



# 20 MULE TEAM™

## *The History Behind the Scale Model*

Your 20 Mule Team™ is an accurate 1/67th scale model and authentic replica of the great twenty mule team wagon train of Pacific Coast Borax Company (now U.S. Borax) which, over 100 years ago, hauled borax across the blistering deserts of Death Valley.

These great mule teams traveled 162 miles from Furnace Creek in Death Valley to Mojave, California; and from the mines at Old Borate to Dagget, the nearest railroad points. Their routes carried them over some of the most forbidding land on the face of the earth.

There was not a single house or any other sign of habitation along the Death Valley trail. One stretch of 60 miles was without water. In the summer, temperatures ranged from 136 degrees to 150 degrees.

The twenty mule teams could cover from 16 to 18 miles a day. Camp was made on the desert floor each night. The one-way trip, from mine to railroad point, took about ten days.

### **THE BORAX WAGONS**

The borax wagons, said to be the largest and strongest of their kind, were built in Mojave, California. The rear wheels were 7 feet high. The front wheels, 5 feet high. Each wheel had steel tires 8 inches wide and 1 inch thick. The spokes of split oak, measured 5 ½ inches wide at the hub and 4 inches wide at the point. The axles were made of solid steel bars, 3 ½ inch square. The wagon beds were 16 feet long, 4 feet wide and 6 feet deep.

The two wagons held 25 tons, or a carload, of ulexite, the borax ore. Two of them, together with a trailer tank wagon that carried 1200 gallons of water, constituted a train. Each borax wagon weighed 7800 pounds, and the combined weight of the two, loaded, (exclusive of hay, grain, and other provisions) was more than 60,000 pounds. However, there is no record that one of them ever broke down on the trail during the many years they were in service.

### **DRIVING THE 20 MULE TEAM™**

The mules were all selected for their intelligence and were trained to answer to their names. Commands were given by the driver or "skinner." He controlled his team by shouting orders, calling the mules by name, and by means of a long "jerk" line. The "skinner" rode the "nigh-wheel" (left hand) mule. He held the "jerk" line which was 120 feet long. It ran through rings on the harness of the nigh animals up to the leader. A light iron rod called a jockey stick, with a snap hook on each end, connected the leaders. One end of it was fastened to the chin strap of the "off" (right hand) mule. The other end was fastened to the hame ring on the offside of the nigh mule. A steady pull on the line caused the team to go to the left. A jerk turned them to the right. Hence the name "jerk" line.

### **THE 20 MULE TEAM™ DRIVER OR "SKINNER"**

The driver had to know his mules and to be able to handle them under all conditions. He had to be a practical veterinarian to take care of them when they got sick, a blacksmith to replace any shoes that came off, and something of a wheelwright to make any needed repairs.

One of the best drivers was Bill Parkinson, better known as "Borax Bill." He had a most eloquent vocabulary to awaken the necessary amount of energy in balky mules. On occasion, he backed up his verbal commands with a long black-snake whip.

### **THE "SWAMPER"**

The driver's assistant was called a "swamper" and his duties were numerous. In going up grades, he had to get out and walk beside the team. In going down grades, he operated the brake on the rear wagon. When the train made camp, he assisted in unhooking and unharnessing the mules and in feeding them. He gathered fuel for the fire, cooked the meals and washed the dishes.

The building of railroads to all portions of the Great West rapidly limited the necessity for the "twenty mule teams". Before long the 20 Mule Team™ wagon train and "Borax Bill" were relics of the past. They did, however, perform an interesting and useful part in the service of man and the development of our country.

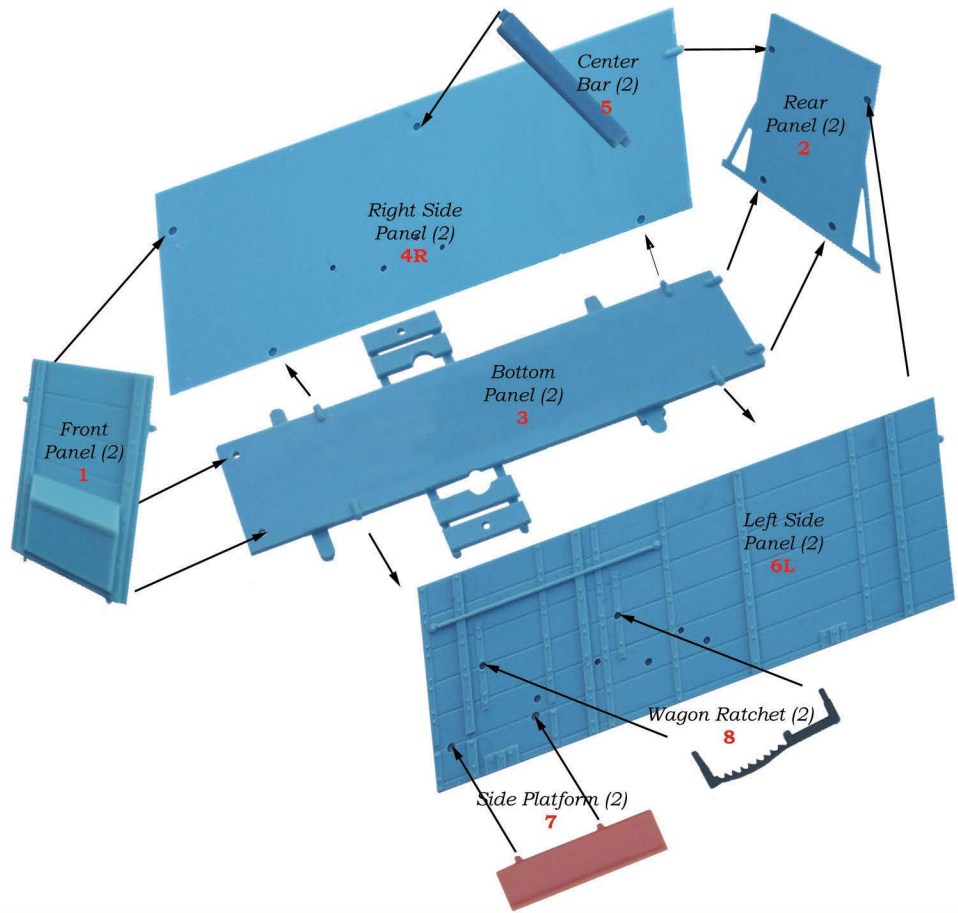




# 1

**SPREAD OUT THE PARTS FOR THIS STEP.**  
**\*PAINT DETAIL SHOWN AND LET DRY BEFORE CEMENTING.**

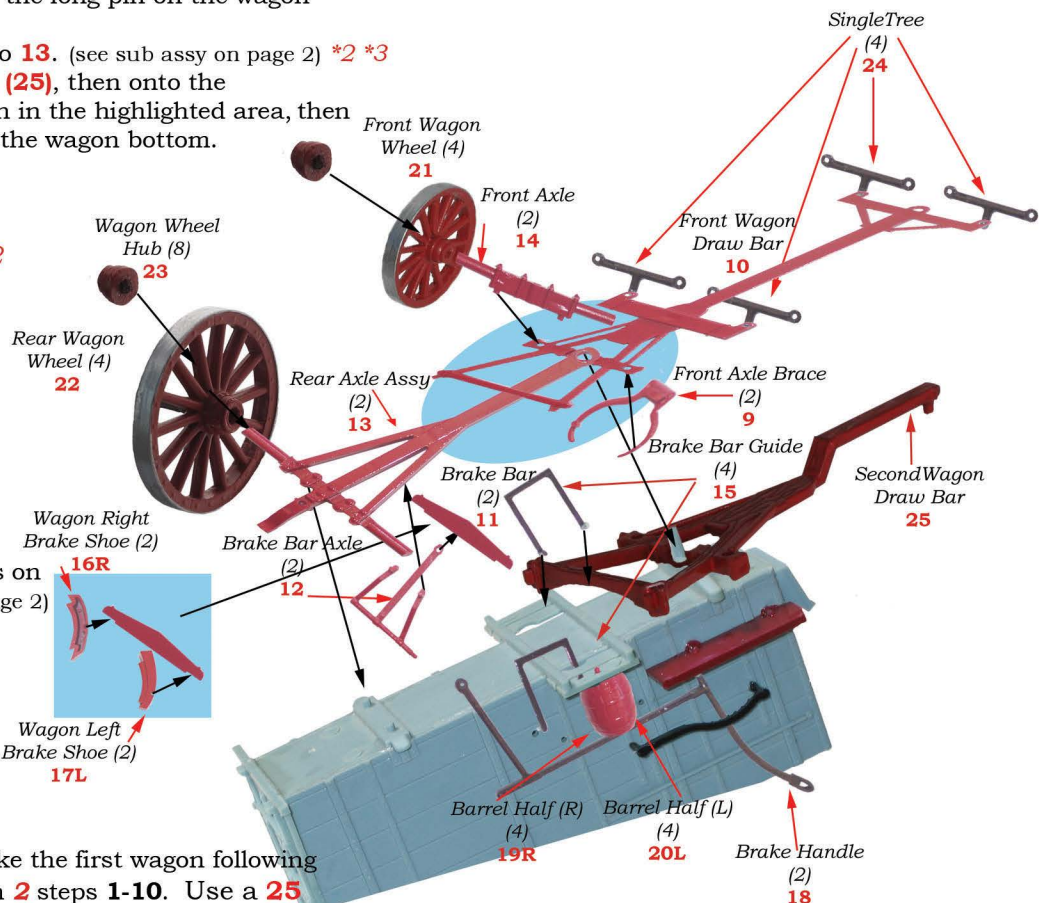
- Cement **1** & **2** to **3**.
  - Cement **4R** to **3**, **1** & **2**.
  - Cement **5** to **4R**.
  - Now cement **6L** to **3**, **1** & **2**.  
Also, cement **5** to inside of **6L**.
  - Finally, cement **7** & **8** to **6L**,  
now set aside to dry.
- MAKE TWO OF THESE  
**See website for alternate method of assembly.**



# 2

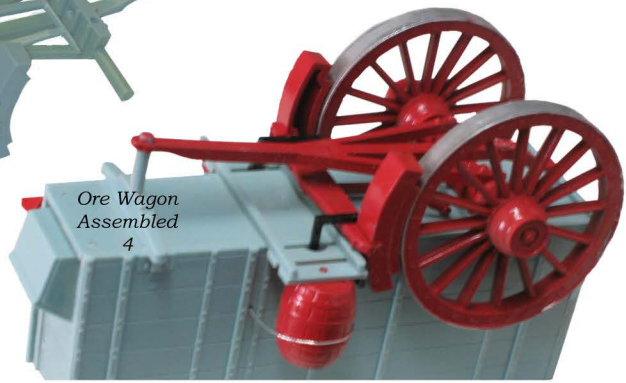
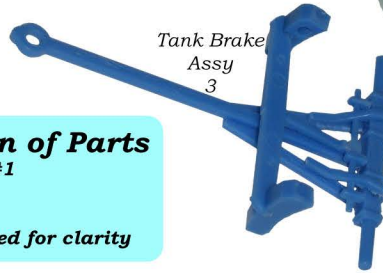
**TURN YOUR WAGON UPSIDE DOWN AS SHOWN.**

- Cement **9** to **10** (25).
- Now slide (do not cement) **10** (25) onto the long pin on the wagon bottom.
- Next cement **11** to **12** and cement **12** to **13**. (see sub assy on page 2) \*2 \*3
- Now slide the long bar on **13** under **10** (25), then onto the long pin on the wagon bottom as shown in the highlighted area, then cement the rear axle **13** to the pins on the wagon bottom.
- Cement **14** onto **10** (25).
- Now cement **15** to the holes in the right and left sides. Be sure the brake bar **11** fits through both **15**'s. \*2
- Now cement **16R** and **17L** to the right and left of **11** as shown in the highlighted area. \*2
- Next slide **18** through ratchet and cement to left side panel and also to the brake bar axle **12**.
- Turn wagon right side up and cement **19R** to **20L**, then cement a completed barrel to the right and left platform. Take a 2.5 inch piece of silver cord and cement to holes on both sides of barrels. (see sub assy on page 2)
- Slide **21** and **22** onto the front and rear axle, then put a drop of cement inside **23** and press a hub onto each axle being careful not to glue the wheel to the axle.
- Finally cement 4- **24**'s (pins facing down) to the front and rear holes in **10** as shown, set aside to dry.
- Build a second freight wagon exactly like the first wagon following Instruction **1** steps **1-5** and Instruction **2** steps **1-10**. Use a **25** in place of a **10** on the second wagon. Set this wagon aside to dry.



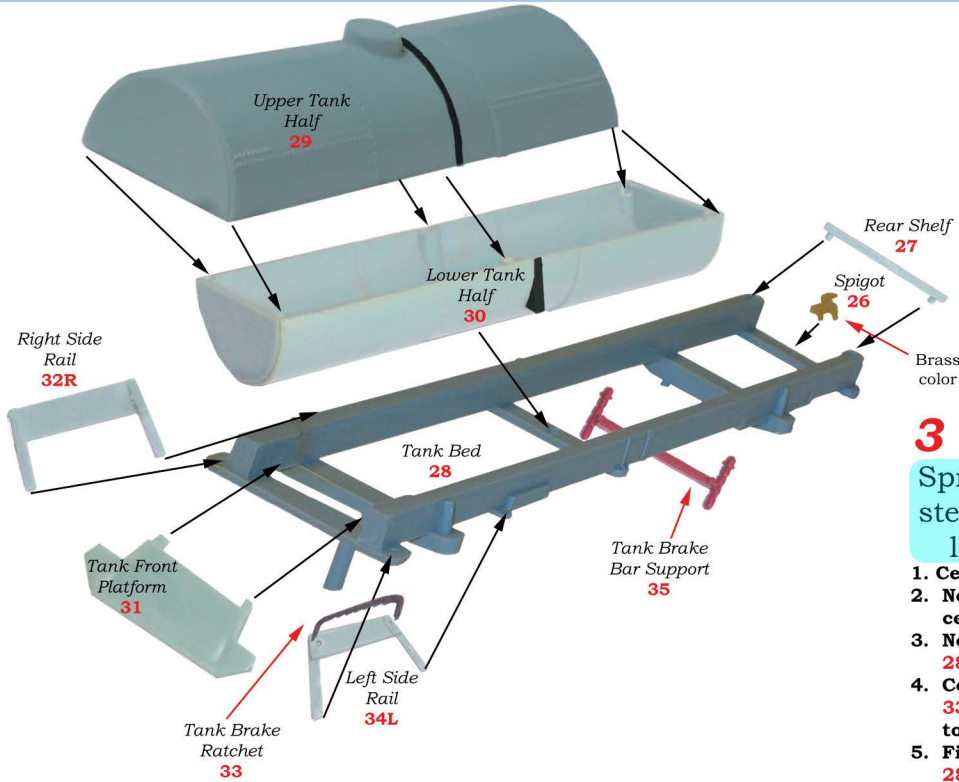
\*2 See website for alternate method of assembly.  
 \*3 Ensure woodgrain on #11 is on TOP upon final assembly.





**Photos for additional Identification of Parts**

- 1) Ore Wagon Assembly for Instruction #1
- 2) Brake Sub-Assembly for Ore Wagon
- 3) Tank Brake Sub Assembly
- 4) Ore Wagon Assembled with Front Drawbar omitted for clarity



**3**

Spread out the parts for this step. Paint detail shown and let dry before cementing

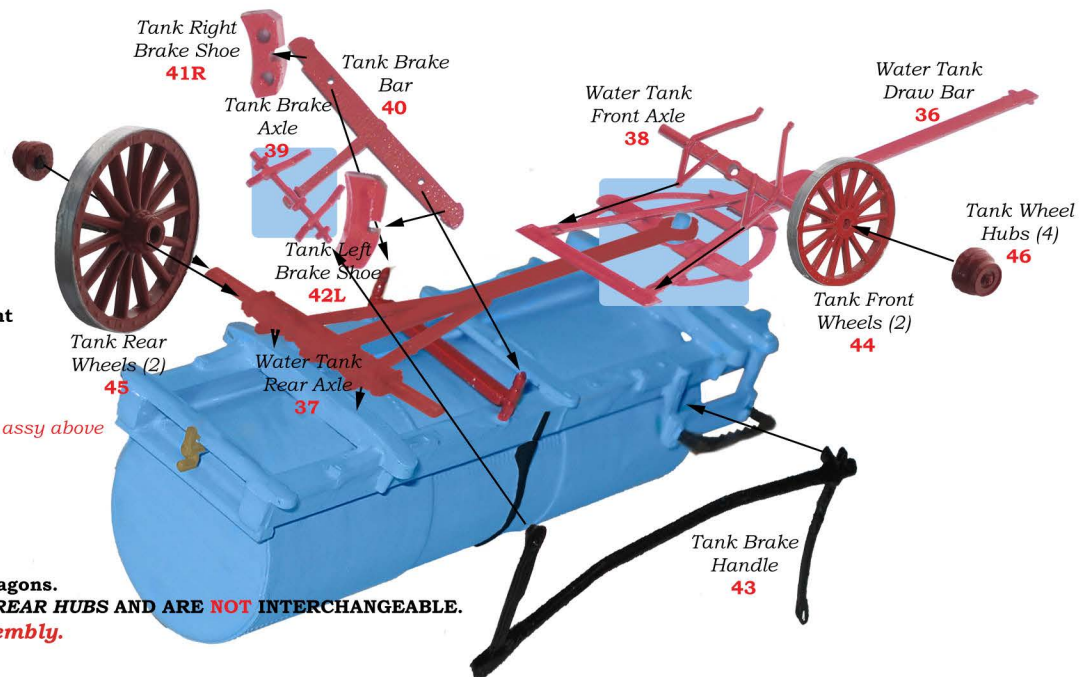
1. Cement 26 and 27 to 28.
2. Now cement 29 to 30. When dry, cement completed tank to 28.
3. Next, cement 31 to the front of 28 as shown.
4. Cement 32R to right side of 28, then 33 to left side of 34L and cement 34L to left side of 28.
5. Finally cement 35 to the underside of 28, then set aside to dry.

**4**

1. Slide-do not cement 36 onto the long pin as shown.
2. Now slide 37 onto the long pin and down into slot in 36, (shown in the highlighted area) then cement axle 37 on to pins on wagon bed.
3. Next, cement 38 onto 36 \*2
4. Cement 39 onto 37, then hook 40 onto bar on 39 and cement 40 onto supports as shown. \*2, see sub assy above
5. Cement 41R & 42L to the right and left ends of 40. \*2
6. Slide 43 through the ratchet and locate pin on 39 into hole 43, then cement into place.
7. Install 44 to front axle and 45 to rear axle and cement 46 to axles as you did on the freight wagons.

**NOTE: THERE ARE TWO FRONT HUBS AND TWO REAR HUBS AND ARE NOT INTERCHANGEABLE.**

**\*2 See website for alternate method of assembly.**



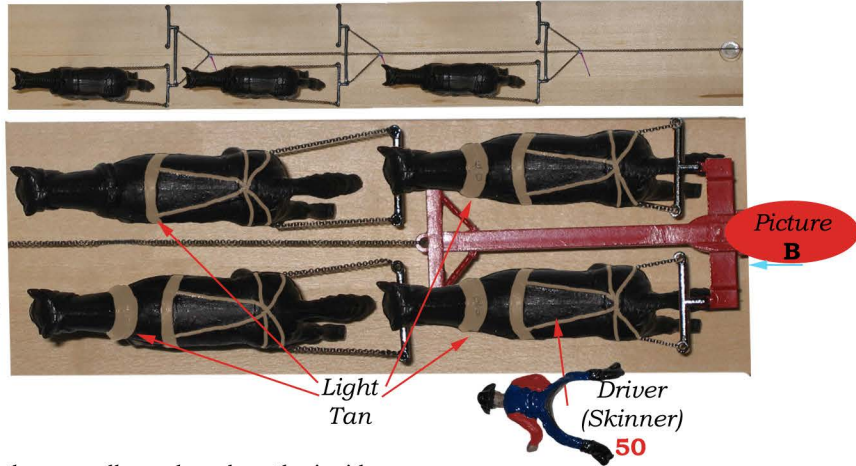
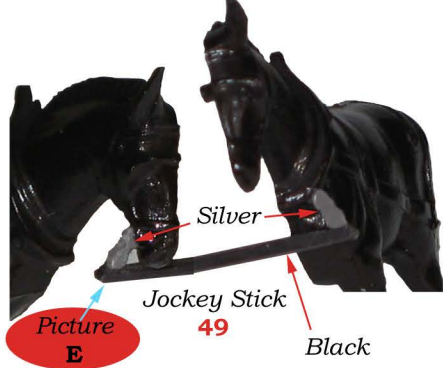


# TEAM ASSEMBLY

SPREAD OUT THE PARTS FOR THIS STEP, PAINT DETAIL SHOWN AND LET DRY BEFORE CEMENTING



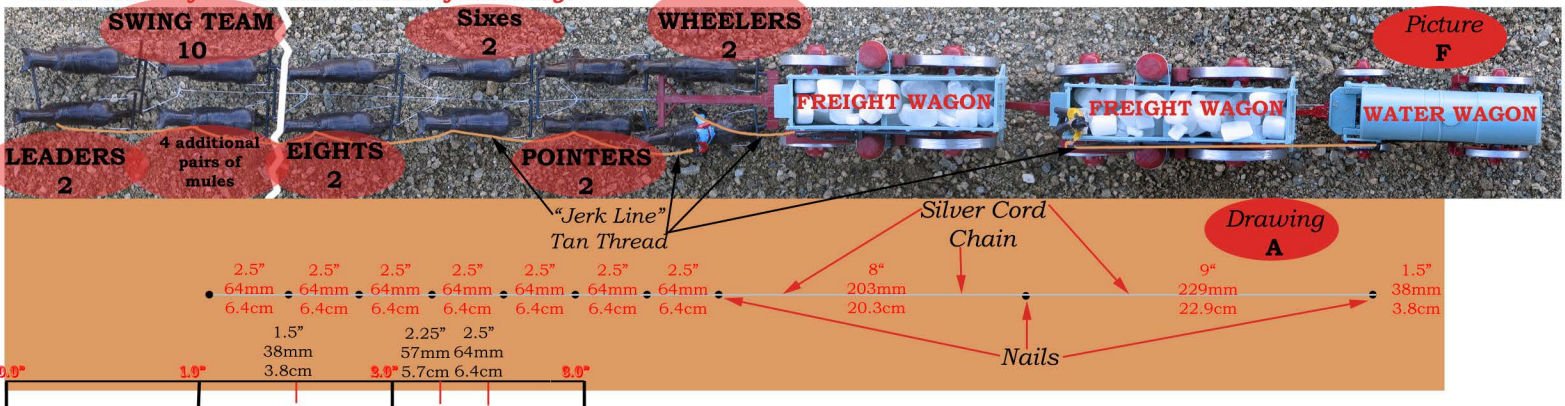
NOTE: A length of silver cord is supplied. Use this wherever chain is called for in hitching up mules and wagons.



## 5

1. There are four different sets of mules and they are all numbered on the inside.
2. Match the numbers in groups, then cement all "RA's" to all "LA's" and "BR's" to "BL's", "DR's" to "DL's" and "ER1's" to "EL1's" and "ER2's" to "EL2's" then set aside to dry in groups.
3. To mount your model on a board for displaying, get a board about 39 inches (1 meter) long, 3 1/2 inches (89mm) wide and 3/4 inch (19mm) thick.
4. Drive a 1 inch (25mm) nail 1 1/2 inch (38mm) from an end. Drive nail only half way into the board. \*1
5. Now drive another nail 9 inches (22.9cm) from first nail and another nail 8 inches (20.3cm) from the second nail. SEE DRAWING "A" \*1
6. Next, nail 8 nails each 2 1/2 (64mm) inches apart as shown in Drawing "A". \*1
7. Take a piece of silver cord and tie one end around the first nail, then cement. Use any good household cement for this.
8. Now stretch cord and loop around second nail and cement; do this to all the remaining nails until you reach the last one.
9. Place the water tank down onto your board until the rear axle is right over the rear nail and cement wheels to the board.
10. Now hook up your second wagon (the one with the short drawbar) to the pin on the front of the water wagon and cement wheels to the board.
11. Next hook front wagon to rear wagon and cement the wheels to the board.
12. Now take the two mules with the different harness and pass a piece of silver cord 2 1/4 inches long through the holes in their hindquarters. \*2
13. Cement a mule to the board on each side of the front draw bar about 5/8 inch from the singletrees. (Steps 12, 13 & 14) SEE PICTURE "B"
14. Pass the ends of the chain into the holes in the singletrees and cement; when dry, cut loose ends. \*2
15. Rein up two more mules to the front of the draw as you did the rear.
16. Cut 8 short pieces of chain 1 1/2 inches long and cut 16 pieces 2 1/2 inches long. (Use supplied measuring guide.)
17. Take a short piece of chain and cement one end into a rear hole in a 47 doubletree, then cement chain to the top of a nail and cement the other end into the other hole. SEE PICTURE "C"
18. Now cement a team of mules (2) in front of the doubletrees and pass a long piece of chain through the hindquarters and cement the ends into the holes in 47. Keep repeating this until you have all the mules cemented and reined properly in place. SEE PICTURE "C" \*2
19. Cement 48 freight bells to the collars of the two front (LEADERS) mules. SEE PICTURE "D"
20. Next cement 49 jockey stick to the outside bit on the right side of the right lead mule and the collar on the left side of the left lead mule as shown in the picture. SEE PICTURE "E"
21. Now cement the 50 driver or "skinner" onto the left mule, next to the front wagon and the swamper 51 swamper to the left side of the second wagon next to the brake handle. (Steps 21, 22, 23 & 24) SEE PICTURE "F"
22. Take a long piece of tan thread (not supplied) and cement it to the collars on all the left hand mules, then into the driver's left hand.
23. Cement a short piece of tan thread to the driver's (skinner's) right hand and up to the brake handle on the first wagon.
24. Take another piece of tan thread and cement it to the swamper's left hand and back to the brake handle on the water tank.
25. Fill front and second wagons with authentic "ulexite" chunks for a final touch of realism. See insert for how you can get your "ulexite".

\*1 See website for alternate nail placement.  
 \*2 See website for alternate method of assembly.





### WHAT YOU SHOULD KNOW BEFORE YOU BUILD THIS KIT

1. This kit is molded of high impact Styrene plastic.
2. Use Styrene type cement to glue parts. Do not let cement touch your eyes or clothing.
3. Paint parts before assembling with enamel paint only. NOTE: Do not use any lacquer base paints because it will soften the plastic.
4. Trim any extra plastic (flash) from parts before assembling to insure a good clean fit.
5. Read instructions over carefully before starting to assemble parts. Begin with step 1.
6. The drawings are numbered for ease of assembly. Start with 1 and cement to a 2, etc.. On all mule parts the "R" or "L" tells you where the part is to be placed, "right side" or "left side".
7. Put cement on the edges of the parts which are to be assembled. Do not use too much cement as it will soften the plastic and also spoil the finish.
8. Have some rubber bands handy to hold parts together if needed.

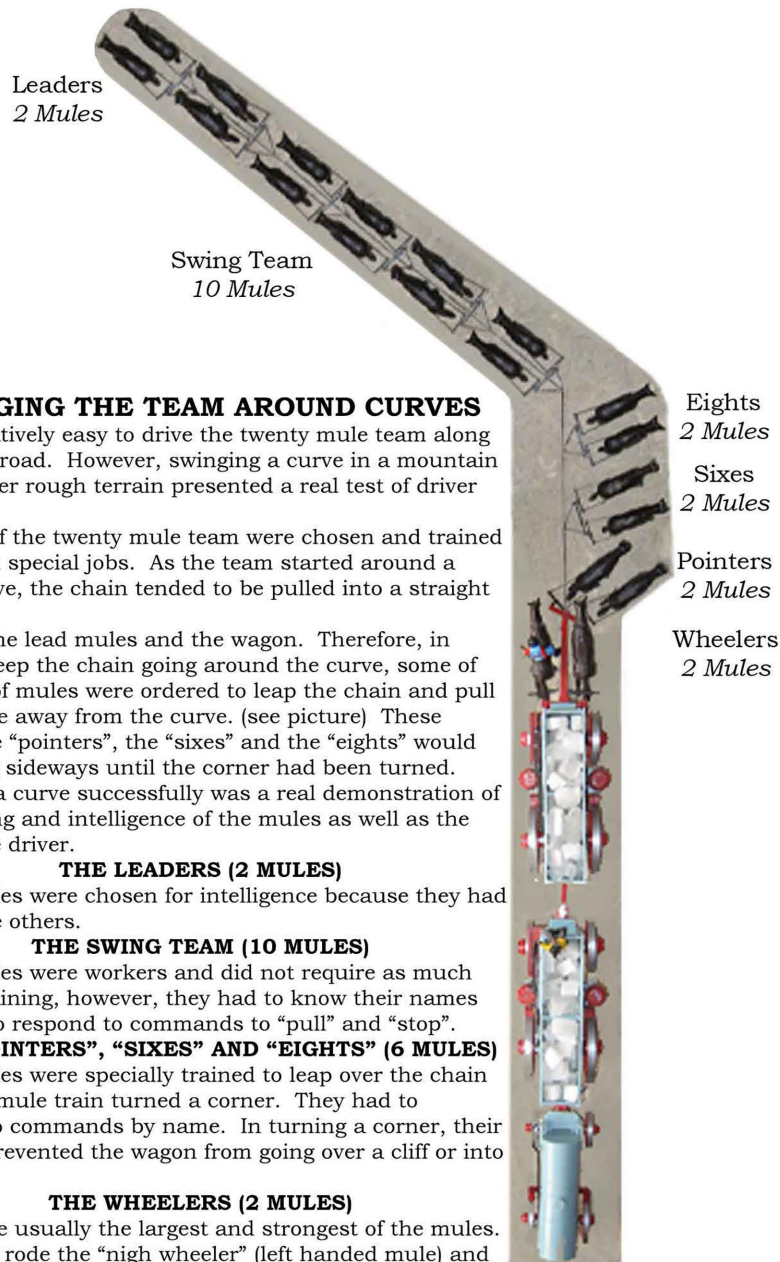
### SUGGESTED SUPPLIES FOR COMPLETING YOUR MODEL

Paint: Black, Wood Brown, Red, Silver, Brass, Yellow, Flesh, Blue, Light Tan.

Styrene cement, Tan sewing thread.

If you are mounting your model on a board, (HIGHLY RECOMMENDED), you will need a board 39" (1 meter) x 3.5" (89mm) x .75" (19mm), 10-1" (25mm) nails, contact type cement for cementing wheels to the board and some diorama sand. Once you have mounted your model on the board, your imagination is your limit.

You will also need typical tools, but not limited to, for assembly: hobby knife, fine files, assorted grades of sanding film, rubber bands to hold mules and wagons together if needed and tweezers.



### SWINGING THE TEAM AROUND CURVES

It was relatively easy to drive the twenty mule team along a straight road. However, swinging a curve in a mountain pass or over rough terrain presented a real test of driver and team.

Sections of the twenty mule team were chosen and trained to perform special jobs. As the team started around a sharp curve, the chain tended to be pulled into a straight line

between the lead mules and the wagon. Therefore, in order to keep the chain going around the curve, some of the span of mules were ordered to leap the chain and pull at an angle away from the curve. (see picture) These mules, the "pointers", the "sixes" and the "eights" would step along sideways until the corner had been turned. Swinging a curve successfully was a real demonstration of the training and intelligence of the mules as well as the skill of the driver.

#### THE LEADERS (2 MULES)

These mules were chosen for intelligence because they had to lead the others.

#### THE SWING TEAM (10 MULES)

These mules were workers and did not require as much special training, however, they had to know their names and had to respond to commands to "pull" and "stop".

#### THE "POINTERS", "SIXES" AND "EIGHTS" (6 MULES)

These mules were specially trained to leap over the chain when the mule train turned a corner. They had to respond to commands by name. In turning a corner, their training prevented the wagon from going over a cliff or into a bank.

#### THE WHEELERS (2 MULES)

These were usually the largest and strongest of the mules. The driver rode the "high wheeler" (left handed mule) and from this position operated the brake on the front wagon.