



May '78

# REPORT

No. 146

OFFICIAL PUBLICATION of the PACIFIC SOUTHWEST RAILWAY MUSEUM ASSOCIATION, Inc.



## SANTA FE IS SQUARED AWAY



### SPECIAL AGENT IMPRESSIVE AT APRIL MEETING

Mr. J. P. Carter, Santa Fe's Superintendant of Special Service for the Southern California area, showed a film and gave a most informative talk on the tough and thankless job of railroad policemen at the April 28th Association meeting.

The duties of railroad special agents are either unknown or misunderstood by most people and many railfans as well. Mr. Carter's articulate and professional presentation enlightened the forty-plus members present to the formidable task of combatting thieves and vandals on the nation's railroads.

The film made by the Penn Central in 1971, showed actual footage of thieves looting boxcars in New York City freight yards. The film showed gangs of thieves and drug addicts breaking into railcars with an almost casual boldness. The magnitude of the theft problem alone is almost overwhelming. A few thieves that were arrested and booked in the morning of a typical weekday were out on bail and back looting boxcars the next afternoon! The revenue losses are so staggering from this kind of action that its no wonder that the Penn Central folded up! Can Conrail be far behind?

On the local scene, Mr. Carter informed us that there are only six special agents assigned to the San Diego area. That's six people to police all trackage in San Diego County and part of Orange County 24 hours a day, 7 days a week! One of the biggest problems Carter's men have locally is illegal aliens. Pulling over one hundred of these people off a freight train in San Diego is a routine night's work.

An alien hiding in a covered hopper-full of grain or flour for many hours will defecate on the goods causing the whole shipment to be rejected and a \$50,000 loss to the railroad. In addition to this problem, local agents average fifteen arrests a month for freight car theft, and, of course, don't forget the vandal headache.

At the end of his talk, head agent Carter was hammered with questions from the members present. An interesting point is that railroad police have more power to make arrests than local city police or county sheriff deputys in that they are not restricted by county lines or city limits. Their jurisdiction covers the entire state. It was also mentioned that special agents are still referred to in railroad slang as "pussy foot", "elephant track", "yard bull" etc. just as they were in the early hobo days at the turn of the century.

Mr. Carter said PSRMA's Railfan Patrol could do much to aid his people by keeping an eye out and supplying information to help in the apprehension of vandals and thieves. This idea is already starting to spread. Ed Smith has been invited to set up a Railfan Patrol program in Salt Lake City by the local chapter of the National Railway Historical Society. They have even offered to pay all his expenses to lure him to Utah.

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If you missed this meeting, fans, you really blew it! It was one of the most interesting we have had. Mr. Carter showed intelligence and class and is a credit to the Santa Fe and to law enforcement in general, and it's no wonder. Only three applicants out of six hundred get to be Santa Fe special agents!

Other meeting highlights in addition to the usual activity reports and PSRMA drumbeating, included the introduction of member John Carnes, a direct link to the great railroading tradition of the Lima Locomotive Works founded by his grandfather. John's father also was a top officer of the firm. Shown here is one of John's dad's old-time business cards that he laid on the editor of this sheet some time ago. Its no wonder John feels a special closeness to our Feather River Shay #3.

Special thanks go to Nadine Bristow and Jo Pressnall for providing refreshments and George Geyer for arranging a super meeting. Even good ol' Jack Linn showed up! (L.R.)

## FROM THE CUPOLA

by H. Chalmers Kerr, Jr., President

HIGH-SPEED RAIL TRANSIT SYSTEM FOR SAN DIEGO, AN UPDATE- The Metropolitan Transit Development Board (MTDB) will soon decide if a high-speed rail transit system is feasible to serve the growing population of the San Diego community. MTDB's decision, which is scheduled to be made in about nine weeks, is of critical importance to every San Diego area resident and could impact all of us, now and in the future.

The Draft Environmental Impact Report for the guideway transit project has been prepared and distributed for review and comment. It identifies every possible effect which the ground-level rail system could have on our neighborhoods, economy, natural and man-made environments, and quality of life.

MTDB has now identified every key aspect of the rail transit project: where and how the vehicles would operate, where stations would be located, how bus service would be coordinated with the rail segment, what type of vehicles would be used and much, much more.

The public will provide MTDB with an important input for use in their decision making process, testimony given by members of the total community. To be helpful, this testimony from the public should be based on as much accurate information as MTDB staff is able to disseminate.

PSRMA has been a keen supporter of MTDB's transit plans and how purchase of the San Diego and Arizona Eastern Railway will impact on the future of our needs for museum facilities and trackage to operate a steam powered excursion train.

Because PSRMA is vitally interested in MTDB's success, they have arranged to make an in-depth presentation to PSRMA members of recent findings on the guideway project. The one hour presentation will be held on Monday evening, May 15th at 7:30 in the MTDB offices at 620 "C" Street, Suite 400, San Diego. Please plan to attend. A preliminary head count would be helpful, call Larry Rose (469-3064) or me (291-4787) if you plan to attend.

SUN DAY AND THE RAILROADS- Americans, blessed with sun in some parts of the nation and braving fog, rain or snow in others, on May 3, 1978 celebrated Sun Day with song and dance and a pledge from President Carter to increase government emphasis on solar energy.

During the many nationwide events, solar enthusiasts proclaimed hopes that solar energy will solve such problems as skyrocketing home heating bills, environmental pollution and reliance on huge energy companies, solar energy not being subject to blackouts or power failures or from embargoes by any foreign nations.

What has all this got to do with railroads? Well, a recent issue of the Solar Energy Digest carried a thought-provoking article---SHOULD WE SOLARIZE THE RAILROADS? The article outlines new solar heating concepts for propulsion of a steam locomotive. For decades, American industry has used a primitive "fireless" steam locomotive which received its charge of high temperature pressurized water from a stationary power plant. This type of locomotive was most often found pattering around a major electric power generating station moving coal cars from the main line to power plant trackage. The Solar Energy Digest article carries this idea further with modern steam engine technology and solar energy water heating systems. The postulated applications would be most useful on short line railroads, the example used in the paper is the San Diego and Arizona Eastern Ry. If the MTDB and/or PSRMA acquire the SD&AE east county assets, a perfect test bed would be available. Now, that is something to ponder! Enclosed in this issue of REPORT is a copy of the article. Please contact me if you are interested in developing proposals to undertake such a research project.

## Membership News

by Tanya Rose

Our PSRMA builders have, in the space of just one month, pushed the membership total up to 423 members! The current leaders are Bob Martin, with 8 points and "Chop" Kerr, with 5 points. John D. Corder, our Burlington Northern engineer in McCook, Nebraska, requested two dozen membership brochures, saying "We will do our part on this end to build for more memberships". I wrote back that if he didn't sign up every hogger in his division I knew it wouldn't be because he didn't try. I hope John's example fires you up to get out there and do your darndest. Just think of what we can do with an expanded membership base!

Please remember to put your name on the application so I can credit you when it is returned by that new member. Here is the point system once again: regular membership = 3 points; contributing membership = 1 point; family membership = 3 points for the head of house, plus 1 point for each additional family member. Now, allow me to introduce you to our newest members!

### REGULAR MEMBERS

Patrick F. Burns      Francis M. Salvage  
Robert S. Rios

### CONTRIBUTING MEMBERS

Bessie L. Cossette      Roger H. Harder  
Roger Greenwell      Mae G. Pierce

### FAMILY MEMBERS

Jack G. & Margaret Cauthen  
Bob & Linda DiGiorgio (upgraded)  
George S. & Joyce C. Fuchs

James & Corrine Gallagher (upgraded)  
George & Mary Lazar  
Robert M. & Jeanne Martin (upgraded)

## Exhibit Staffers

by Tanya Rose

Linda Di Giorgio, our tireless "call" girl, who gives the Miramar tour when she isn't busy answering the museum phone or involved with her family's needs, says that there were twelve tours in April, averaging twenty-five people each. She had four volunteer staffers, RAY ARCHER, PAT STANLEY, AL VARTANIAN (who also thoughtfully sends me occasional newsclippings for the REPORT), and PAUL BOVEE, a non-member who has helped her for years supervising tours and locking up the equipment. If you look on the Victoria staffing list, you will again find Pat, Al, and Ray listed. You folks are to be commended! You're O.K.!

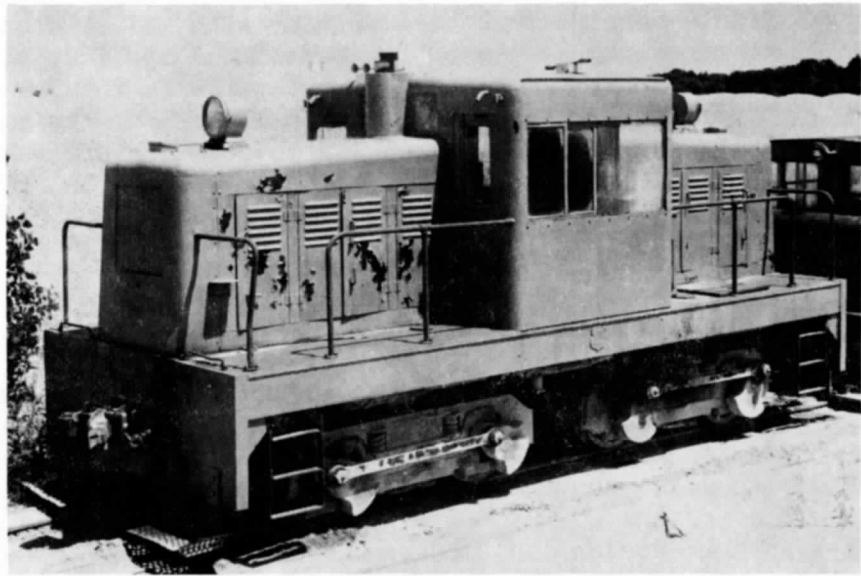
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# Industrial Railways of San Diego County

by P. Allen Copeland

## PART 6---UNITED STATES NAVY, U.S. NAVAL WEAPONS STATION, FALLBROOK ANNEX

Built at the same time as Camp Pendleton, in 1942, and actually a part of the same reservation, the Naval Ammunition Depot was constructed to provide for explosive storage and handling for the Marine Base and to an extent for Navy ships and facilities in the San Diego area. Connecting with the Santa Fe Fallbrook branch at the station of DeLuz, the track extends in a network to service the many storage bunkers built to contain munitions. Naval ordnance is both heavy and bulky, so a number of locomotives were required to service the facility. Four new 1000 HP switchers were purchased to operate the depot, and as time went by, additional engines were brought in and the original power was sent elsewhere. The depot continues in operation today, performing the same tasks that it was built for, with a single GE 80-tonner doing the switching. Operated as a sub-facility of the U.S. Navy Weapons Station at Seal Beach, California, the Ammunition Depot was re-named the Naval Weapons Station, Fallbrook Annex, about 1969.



↑ On June 10, 1972 Ken Douglas shot Porter #7374 in a location far from Fallbrook. Shown here as Ohio & Indiana Stone Co. of Greencastle, Indiana, the Porter unit once had been Fallbrook #6.

← Shown switching at Fallbrook on April Fool's Day of 1945, NW2 still carries her factory paint job in this Gerald M. Best photo. This big switcher would see further service in the San Diego Naval Station.

## Honor Roll

Bill Kingston, owner of the Whistle Stop model railroad shop and a long-time member of PSRMA, has donated a large brass AT&SF steam locomotive bell and front smokebox mount hanger. Stop by and see this rare item and say hi to Bill at his shop at 3834 Fourth Avenue in San Diego. What we need now is a Northern or a Texas-type loco to go under it!

Roster of Locomotives:

U.S. Naval Weapons Station, Fallbrook Annex, California  
Standard Gauge

	1	B-B D/E	1000 HP	250000	GM-EMD	#1922	3/42	Model NW2
	2	B-B D/E	1000 HP	250000	GM-EMD	#1923	3/42	" "
	3	B-B D/E	1000 HP	250000	GM-EMD	#1924	3/42	" "
	4	B-B D/E	1000 HP	250000	GM-EMD	#1925	3/42	" "
65-00052	5	B-B D/E	300 HP	90000	Porter	#7373	3/42	
	6	B-B D/E	300 HP	90000	Porter	#7374	4/42	
	7?	B-B D/E	400 HP	130000	Gen. Elec.	#27519	2/44	
65-00051	8?	B-B D/E	1000 HP		Baldwin	#72004	5/45	Model VO 1000
65-00355	-	B-B D/E	470 HP	160000	Gen. Elec.	#31829	3/53	

- 1 Transferred to Naval Ammunition Depot #45, Hawthorn, Nevada. Later USN #65-00035.
- 2 Transferred to Naval Ammunition Depot, Hingham, Mass. Later USN #65-00160. Sold Whisler Equip. Co. (D), St. Louis, Mo. Sold 1/63 Elgin, Joliet & Eastern RR #408.
- 3 Transferred to U.S. Naval Station, San Diego, Calif. Transferred 11/67 to Naval Ammunition Depot, Crane, Indiana but may never have been delivered there. To Naval Ammunition Depot, Hawthorn, Nevada. Assigned USN #65-00248.
- 4 Transferred to U.S. Naval Proving Ground, Dahlgren, Va. To USN #65-00117. Transferred to U.S. Navy Yard, Portsmouth, N.H. (per EMD records, but may have never been delivered there). Later to Naval Weapons Station, Concord, California.
- 5 Sold 1964 Pacific Terminals Co. #2, Port of Long Beach, California.
- 6 Sold ? Ohio & Indiana Stone Co, Plant #2, Greencastle, Indiana.
- 7? Sold via War Assets Administration at San Diego, 1/47 to Export & Import Co. (D), Dallas, Texas. Further resales unknown.
- 8? Acquired from U.S. Naval Magazine #31, Port Chicago, California. Transferred back 12/31/50 to same location, now called the Naval Ammunition Depot, Port Chicago. Transferred 1962 to N.A.S.A. Ames Research Center, Moffett Field, California.
- New. Still in service at Fallbrook.

## VIEW <sup>from</sup> <sub>the</sub> VESTIBULE

by Jim Lundquist

SD&AE- The abandonment hearings started April 4th and finished up a few weeks later. The Southern Pacific appeared to have weak answers or no answers to the many questions asked by the committee. An opinion shared among those in attendance, which I also share, is that the S.P. has lost their case to tear up the line. Rumor has it that the S.P. also believes this and are now attempting to sell the line. The presiding judge will issue his opinion in August, and then about one or two years later a final decision could be made, (after several lengthy court appeals, no doubt).

MTDB- The MTDB Board of Directors has postponed a final decision on the proposed \$45 million, sixteen mile-long light rail system. BOD member O'Connor will be out of town in June, when they originally were going to make their announcement.

The Environmental Impact Report has been issued on the effects of the light rail system. Basically, it was positive to the idea of running light rail vehicles from the depot to the border. The Environmental Impact Report can be viewed at most libraries in the county.

AMTRAK- Former Department of Transportation Secretary Alan Boyd has been named the third President of Amtrak. Hopefully, he has some friends in Washington who can help him with this tremendous job.

MUSEUM JOINS IN ON PLANS TO RUN STREETCARS IN SAN DIEGO- PSRMA has been asked by the Gas-lamp Quarter Trolley Committee to participate in their plans to run streetcars on Fifth Avenue in downtown San Diego. This could be a big project for the museum and the city. Anyone interested in streetcars or the renewal of the downtown area is invited to attend the first joint meeting on Tuesday, May 16th at 7:00 pm at 520 "E" Street, Suite 1010 in downtown San Diego. This is one project that the same hard-working members cannot undertake by themselves. So, all you traction buffs who have been waiting in the wings for a project you can interest yourselves in have a great opportunity to get involved. Don't drop the ball! We are counting on you. This is just too great of an idea to be held up because of lack of manpower. Be there on the 16th!

LEGISLATIVE NEWS- In response to questions in voting against Amtrak, (see VFTV, Jan. 1978) Bob Wilson wrote me expressing the opinion that "Amtrak was saying to Congress 'if you don't give us \$18 million extra dollars...we'll cancel this service (the Floridian)'"'. He also said "You should clearly understand that I not only recognize the importance of passenger service but I am supportive of the U.S. Government subsidizing the service. (However) I will not vote to spend taxpayers' money under threats of intimidation." I would question the need for Amtrak to threaten the Congress to get the money they need, and hope that Bob Wilson will look into why this has to be done.

California's own anti-Amtrak "Representative" John J. McFall has introduced legislation that would completely change Amtrak by dropping the present Board of Directors and replacing it with a three-man board while also making it a full-fledged arm of the U.S. Government and placing funding restrictions below what Amtrak needs(H.R. 11089). He appears to have White House support.

The S.P. has asked the FUC for permission to drop all commuter service from San Jose to San Francisco except during the rush hours. To counter that move, Papan, Daly City, has introduced legislation in the state to ask the FUC to deny its request (AJR 85).

Senator Jim Mills of Chula Vista has introduced the most interesting pro-rail legislation. These are SB 1894 which would speed up the line between San Juan Capistrano and San Clemente to allow passenger speeds of 110 m.p.h. and keep ownership of the line with Santa Fe, SB 1750 which would buy the San Diego Depot for use as a multi-modal transit terminal, SB 1746 which would abolish the Comprehensive Planning Organization (CPO) in San Diego, allowing the County and MTDB to take over their functions.

## **RESTORATION NEWS**

by Ken Helm

Last month saw steady progress on our Shay loco with more people showing up. It looks like we are working towards an early summer completion date. This month, the entire tender was scraped down to metal for a glass-smooth finish. About six rusted side panels remain to be replaced, then some of the surge plates inside need attention. Dick McIntyre stopped by last month to weld two plates and do some brazing on the exhaust pipe of diesel #7485. The rest of the Shay exterior above the running boards is about one month away from finishing.

Elsewhere, ex-U.P. #576 received a new window, (costing us \$85 thanks to a witless vandal!) as well as a thorough cleaning by Frenda Bailey. Knud Antonsen continues to tweak the diesel. This month, counterbalanced automatic caps to plug the exhaust pipes were installed. There'll be no water down them now! Victoria received attention this month with both generator and ice-engine getting their cooling systems flushed by Ron Milot, Harry Hurry and Ken Helm.

With good weather coming up, the restoration crew hopes to see more of you out on Saturdays. Dirty as usual were: "Nick" Nichols, Knud Antonsen, Tom Collins, Jim Lundquist, Larry Rose, Dick McIntyre, Ken Brandenburg, Jeff, Joe and John Ashman, Dennis Massey, Steve Fuchs, Bob Martin and good ol' Jack Linn.

### AN APPEAL!

The Shay locomotive needs someone who knows how to do body work with lead. In order to make our patches on the tender absolutely invisible some work with lead is required. If you or someone you know can do this, call General Manager Larry Rose at 469-3064.

# RAILFAN PATROL NEWS

by Tanya Rose

The beach at San Clemente was filled with the typical weekend sun worshippers and Ed Smith and I were walking along keeping our eyes on the kids tossing a baseball back and forth across the tracks while we waited for the Amtrak to pass by. In the distance, we saw someone sitting on the rails oblivious to the fact that the train was due any time. We hot-footed it up there just as the train rounded the curve. From our vantage point it was visible, but the man was not aware of any danger. Ed and I yelled at him to get off the tracks, but he stared at us like someone with the I.Q. of a dead plant, finally getting up at the last minute only when he saw it with his own eyes.

Some boys were on a minimum-clearance bridge over a slough pelting the waterfowl with ballast. Because Ed had his scanner tuned to the Santa Fe frequencies, we knew the train was long overdue. Ed shooed the kids off the bridge, but they hung around a little ways off while we stayed there preventing their return. On this stretch of track the train blows by about sixty to eighty m.p.h. This creates a vacuum, which, because of their proximity to the track, could have sucked them under the wheels. They would have been fogged instantly, as they had nowhere to really get out of the way. Instead of thanking us, all we got for our trouble was some choice sass as they took off after the train went by.

This is a taste of a typical Railfan Patroller's day. You might also see someone hurling a rock at a train, playing "chicken" as one rolls down the line, stealing something or trying to cause a derailment. Ed even found a dog tied to the tracks one time. (This "sicko" was eventually caught in the act and arrested!) Much as you might like to dance the "Funky Chicken" on their heads, discretion and judgement are the qualities a Railfan Patrol member must use.

The whole idea of the patrol is to be extra eyes for the badly out-numbered men who police the rails. This is a very non-violent activity, or I would not have gone along with Ed as he patrolled. Anybody can, during his normal railfanning, be of tremendous assistance by just knowing where and how to look for potential vandalism. Your very presence in certain hot-spots might make a prospective trouble maker think twice about doing anything.

We are not vigilantes; we observe and report what we see to the special agent and do not confront the person. Except when there is a clear and present danger such as a kid who doesn't know any better doing something stupid, we stay out of the way.

You would think train crews are safe and secure in the cab of a large road engine but they are so vulnerable it hurts me to even think about it. There's no way they can stop in time if someone or something is on the tracks; there's nothing they can do if they are shot at or an object such as a stone is thrown at the windshield of the cab.

If you would like to help these people who are only trying to do their jobs, come to a meeting of the Railfan Patrol Tuesday, May 23, at 8:00 pm, over at Jim Lundquist's house 3376 Par Drive in La Mesa. Call Ed at 449-0968 or me at 469-3064 if you have any questions. By attending, you will get a better grasp of what the patrol is all about and be on the way to making yourself an even better railfan and a credit to the museum. So get off your caboose and get in your car. There's a great need that has to be met and you can help.

Ed Smith nailed five vandals, thereby making him the first "ace" of the R.P. Now's your chance to score. Join the Railfan Patrol and make an "ace" out of yourself too! See you at Jim's Tuesday night the 23rd!

## REPORT

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Speaking of our Victoria, Jo reports that more and more folks are repeat visitors, they enjoyed it so much the first time. She's indeed unique; small wonder that many return to again savor her beauty.

Nadine Bristow and Pat Stanley have offered to help our proud lady look her best. Are there any more of you out there willing to do a little light housekeeping? Call Jo at 435-5022. We'd all be very grateful, especially Jo, Pat and Nadine!

A big thank you to those of you who filled in at the last minute, and a warm welcome to our newest staffers, Jackie, Ward, Corsica and Lisa. Carol Lande volunteered, but was ill. I will have the pleasure of staffing with her on the 20th, if we both stay healthy! Here are our staffers for March and April:

Jim Cooley, Jr.  
John Patterson  
Al Vartanian  
Ron Milot  
Ray Archer  
Janice Sanders

Harry Hurry  
Anita Rhein  
Nadine Bristow  
George Geyer  
Ed (Ace) Smith  
Corsica de Lascurain  
John Pattison

Carol Lande  
Lisa de Lascurain  
good ol' Jack Linn  
Jackie Collins  
Ward Fagan  
Frank (Faithful) Kearney  
Jo Pressnall



Linda Di Giorgio fields questions from Cub Scouts at Miramar.

photo by Bob Di Giorgio

# PACIFIC SOUTHWEST RAILWAY MUSEUM ASSOCIATION INC.

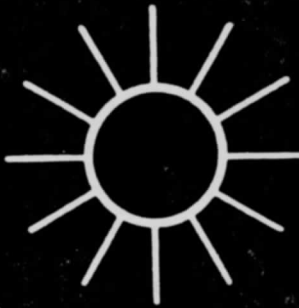
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# SOLAR ENERGY DIGEST

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## SHOULD WE SOLARIZE THE RAILROADS?

Many short line railroads in the United States and elsewhere have either been abandoned or are considering abandonment because of declining freight and passenger revenue. Yet at least some of these railroads can be saved and even made profitable again, particularly if they are located in picturesque areas where tourism can be promoted.

Perhaps the outstanding example of such a railroad is the San Diego and Arizona Eastern, which runs from San Diego south to San Ysidro, crosses over into Mexico, runs about 45 miles east just a few miles below the U.S.—Mexican border, then recrosses the border near a small store called Dogpatchusa, and proceeds eastward to El Centro, California.

Your editor rode this line during World War II, while it was still carrying passengers, and found it to be one of the most scenic railroads he had ever ridden. The ride through the Carrizo Gorge, which leads down from the Jacumba Mountains to the floor of the Yuha Desert, is particularly thrilling. At one hairpin turn, you seem to be meeting yourself going backwards.

Before Tropical Storm Kathleen came along, in September 1976, and washed out part of the SD&AE line in eastern San Diego County, it was running only one freight train a day with an average of 20 cars. This was not enough to make the railroad pay, according to Southern Pacific, which owns the line, and it does not appear to your editor that even if the line is repaired, at an estimated cost of \$1.7 million, it would generate enough freight business to show a profit.

Southern Pacific holds the same view and has asked for permission to abandon the railway.

This means that other sources of revenue must be sought. The most obvious of these is the millions of tourists who visit the San Diego/Tijuana area each year, all looking for something different in the way of entertainment.

If the tracks were improved from their present Class 3 standard, which is suitable only for freight up to 35 miles per hour, to Class 5 or 6, tourist passenger trains could zip from the Pacific to the Desert at 55 miles or more per hour on most sections of the line.

But there would have to be some showmanship connected with such an enterprise to attract the required volume of tourists. For this, you editor visualizes a number of Disneyland-type attractions along the line, each of which would be complete with parking spaces so tourists could leave their cars.

For example, at the San Diego end of the line, there could be a combined parking lot, marina, beach, and Mexican flavored entertainment center called Aztecland.

At Dogpatchusa, near the point where the railroad crosses back into the United States from Mexico, there could be a Dogpatch Land featuring Sadie Hawkins Day Races for the benefit of the tourists.

At the bottom of the Carrizo Gorge, a spectacular Desertland complete with burros, old-time prospectors, desert animals and plants, could climax the journey.

But the most showmanlike feature of all would be to power the new railway, which might be called the Sea to Sand Railroad, with the sun.

There are of course many options as to how this might be done, but one of the simplest and most straightforward appears to use highly insulated steam accumulators resembling huge tank cars. The water in these tanks would be heated to the required temperature, say about 500 F., corresponding to a steam pressure of about 700 psi, with various solar equipment.

For example, at the San Diego end of the line, where sunshine is not as plentiful as in the mountains and deserts to the east, we might use refuse-fired boilers to supply the accumulators with heat.

In the mountains, we might use one or more carousel-type high temperature solar concentrators, while on the floor of the desert we could erect a mini power tower, to do the heating.

The steam accumulators, each of which would hold at least 10,000 gallons of water, would retain the heat for days with modern insulation.

When steam was required, one or more of these steam accumulators would be hooked onto the locomotive from a convenient siding. The locomotive could be powered with either a modern uniflow reciprocating steam engine or by a steam turbo-generator which would supply electric power to the wheels in the same manner as in a diesel-powered locomotive.

It is our understanding that the Germans have used steam accumulators to power locomotives with some success, so we are not breaking new ground with such a proposal.

San Diego's Metropolitan Transit Development Board is seriously considering buying and refurbishing the SD&AE for some \$50 million in order to restore direct rail service to the rich Imperial Valley of California as well as to use the track from San Diego to San Ysidro as a modern high-speed passenger rail corridor. We earnestly recommend that they include these solar and other tourist attractions in their long-range planning as a possible means of obtaining additional funding from such government agencies as the Department of Energy and the Department of Transportation, both of which should be interested in the innovative concepts we have advanced, as well as other ideas which will naturally surface as such a multi-purpose project matures.

We also recommend that other areas with similar railroad situations consider such multi-use projects for their ailing rails.

In the case of San Diego, success for such a project seems financially assured because we are literally drowning in an ocean of visitors and tourists with money to spend for new and exciting experiences. And the various Disneylike attractions we have suggested along the way would also generate a considerable volume of additional freight, which could be hauled at night in order to avoid interference with the Sea to Sand Tourist Trains.

To get the project started, there are even several organizations of railroad buffs in the San Diego area who own working steam locomotives as well as passenger cars which could be dragooned into service until more modern equipment was available. The engines of these locomotives could even be driven directly with the accumulators through flexible steam piping, by-passing the boilers completely.

Then, instead of stopping every 50 miles or so for a tank of

water, the trains would stop to drop off and pick up one or more steam accumulator tank cars.

### But What Is A Steam Accumulator?

For the uninitiated, a steam accumulator is simply a device for storing the energy of steam. This is done in a suitable vessel heated by admixture with steam. When there is an excess of steam, it is condensed in the accumulator with a consequent rise of its temperature and pressure. Then, when there is not enough steam, the shortage is made up from the accumulator. As the pressure in the accumulator drops, the water is vaporized at the expense of the stored energy.

The Rateau accumulator, according to the 6th edition of Marks' Handbook, is principally used to furnish steam to low-pressure turbines. It takes the exhaust from engines working intermittently, as hoisting engines or rolling mill engines, and with sufficient water capacity furnishes a steady supply of steam to the turbine. The accumulator operates at low pressure, and the pressure variation is necessarily small.

The Ruths accumulator has its special field in plants that are required to furnish steam for process work, such as plants for sugar factories, pulp and paper mills, textile and chemical industries. It may also be used in plants for the generation of power, solely, and in power and heating stations. The use of the accumulator permits the operation of the boilers under steady conditions at maximum efficiency. The fluctuations in steam demand are taken care of by the accumulator, leaving the boilers unaffected. In the Ruths accumulator, again according to Marks, the pressure may be relatively high, and the change of pressure during operation may be considerable.

The accumulators we envision for the Sea to Sand Railway would probably resemble the Ruths type, which have special internal piping to condense the steam and means for scrubbing condensate from the issuing steam. However, if they were merely filled with superheated water, which would serve the same purpose, the steam condensing piping would not be necessary.

Marks Handbook, 6th ed., gives us a formula for calculating the capacity of an accumulator, but for the sake of simplicity we can make some rough calculations as follows which will give us a ballpark figure.

If our accumulator tank holds 10,000 gallons and we heat the water to 503.10 F., corresponding to an absolute pressure of 700 pounds per square inch (psia), then use up the heat until the temperature drops to about 281.01 F., corresponding to a pressure of 50 psia, we have extracted  $503.10 - 281.01 = 222$  degrees from each pound of water. This is equivalent to 222 Btus per pound.

Now, since a gallon of water weighs 8.33 lbs., we have extracted a total of  $10,000 \times 8.33 \times 222 = 18,492,600$  Btus of heat from our tank.

If we have an engine which uses 20,000 Btus to produce a horsepower-hour, then we have extracted  $18,492,600/20,000 = 924$  horsepower-hours.

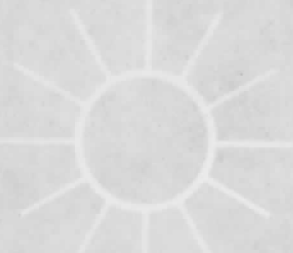
Now, an EMD Diesel-electric passenger locomotive is rated at 1200 H.P., so if our steam locomotive were the same size, we could expect it to run for  $924/1200 = 0.77$ -hour at full throttle. But such locomotives seldom use over about half of their rated output, so we could expect one tank car to last for  $2 \times 0.77 = 1.44$ -hours, or about 86 minutes. This, at an average speed of 50 mph, would be enough to run the Sea to Sand passenger train for about  $50 \times 1.44 = 72$  miles, or about half way to El Centro from San Diego via the SD & AE's present trackage.

These calculations, of course, are merely indicative of what might be possible, and are not to be used in actual engineering work. For that, many other inputs would be required such as tank insulation, actual engine efficiency, weight of train, and many others.

But, even so, it appears that steam accumulators would be quite effective on such short-haul railways, particularly when frequent stops are made anyway to let off and take on passengers. These stops, as already indicated, could also be used to sidetrack discharged and to pick up charged accumulator tank cars.

The possibilities of such railroad solarization are obviously mind-boggling and we have merely scratched the surface!

— William B. Edmondson



SOLAR ENERGY DIGEST