2 dice (1, 3) +4%. 10MB spent. K: 5 dice (2, 2, 3, 5, 6) + 18%. 15MB spent.

JOE i: 4 dice (1, 5, 6, 6) +18% to Max R&D. 32MB spent. K: 8 dice (1, 1, 2, 2, 5, 5, 5, 6) +27%. 24MB spent. n: 8 dice (1, 2, 3, 3, 5, 6, 6, 6) +32%. 40MB spent.

Cain Program F: 8 dice (2, 3, 3, 4, 5, 5, 6) +34%. 8MB spent. d: 8 dice (1, 2, 4, 4, 5, 6, 6, 6) +34%. 16MB spent.

Romulus Project c: 4 dice (1, 4, 5, 6) +16%. 20MB spent.

Declare Future Missions

Republic of Texas declares 6 launches, **JOE** declares 3 launches, **Cain Program** declares 2 launches, and **Romulus Project** declares 2 launches.

Missions

No rushing. Launch order is: Romulus Project, Romulus Project, Romulus Project, Cain Program, Cain Program, JOE, JOE, JOE, Republic of Texas, Republic of Texas, Republic of Texas

JOE continues a Uranus Flyby. In-Route Activities (13%<93%). Mission continues next turn (3 turns until arrival at Uranus).

JOE continues a Neptune Flyby. In-Route Activities (76%<93%). Mission continues next turn (10 turns until arrival at Neptune).

Republic of Texas continues a Jupiter/Saturn Flyby. Jupiter Orbital Burn (70%<93%), Jupiter Orbital Activities (34%<93%). Partial mission success. +8MB to budget. Mission continues next turn (arrives at Saturn in 2 turns).

Republic of Texas continues a Uranus Flyby. In-Route Activities (90%<93%). Mission continues next turn (7 turns until arrival at Uranus).

Republic of Texas continues a Long Duration Manned Orbital (Travis, Bowie, Simmons). Earth Orbital Activities (07%<83%), Earth Orbital Activities (93%>83%), crew does not save, communications failure, minor problem, backup system takes over, Earth Orbital Activities (20%<83%), Earth De-Orbital Burn (35%<95%), Re-entry (67%<95%), Recovery (22%<95%). Mission success. +1% to c and i, Bowie to 50% and Simmons to 30%, +30MB to budget.

Romulus Project launches 1 Habitation extender. Liftoff (60%<90%), Earth Orbital Burn (16%<96%), Earth Orbital Activities (73%<98%), mission success. +1% to A and F.

Romulus Project launches a Manned Lunar Pass (Caesar, Nero, Brutus). Liftoff (12%<83%), Earth Orbital Burn (71%<82%), Earth Mission Burn (37%<82%), In-Route Activities (74%<82%), Lunar Mission Burn (25%<82%), In-Route Activities (59%<82%), Earth Orbital Burn (27%<82%), Earth Orbital Act ivies (87%>82%),

crew saves, Earth De-Orbital Burn (44%<82%), Re-entry (26%<82%), Recovery (36%<82%). Mission success. +1% to C and c, Caesar to 70%, Nero to 50%, and Brutus to 40%, +5MB to budget.

Romulus Project scrubs a Manned Lunar Pass. -10MB to budget.

Cain Program scrubs a Manned Lunar Landing (Ventrue, Tremere, Brujah). -10MB to budget.

JOE scrubs a habitation extenders launch.

JOE scrubs a Medium Duration Manned Orbital (Gordon, Rodgers). -10MB to budget.

JOE launches a Manned Sub-orbital (Astro). Liftoff (15%<97%), Re-entry (26%<89%), Recovery (53%<89%). Mission success. +1% to A and a, Astro to 70%. +2MB to budget.

Republic of Texas launches a Neptune Flyby. Liftoff (88%<98%), Earth Orbital Burn (78%<93%), Earth Mission Burn (92%<93%). Mission continues next turn, arriving at Uranus in 8 turns.

Republic of Texas launches a Uranus Flyby. Liftoff (88%<98%), Earth Orbital Burn (78%<93%), Earth Mission Burn (92%<93%). Mission continues next turn, arriving at Uranus in 8 turns.

Republic of Texas launches 7 habitation extenders for rendezvous with the space station. Liftoff (66%<98%), Earth Orbital Burn (66%<94%), Docking (48%<98%). Mission success. +1% to c.

Republic of Texas launches a Long Duration Manned Orbital (Travis, Bowie, Simmons). Liftoff (95%<98%), Earth Orbital Burn (46%<93%), Earth Orbital Activities (24%<93%), Docking (72%<98%), Earth Orbital Activities (53%<82%), Earth Orbital Activities (53%<82%), Earth Orbital Activities (39%<82%), 7 extenders installed (automatic success). Mission continues next turn. +1% to c and i, Travis to 70%, Bowie to 40%, and Simmons to 20%.

Players

Player Name	Dennis Cain	Cary Nichols	Bill Scharf	Andy York
Country	Cain Program	Romulus Project	JOE	Republic of Texas
1971 Budget	145	93	168	198
Cash	132	31	69	0
Launch Facilities	3	3	3	6
Astronauts	8	3	4	7

Astronauts: Cain Program: Ventrue, Tremere (60%), Brujah (40%), Gangrel, Malkavian, Nosferatu (10%), Toreador, Caitiff (0%), **Romulus Project:** Caesar (60%), Nero (40%), Brutus (30%), **JOE:** Roger Manning (70%), Astro (60%), Buck Rodgers (50%), Flash Gordon (30%), **Republic of Texas** Travis (70%), Crockett, Bowie (50%), Simmons (30%), Houston, Ocnaschek, Boyle (10%)

Programs and Hardware

Cain Program: Orbital Satellite (1): 3/98%, Lunar Probe (3): 1/86%, Docking Module (4): 2/70%, One Stage Rocket (A): 5/84%, Three Stage Rocket (C): 2/98%, Kicker (F): 1/59%, One Person Capsule (a): 5/84%, Three Person Capsule (c): 2/93%, Two Person Module (d): 2/79%, Three Person Space Station (i): 1/42%, Habitation Extenders (p): 1, EVA: 98%, Photoreconnaissance: 95%, Space Construction: 55% IN ORBIT:

Romulus Project: Orbital Satellite (1): 2/98%, Interplanetary Satellite (2): 4/72%, Lunar Probe (3): 0/65%, Docking Module (4): 2/70%, One Stage Rocket (A): 0/91%, Two Stage Rocket (B): 0/81%, Three Stage Rocket (C): 1/83%, Liquid Fuel Strap-ons (D): 2/33%, Kicker (F): 0/97%, One Person Capsule (a): 3/86%, Three Person Capsule (c): 0/82%, Three Person Space Station (i): 2/62%, Habitation Extenders: 2, EVA: 85%, Photorecon: 70%, Space Construction: 55% IN ORBIT: 1 three person space station (life support: 36), 1 habitation extender

JOE: Orbital Satellite (1): 0/98%, Interplanetary Satellite (2): 0/93%, Lunar Probe (3): 0/72%, Docking Module (4): 2/98%, Mars Probe (5): 1/88%, One Stage Rocket (A): 2/98%, Two Stage Rocket (B): 3/98%, Liquid Fuel Strap-ons (D): 3/88%, Kicker (F): 3/98%, Solid Rocket Boosters (H): 1/81%, Solar Sail(K): 1/68%, One Person Capsule (a): 0/90%, Two Person Capsule (b): 2/91%, One Person Module (e): 0/92%, Three Person Space Station (i): 1/80%, Two Person Mars Lander (n): 1/52%, Habitation Extenders (p): 33, EVA: 98%, Photorecon: 100%, Space Construction: 55%. IN ORBIT:

Republic of Texas: Orbital Satellite (1): 0/98%, Interplanetary Satellite (2): 0/93%, Lunar Probe (3): 0/88%, Docking Module (4): 1/98%, Mars Probe (5): 2/83%, One Stage Rocket (A): 3/98%, Two Stage Rocket (B): 8/98%, Liquid Fuel Strap-on (D): 1/85%, Kicker (F): 4/96%, Solid Rocket Booster (H): 6/82%, Solar Sail (K): 1/50%, One Person Capsule (a): 5/91%, Three Person Capsule (c): 3/96%, Two Person Module (d): 1/91%, Three Person Space Station (i): 2/84%, Two Person Mars Lander (n): 1/90%, Habitation Extenders (p): 13, EVA: 98%, Photorecon: 95%, Space Construction: 100% IN ORBIT: 1 three person space station with 3 person capsule docked (life support: 99)

1972

Draw Event Cards

Andy York: Sabotage: pay another player 10MB or lose 20% on next Solid Rocket Booster launch. -5MB to budget.

Bill Scharf: Major media event. Leader makes impassioned plea in support of space program. +30MB to budget.

Dennis Cain: Fortunate accident: Mars lander. +5MB to budget.

Cary Nichols: Minor problem: Pay 10MB or lose 3% on safety factor of next Space Station mission. +5MB to budget.

Final Positions

Player Name	Dennis Cain	Cary Nichols	Bill Scharf	Andy York
Country	Cain Program	Romulus Project	JOE	Republic of Texas
1972 Budget	128	103	180	235
Cash	233	17	50	2
1973 Budget	133	108	210	230

Retriever**Turn 10****Turn 11 due: 7/19 Tuesday****Commander Actions**

SD, Inc. opens the bidding on an Orbital Lab at 51, and Little Green Manufacturing gets it for 54 (Or1, Wa5, Wa9, Wa9, MWa). SD, Inc. opens the bidding on the second Orbital Lab at 51 and ORION gets it for 53 (Or3, Wa4, Or4, Wa9, Wa9, Wa10, Re14). SD, Inc. opens the bidding on the third Orbital Lab at 51 and MMC gets it for 52 (Ti8, Re14, MWa). SD, Inc. opens the bidding on the last Orbital Lab at 51 and gets it (Or2, Or2, Or2, Or5, Wa5, Wa8, MWa).

Little Green Manufacturing buys a population factor (Or5).

Mud Mining Corporation passes.

Bartertown passes.

ORION passes.

Golden Orb Developers buys a titanium factory (Or2, Wa5, Wa6, Wa8, Wa9) and moves a population factor from an ore factory to man it.

ACK! passes

HBDC buys a titanium factory (Wa6, Wa7, Wa7, Wa10) and moves a population factor from an ore factory to man it.

The Players

	Outpost Name	Commander	Factories	Upgrades	VP
1	SD, Inc.	Andy Lewis	OrF, OrF, WaF, WaF, WaF, WaF, WaF	HE, No, Wa, Ec, OL	19
2	LGM	Dave Partridge	OrF, OrF, WaF, WaF, WaF, WaF	2No, Ec, OL	18
3	MMC	Eric Brosius	OrF, OrF, WaF, WaF, WaF, WaF, TiF	HE, No, Sc, 2OL	17
4	ORION	Michael Lowrey	OrF, OrF, WaF, WaF, WaF, WaF	2DL, No, 2Sc, OL	16
5	Bartertown	Andy York	OrF, OrF, WaF, WaF, WaF, WaF, WaF, ReF	2DL, Wa, La	14
6	GOD	Cary Nichols	OrF, OrF, WaF, WaF, WaF, WaF, TiF	Wa, HE, Ec	13
7	ACK!	Bill Scharf	OrF, OrF, WaF, WaF, NCF	HE, DL, Wa, Sc	11
8	HBDC	Kevin Wilson	OrF, OrF, WaF, WaF, WaF, WaF, TiF	Wa, HE, OL	11

LGM is Little Green Manufacturing, GOD is Golden Orb Developers, HBDC is Heavenly Bodies Development Corp, ORION is Orbital Recovery and Intergalactic Opportunity Network, MMC is Mud Mining Corporation

Available Upgrades**Resource Cards**

New Arrivals: Laboratory, Ecoplants, Robots, and Outpost

Upgrade	Minimum Bid	Available	Not Yet Delivered
Scientists (Sc)	40	0	2
Orbital Lab (OL)	50	0	0
Robots (Ro)	50	3	3
Laboratory (La)	80	2	3
Ecoplants (Ec)	30	1	2
Outpost (Ou)	100	2	4

SD, Inc., MMC, and ORION took Mega Water cards.

Dogwood**Epoch III Empire Selection and Celts****Epoch III Macedonia, Maurya, and Han Dynasty due: 7/19 Tuesday****Epoch III Empire Selection**

Retropolis (Cain) keeps

The Time Traveler (Anderson) passes to Arachnids

Arachnids (Bolduc) passes to the Royal Manticoran Historical Society

Turanians (Nichols) passes to Marching Through the Ages

Royal Manticoran Historical Society (Wilson) passes to The Horde

Marching Through the Ages (Lewis) passes to the Time Traveler

The Horde (Geggus) passes to the Turanians

Epoch III

The Hoard (Geggus) CELTS: Army Central Europe, Northern Gaul, Albion, Central Massif, Northern Apennines (vs. Greek City States: C: 6, 4; G: 5, 3; wins), Dalmatia (vs. Greek City States; C: 6, 2; G: 5; wins), Pindus (vs. Greek City States; C: 6, 1; G: 4, 4; wins), Morea (vs. Greek City States; C: 5, 3; G: 3+1; wins, Capital reduced to city, fleets in Eastern Mediterranean unsupported). Builds Monument Central Europe. Points: Dominance in Southern Europe (6) and Northern Europe (2), Presence in North Africa (2), 1 city (1), 1 Sea (1), and 1 Monument (1) for 13 points.

Press

Somewhere in North Africa: The Time Traveler was upset. The Chinese couldn't be trusted. Treachery had cursed him once again. The spider people which he had dealings with before fared little better. And still others who either were divided scattered and leaderless or even those who had only 1 army were doing far better. He pondered these things as he was cleaning up yet another pile of elephant dung.

Players

Player Name	Player Faction Name/Color	Empire Strength Points	Victory Points
Dennis Cain	Retropolis (red)	10	20
Paul Bolduc	Arachnids (blue)	11	12
Kevin Wilson	Royal Manticoran Historical Society (purple)	12	33
Dave Anderson	The Time Traveler (orange)	12	21
Cary Nichols	Turanians (black)	13	13
Andy Lewis	Marching Through the Ages (green)	19	28
Chris Geggus	The Horde (yellow)	20	40

Positions

Turanians: Two fleets Eastern Mediterranean. GREEK CITY STATES: Army Southern Apennines.

The Horde: Fleet Red Sea. HITTITES: Army Balkans. EGYPT: Army Nubia. SCYTHEANS: Army Caucasus. CELTS: Army and city Morea, army and Monument Central Europe, armies Northern Gaul, Albion, Central Massif, Northern Apennines, Dalmatia, Pindus.

Marching through the Ages: Fleet Black Sea. MINOANS: Army, Capital, and Fort Crete. NORTH AMERICAN MIGRANTS: Armies Central America, West Indies. PERSIA: Army, Capital, and Monument Persian Plateau, army, city, and Monument Upper Indus, army and Monument Levant, Middle Tigris, Lower Indus, Zagros, armies Turanian Plain, Tarim Basin, Hindu Kush, Eastern Anatolia, Western Anatolia, Upper Tigris.

Retropolis: CHOU DYNASTY: Army and Capital Wei River, army and city Yellow River, armies Szechuan, Irrawaddy, and Ganges Delta.

Royal Manticoran Historical Society: ASSYRIA: Army Western Deccan.

The Time Traveler: Fleet Western Mediterranean. SHANG DYNASTY: Army Great Plain of China. CARTHAGINIA: Army, Capital, Monument, and Fort Shatts Plateau, army and Monument Nile Delta, armies, Southern Iberia, Libya, and Palestine.

Arachnids: SUB-SAHARAN MIGRANTS: Armies Central Africa and Congo Basin. VEDIC CITY STATES: Armies Ganges Valley, Eastern Deccan, Eastern Ghats, and Persian Salt Desert.

Event CardsEpoch II Empire**Salty Dog****Seafarers of Catan****Initial Placement Round 1****Deadline Initial Placement Round 2 7/19, Tuesday**Initial Placement, Round 1

Kevin places at E12, road at E12-F12

Cary places at C14, road at C14-D14

Chris places at D8, ship at D8-D7.

Dave places at D10 road at D10-C10

Bill places at C17, road at C17-C18

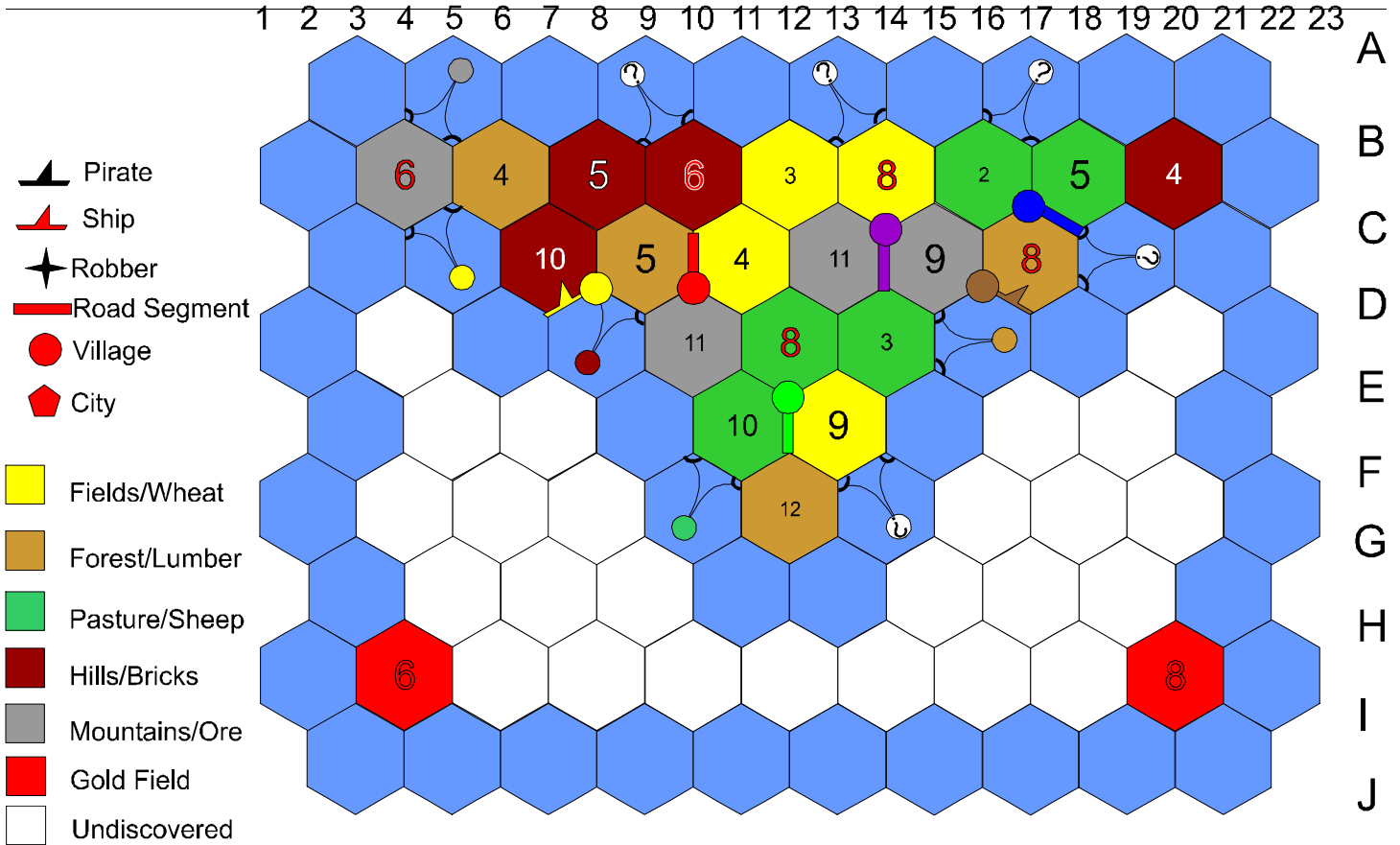
Ward places at D16, ship at D16-D17

The Players

Player	Color	Grain	Wool	Lumber	Brick	Ore	Development Cards	VP
Kevin Wilson	Green							
Dave Partridge	Red							
Cary Nichols	Purple							
Bill Scharf	Blue							
Chris Geggus	Yellow							
Ward Narhi	Brown							

Notes

Remember that the second placement round is in *reverse* order, so Ward selects first and Kevin last.



Pedagoguery

Philosophers for centuries have pondered the beginning of time. The ancient Greeks debated over whether the universe had a beginning or had existed forever. Aristotle, citing the principal that “out of nothing, nothing comes” reasoned that the universe had existed forever, and so the belief went until the age of Christian philosophers. Augustine reasoned that since God was outside of space and time, he could create them just as surely as he could create anything else, and thus in his view, the universe had a definite beginning.

The question of the origin of the universe remained the province of philosophy for a long while. It wasn't until the last century that science developed the tools to tackle this problem. The first of those tools arrived in 1917 with the publication of Einstein's General Theory of Relativity. Now, scientists had a theory that described space and time as a whole, and which could then be used to depict the conditions of the early universe. The first serious attempt to do that took place in the 1960s by Stephen Hawking and Roger Penrose. They determined that using General Relativity, you could not extend time back indefinitely. Eventually, you would reach a point at which the density, temperature, and spacetime curvature would become infinite – in scientific terms, a singularity.

Typically, when a scientific theory yields a singularity, it means that the theory is incomplete. In the case of the early universe, the problem is that when things get so small, quantum effects must be taken into account – something General Relativity does not do. It will take a quantum theory of gravity to fully explain the early universe, and while we do not yet have one, we have two candidates – string theory and loop quantum gravity. String theory in particular offers some interesting possibilities with regard to the early universe, ones in which the Big Bang does not represent the beginning of time after all, but merely the transition from one state to another.

String theory offers this way out because instead of particles being represented by points, which have no dimension, they are tiny one dimensional strings. Since they now have a dimension, they force a minimum size on the

universe. No longer can it achieve infinite density. It is by this mechanism that we can explore conditions at the big bang, and prior to it, at least through thought experiments. Two main scenarios have been put forward for describing the pre-big bang universe. They are the pre-big bang scenario and the ekpyrotic scenario.

The pre-big bang scenario relies on the fact that in string theory, most of the so-called constants of nature, such as Newton's gravitational constant are not really constants at all, but depend on the detailed geometry of the extra dimensions. If those extra dimensions change over time, then so do the constants. This theory postulates that the universe existed forever, and in the very distant past, it was nearly empty. All that existed was a diffuse fog of elementary particles, and the forces of nature were very weak, so the particles barely interacted with each other. As the forces of nature gradually strengthened, matter began to clump. In some regions, the density grew so high, that black holes evolved. Inside the black hole, matter fell inward, until it reached the minimum size permitted by string theory, at which point, it rebounded. This was the big bang. So according to this scenario, our entire universe exists inside a black hole within another universe. By the same token, it is possible that whenever a black hole is created in our universe, a new universe is born.

The ekpyrotic scenario builds on a postulate that I described in last issue's column. That is the supposition that nearly all fundamental particles are open-ended strings whose end points are fixed within a set of dimensions referred to as a brane. This allows other dimensions to be large, without disrupting the three-dimensional world we see. Like the last scenario, this one postulates that our universe has existed forever, but that there is a brane parallel to ours in this higher-dimensional space. At some point in the past, these two branes collided. The collision converted the kinetic energy of the two branes to matter and radiation within the two branes. This collision represents the Big Bang. After the collision, the two branes start to move apart. Now, at this point, the branes could move apart forever, or there could be an attractive force between them that

draws them close together after a time, which would lead to the whole thing happening again. Interestingly, during the phase in which the branes are approaching each other, the theory predicts that the spacetime inside the branes expands at an accelerated rate.

The next question becomes, how can we tell if either of these scenarios is true? We certainly can't get outside the local black hole/universe in the first scenario, or outside our own brane in the second, so have we gone back into the realm of pure philosophy? The answer is no. There are ways to tell if either one is true. It involves measuring the ambient gravitational radiation of the universe. Gravitational radiation is one form of radiation that can survive the conditions of

the Big Bang and can thus tell us about the time before the Big Bang. We don't currently have the capability of measuring those gravitational waves, but we soon will be able to make some measurements that can at least rule out some models. The LIGO/VIRGO gravitational observatory system will be able to tell us if the pre-big bang scenario is possible. In addition, the Planck satellite can tell us if the conventional inflationary universe is the correct one. In either event, interesting things about our universe will be revealed.

Next issue, I will commemorate the 100th anniversary of Einstein's miracle year.

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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 **Dune:** Steve Koehler, Paul Bolduc, Kevin Wilson, Ward Narhi, Andy York, Cary Nichols, Bill Scharf, Dave Partridge **New World:** Andy York, Bill Scharf, Cary Nichols, Dave Partridge **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 **History of the World:** Andy Lewis, Paul Bolduc, Kevin Wilson, Chris Geggus, Andy York, Cary Nichols, Dave Partridge **Stellar Conquest:** Paul Bolduc, Kevin Wilson, Andy York, Cary Nichols, Dave Partridge **Liftoff!:** Dennis Cain, Andy York, Cary Nichols, Bill Scharf, Dave Partridge **Age of Renaissance:** Bob Robles, Michael Lowrey, Cary Nichols, Dave Partridge **Kremlin:** Andy York, Andy Lewis, Pasquale Giovine, Cary Nichols, Bill Scharf, Dave Partridge **Silverton:** Cary Nichols, Bill Scharf, Dave Partridge **Settlers of Catan:** Michael Lowrey, Chris Geggus, Cary Nichols, Dave Partridge **Gunslinger:** none

Standby Calls

None this issue.

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