

**Notes from Hades**

**W**ell, it wasn't easy, but I got here. I made the mistake of trying to make some major hardware upgrades myself, and ended up putting my computer out of commission during zine weekend. Not a good thing. So, here I am a week later and a week wiser. Next time, I hire someone to do the work for me.

However, this time has not been all bad. I have just managed to obtain a cable modem. So, first of all, my email address is changing (see below). The old compuserve address will remain in place, but it will be my wife's email exclusively. In addition, I am going to perform an experiment. I am going to see if I can put this zine out as a web page in addition to the print version. If it works, then I will offer web subscriptions, which would probably be free. Let me see how things go.

I've had an opening in the next gunboat Machiavelli game, so if those of you who are currently signed up for the next Machiavelli game would like to take advantage of the opportunity, please let me know.

This issue's deadline to **Tuesday, February 13 at 5:00 p.m. Pacific Time.** Please note that games that are run by guest GMs or in a subzine could be on a different schedule, so look at the games themselves. **Please do not call or fax orders after 10:00 p.m. Pacific time.** My wife and I tend to retire early.

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**Game Openings**

**Off the Leash.** Gunboat Machiavelli.

This game will start when the next Machiavelli game ends. Scenario and specific rules to be determined at game start by player vote, as usual. Have 7. I can take 1 more. You are signed up if this box is checked:

**Pavlov.** Dune. We will use the three variant powers (Bene Tleilaxu, Ixians, and Lansraad). Have Steve Koehler and Bill Scharf. Will take up to 4 more.

**Hyena.** Merchant of Venus. Will use the Fast Setup, Lost ? Box, Own Species Bonus, Customized Spaceships, and Agents, Bases, and Second Ships variant rules. Will use the combat rules if a majority of players agree. If so, the Variable Nova Balls and Mercenaries variant rules will also be used. Have Andy Lewis, Dennis Cain, Chris Geggus, and Bob Robles, need 2 more.

**Dog Show.** Age of Renaissance. Have Bob Robles, Paul Bolduc, Caleb Cousins, Ward Narhi, and Dennis Cain, will take 1 more.

Wish List

**Machiavelli.** This game will start when the next game ends after Off the Leash begins. Scenario and specific rules to be determined at game start by player vote, as usual. Have Phil Reynolds, Joe Carl, Bob Robles, and Brendan Whyte, will take up to 4 more.

**Kremlin.** This game will start when Dog Tired ends. Have Any Lewis, Pasquale Giovine, and Mike Scott, will take 3 more.

**Seafarers of Catan.** This is a game that expands on the original Settlers of Catan to include sea travel, but is very similar to the original. Exact scenario to be determined. This will start after Fenris has ended. Have Tom Howell, will take 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 \$1.50 per issue (\$2.25 overseas).

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

**Brendan Whyte**

To Ward Narhi:

I read a couple of Lovecraft books, and while many of the stories were good, the settings were pretty much the same, and the repetition of the same words over and over each story meant an anthology of his is an exercise in literary xeroxing it seems. I did enjoy one story set on Mars (I believe) where a spaceman

becomes trapped in an invisible maze. But the rest are set around Arkham mainly and suffer for a claustrophobia of vocabulary. One can read one every once in a while, but not a whole anthology in a couple of days.

My favourite short story writers include Saki. Great words, and many more adjectives than Lovecraft can find for his limited genre, probably due to a greater variety of settings, and a general rather than specific genre.

## Feral Dogs

### Advanced Game, no Optional Rules, Black Press, Ultimate Victory, Gunboat Spring 1465

**Deadline/Summer 1465 2/13 Tuesday**

*Venice abandons his northern lands to Milan while concentrating his effort against the perfidious Pope. France continues his back stage role while Naples remains in his shell.*

#### Fall 1464 Retreats

Venice retreats Croatia to Bosnia

#### Winter 1465 Builds

		Treas	Cost	Rem
<b>Fra</b>	Maintains all except F Durazzo, builds F Marseilles	35	18	17
<b>Mil</b>	Maintains all, builds A Cremona	47	27	20
<b>Nap</b>	Maintains all, no new builds	24	12	12
<b>Pap</b>	Maintains all, builds A Perugia	59	30	29
<b>Ven</b>	Maintains A Bosnia, no new builds	24	3	21

#### Expenditures

France gives 3 ducats to Naples, and 2 ducats each to Milan and the Papacy.

Venice attempts to buy the Papal F Venice for 18 ducats

#### Orders

France :

- A AVIGNON to Turin
- A PROVENCE to Turin
- F GENOA holds
- F GULF OF LIONS to CORSICA
- F MARSEILLES to GULF OF LIONS
- F WESTERN MEDITERRANEAN holds

Milan :

- A AUSTRIA to HUNGARY
- A SLAVONIA to CARNIOLA
- A CARINTHIA supports A Slavonia to Carniola
- A TYROLEA supports A Carinthia
- A VERONA to FRIULI
- A TREVISO supports A Verona to Friuli
- A MANTUA to VERONA
- A CREMONA to MANTUA
- A MODENA supports A Cremona to Mantua

Naples :

- A NAPLES supports G Naples
- F BARI supports G Bari
- G NAPLES supports A Naples
- G BARI supports F Bari

Papacy :

- A PERUGIA to SIENNA
- A FERRARA besiege (no garrison)
- A BOLOGNA supports A Ferrara
- A CROATIA supports F Upper Adriatic to Dalmatia
- A RAGUSA supports F Lower Adriatic to Herzegovina
- F Venice to Padua (nsu)
- F Upper Adriatic to DALMATIA
- F TYRRHENIAN SEA holds
- F IONIAN SEA to LOWER ADRIATIC
- F LOWER ADRIATIC to HERZEGOVINA

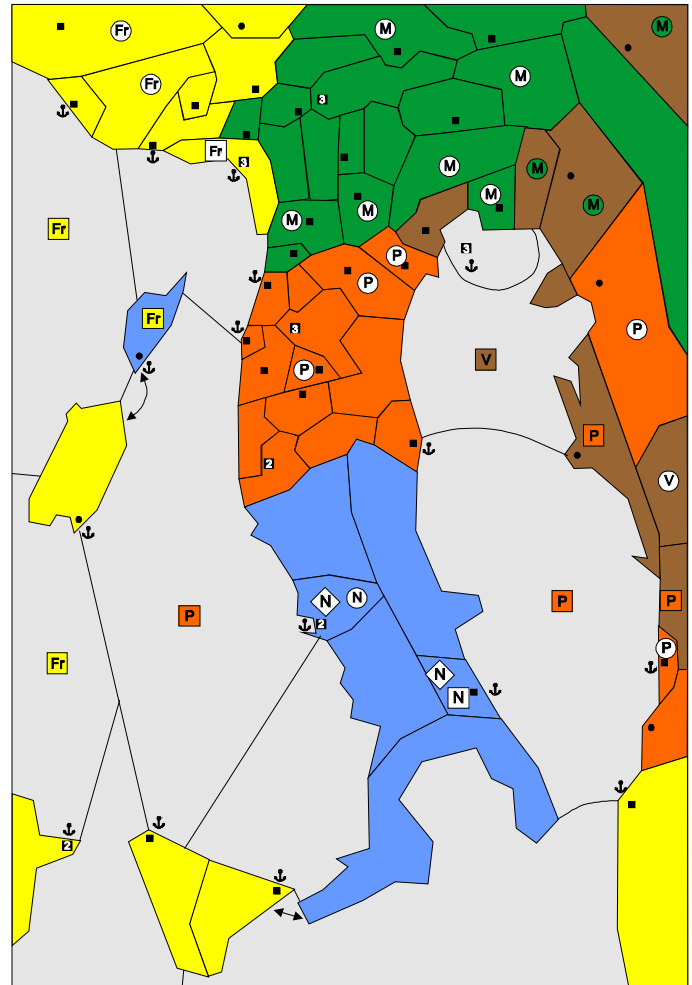
Venice :

- A BOSNIA to DALMATIA
- F Venice to UPPER ADRIATIC

#### Notes

Both draws fail, France/Milan/Naples/Papacy with 3 no votes, France/Milan/Papacy with 4. Both draws have been re-proposed. Please vote with your next set of orders. Remember, NVR = no, NMR = yes.

"Feral Dogs"



#### Press

**France – Naples:** Consider the ducats I've given you the purchase price for Corsica. To be honest, your continued silence has me concerned that you are not one of us...

**France – Milan/Papacy:** I've kept back a few ducats...to distribute them to whichever of you needs them more in the next season or two...actually you're both doing very well at the moment. I've proposed a couple of draws that include all of us.

**France – Papacy:** I'm concerned about Naples...any suggestions?

**Milan – Pope:** We are going to overwhelm Venice and to arrive in contact, hence I hope that you want to fix our new boundaries before to have incomprehensions. In particular, in EAST I hope that you would to stop your advance in Croatia (you will have all the south coast) and to support my A Carinthia - Carniola, if I am not yet there this Spring. In WEST I remember you that I supported you in Ferrara and asked, some time ago, to have your support for Padua from Verona; I would remember this because you (with Ragusa, Dalmatia, Croatia, Ferrara and Padua also) will arrive to 17 CITIES (very near to

22) and I prefer to avoid you any temptation: 44 divided by 3 should be equal to 14.667.

**Milan – France:** Peace forever between us, for me, and mutual aid in case of external aggression (Papacy is going to have 17 CITIES), if you agree.

**Naples – France/Papacy:** You have my continued best wishes for the struggle against Venice.

**Pope – France:** Thanks for the 3 ducats, it helped offset the expense of fighting Venice. Could you move Dur - alb and help me get rid of Venice in Rag and Her? I'll trade Alb for Dur for the time being.

**Pope – Venice:** I'm shakin' in my boots.

**Pope – Milan:** How about you take Car and Pad while I take what is south of that? Let's get rid of Venice as quick as possible. Next turn I will support Ver to Pad, this should cover any holes you have from a retreating Venice unit. Right now I'm just cutting support since I don't know what you'll be doing just yet.

**Venice – All:** There is no way I will vote for a draw with Milan or the Papacy still in the game. You'll have to kill me all the way first! I'll be helping France get a solo if he'll take me up on the offer. That'll teach you idiots how to play this game.

**Venice – Milan:** Like I said, take what you can (before Papacy does).

**Venice – Papacy:** Tit for tat.

## Citizen Dog

### Advanced Game, Plague, Famine, Special Military Units, and Conquest, White Press, Ultimate Victory Spring 1461

**Deadline for Summer 1461: 2/13 Tuesday**

*Venice presses his attack against Naples. Meanwhile, France manages to stalemate Austria and Milan, and is the only one to emerge unscathed from the terrible plague of the season.*

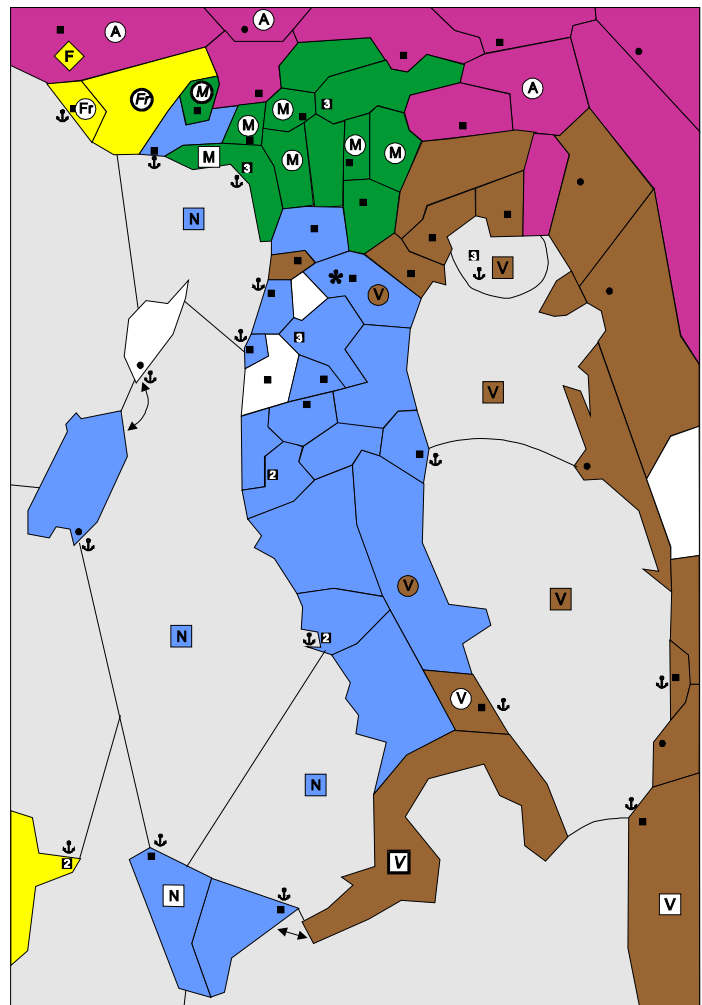
#### Winter 1459 Errata

The map last issue was incorrect in a one particular. First, France maintained garrison Avignon, not Savoy. Naples, however, does still maintain control of the province of Modena, because control is determined at the start of the turn, before military unit adjustment, which is when his army in Modena was removed. For that reason, the ducat totals shown in last issue are correct.

#### Orders

- AUSTRIA (Robles):** A TURIN supports A Avignon (cut)  
 A SWISS supports A Avignon  
A AVIGNON supports Milan A Saluzzo to Provence (cut)  
 A Austria to Carinthia
- FRANCE (Scott):** A (EM) PROVENCE to Turin  
A MARSEILLES to Avignon  
 G AVIGNON supports A Marseilles to Avignon
- MILAN (Giovine):** A PAVIA supports Austrian A Turin  
A (EM) SALUZZO to Provence  
A MONTFERRAT to Genoa  
 A FORNOVA supports G Modena convert to A  
 A Mantua to BERGAMO  
 A CREMONA supports A Mantua to Bergamo  
F GENOVA to Ligurian Sea  
 G MODENA convert to A
- NAPLES (Narhi):** A Pisa to PISTOIA  
A Bologna supports A Spoleto to Urbino (cut, DISLODGED, retreat Mantua, Florence, garrison, OTB)  
A SPOLETO to Urbino  
 F LIGURIAN SEA holds  
 F Patrimony to TYRRHENIAN SEA  
 F MESSINA supports F Palermo to Ionian Sea  
F PALERMO to Ionian Sea  
 F GULF OF NAPLES supports F Palermo to Ionian Sea
- VENICE (Grib):** A Lucca to BOLOGNA  
 A FERRARA supports A Lucca to Bologna  
 A Albania to AQUILA  
 A BARI supports A Albania to Aquila  
 A PADUA holds (u)  
F (EM) OTRANTO to Ionian Sea  
 F DURAZZO supports F Otranto to Ionian Sea  
 F LOWER ADRIATIC transports A Albania to Aquila  
F UPPER ADRIATIC to Urbino

F VENICE to Upper Adriatic  
Citizen Dog



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

#### Press

**Venice – All:** I have a sick computer that likes to eat C-drives. After my third C-drive failure, Gateway is servicing my tower and replacing almost everything. My apologies for unanswered emails, but I'm down and out for the next 10 days.

Spring 1461 Famine Losses

Naples A Spoleto, Naples A Mantua (if A Bologna retreats there).

Summer 1461 Plague

**Bad Year – Row and Column:** Turin (Austria A destroyed), Sienna, Messina (Naples F destroyed), Padua (Venice A destroyed), Austria, Ferrara (Venice A destroyed), Friuli, Albania, Modena (Milan A destroyed), Parma, Urbino, Pistoia (Naples A destroyed)

**New Tricks**

**Advanced Game, Plague, Famine, Special Military Units and Conquest, Black Press, Ultimate Victory**  
**Fall 1258**

**Deadline for Winter-Spring 1259: 2/13 Tuesday**

*Venice eliminates Aragon while Florence pounces on the Pope. Will peace be had in the next year?*

Summer 1258 Retreats

Aragon retreats F Palermo to garrison

Orders

- ARAGON A ANCONA holds  
 (Bolduc) F Messina supports G Palermo convert to F (cut, DISLODGED, retreat garrison, OTB)  
G PALERMO converts to F
- FLORENCE A FLORENCE converts to G  
 (Robles) A GENOA to PIOMBINO  
 A (EM) Saluzzo to SAVOY  
 A PROVENCE holds  
 A SWISS holds  
 F Capua to ROME  
 F TYRRHENIAN SEA supports F Capua to Rome  
 F SIENNA to PATRIMONY  
 F LIGURIAN SEA transports A Genoa to Piombino
- PAPACY A NAPLES holds  
 (Narhi) A SPOLETO to Rome
- VENICE A BOLOGNA holds  
 (Reynolds) A Ferrara to VERONA  
 A Verona to FRIULI  
 A Carinthia to SLAVONIA  
 A TYROLEA supports A Como  
 A PAVIA supports A Como  
 A COMO supports A Pavia  
 F CENTRAL MEDITERRANEAN supports F Palermo  
 F PALERMO besieges  
 F Otranto to MESSINA  
 F GULF OF NAPLES supports F Otranto to Messina  
F IONIAN SEA supports F Gulf of Naples (imp., Messina not controlled)

Notes

The Florence/Venice draw has failed with 1 no vote. It has been re-proposed. Please vote with your next set of orders. Remember, NVR = no, NMR = yes. Also, since at the end of this turn, Aragon will no longer have control of any of his home cities (as defined as owning both the city and the province), he is eliminated.

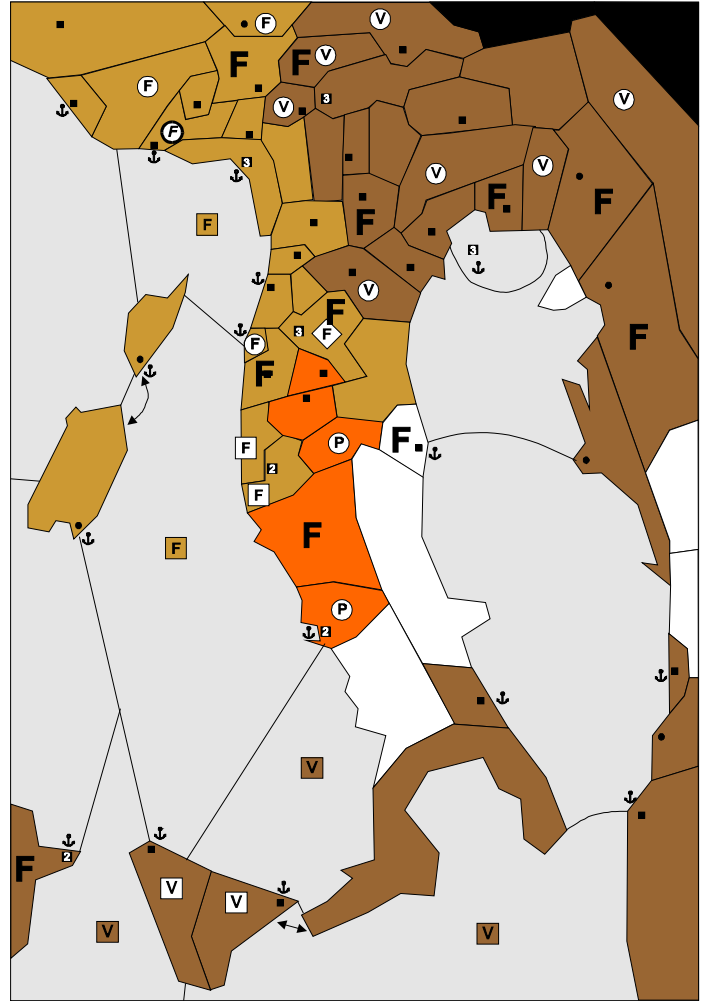
Press

- Florence – Papacy:** Sorry, but it had to happen sooner or later.  
**Venice – Florence and Papacy:** You say and act like you want a Florence-Venice draw. So how come we aren't getting at least three "Yes" votes for it?  
**Venice – Aragon:** Hey, I for one am doing my best to kill you!

Spring 1259 Famine

**Bad Year – Row and Column.** Croatia, Florence, Turin, Mantua, Capua, Treviso, Ancona, Tunis, Sienna, Como, Carniola

New Tricks



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

Spring 1259 Income

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

Provinces

FLO	Avignon, Marseilles, Provence, Swiss, <u>Turin</u> , Saluzzo, Savoy, Montferrat, Genoa, Fornova, Modena, Lucca, Pistoia, <u>Florence</u> , Urbino, Pisa, Piombino, <u>Sienna</u> , Corsica, Sardinia, Patrimony, Rome	19
PAP	Arezzo, Perugia, Spoleto, <u>Capua</u> , Naples	4
VEN	Tyrolea, <u>Como</u> , Pavia, Parma, Milan, Cremona, <u>Mantua</u> , Bologna, Ferrara, Verona, Bergamo, Trent, Carinthia, Slavonia, <u>Croatia</u> , <u>Carniola</u> , Friuli, <u>Treviso</u> , Padua, Dalmatia,	22

Ragusa, Albania, Durazzo, Bari, Otranto, Messina, Palermo,  
Tunis

Totals

Variable income die roll was 5.

	Var.	Prov.	Seas	Cities	Gross	Treas.	Total
FLO	9	19	2	17	47	6	53
PAP	5	4	0	4	13	2	15
VEN	8	22	4	20	54	2	56

Seas

FLO Tyrrhenian Sea, Ligurian Sea 2  
VEN Venice, Ionian Sea, Gulf of Naples, Central Mediterranean 4

Cities

FLO Avignon, Marseilles, Swiss, Turin, Saluzzo, Savoy, 17  
Montferrat, Genoa (3), Modena, Lucca, Florence (3), Pisa,  
Piombino, Sienna, Corsica, Sardinia, Rome (2)  
PAP Arezzo, Perugia, Naples (2) 4  
VEN Tyrolea, Pavia, Milan (3), Cremona, Mantua, Bologna, 20  
Ferrara, Trent, Croatia, Carniola, Treviso, Padua, Dalmatia,  
Ragusa, Albania, Durazzo, Bari, Messina, Palermo, Tunis,  
Venice (3)

Game Summary

	1253	1254	1255	1256	1257	1258	1259
Ara	3	4	5	8	7	4	0
Avi	4	4	0	0	0	0	0
Flo	3	4	5	6	9	13	17
Gen	3	3	3	2	0	0	0
Mil	3	4	5	4	4	0	0
Pap	3	5	4	4	3	3	3
Ven	3	6	9	12	15	19	21

**Doggin' It**

**Turn 16, Phases IV-VII, Turn 17, Phases I-III**

**Turn 17, Phases IV-VII, Turn 18, Phases I-III due: 2/13 Tuesday**

**Turn 16**

Construction and Operation

**Red** (Scharf) operates claims #7 (\$400, ½ gold) and #19 (\$250, 2 silver).

**Green** (Narhi) collects \$750 in passenger revenue.

**Brown** (Carl) operates claims #60 (\$100, 5 coal) and #63 (\$150, 5 coal).

**Gray** (Cain) no activity.

**Gold** (Bolduc) operates claims #44 (\$100, 3 coal), #39 (\$250, 1 lumber), #12 (\$250, 1½ silver), #34 (\$200, 1 lumber), and #47 (\$100, 4 coal), delivers 8 lumber from Lumberton to Salt Lake City for \$12,000, collects \$100 in passenger revenue.

**Blue** (Martin) operates claims #66 (\$200, 3 coal), #37 (\$100, depletes), and #68 (\$200, 3 coal), delivers 16 coal from Trinidad to Denver for \$11,200.

Commodity Prices

Gold: \$7000 Lumber (S.L.C.): \$1200 Coal (S.L.C.): \$500  
Silver (Denver): \$4000 Lumber (Pueblo): \$1000 Coal (Pueblo): \$400  
Silver (S.L.C.): \$2000 Lumber (Santa Fe): \$800 Coal (Santa Fe): \$600  
Lumber (Denver): \$1000 Coal (Denver): \$600

**Turn 17**

Move Prospectors and Surveyors

**Red** (Scharf) surveys Craig to Elk Springs, prospects #52.

**Green** (Narhi) surveys Rifle to Meeker, prospects #20

**Brown** (Carl) surveys Westcliffe to Salida, no prospecting.

**Gray** (Cain) surveys Mack to Rangely, prospects #51

**Gold** (Bolduc) surveys Green River to Sunnyside, prospects #35

**Blue** (Martin) no prospecting or surveying.

Dispute Resolution

No disputes. Red pays \$900, Green pays \$800, Brown pays \$700, Gray pays \$1400, and Gold pays \$1100.

Press

**Red – Brown:** B47L005 23Z CL17MB L8 Z011 2RU 89LSTRM L2X 5T5R  
T745. H843 90W 23Z BNJ5YT3.

The Players

Player	Color	Starting Location	Money	Personnel
Bill Scharf	Red	Denver	\$17,650	S+1, P
Ward Narhi	Green	Denver	\$38,200	S, P+1
Joe Carl	Brown	Pueblo	\$12,350	S+1, P
Dennis Cain	Gray	Salt Lake City	\$16,250	S, P+1
Paul Bolduc	Gold	Salt Lake City	\$22,900	S+1, P
Brad Martin	Blue	Santa Fe	\$58,250	S, P+1

Owned Claims

#	City	Owner	Goods	Type	Operation
17	Leadville	Red	3	Silver	Depleted
18	Leadville	Red	1	Silver	Depleted
7	Cripple Creek	Red	2½	Gold	\$400
19	Leadville	Red	2	Silver	\$250
52	Craig	Red	N	Coal	\$100
58	Crested Butte	Green	7	Coal	\$100
29	Lake City	Green	2	Silver	\$150
28	Lake City	Green	N	Silver	\$200
20	Leadville	Green	N	Silver	\$200
42	Vallecitos	Brown	1	Lumber	Depleted
64	Walsenburg	Brown	0	Coal	\$250
24	Ouray	Brown	N	Silver	\$200
60	Durango	Brown	5	Coal	\$100
21	Westcliffe	Brown	1	Silver	\$150
63	Alamo	Brown	5	Coal	\$150
23	Ouray	Gray	½	Silver	Depleted
54	Bowie	Gray	3	Coal	\$200
55	Bowie	Gray	3	Coal	\$200
51	Rangely	Gray	N	Coal	\$100
44	Scofield	Gold	3	Coal	\$100
39	Lumberton	Gold	4	Lumber	\$250

#	City	Owner	Goods	Type	Operation
12	Eureka	Gold	3	Silver	\$250
34	Dolores	Gold	3	Lumber	\$200
47	Sunnyside	Gold	4	Coal	\$100
35	Dolores	Gold	N	Lumber	\$200
66	Trinidad	Blue	0	Coal	\$200
37	South Fork	Blue	3	Lumber	Depleted
68	Raton	Blue	6	Coal	\$200

Owned Passenger Lines

#	Type	Route	Payoff	Owner	Notes
7	B	Denver – Leadville	\$600	Red	
9	B	Denver – Grand Jct.	\$1350	Red	Discard when 15 is taken. Good for \$1350 toward card 14 or 15
10	B	Pueblo – Grand Jct.	\$750	Red	Discard when 17 is taken. Good for \$750 toward card 17 or 18
2	A	Denver – Colorado Springs	\$250	Green	
3	A	Denver – Pueblo	\$400	Green	
8	B	Denver – Aspen	\$650	Green	
1	A	Denver – Boulder	\$100	Green	
12	B	SLC – Grand Jct.	\$1250	Gray	Discard when 15 is taken. Good

#	Type	Route	Payoff	Owner	Notes
					for \$1250 toward card 14 or 15
5	A	SLC – Provo	\$100	Gold	
6	A	Pueblo – Santa Fe	\$600	Blue	
13	C	Denver – Santa Fe	\$2100	Blue	

Available Claims

#	City	Type	Claim	Operation
53	Craig	Coal	\$200	\$100
50	Elk Spings	Coal	\$300	\$100
22	Telluride	Silver	\$800	\$200
3	Dillon	Gold	\$600	\$200
32	Hot Sulphur Springs	Lumber	\$300	\$150
31	Walden	Lumber	\$500	\$250

Available Passenger Lines

#	Type	Route	Payoff	Cost	Notes
17	C	SLC – Pueblo	\$3000	D x \$75	
15	C	Denver – SLC	\$4000	D x \$100	
16	C	Santa Fe – Leadville	\$800	D x \$50	
11	B	SLC – Grand Jct.	\$700	D x \$50	Discard when 17 is taken. Good for \$700 toward card 17 or 18
18	C	SLC – Colorado Springs	\$3000	D x \$75	May not be taken by player who has card 14

**Rover**

1964

1965 due: 2/13 Tuesday

**1964**

Saved Cards

**Moonshooter Unlimited** fortunate accident (satellite or probe)

**Cinnabar** Government order: Man on moon by 1964.

**Republic of Texas** fortunate accident (capsule)

**SCIFI** astronauts cost only 1MB each

Purchases

**Penny Pines** (Scharf) spends 12MB to fix severe setback, buys One-Person Module program for 42MB, 2 two-stage rockets for 24MB, 1 liquid fuel strap-on for 3MB, 2 two-person capsules for 12MB, and 1 docking module for 2MB.

**Cinnabar** (Carl) buys 1 interplanetary satellite for 4MB, 1 one-person capsule for 2MB, 1 astronaut (Meowth) for 2MB, 2 docking modules for 4MB, 2 liquid fuel strap-ons for 6MB, a third launch facility for 30MB, and a One-Person Module program for 42MB.

**Moonshooter Unlimited** (Bolduc) buys 1 three person capsule for 12MB, 2 two stage rockets for 24MB, and 1 interplanetary satellite for 4MB.

**Republic of Texas** (York) buys 1 one stage rocket for 3MB, 1 two stage rocket for 12MB, 1 lunar probe for 6MB, and 3 astronauts (Gallagher, Camden, Mitchell) for 6MB.

**SCIFI** (Cain) no new buys

Research and Development

**Penny Pines** (Scharf) B: 8 dice (1, 3, 4, 4, 5, 5, 6) = 34% to Max R&D. 32MB spent. D: 4 dice (1, 1, 4, 4) = 10%. 8MB spent. e: 8 dice (1, 3, 3, 3, 3, 4, 5, 5) = 27%. 32MB spent. 2: 6 dice (1, 1, 4, 5, 6, 6) = 23% to Max R&D. 18MB spent.

**Cinnabar** (Carl) e: 8 dice (2, 2, 3, 5, 6, 6, 6, 6) +8% = 44%. 32MB spent. b: 8 dice (1, 2, 2, 4, 4, 5, 5, 6) +8% = 37%. 12MB spent.

**Moonshooter Unlimited** (Bolduc) c: 8 dice (1, 1, 2, 2, 3, 5, 5, 6) = 25%. 40MB spent.

**Republic of Texas** (York) B: 8 dice (3, 3, 4, 4, 4, 5, 6, 6) = 35%. 32MB spent. F: 1 die (6) = 6% to Max R&D. 1MB spent.

**SCIFI** (Cain) c: 4 dice (1, 2, 6, 6) = 15%. 20MB spent. C: 5 dice (1, 3, 3, 4, 5) = 16%. 30MB spent.

Declare Future Missions

**Penny Pines** (Scharf) declares 2. **Cinnabar** (Carl) declares 3. **Moonshooter Unlimited** (Bolduc) declares 2. **Republic of Texas** (York) declares 3. **SCIFI** (Cain) declares no missions.

Your missions are:

Missions

No rushing. Launch Order: Moonshooter Unlimited (Mars Flyby in progress), Republic of Texas, Republic of Texas, Republic of Texas, Moonshooter Unlimited, Moonshooter Unlimited, Cinnabar, Cinnabar, Penny Pines, Penny Pines

**Moonshooter Unlimited** continues with a Mars Flyby. Mars Orbital Burn: 78%<91%, Mars Orbital Activities: 54%<91%. Mission success. +1% to 2, +8MB to budget.

**Republic of Texas** launches a Docking Module. Liftoff: 70%<98%, Earth Orbital Burn: 72%<98%, Earth Orbital Activities: 73%<98%. Mission success. +2MB to budget.

**Republic of Texas** launches an Manned Orbital with Docking and Spacewalk (Ocnaschek). Liftoff: 54%<98%, Earth Orbital Burn: 53%<83%, Earth Orbital Activities: 94%>83%, Ocnaschek saves, Docking Module Power On: 82%<98%, Docking: 90%>65%, Ocnaschek fails to save, Spacewalk: 92%>71%, suit communication malfunction, repairs made, EVA successful, Earth De-Orbital Burn: 06%<83%, Re-Entry: 15%<83%, Recovery: 59%<83%. Partial mission success. +1% to a and EVA, +5% to docking, Ocnaschek to 30%, +3MB to budget.

**Republic of Texas** launches an Manned Orbital with Docking and Spacewalk (Milbourn). Liftoff: 42%<98%, Earth Orbital Burn: 49%<84%, Earth Orbital Activities: 19%<84%, Docking Module Power On: 58%<98%, Docking: 44%<70%, Spacewalk: 09%<72%, Earth De-Orbital Burn: 01%<84%, Re-Entry: 08%<84%, Recovery: 56%<84%. Mission success. +1% to a and EVA, +15% to docking, Milbourn to 10%, +6MB to budget.

**Moonshooter Unlimited** launches a Venus Flyby. Liftoff: 79%<93%, Earth Orbital Burn: 16%<92%, Earth Mission Burn: 32%<92%. Mission continues next year. +1% to B and 2.

**Moonshooter Unlimited** launches a Manned Orbital with Spacewalk (Helm, Powers). Liftoff: 69%<94%, Earth Orbital Burn: 31%<85%, Earth Orbital Activities: 41%<85%, Spacewalk: 24%<98%, Earth De-Orbital Burn: 88%>85%, crew saves, Re-Entry: 80%<85%, Recovery: 80%<85%. Mission success. +1% to B and b, Helm to 30%, Powers to 20%. +15MB to budget.

**Cinnabar** launches a Lunar Probe. Liftoff: 19%<92%, Earth Orbital Burn: 69%<70%, Earth Mission Burn: 35%<70%, Lunar Orbital Burn: 69%<870%, Lunar De-Orbital Burn: 74%>70%. Mission failure. +1% to B and 2, -6MB to budget.

**Cinnabar** launches a Manned Orbital with Spacewalk (Jesse). Liftoff: 31%<93%, Earth Orbital Burn: 45%<78%, Earth Orbital Activities: 62%<78%, Spacewalk: automatic failure, no EVA technology, Earth De-Orbital Burn: 44%<78%, Re-entry: 70%<78%, Recovery: 75%<78%. Mission partial success. +1% to a, 1, and B, Jesse to 30%, +2MB to budget.

**Cinnabar** has failed to carry out his government order. -76MB to budget.

**Penny Pines** launches a Lunary Flyby. Liftoff: 50%<90%, Earth Orbital Burn: 51%<90%, Earth Mission Burn: 77%<90%, Lunar Orbital Burn: 15%<90%, Lunar Orbital Activities: 82%<90%. Mission success. +1% to B, 2, +5% to Photo Recon, +4MB to budget.

**Penny Pines** launches a Manned Orbital with Docking (Clifford Russell, Tom Corbett). Liftoff: 45%<91%, Earth Orbital Burn: 37%<85%, Earth Orbital Activities: 46%<85%, Docking Module Power-up: 25%<98%, Docking: 51%<80%, Earth De-Orbital Burn: 57%<85%, Re-Entry: 70%<85%, Recovery: 32%<85%. Mission success. +1% to B and b, +15% to docking, Clifford Russel to 50%, Tom Corbett to 40%, +9MB to budget.

## Players

Player Name	Dennis Cain	Joe Carl	Paul Bolduc	Bill Scharf	Andy York
Country	SCIFI	Cinnabar	Moonshooter Unlimited	Penny Pines	Republic of Texas
1964 Budget	50	135	119	138	62
Cash	0	4	6	49	8
1-Orbital Satellite	0 / 97%	1 / 98%	1 / 95%	0 / 98%	0 / 98%
2-Interplanetary Satellite		1 / 93%	1 / 93%	0 / 91%	
3-Lunar Probe		0 / 71%	1 / 85%		2 / 85%
4-Docking Module	0 / 45%	3 / 50%		1 / 95%	0 / 95%
A-One Stage Rocket	1 / 89%	0 / 79%	1 / 89%	1 / 93%	1 / 98%
B-Two Stage Rocket		0 / 94%	1 / 94%	2 / 91%	2 / 60%
C-Three Stage Rocket	1 / 49%				
D-Liquid Fuel Strap-ons		3 / 81%		2 / 83%	
F-Kicker		1 / 41%		2 / 95%	1 / 95%
G-"Mega" Stage Rocket					
EVA Suits	98%		98%	98%	73%
a-One Person Capsule	2 / 10%	0 / 79%	2 / 83%	1 / 86%	1 / 85%
b-Two Person Capsule		1 / 81%	0 / 85%	3 / 85%	
c-Three Person Capsule	1 / 47%		2 / 73%		
d-Two Person Module					
e-One Person Module		1 / 54%		1 / 37%	
f-Three Person Minishuttle					
h-Four Person Cap/Module					
Photo Recon	65%	70%	65%	70%	65%
Launch Facilities	3	3	2	2	3
Astronauts	3	3	3	2	7

Astronauts are: **SCIFI** (Arthur C. Clarke, 20%; Roger Zelazny, 0%), **Moonshooter Unlimited** (James Bond, 30%; Matt Helm, Austin Powers, 20%), **Republic of Texas** (Ocnaschek, 30%; Spenny, Milbourn, 10%; Gallagher, Camden, Mitchell, 0%), **Penny Pines** (Clifford Russell, 50%), **Cinnabar** (Jesse, 30%; James, Meowth, 0%)

1965

Draw Event Cards

**Bill Scharf:** Tom Corbett retires. -5MB to budget.

**Andy York:** Scientific Breakthrough, 6 free R&D dice on most advanced capsule (no effect). +10MB to budget.

**Paul Bolduc:** Major media event, receive 12MB cash. -5MB to budget.

**Joe Carl:** Government Order: Next planned launch must be manned. +20MB to budget if accepted, -15MB if declined.

**Dennis Cain:** Computer breakthrough. Increase Max R&D and Max Safety factors by 5% each for Interplanetary Satellite and Lunar Probe. -2MB to budget.

**Final Positions**

Player Name	Dennis Cain	Joe Carl	Paul Bolduc	Bill Scharf	Andy York
Country	SCIFI	Cinnabar	Moonshooter Unlimited	Penny Pines	Republic of Texas
1965 Budget	70	76	132	146	72
Cash	0	1	57	2	10
1966 Budget	68	96 or 61	127	141	82

SCIFI is Space Conquest Interplanetary Federation, Incorporated.

**Dog Days**

**Epoch IV Empire Selection**

**Deadline for Epoch IV Guptas, Goths, and Huns: 2/13 Tuesday**

**Amorphous, Cadaverous, and Nebulous** (Reynolds) keeps

**Peoples Who Need Peoples** (Cousins) NMRs! (Will Andy York please submit standby orders!) Keeps.

**Gaming Through the Ages** (Lewis) keeps

**The Triffids** (Geggus) keeps

**Royal Manticoran Historical Society** (Wilson) keeps

**Kibbles and Bits** (Narhi) keeps

Players

Player Name	Player Faction Name	Empire Strength Points	Victory Points
Phil Reynolds	Amorphous, Cadaverous, and Nebulous (Black)	19	43
Andy Lewis	Gaming Through the Ages (Purple)	21	42
Kevin Wilson	Royal Manticoran Historical Society (Blue)	25	42
Caleb Cousins	Peoples who Need Peoples (Red)	26	44
Chris Geggus	The Triffids (Green)	27	58
Ward Narhi	Kibbles and Bits (Orange)	35	44

Final Positions

SUMERIANS: Capital and 3 armies in *Lower Tigris*.

**Amorphous, Cadaverous, and Nebulous.** EGYPT: Army *Arabian Peninsula*.

SCYTHEANS: Armies *Caucuses*, and *Eastern Anatolia*. REBELLION: Army *Ceylon*. CELTS: Army, fort, and Monument *Albion*, army and fort *Ireland*, armies *Central Europe*, *Northern Gaul*, *Highlands*, and *Central Massif*.

**The Triffids.** MINOANS: Army, fort, and Capital *Crete*, army and fort *Western Anatolia*. SUB-SAHARAN MIGRANTS: Armies *Congo Basin* and *South Africa*. MACEDONIA: Army, city, and Monument *Persian Plateau*, army and Monument *Morea* and *Zagros*, army and city *Pindus*, army *Hindu Kush*.

**Peoples Who Need Peoples.** INDUS VALLEY: Armies *Western Deccan*, *Persian Salt Desert*. PERSIA: Army *Turanian Plain*. HSUING-NU: Army, city, and Monument *Great Plain of China*, armies *Mongolia*, *Yellow River*, *Eastern Steppe*, *North European Plain*, and *Dniepr*.

**Royal Manticoran Historical Society.** Fleet *Western Mediterranean*. GREEK CITY STATES: Three armies *Dalmatia*. HAN DYNASTY: Army and city *Wei River*, armies *Chekiang*, *Tarim Basin*, *Yangtse Kian*, and *Szechwan*.

**Kibbles and Bits** Fleets *Western Mediterranean*, *Eastern Mediterranean*, *Black Sea*, and *Red Sea*. VEDIC CITY STATES: Armies *Eastern Deccan* and *Eastern Ghats*. ROMANS: Army, Capital, and Monument *Southern Apennines*, army and Monument *Levant* and *Upper Tigris*, armies *Northern Apennines*, *Balkans*, *Danubia*, *Pyrenees*, *Western Iberia*, *Southern Iberia*, *Shatts Plateau*, *Libya*, *Nile Delta*, *Nubia*, and *Palestine*.

**Gaming Through the Ages** NILE KINGDOM: Army, city, and fort *Upper Nile*. MAYANS: Two armies and a Capital *Central America*. MAURYANS: Armies *Ganges Valley*, *Lower Indus*, *Persian Salt Desert*, *Malayan Peninsula*, *Mekong*, and *Si-Kyang*.

Event Cards

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Epoch IV Empire

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**Ferris**

**Turns 6.6 to 7.6**

**Deadline for Turns 8.1 to 9.1: 2/13 Tuesday**

Turn 6

**Bill** Die roll = 5, **Ward** receives a wheat and a wool, **Steve** receives 2 wool, **Kevin** receives a wheat, and

**Bill** receives 2 wool. **Bill** trades 1 wool to **Kevin** for

1 ore. He also trades 1 wheat to **Ward** for 1 ore. Upgrades settlement at O9/W12/S5 to city.



Turn 7

**Paul** Die roll = 8, Ward gains 2 lumber, Chris gains 1 wool, and Bill gains 2 lumber. Paul tries to trade 3 brick for a wool, but is not in a ? port.

**Ward** Die roll = 10, Ward receives 2 ore and Chris receives a brick. Upgrades settlement at L8/H9/O10 to a city. During the special build turn, Chris builds a road at H10/Sea.

**Steve** Die roll = 2, Paul receives a wool, Ward receives a wool and a wheat. Buys a development

card (\_\_\_\_\_). During the Special Build turn, Paul buys a development card (\_\_\_\_\_).

**Chris** Die roll = 2, Paul receives a wool, Ward receives a wool and a wheat. Plays Soldier card and moves the Robber to H4, stealing a wheat from Kevin.

**Kevin** Die roll = 7, Ward discards 3 wool and 2 lumber. Kevin moves the robber to H3, stealing a brick from Paul. No activity.

**Bill** Die roll = 9, Ward receives 2 brick, Steve receives 2 lumber, Chris receives a lumber and an ore, and Bill receives 2 ore. Bill trades 1 wool to Kevin for 1 ore. He also trades 1 wheat to Ward for 1 ore. Upgrades settlement at O9/W12/S5 to city.

Open Trade Offers

Kevin will give 1 lumber for 1 wheat.

Bill will give 1 lumber for 1 brick.

Turn 8 Dice Rolls

**Paul** 7                      **Ward** 7                      **Steve** 12                      **Chris** 3                      **Kevin** 7                      **Bill** 8

Turn 9 Dice Rolls

**Paul** 10

The Players

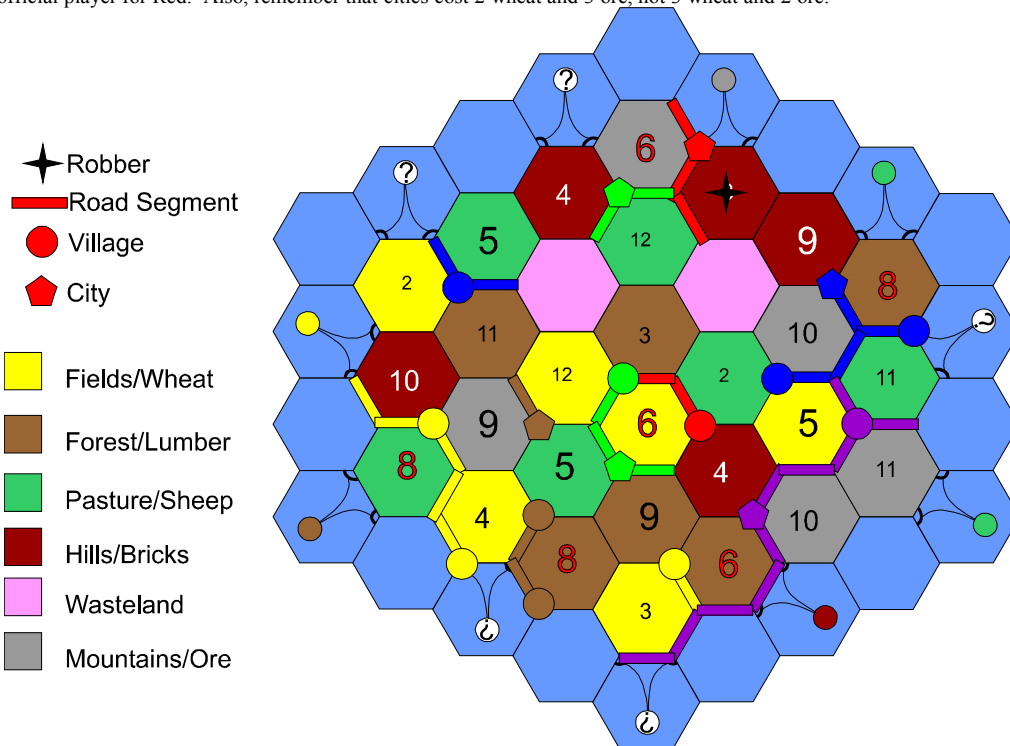
Player	Color	Wheat	Sheep	Brick	Lumber	Ore	Development Cards	VP
Paul Bolduc	Red		1	2			1 Unplayed	3
Ward Narhi	Blue	2	1	2	1	1		5
Steve Koehler	Green	2	1	1	2	1	Soldier, 1 Unplayed	5
Chris Geggus	Yellow	2	1		2	1	Soldier, 1 Unplayed	3
Kevin Wilson	Purple		1	1	2	3		5*
Bill Scharf	Brown		1		2	3	Soldier	4

Your unplayed card(s) is(are): \_\_\_\_\_

\* Longest Trade Route

Notes

Paul Bolduc is now the official player for Red. Also, remember that cities cost 2 wheat and 3 ore, not 3 wheat and 2 ore.



## Canes Venatici

### Turn 5

**Deadline for Turn 6: 2/13 Tuesday**

#### Commander Actions

**S.A.R.A.** (Cousins?) NMRs! **Will Steve Koehler please submit standby orders!**

**SUPERB** (Lowrey) opens the bidding on a data library at 15 and HBDC V gets it for 25 (Or3, Wa6, Wa7, Wa9). Opens the bidding on Heavy Equipment at 30 and gets it (Or3, Or3, Wa8, Wa8, Wa8)

**BarterTown V** (York) buys a titanium factory (Or2, Or3, Or3, Or4, Wa5, Wa6, Wa7) and moves a population factor from an ore factory to man it.

**HBDC V** (Wilson) passes.

**Miller's** (Scharf) buys a water factory (Or5, Wa5, Wa10) and a population factor (Or2, Wa8)

**Mystery Machine 2** (Lewis) buys a population factor (Wa4, Wa6)

**2113 Corporation** (Cain) passes.

#### The Players

	Outpost Name	Commander	Factories	Upgrades	VP
1	SUPERB	Michael Lowrey	OrF, OrF, WaF, WaF, WaF	No, HE	8
2	BarterTown V	Andy York	OrF, OrF, WaF, TIF	HE, No	7
3	HBDC V	Kevin Wilson	OrF, OrF, WaF, WaF, WaF	Wa, DL	7
4	S.A.R.A.	Caleb Cousins	OrF, OrF, WaF, WaF	HE, No	7
5	Miller's	Bill Scharf	OrF, OrF, WaF, WaF, WaF, WaF	DL	6
6	Mystery Machine 2	Andy Lewis	OrF, OrF, WaF, WaF, WaF	HE	6
7	2113 Corporation	Dennis Cain	OrF, OrF, WaF, WaF, WaF	HE	4

SUPERB is Space Urchin Planetary Evaluation and Recovery Board. HBDC V is Heavenly Bodies Development Company V. S.A.R.A. is Supremely Arrogant Republican A@#S^&\*!

#### Available Upgrades

New Arrivals: Two Data Libraries

Upgrade	Minimum Bid	Available	TBD
Data Library (DL)	15	2	1
Warehouse (Wa)	25	3	1
Heavy Equipment (HE)	30	0	0
Nodule (No)	25	2	0

Your Production Cards:

## Dog Tired

**Turn 2 Cure Phase through Health Phase**

**Turn 2 Funeral Commission through Parade due: 2/13 Tuesday**

#### Cure Phase

FBI declares 1 IP on T. RE declares 6 IP on A and 8 IP on T. TCC declares 1 IP on T and 1 IP on F. HLS declares 1 IP on L. IP declares 2 IP on X. IP plays Perestroika (35). X may not be purged or tried this year. IP gains 2 extra IP on X. F and L take the cure. Nestor ages to 87, Tigran ages to 70, Mikail ages to 60, Boris ages to 56, and Andrej ages to 72.

#### Purge

TCC plays Visit the Sanatorium (7) on Q. Die roll = 3, fails. HLS plays Drought Ruins Harvest (14), which is negated by Perestroika. Tigran attempts to purge Igor. Die roll = 17 + 3. Success. Tigran then attempts to purge Petr. Die roll = 1. Fails. Tigran ages to 74.

#### Spy Investigation

Petr brings Tigran to trial. FBI declares 1 IP on E. HLS declares 5 IP on E. Tigran and Boris both vote to acquit. ? is removed and D ages to 80. Petr begins an investigation of A and ages to 81.

#### Health

RE plays Flu Epidemic (44). All health rolls are -3.

Nestor Aparatschik (dr = 6-3) dies.

Tigran Zenjarplan (dr = 2-3) dies.

Mikail Strychnin (dr = 14-3) remains ill.

Petr Niewitko (dr = 20-3) is fine.

Karel Krakemheads (dr = 9-3) gets sick.

Boris Badenuff (dr = 17-3) is fine.

Andrej Purgemoff (dr = 17-3) recovers to sick.

#### Politburo

Office	Politician	Condition	Influence
Party Chief			
KGB Head			
Foreign	Mikail Strychnin (T)	60 ? ++	8 (RE), 1 (FBI), 1 (TCC)
Defense	Petr Niewitko (D)	81	3 (HLS)
Ideology			
Industry	Karel Krakemheads (E)	72 +	5 (HLS), 1 (FBI)
Economy	Boris Badenuff (X)	56 ?, weak	4 (IP)
Sport	<b>Andrej Purgemoff (F)</b>	72 ? +	1 (TCC)

Politicians listed in **bold** are in the sanatorium.

**Candidates:** B, C, H, I, J

**People:** K, N, O, P, R, U, V, W, Y

**Siberia:** G, M, S, Z, L (++)

**Kremlin Wall:** A, Q

Your cards: \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Your undeclared influence: \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Players

- |               |                                 |
|---------------|---------------------------------|
| Joe Carl      | Reform Expansionists            |
| Kevin Wilson  | October Revolution Reform Party |
| Chris Geggus  | Floridian Ballot Investigators  |
| Mike Scott    | The California Connection       |
| Bill Scharf   | Ideological Purists             |
| Steve Koehler | Hard Line Stalinists            |

**Hounds of Tindalos**  
**Initial Anchorage Bids and Turn 1**  
**Turn 2 due: 2/13 Tuesday**

Bidding

- Spanish** bid \$6, select landing K, \$6 to the English  
**Portuguese** bid \$0, select landing U  
**French** bid \$0, select landing N  
**English** bid \$0, select landing L

Planning

- English** buy 4 ships (\$48) and 4 soldiers (\$40) for \$88.  
**French** buy 4 ships (\$48) and 4 soldiers (\$40) for \$88.  
**Portuguese** buy 4 ships (\$48) and 4 soldiers (\$40) for \$88.  
**Spanish** buy 5 ships (\$60) and 6 soldiers (\$60) for \$120.

Outbound Naval Movement

- English** Dice: 1, 1, 2, 6. Loses 1 ship with 1 colonist and 1 soldier, plus an additional soldier.  
**French** Dice: 1, 2, 2, 6. Loses 1 colonist and 1 soldier.  
**Portuguese** Dice: 1, 3, 4, 5. Loses ship with 1 colonist and 1 soldier.  
**Spanish** Dice: 3, 5, 5. No losses.

Land Movement

- English** move 2 soldiers and 3 colonists into area L. It is a climate 3 area with 2 natives and 1 site.  
**French** move 3 colonists and 3 soldiers into area N. It is a climate 2 area with the x2 city and 4 natives.  
**Portuguese** move 3 colonists and 3 soldiers into area U. It is a climate 2 area with one site and 2 natives.  
**Spanish** move 4 colonists and 6 soldiers into area K. It is a climate 1 area with the x3 city and 6 natives.

Native Combat

**Portuguese:** 2 natives and 1 soldier killed.

Native Uprisings

Climate is a 4. Uprisings in K (0 colonists killed) and N (1 colonist killed).

Survival

- Climate is a 2.  
**English** lose 1 soldier and 1 colonist. **French** lose 2 soldiers and 1 colonist.  
**Portuguese** lose 2 soldiers and 1 colonist. **Spanish** lose 2 soldiers and 2 colonists.

Political Control

None.

Homebound Naval Movement

- English:** Dice: 2, 2, 3, 4. No losses.  
**French:** Dice: 1, 2, 3, 5. No losses.  
**Portuguese:** Dice: 2, 5, 6, 6. No losses.  
**Spanish:** Dice: 1, 2, 4. No losses.

Income

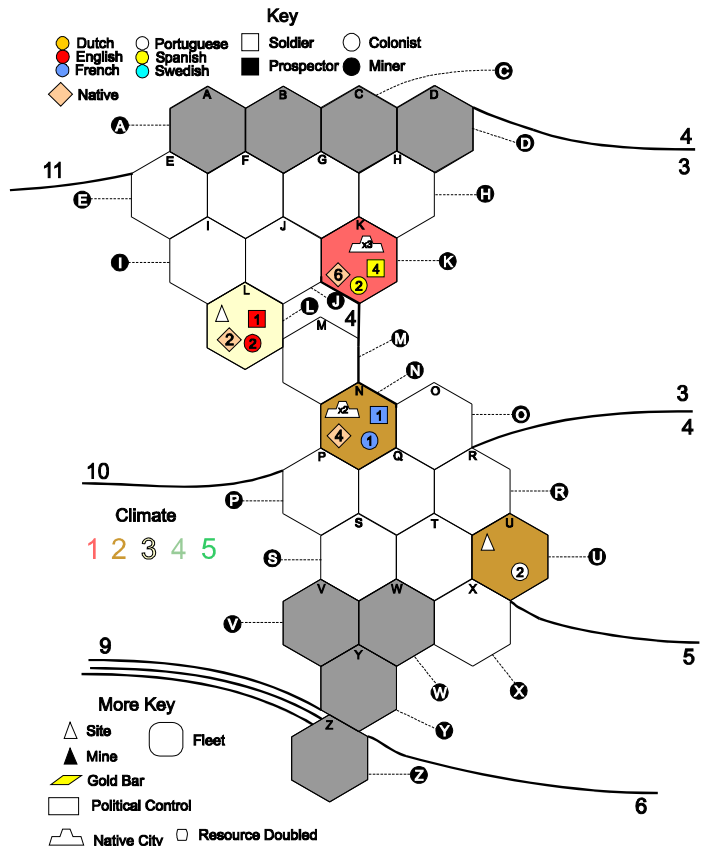
- English:** Political Control: \$20, resources: \$2.  
**French:** Political Control: \$20, resources: \$1.  
**Portuguese:** Political Control: \$20, resources: \$2.  
**Spanish:** Political Control: \$20, resources: \$2.

Turn 2 Initiative

Portuguese, Spanish, French, English

Players

Country	Player	Money	Available Soldiers	Ships	Colonists
English	Andy Lewis	\$100	21	3	4
French	Bill Scharf	\$93	21	4	4
Portugese	Bob Robles	\$94	21	4	4
Spanish	Dennis Cain	\$56	19	5	4



**Trivia Quiz**

You get 2 points for a solo answer, 1 point for sharing the correct answer with one other person, and ½ point for sharing the answer with two or more people. Every 10 points earn you a free issue. Research is allowed. Free issues are credited as they are earned. Players may submit a list of questions (answers must be

included.) If used, five points are awarded. In addition, if no correct answers are received for a question, the supplier of the question receives two points.

And so, without further ado, the answers to last issue's questions:

Q1. Several truck drivers at a roadside cafe started to play poker. The pot was large and the game was serious. Suddenly, one of the men accused the dealer of cheating. The dealer drew a knife and, in plain view of all the others, stabbed the man and killed him. The police were called and they interviewed everyone who had been present. But no man was arrested or charged with any offence. Why not?

A1. The police arrested the dealer and charged her with murder.

Bill Scharf, Tom Howell, Chris Geggus, and Joe Carl all receive ½ point.

Q2. A man was born in Boston, Massachusetts. Both his parents were born in Boston, Massachusetts. He lived all his life in Boston but he was not a United States citizen. How come?

A2. He was born in Boston, Massachusetts in the early eighteenth century when it was still a British colony. He was British.

Bill Scharf, Tom Howell, Andy York, and Ward Narhi each receive ½ point.

Q3. A woman bought a young tree and put it in her garden. The next day she took an axe to it. Why?

A3. She bought a Christmas tree. After Christmas she put it in the garden, and the next day she chopped it up.

Tom Howell receives 2 points.

Q4. A middle-aged man took up golf for the first time and within a month he went around his local course in under 90 shots. However, he was not pleased. Why?

A4. It was a nine-hole golf course.

Bill Scharf, Tom Howell, Andy York, Ward Narhi, and Chris Geggus each receive ½ point.

Q5. The Chevrolet Nova was a successful car in many countries but not in Mexico. Why not?

A5. Nova means "won't go" in Spanish

Bill Scharf, Tom Howell, Andy York, Ward Narhi, and Joe Carl each receive ½ point.

### Current Scores

Chris Geggus	71½	Andy York	56
Paul Bolduc	49½	Bill Scharf	49½
Caleb Cousins	47½	Dennis Cain	44
Joe Carl	41½	Brendan Whyte	37
Andy Lewis	33½	Steve Koehler	29
Ward Narhi	27	Bob Robles	20½
Tom Howell	17	Brad Martin	16
Kevin Wilson	8	Sean Cousins	7
Sigourney Street	½		

### New Questions

#### Topic: Brain Teasers

1. A manufacturer of confectionery has a workforce of thousands of workers. They never strike or demand better conditions. They work up to twenty hours a day and receive no wages other than food and shelter. Yet every year a completely new workforce is brought in and non of the existing workers are re-employed. Why?

2. Much of his painting was seen at the city's two large art galleries but no one had ever heard of him. Why not?

3. As a group of sailors emerged from their ship after months at sea, one spindly wimp bet his fellow sailors that he would have a beautiful girl on each arm within an hour. How did he win his bet?

4. There is an orange in the middle of a circular table. Without touching or moving the orange or the table how could you place a second orange under the first?

5. A man who was completely bald met a doctor at a party. She had lovely short black hair. He explained that he had tried hair restorers and transplants but without any success. She sympathized. "If you could make my hair look like yours, I would gladly pay you \$1000," he said. "O.K., I'll do it," she answered. How did she win the \$1000?

## Pedagoguery

When we last left our dying star, it had lost most of its mass. This mass lay in a thick shroud around the remaining core of the star. The core itself consists of an inert carbon-oxygen core, surrounded by a thin helium layer, surrounded by a thin hydrogen burning shell, which is finally surrounded by a thin shell of hydrogen that is not fusing. This stellar core is very hot, so hot that most of its energy emerges in the ultraviolet. This is the makings of a proto-planetary nebula, the elusive and ephemeral stage between an asymptotic giant branch star and a true planetary nebula.

The mass that was lost during the earlier phase tends to be thicker toward the equator of the star than at the poles. No one is quite sure why this is, but it has been observed repeatedly. Therefore, the intense ultraviolet radiation being produced by the core tends to punch through at the poles first. If we happen to be looking down on one of the poles of the star, the tremendous brightness of the star itself will wash out the beginnings of the nebula. However, if we see the nebula from the side, the view looks like Figure 1.

While the central star of a proto-planetary nebula no longer has, or can support, the dense stellar wind of an asymptotic giant branch star, it still does have a stellar wind. The main differences between this wind and the earlier wind are that it is much thinner, and much faster. Unlike the earlier wind, the stellar wind at this stage is driven by the intense radiation coming from the star's surface. This radiation literally blows surface material off. However, the star is approaching white dwarf density at this point, so the surface gravity is very high. Therefore, in order to escape, the wind must be very fast. It is the combination of the earlier slow, dense stellar wind and the later fast, hot stellar wind that is believed to drive the evolution of the resulting planetary nebula.

Essentially, the fast wind carves out a cavity from the slow wind. At the boundary between the two winds is a shock front, which heats the surrounding

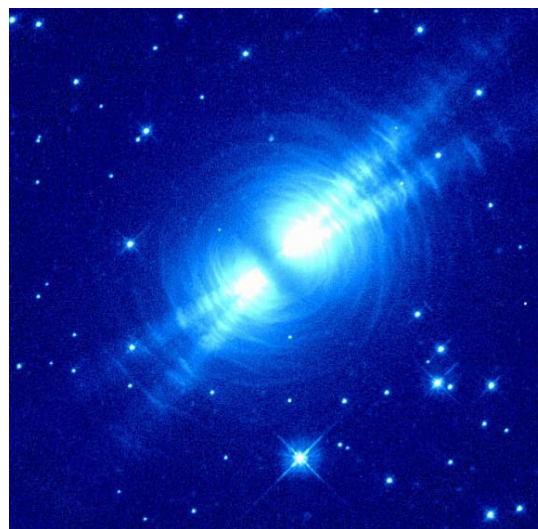
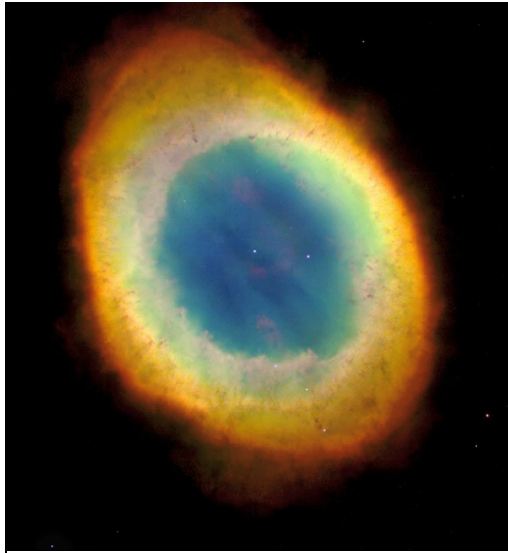


Figure 1. The Egg Nebula.

material. Meanwhile, in this inner cavity, the material is thinned out, and the ionizing radiation from the central star does its work, stripping the outer electrons from the gas in this area. Nearly all of what we see in visible light arises from this ionized material.

Within the high-energy environment of the ionized region, hydrogen tends to live in an equilibrium state. There are plenty of high-energy photons that can



**Figure 2, The Ring Nebula**

strip the electron from a hydrogen atom. Eventually, the electron will combine with a free proton, and through this process, the original high-energy photon is converted into a series of lower energy photons, corresponding with the various recombination states of the hydrogen atom. A photon that has exactly enough energy to strip away a hydrogen electron in the ground state is said to be at the Lyman limit. A large fraction of the light being thrown off by the central star is



**Figure 3, IC 418, the "Spirograph Nebula"**

above this limit. When a hydrogen atom is hit by such a photon, the electron is knocked free, and any energy that the photon had above the Lyman limit is converted into the electron's kinetic energy. With all of the free hydrogen surrounding the star, the chances of one of the Lyman limit photons making it through without hitting one is very remote. Therefore, it is said that the gas is opaque to radiation of this wavelength. However, when an electron and proton recombine, it doesn't jump straight to the ground state. Instead, it generally passes through a number of intermediate energy states. For each state transition, a photon is emitted, one of much less energy than the Lyman limit. One of the brightest of these to our eyes is the Balmer  $\alpha$  line, which lies in the

red part of the spectrum. This line represents the transition from the second excited state to the first excited state of hydrogen.

While the hydrogen lines are an important component of the nebula's emission, they are not the only ones. In fact, there are a number of others that serve a very important function within the nebula. Among the most important of these are the so-called forbidden lines of OIII and NII. In astronomical notation, a Roman numeral after an element tells you its ionization state, with I meaning neutral. So, OIII is twice ionized oxygen. The reason these lines are called forbidden is because they were never observed in the laboratory, and were only deduced by detailed theoretical study of the quantum mechanics of the oxygen atom. The reason for this is because the purest vacuum we can get in the laboratory is still very dense by interstellar standards. So, a oxygen atom that was in the proper excited state to emit such a line would probably hit something and be knocked out of that state before it got around to emitting the photon. The opposite is true in the environs of a planetary nebula. Typically,



**Figure 4, NGC 2392, the Eskimo Nebula**

such an atom is knocked into such a state by collisions, but is left alone long enough to emit a photon. This has the effect of converting the kinetic motion of the gas into radiation, which then escapes the nebula. This, then is the main cooling mechanism for the nebula, while the nebula is heated when a photon more energetic than the Lyman limit hits a hydrogen atom. Without the cooling process of the forbidden lines, the nebular gas would get so hot, that it would expand at a much faster pace, and we would probably not see planetary nebulae at all.

Looking at planetary nebulae, we see a remarkable variety of shapes. While we are not sure what causes all of these shapes, the leading explanation is that the primary driving force is the interaction of the fast and slow stellar winds. This is called the interacting winds theory. Many of the nebulae we see have the appearance of pipes seen on end. A prime example of this is the famous Ring Nebula in Lyra (Figure 2). Rather than being a sphere, a careful analysis has shown that the configuration is more of a cylinder directed toward us. Apparently, the slow wind was much thicker around the equator, and was able to confine the fast wind there, but the fast wind was able to escape out through the poles. Other startling shapes are shown in figures 3 and 4.

What will eventually happen to the nebula? Within a fairly short period of time, say a few tens of thousands of years, the nebula will disperse away, leaving behind a slowly cooling white dwarf. Meanwhile, much of the gas and dust that was blown off, enriched with the heavy elements forged during the star's life, will be slowly incorporated into new molecular clouds, where they will take part in a new cycle of star formation. This is the probable source for much of the carbon and oxygen that makes up us.

Next issue, I will start a series on the long-term evolution of our universe.

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