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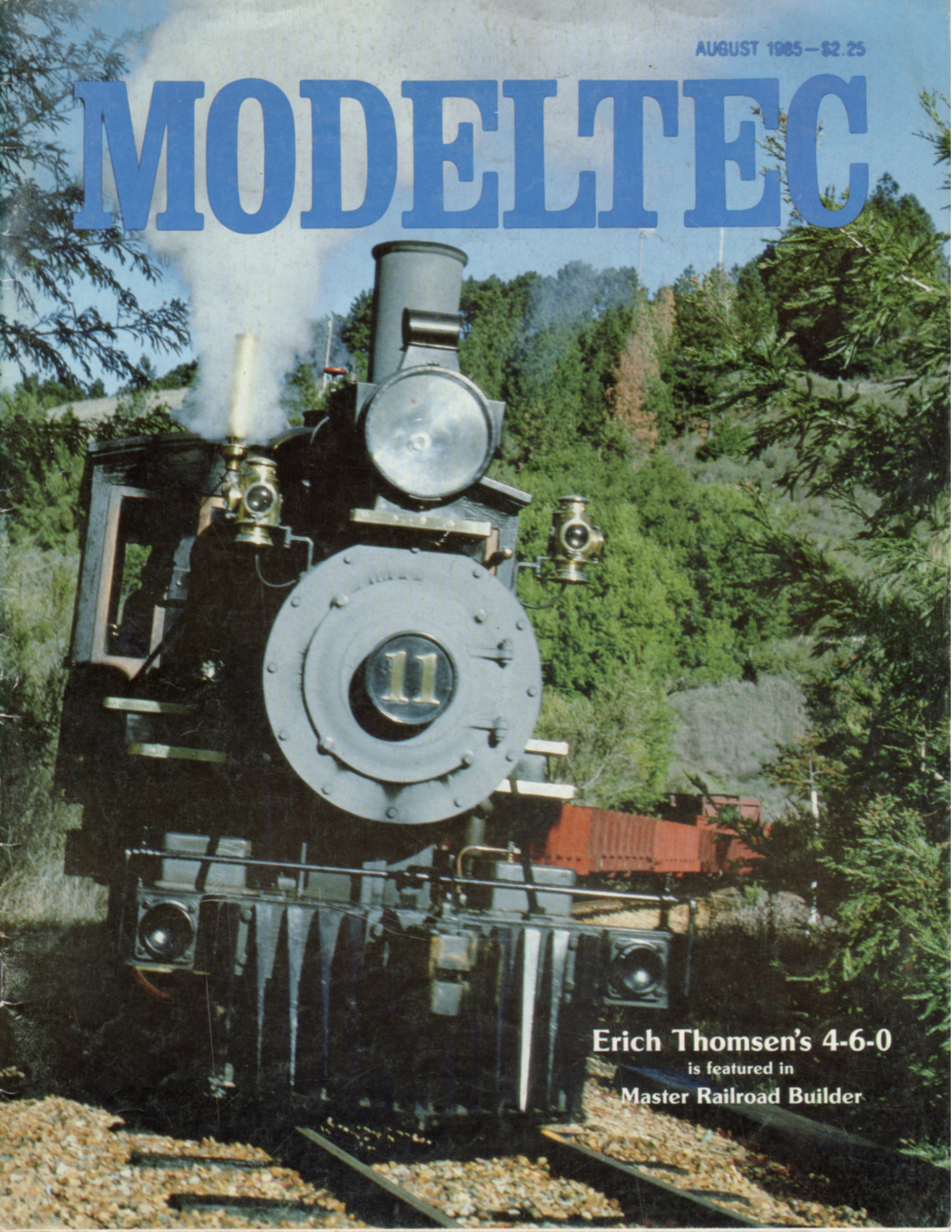
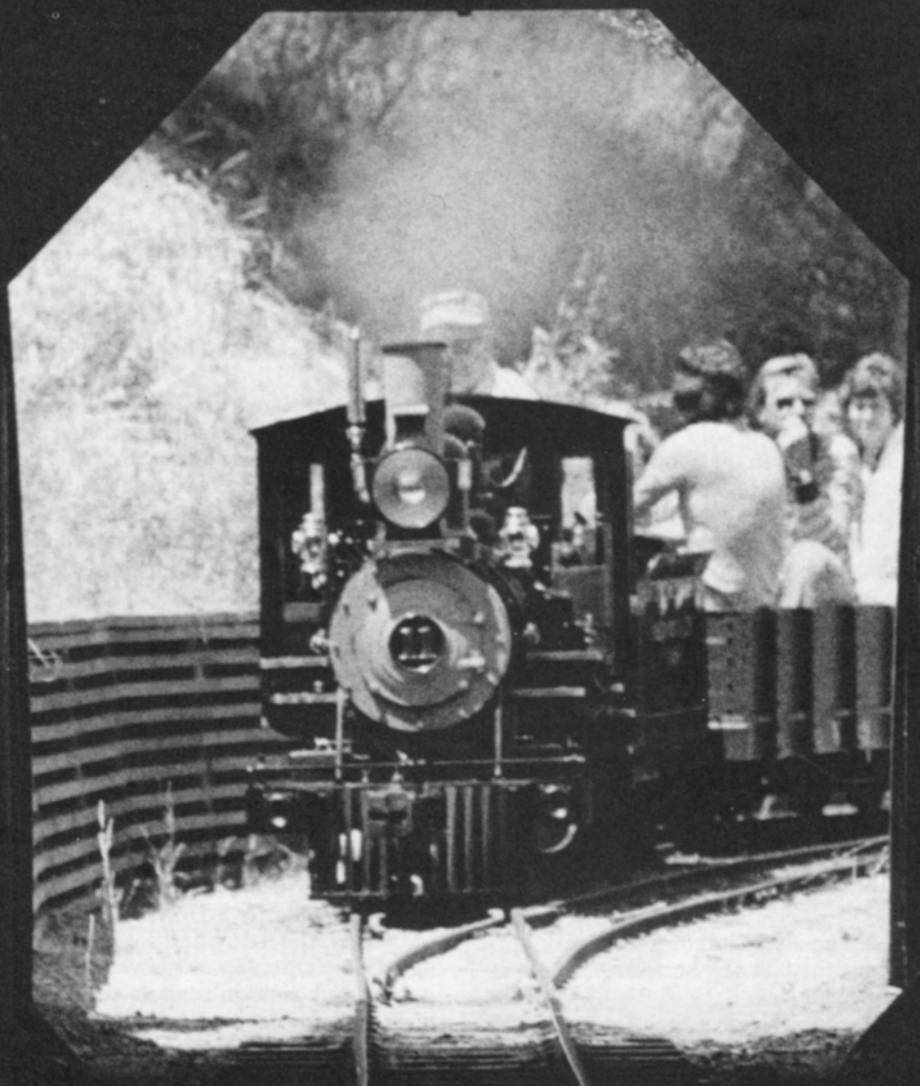
# MODELTEC




**Erich Thomsen's 4-6-0**
is featured in
**Master Railroad Builder**



Into the big bore on the *Redwood Valley*.

# MASTER RAILROAD BUILDER

## *Chapter 6—Narrow Gauge—Tonnage and Revenue*

by Steve Booth

PHOTOS BY THE AUTHOR UNLESS OTHERWISE CREDITED

When Erich Thomsen talks narrow gauge, he's talking *real* railroading brought down to a size a perfectionist with a modest budget and a willingness to work can deal with. He's thinking of heavy equipment, realistic operation and *revenue*, all within the parameters of safety, fun and the limitations of available land and the energy of the people involved.

Erich is a professional railroader who's spent a whole lifetime working on the real thing — 28 years in the chief engineer's office of the Western Pacific, specializing in trackwork, then as chief mechanical engineer and president of Campbell Associates, Inc. in the San Francisco area, which provides technical and consulting services for railroads of all kinds. In his spare time, he has built two large-scale narrow-gauge miniature

**Upper Right** Erich Thomsen at the throttle of No. 4 during rare night operations on the 5-inch scale *Redwood Valley*.

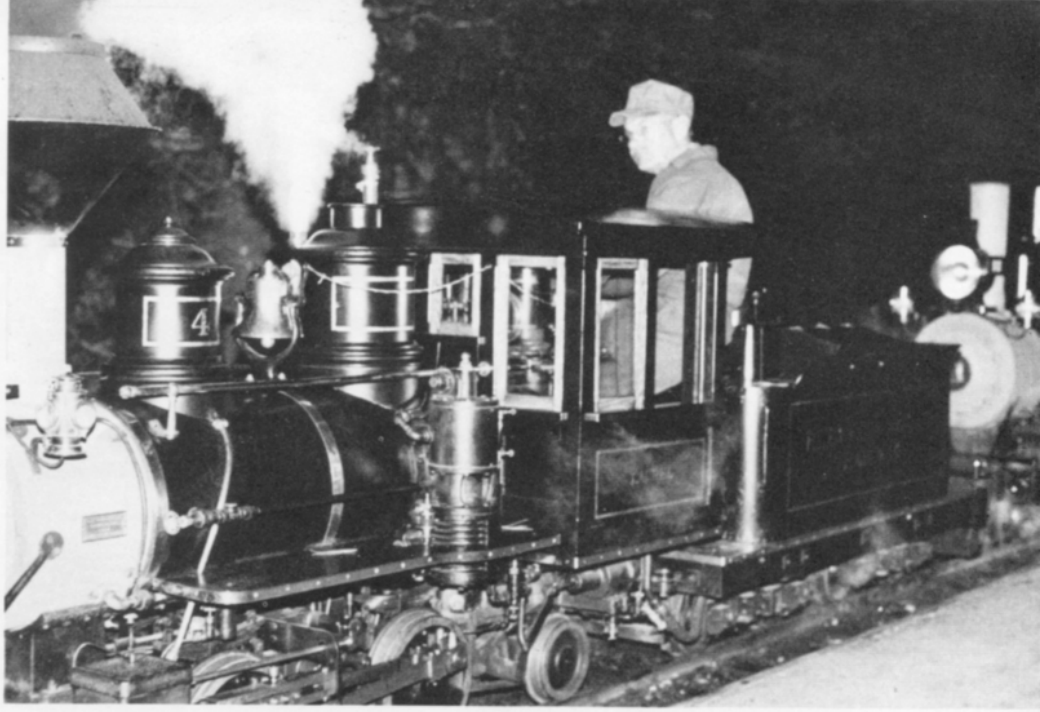
**Middle Right** The *Redwood Valley's* gasoline dinky and 4-wheel jimmy cars in the days when they ran on Erich's 12-inch gauge railroad at Mountain View, California. Scale was 6-inch. Photo by Erich Thomsen.

pikes, a 6-inch scale, 12-inch gauge hobby railroad in Mountain View and the railroad in Tilden Regional Park above Berkeley, California, which started operating in 1952 as a 4-inch scale, 12-inch gauge system, then was converted in 1968 to 5-inch scale on rails 15 inches apart, the size Erich feels is ideal where passenger carrying and realism are involved.

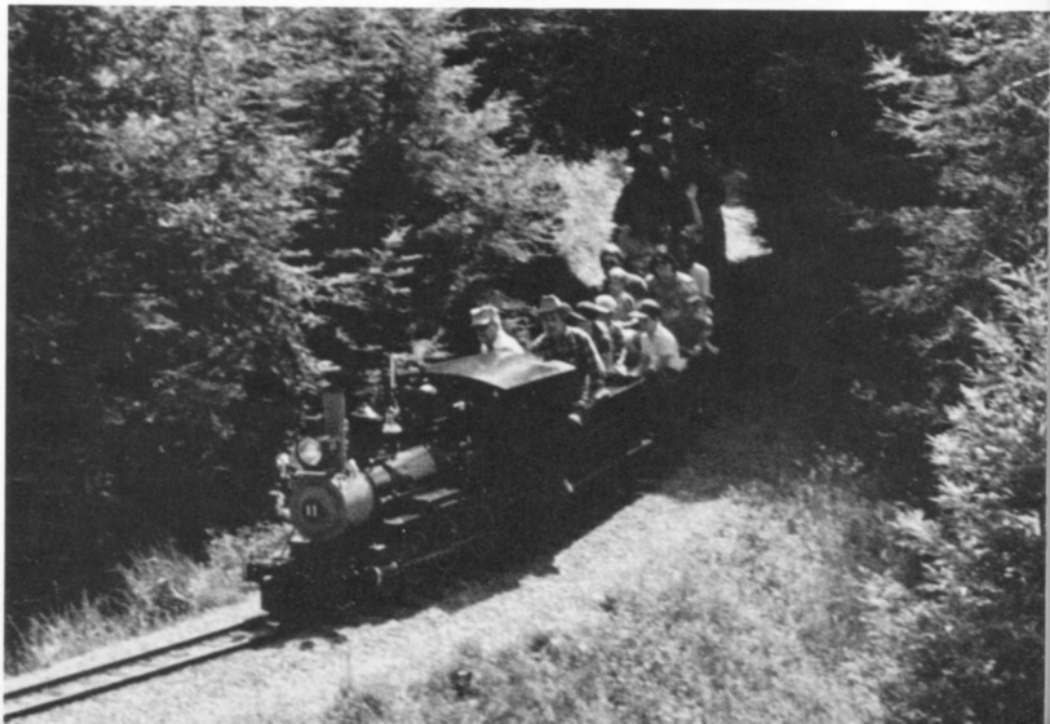
The search for the perfect park railroad gauge and scale had been going on for decades when Erich got together with Live Steam veteran William L. Daney of Pueblo, Colorado, back in the early '50s. At the time, Erich was operating his 12-inch *Tilden, South Gate & Pacific Railway,* and Bill had a 3-inch scale, 15-inch gauge park railroad at Pueblo. Neither of them were really happy with what they had because both railroads had a seat width of 27½ inches, not wide enough for two adults side by side. They agreed then that the choice of the ideal scale and gauge "should begin with the width of the average adult fanny multiplied by two."

When the two men sat down and measured themselves, they found a seat 36 inches wide would accommodate them easily. With two inches added for each car side, the overall width dimension of a car came out 40 inches, exactly 5-inch scale of the full-size, 8-foot wide cars commonly used on 36-inch gauge, which scales down to 15 inches. What a happy coincidence! Also, such nice round numbers.

Erich knew that miniatures of standard gauge cars had been built to this width by MacDermott for his 19-inch gauge *Overfair Railway* at the 1913 Panama-Pacific Exposition in San Francisco. But that was 4-inch scale, and all but the smallest locomotive types built that size would require curves of very large radius, Erich and Bill realized. The case for a large narrow-gauge scale became stronger, since equipment used on all narrow-gauge lines was designed







**Lower Right** In the early '50s, William L. Daney and Erich Thomsen did some measuring and figured out that 5-inch scale narrow gauge was ideal for park use.

Texas & Pacific Railroad Shops in Big Springs built this locomotive as a 15-inch gauge miniature of a standard gauge 4-6-2. It was rebuilt as a narrow gauge 2-6-2 Prairie in 1967 by Bill Daney and now pulls trains on the *Paradise & Pacific* in Scottsdale. Photo by Russell C. Joslin.


GP-7 diesel built in 1960 by C. L. Schlosser of Phoenix, Arizona, in 16-inch gauge. It was converted to 15-inch gauge in 1980 by Bob Manista and Russ Joslin. Photo by Russell C. Joslin.

**SPECIFICATIONS**

Scale — 5″
Gauge — 15″
Length overall — 16′ 0″
Power plant — 4-cyl. 2300cc, Ford Pinto
Fuel — Gasoline
Transmission — Automatic
Driver diameter — 9⅜″
Driving axles — 4
Final drive — Belt drive — worm gear

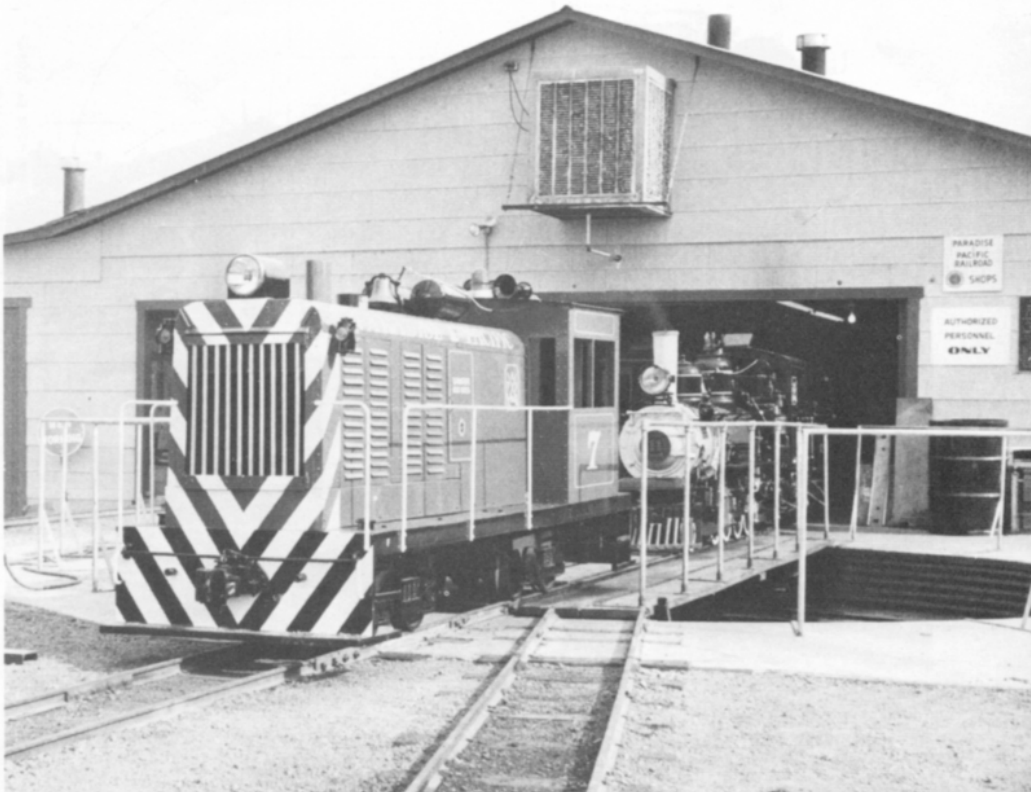
Ten-wheeler in 5-inch scale built in 1980 by William L. Daney of Pueblo, Colorado, for the *Paradise & Pacific Railroad,* Scottsdale, Arizona. Photo by Russell C. Joslin.

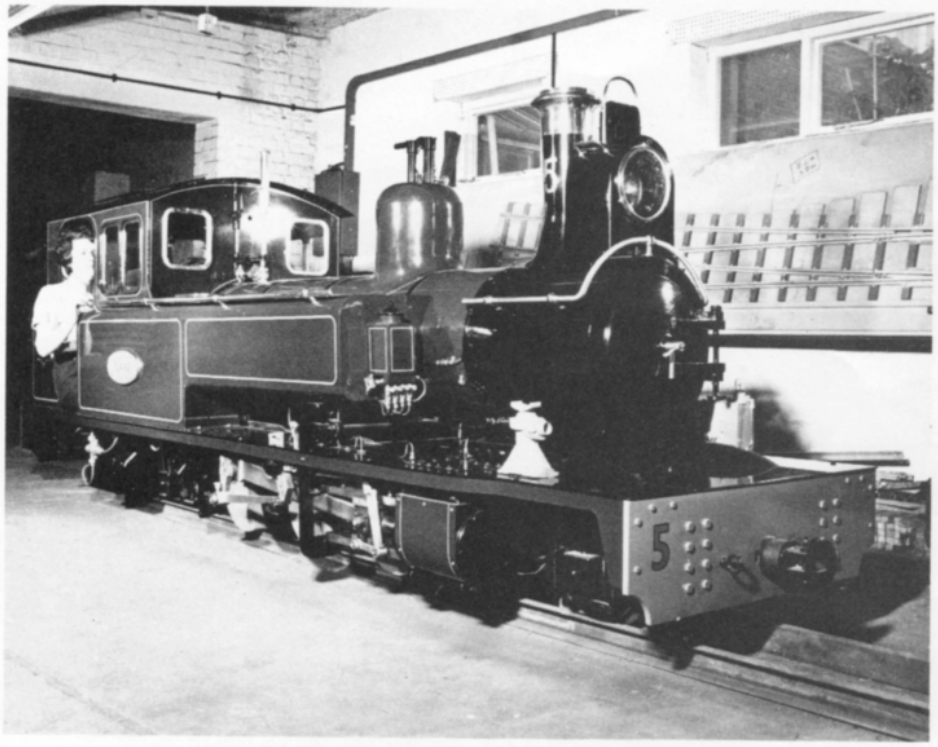
**SPECIFICATONS**

Scale — 5″
Gauge — 15″
Length engine & tender — 19′ 6″
Weight in working order — 4000 lbs.
Tractive force at 85% — 1031 lbs.
Fuel — Diesel oil
Boiler pressure — 150 psi.
Cylinder size — 4¼″ × 5⅜″
Driver diameter — 12″
Valve gear — Walschaerts
Valves — Piston
Main bearings — Brass
Tender trucks — 4-wheel
Tender fuel capacity — 48 gals.
Tender water capacity — 70 gals.

Equipment: Steam-operated air pump, axle-driven air pump on tender, air brakes.

Engine terminal of the 15-inch gauge *Paradise & Pacific.* Photo by Russell C. Joslin.





12¼-inch gauge, 6-inch scale Leek & Manifold narrow gauge 2-6-4T built for the *Resseau Guerledan Chemain de Fer Touristique* in France by Milner Engineering, England. Photo by Milner Engineering.

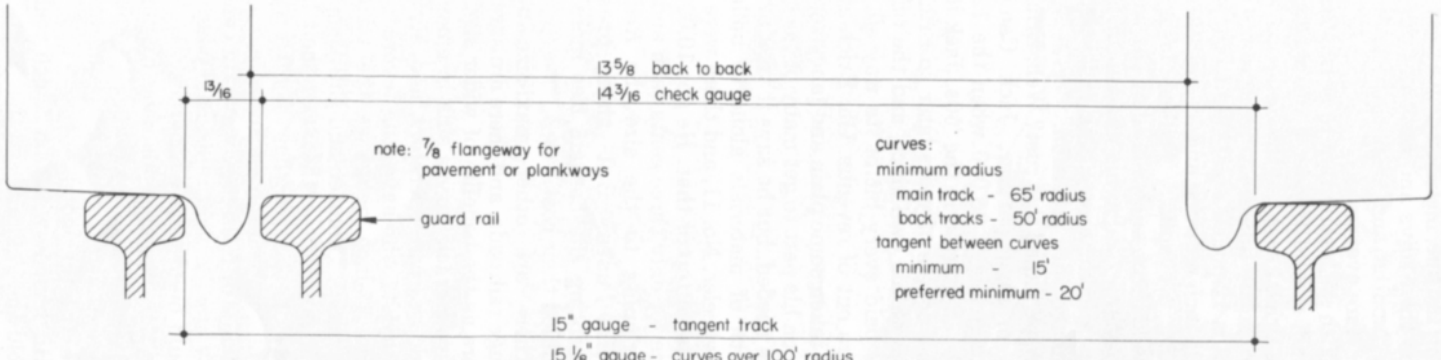
Darjeeling & Himalayan 0-4-0 locomotive in 12-1/4-inch gauge undergoing trials in France. Builder of this half-size engine is Milner Engineering. Photo by Milner Engineering.

for tight curves. As to stability when narrow gauge is miniaturized, Erich's 12-inch gauge TSG&P, built to narrow-gauge proportions and utilizing heavy cars to minimize the effect of passenger weight and movement and lateral forces when there is a large overhang, had disproved an old rule-of-thumb that seat width must never exceed 1½-times track gauge on park railroads.

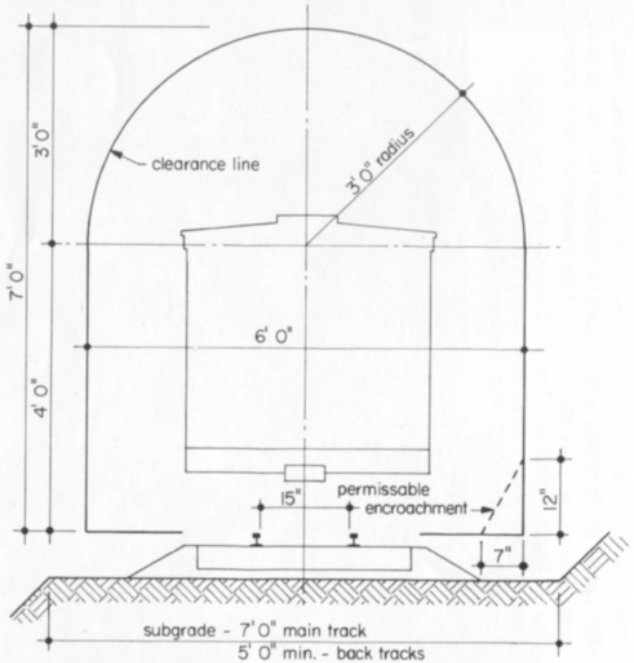
It was then that 5-inch scale was born as an answer to the problems of track curvature, rolling stock stability and passenger-carrying efficiency, factors of great importance to park system operators who are faced constantly with the bottom line — if it doesn't make money it can't succeed. Soon, Bill Daney started building a 5-inch scale Consolidation for Guy Stillman's new *Paradise & Pacific Railroad* on a ranch at Scottsdale. Erich Thomsen began planning the conversion of his Tilden Park railroad to the new scale and gauge, and he started construction of No. 4, the diamond-stacked 2-4-2 he outshopped in 1965 with a string of 15-inch narrow gauge cars.

Since then, others have taken the plunge into this maxi scale with varying degrees of accomplishment. Jim Holmes is building the *Glenwood, South Park & Pacific* on his property in the Santa Cruz Mountains down the coast from San Francisco, and grades of up to nine percent challenge everything that runs there, including the two-truck Shay built by Ken Kukuk, Ken Petersen and John Hoffman during the '70s. Another Shay, built by Tom Coffey, runs on the slowly expanding 15-inch gauge trackage of the Joshua Tree & Southern Railroad Museum in southern California. That pike, which also has 2½-inch scale narrow gauge, is the project of Joel Tedder and several other Live Steam enthusiasts. In Colorado, Lee Merrick converts miniatures of standard gauge prototypes to narrow gauge. His first locomotive, built originally by the Texas & Pacific Railroad Shops in Big Springs, Texas as a 4-6-2 and later sold to Bill Daney, now runs on the *Paradise and Pacific* at Scottsdale's McCormack Railroad Park. The line was given to the city by Guy Stillman and rebuilt across the road from its original location. In Oregon, Byron Hall has an Erich Thomsen designed 2-4-2 under construction.

It's with the originators of the scale, though, where most of the activity has been. Bill Daney has built a whole stable of engines for the P&P, and Erich Thomsen, who always has more than one locomotive in some stage of construction, is building a stable of his own narrow gauge thoroughbreds for operation on the *Redwood Valley Railway* at Tilden Park, what was originally the TSG&P. It's the *Redwood Valley* that shows how successful the scale is, how

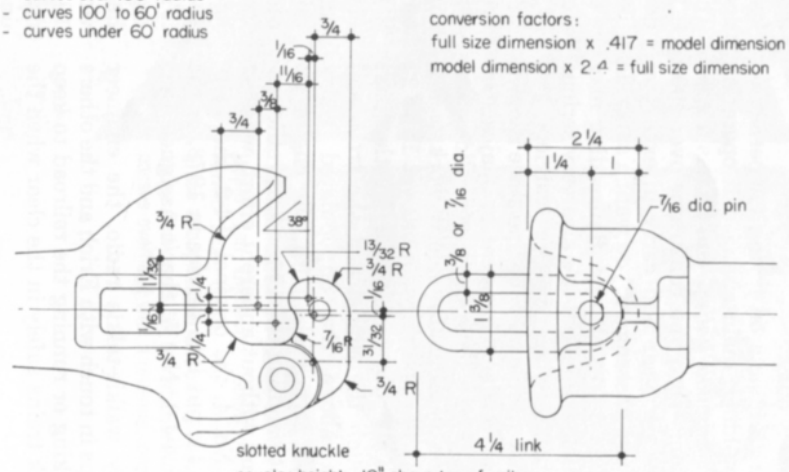



locomotive cab - height - small, 50" - medium, 52" - large, 54"
width - 38" 40" 42"
cars (freight type - height - 52" to peak of roof
width - 40" over sides or stakes

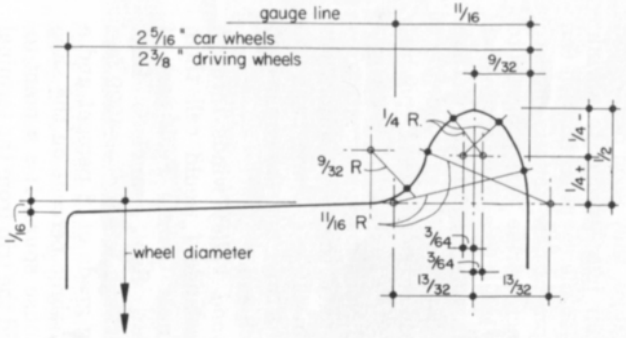



rail - 12# main track
8# or 12# back tracks
ties - 4" x 4" x 35" main track
3½" x 3½" x 32" back tracks
spikes - 5/16" x 2½"
ballast - ¾" x 3/16" crushed rock

conversion factors:
full size dimension x .417 = model dimension
model dimension x 2.4 = full size dimension




slotted knuckle
coupler height - 10" above top of rail




# 5" SCALE - 15" GAUGE STANDARDS

ET/wef

much potential it has for both commercial and private use. With the *Redwood Valley,* Erich has refined his designs and construction methods and turned out what can only be called a gem of a railroad.

At the time Erich and his crew changed over the railroad from 4-inch scale with 12-inch gauge to 5-inch scale on 15-inch gauge, they soon discovered that the main line seemed to shrink. What had been plenty of track with the smaller equipment now was too short to give a satisfactory ride. So a program to lengthen the main to a new terminal at Army Camp was begun, more than doubling the length of the railroad. Since part of the loop at South Gate Depot had to be removed, a run-around track was provided and No. 4 made alternate trips tender first until the new section was completed in 1978. There was no caboose at the time, and the engine had a pilot at each end.

The *Redwood Valley* winds through the hills (flatlanders would call them mountains) near Grizzly Peak east of Berkeley and San Francisco Bay. Mainline trackage totals over 4000 feet with a ruling grade of .8 percent and a maximum of three percent on the shop and enginehouse spurs. It's a point-to-point line, and the trip from the terminal at Army Camp to the opposite end of the railroad at North Point and return is 1¼ miles and takes 11-12 minutes. Trains are normally 11 cars — eight gondolas and two box-car-like excursion cars, plus a caboose — pulled by a single steam locomotive on all but holidays when double headers are scheduled for the heavy traffic. Each revenue car holds eight adults or 12 children, and trains operate Saturdays and Sundays all year long and weekdays during the summer. When the weather is good, the ticket agent (most often Erich's daughter Ellen) is busy.

Erich insists on trying for perfection in building, maintaining and operating the *Redwood Valley,* and he has a good reason: When you run trains over 4000 miles per year and carry in excess of 100,000 passengers, you want a safe ride and an enjoyable one. Railroading may be his passion, but it's also very serious business when you've carried two million people on your line since it opened, all without accident or major incident. There have been earthslides and minor derailments (mostly work trains) to disrupt operations a bit, yet 15 to 22 trains a day cross the trestle, pass through the tunnel and the trees and high above the unpopulated valley that's part of the park, the engine up front handling the 12-ton train efficiently and without apparent effort, whether it's No. 4, the original 2-4-2, the 4-6-0, No. 11, put into service in 1978, or the new 4-4-0, No. 5, that's assigned that day.

By walkie-talkie radio, the engineer keeps in touch with Erich and the others working or running the railroad to keep work trains safely in the clear when the regular train is due and to keep everything running smoothly. There's never an idle time on weekends, always maintenance to be done, shop work on locomotives and cars, clean-up after storms and planting of trees. Yes, Erich Thomsen is nuts about trees, and his landscaping shows it. He and his crew have planted hundreds of redwoods along the line, installed drip irrigation to keep them alive and healthy during the dry months and seen them grow tall. They are everywhere.

With such attention to aesthetics and detail, it's no wonder a track specialist like Erich has given the *Redwood Valley* a track any full-size railroad would envy. Rail is 12-pound steel held to the 4 × 4 × 35-inch redwood and fir crossties with $\frac{5}{16}$ × 2½ spikes. Ballast is a local crushed rock known only by the name of the quarry, Gallagher and Burke, that it comes from. Everything is leveled and trimmed with precision.

What did all this cost? Well, Erich and his original partner, Jack Campbell, each invested $5,000 when the 12-inch railroad started in the '50s. Jack bowed out a couple of years later so Erich has been on his own since, and the railroad has paid every bit of its way all those years out of revenue. Oh, Erich admits it's taken some plain and fancy scrounging on his part to get many of the things he's needed, but he says it took $26,000 worth of materials alone to build the 10-wheeler, No. 11, and there were labor costs on top of that. He got 10,000 ties once for only three cents each and a bit of ripping to the size the *Redwood Valley* uses. But then pressure creosoting the bargain ties more than doubled their cost.

There are other maxi-size narrow gauge railroads, and there are sure to be more as the benefits of wider seats and sharper track curves sink in among the park railroad operators and scattered hobbyists who have long favored 3-inch scale, 15-inch gauge as the standard. But Erich Thomsen and Bill Daney put their fannies together, and their brains and skill, to start what they felt was the ideal combination of scale and gauge. Erich still feels that way. He can't see why anyone wanting to haul passengers would build to any other size. He's proven the validity of his ideas by building the *Redwood Valley Railway,* something any enthusiast could be proud to emulate. It's that good.

His hope now is that 5-inch scale can avoid the gauge fiasco that 1½-inch experienced, through the rigid acceptance of standards he has developed and that other builders have adopted in varying degrees. There is still a difference in coupler height used by the 5-inch scale enthusiasts. Erich's standards are based on the original 24-inch height of the prototype adopted by the 1872 Narrow Gauge Convention, not the 26 inches

Joel Tedder at the throttle of Tom Coffey's 15-inch gauge Shay on the 5-inch scale portion of the *Joshua Tree & Southern Railroad.* The 3100-pound locomotive took 6½ years to build. After Coffey's death it was presentd to the JT&S. Photo by Joel Tedder.

**Upper Left** *Glenwood, South Park & Pacific* Shay climbs the three-percent grade through Miller Cut on the *Redwood Valley Railway* as RV ten-wheeler No. 11 passes overhead with a revenue consist.

**Above** Ken Petersen at the throttle of the 5-inch scale, two-truck, two cylinder Shay he built with Ken Kukuk and John Hoffman.

**Lower Left** Work train in a deep cut, all dug by hand, on the *Redwood Valley*. The engine is Ken Kukuk's Shay.

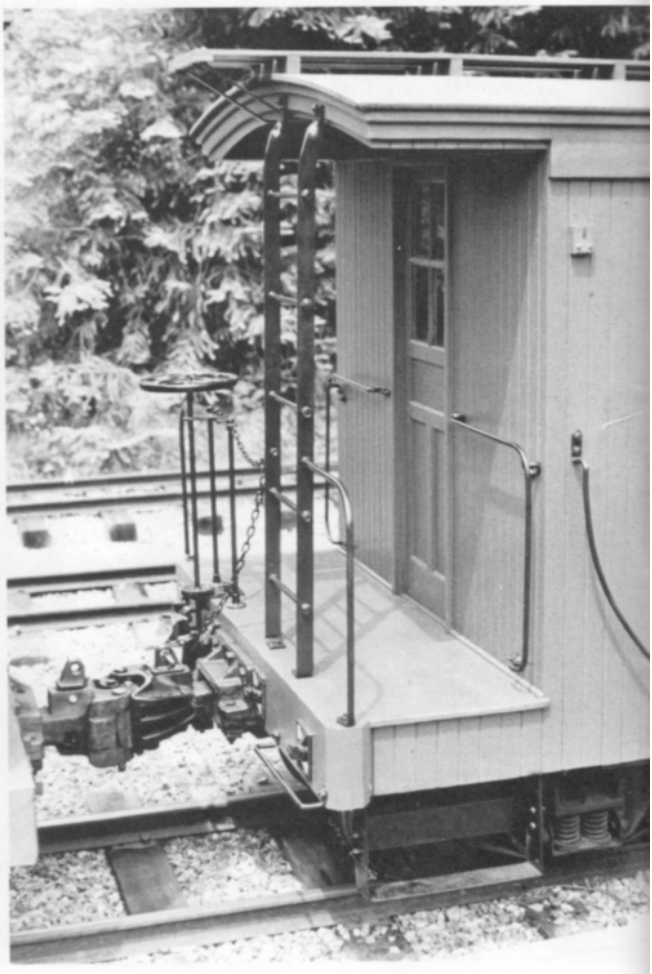
**Below** *Glenwood, South Park & Pacific* 5-inch scale Shay admidst the redwoods.

**Above** Even the structures are to scale. Erich Thomsen made sure they are functional yet authentic looking.

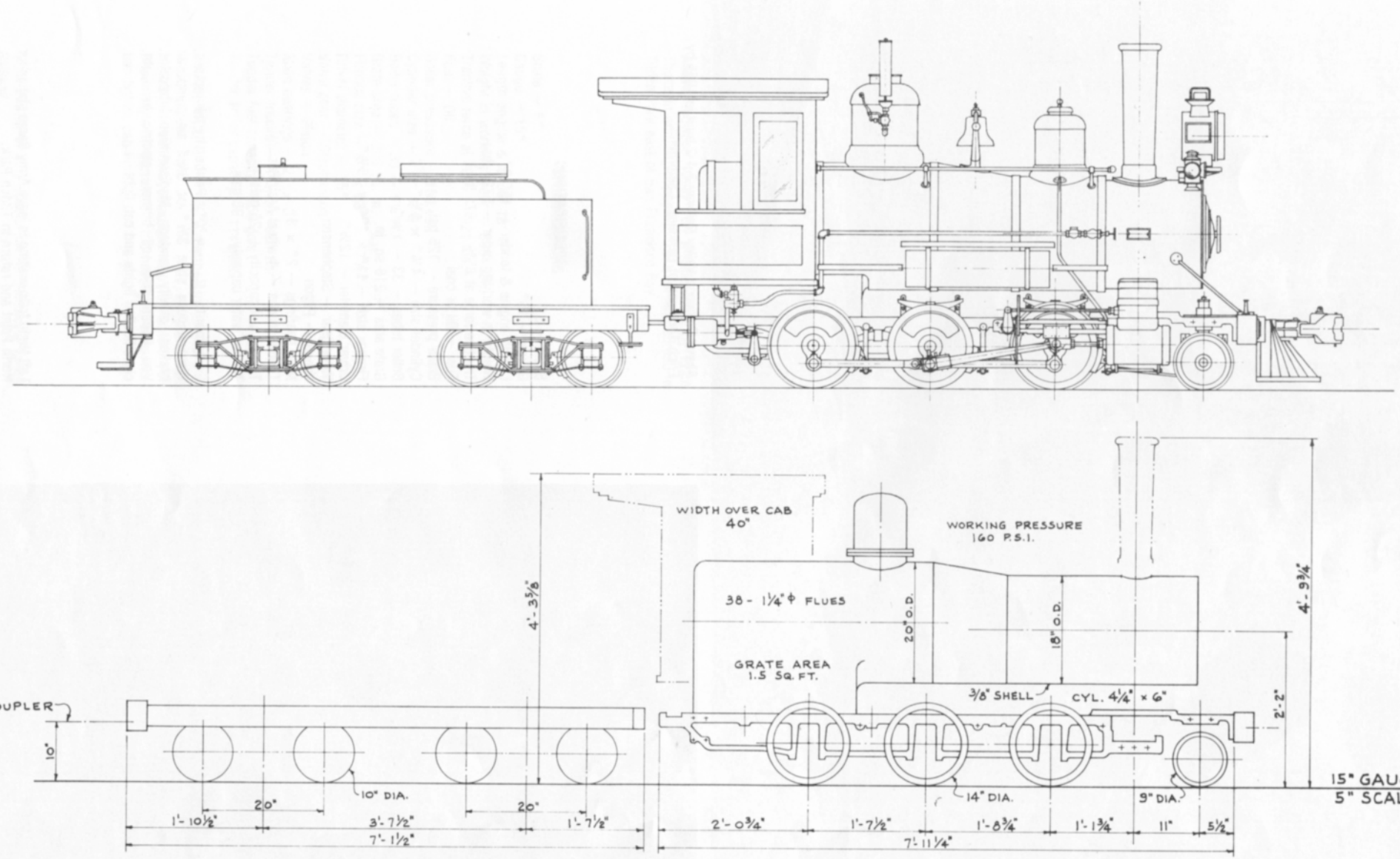
**Upper Right** Timber-lined tunnel under a paved road in Tilden Park, near Berkeley, California.

**Below** One of the advantages of 5-inch scale narrow gauge is that full-grown people can be accomodated in cars with roofs. The caboose on the *Redwood Valley* is furnished inside and is entered through a door in one side.

**Lower Right** Meticulous detail and workmanship is evident on the *Redwood Valley's* caboose.



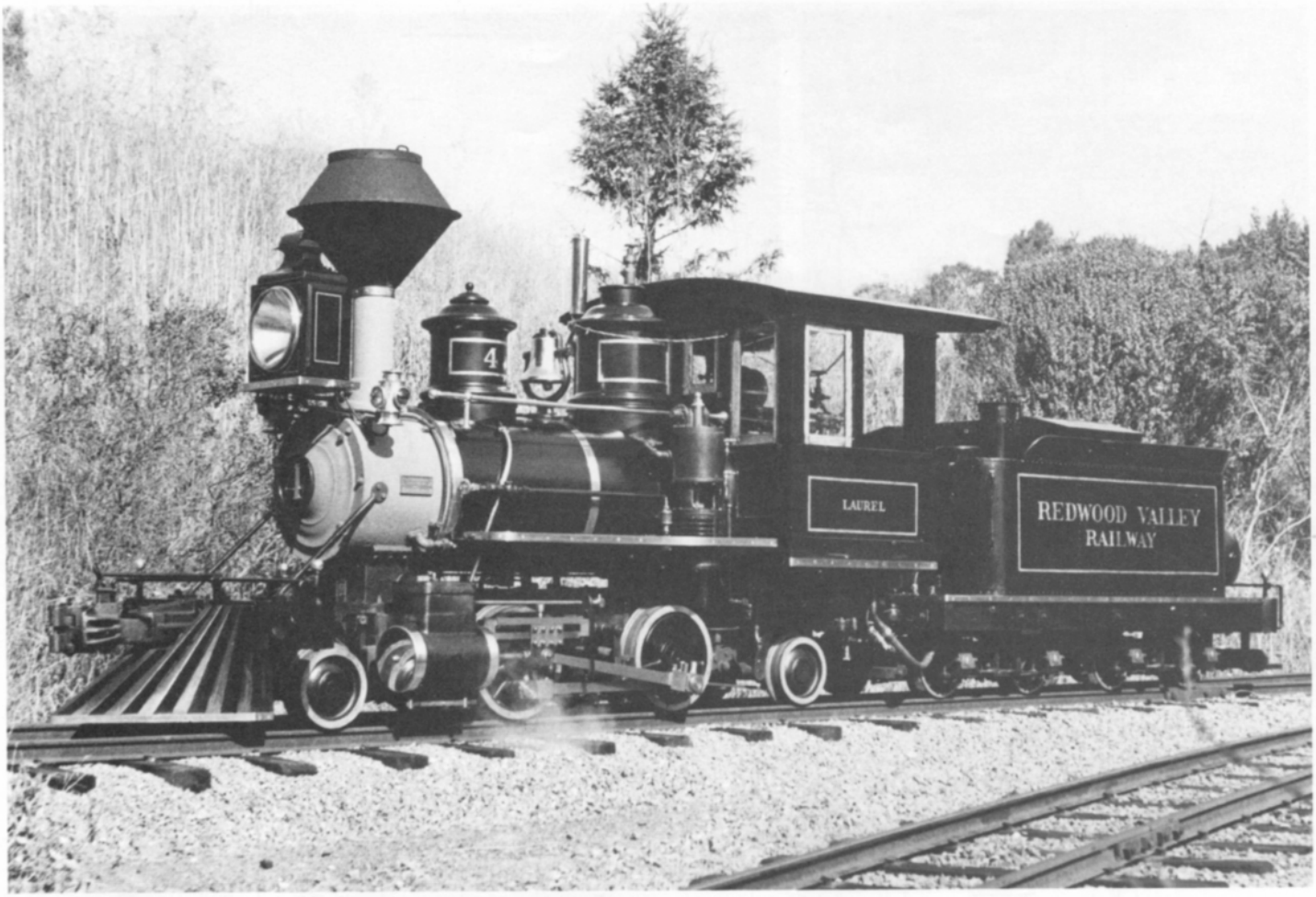
DRAWING BY ERICH THOMSEN



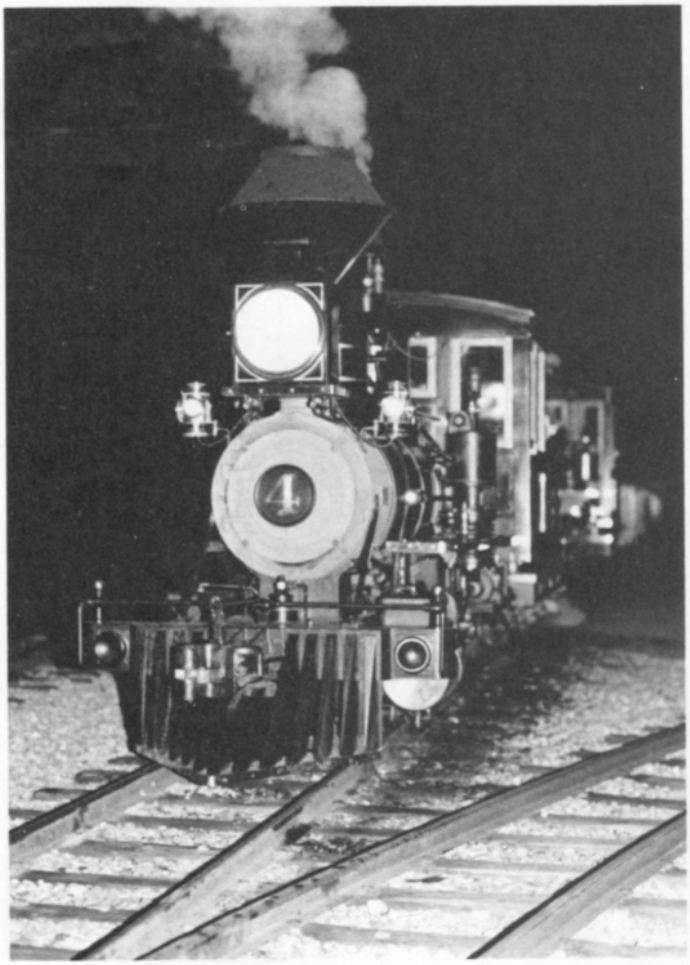

REDWOOD VALLEY SHOPS

# 2-6-0 LOCOMOTIVE

## CLASS 3 STYLE C




**Above** *Redwood Valley Railway* 2-4-2 built in 1965 by Erich Thomsen of Berkeley, California.

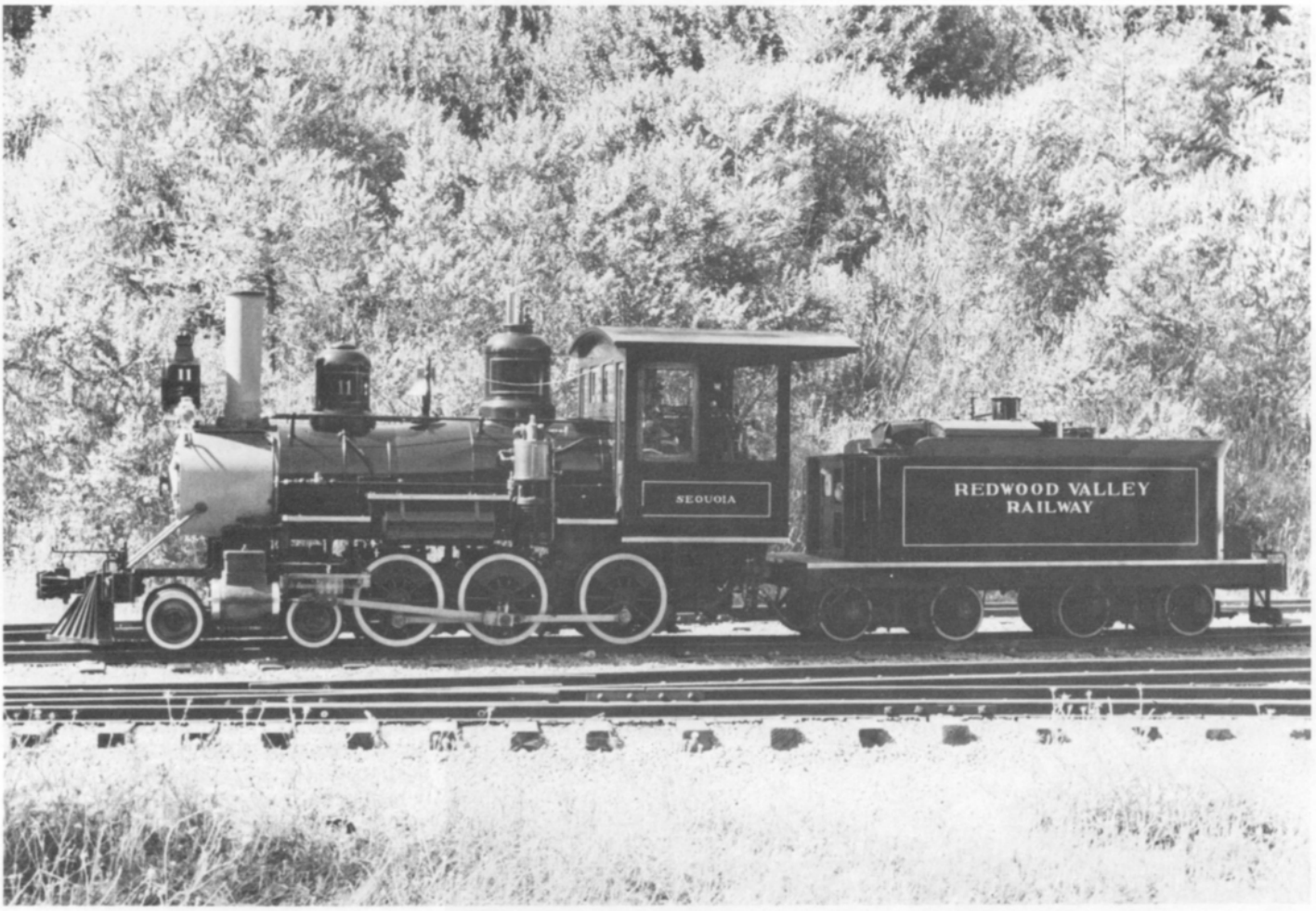



**SPECIFICATIONS**

Scale — 5″
Gauge — 15″
Length engine & tender — 15′ 8″
Weight in working order — 5724 lbs.
Tractive force at 85% — 671 lbs.
Fuel — Oil or coal
Boiler pressure — 125 psi.
Cylinder size — 4¼″ × 5½″
Boiler tubes — 33 — 1¼″
Grate area — 216 sq. in.
Firebox size — 11″ × 19″ × 15½″
Driver diameter — 12½″
Valve gear — Stephenson
Valves — Piston
Main bearings — 2″ × 3″
Tender trucks — 4-wheel Arch Bar
Tender fuel capacity — 26 gals.
Tender water capacity — 96 gals.

Equipment: 2 — ⅜″ Penberthy injectors, Westinghouse style 3½″ × 3½″ air pump, air brakes, gravity sanders, Madison-Kipp lubricator, Von Boden style oil burner, electric headlight, classification lights and cab light.

**Left** Night train waiting to leave Army Camp station for North Point and return in Tilden Park.




**Above** *Redwood Valley* Ten wheeler built by Erich Thomsen and outshopped in 1978 for his railroad in Tilden Park east of San Francisco Bay.

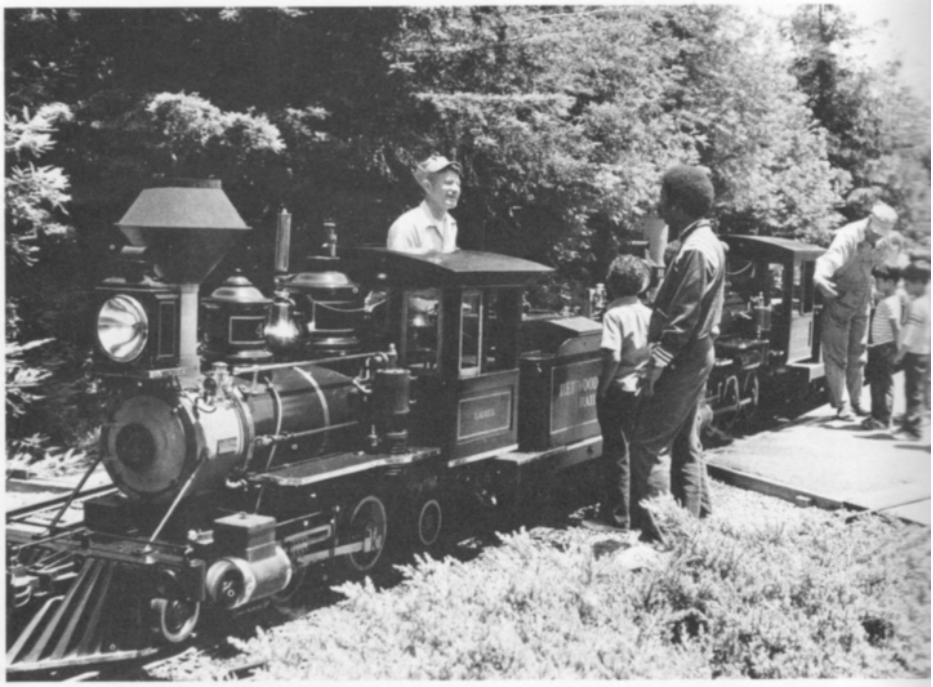
**SPECIFICATIONS**

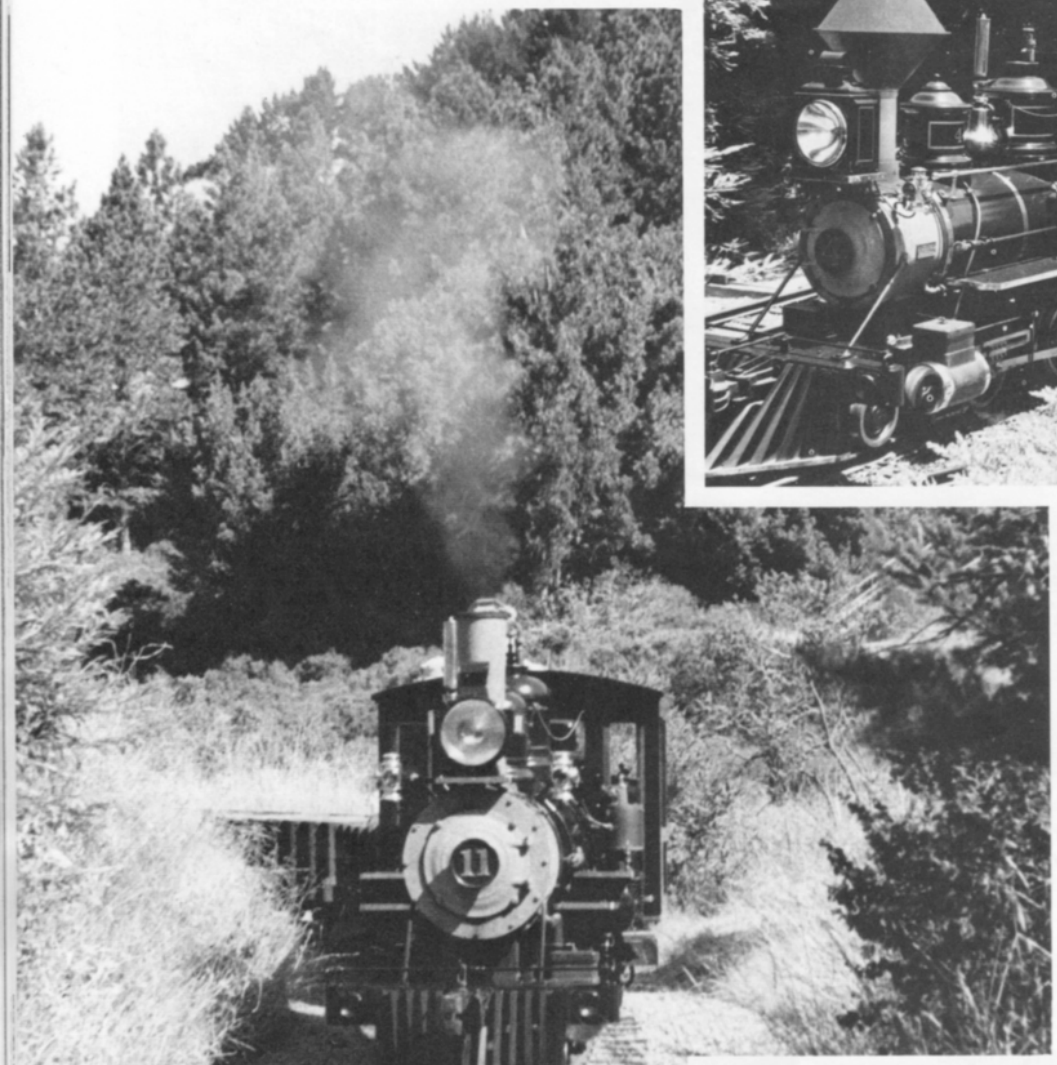
Scale — 5″
Gauge — 15″
Length engine & tender 18′ 3″
Weight in working order — 8884 lbs.
Tractive force at 85% — 921 lbs.
Fuel — Oil
Boiler presssure — 150 psi.
Cylinder size — 4¼″ × 6″
Boiler tubes — 38 — 1¼″
Grate area — 206 sq. in.
Firebox size — 9″ × 23″ × 17½″
Driver diameter — 15″
Valve gear — Stephenson
Valves — Piston
Main bearings — 2″ × 3″
Tender trucks — 4-wheel Arch Bar
Tender fuel capacity — 50 gals.
Tender water capacity — 114 gals.

Equipment: 2 — ⅜″ Penberthy injectors, Westinghouse style 3½″ × 3½″ air pump, air brakes, air sanders, Madison-Kipp lubricator, Von Boden style oil burner, electric headlight, classification lights, cab lights.


**Right** Fourth of July special on the *Redwood Valley Railway*.

**Right** Holiday double-header with a 2-4-2 and a 4-6-0 hauls up to 120 kids or 80 adults at a time on the RV. Ray and Ken Pimlott are the engineers.





common later, because he feels it makes a better-appearing coupler placement on small-prototype engines, and it facilitates designing revenue cars that are as low to the rails as possible, important when you're working with narrow gauge.

Although William Daney had an important role in the adoption of 5-inch scale narrow gauge in the first place, it is really Erich Thomsen who has been its most ardent advocate, a position backed up with the construction of the showpiece *Redwood Valley*. He's earned a right to insist that standards be followed while the number of railroads is small and standards are comparatively easy to adopt.

**Above** Real railroading on Erich Thomsen's *Redwood Valley*. It's hard to tell it's less than half full-size.

**Right** A roundtrip on the RV is 1¼ miles and takes 11 to 12 minutes.