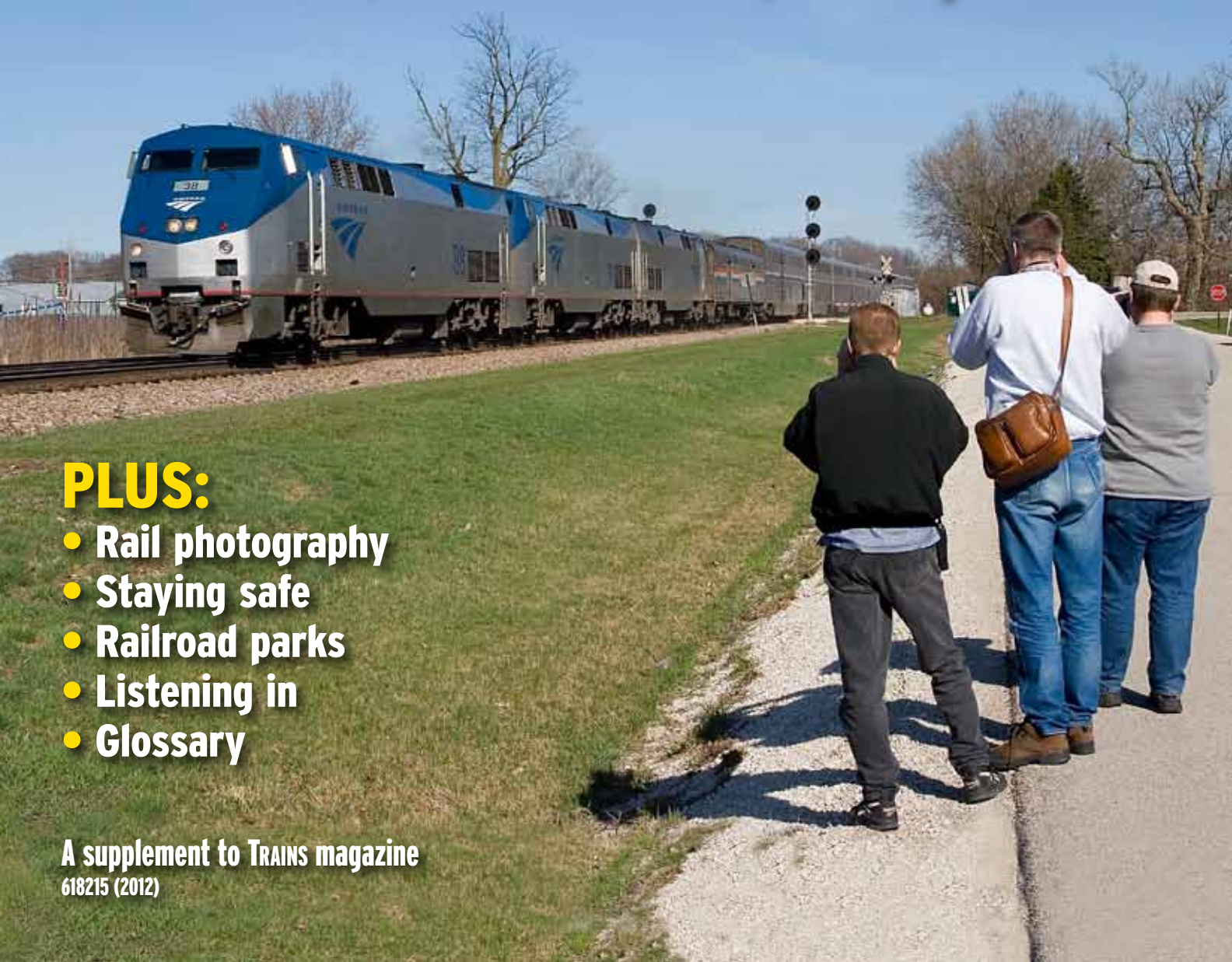
Trains MAGAZINE

Trackside Guide

Your introduction to: train-watching, locomotives and cars, how railroads work, travel by train



PLUS:

- Rail photography
- Staying safe
- Railroad parks
- Listening in
- Glossary

A supplement to TRAINS magazine
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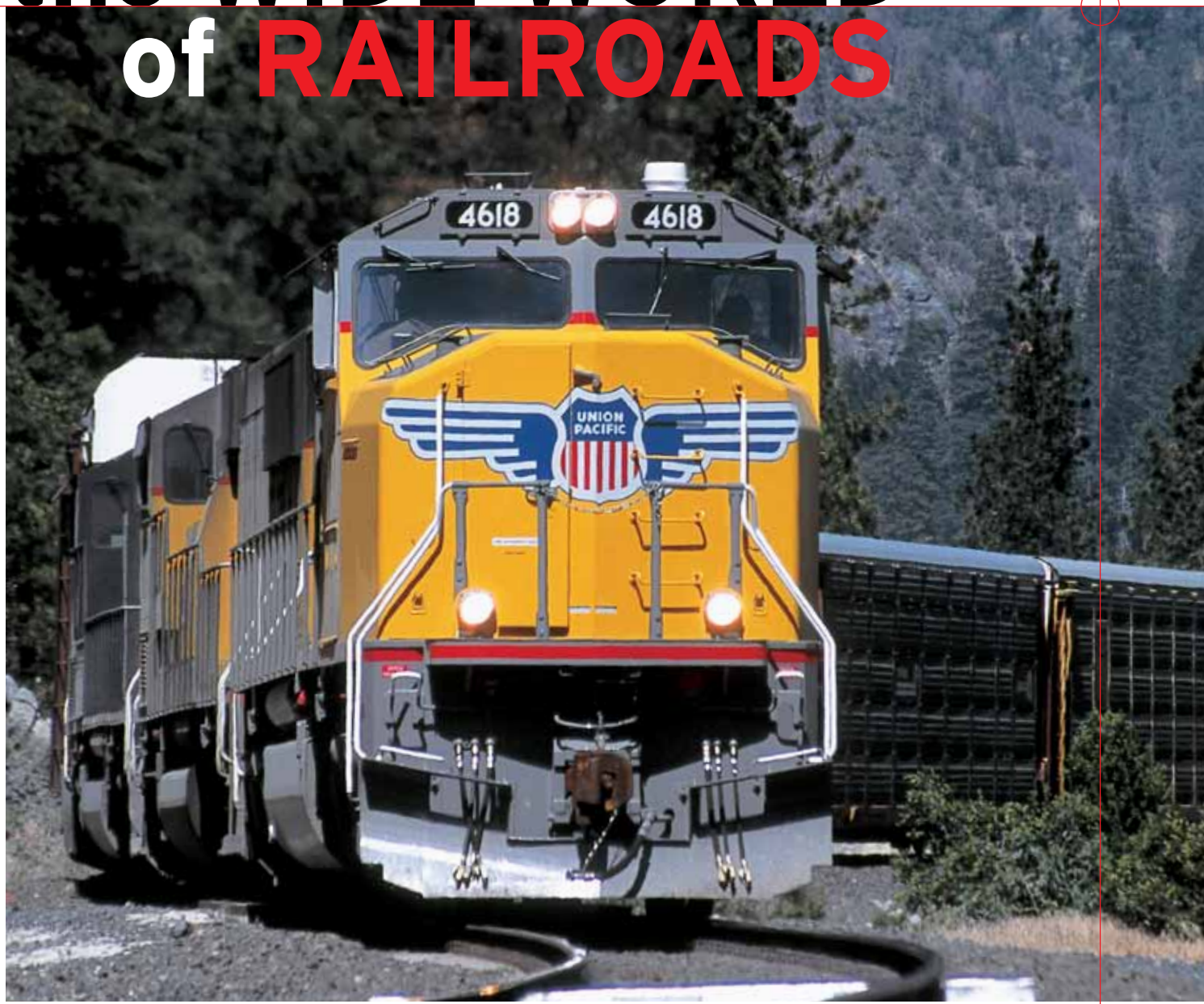
the WIDE WORLD of RAILROADS



Union Pacific SD70M locomotive No. 4618 leads a train of auto racks through California's Feather River Canyon. Ray Lewis

Railroads move millions of tons of freight and millions of passengers each year. America's railroads got their start more than 180 years ago and have been instrumental in the development and prosperity of North America.

But railroading is more than just a major industry with a long history. For perhaps a quarter-million people — from small children to busy adults to great-grandparents — the study of railroading's many fascinating aspects is an important hobby that can be enjoyed in numerous ways.

The modern freight train pictured above reveals several of the characteristics that draw people to railroads: power, color, geography, history, and photography. For the many "train-watchers," "railroad enthusiasts," or "railfans" across the country, these elements are cornerstones of the railroad hobby.

This freight train is one of the thousands that operate each day throughout the continent, moving 42.7 percent of the nation's goods. This train's operator, Omaha, Neb.-based Union Pacific, is one of America's oldest railroad companies. It's also one of the largest, a mega-system with approximately 32,205 route miles of track, more than 8,250 locomotives, and 119,000 freight cars!

This photograph itself represents an important aspect of the railroad hobby. Many train-watchers take photos of the trains they see, and strive to do so as artistically as they can. Others prefer to go trackside and just watch.

No matter what you like — history, locomotives, travel, technology, operations, photography — the railroad hobby has something for every taste. Enjoyed alone or with others, it's an interest that can be immensely fulfilling, and one that can last a lifetime. Something new and exciting is always just around the curve.

>> MORE ON OUR WEBSITE

Wondering where to start your journey into the world of railroading? Go on-line and find railroad information, history, photography, and reference material at www.TrainsMag.com

TRAIN-WATCHING BASICS

Participating in the railroad hobby can be as easy as standing in your favorite trackside spot on a sunny day and watching the trains roll by. Carl Swanson

Among the ways in which people participate in the railroad hobby, the simple act of watching trains is the most popular.

Some railfans thrill to the power of thousands of tons of steel rushing by. Others watch for new locomotive types, or old classics running out their last miles. Many focus on changing traffic patterns on their hometown railroads: what trains run when, what business has been gained or lost, what new routes trains follow, and so on. A great number seek trains so they can photograph them (see box at right). Most are drawn to multiple aspects of the rich railroad scene that run deep and beyond the obvious: technology, finance, physics, engineering, business, history, and more.

On the one hand, train-watching can be as simple as an afternoon next to a busy main line: Just find a spot by the tracks, and sooner or later you'll see a train. Many railfans want to get the most out of their trackside time, however, and they make use of the resources available to help them find where the trains are running.

Maps are a must, from state highway maps to U.S. Geological Survey quadrangle maps, to general-purpose and railroad-related atlases depicting small areas in great detail. Electronic map products even enable a person to customize a map to individual train-watching needs. For selected areas, railfan guidebooks are available; these often include maps, locations of major junctions and other rail facilities, good photo locations, traffic overviews, and historical summaries. GPS has added yet another option.

Other guides present line-by-line, station-by-station descriptions of railroads. These are patterned after the carriers' own employee timetables, surplus copies of which are available from advertisers in Trains, as well as at railroad swap meets and online auctions. Reference books, such as those published by Kalmbach Publishing Co. and others, provide a wealth of information on such topics as the best train-watching "hot spots," diesel and steam locomotives, and tourist lines. They can be purchased via the Internet at www.trainsmag.com, and also in hobby shops and book stores. On the Internet, the Trains site offers a wealth of information, as well as countless news groups, home pages, rosters, and other resources.

Trains magazine offers a monthly column called "Trackside," which spotlights train-watching locations, provides railfan news, and offers advice on this avocation.

The railroad hobby takes other forms besides train-watching. Many people enjoy the unique travel possibilities offered by passenger trains. Some try to "collect" as many miles of the railroad network as possible by riding special passenger trains. Those with model railroads like to study bridges, buildings, and other structures. The hobby is limitless.

Railroading's rich past appeals to many people who examine the industry from a historical perspective through books. In places where railroads have been abandoned, it's interesting to find and follow the old rights-of-way, many of which have been converted to recreational trails. Others collect artifacts like lanterns, timetables, and dining-car china. The past is kept alive by thousands who volunteer their time to preserve locomotives, cars, and structures at museums and on tourist railroads.

In short, railroading is endlessly fascinating.

SAFETY FIRST

Railroads have many safety rules and slogans with good reason: They are dangerous places. Trains can't stop quickly or swerve to avoid hitting someone, and tracks are easy to trip on. Keep in mind an old safety rule: "Expect equipment to move on any track, in any direction, at any time." The only legal place to cross a rail line is at a designated grade crossing. Remember, railroads are private property and require permission to enter. Many states maintain trespassing laws and attach stiff penalties for violators. Even though a location may look tempting, remember that railroad police or stationary cameras may be watching you. Use your head near the railroad.

RAIL PHOTOGRAPHY

For many, photography is an important part of the railroad hobby. By taking photos, railfans can make a visual record of what they've seen, where they've been, and the changes that occur over time. Many take pictures simply for documentation; others enjoy mixing their interest in trains with the artistic possibilities of photography. Also, it's fun to show your photos to others, and to see what you can learn from them about train-watching spots and photo techniques.

Digital photography is the dominant medium for railroad photographers. By capturing images electronically, railfans can instantly see the photos on the backs of their cameras, then share the images with their friends via the Internet. Websites have emerged in recent years that enable rail photographers from around the world to share their photos in one place. Railpictures.net and rrpicturearchives.net are designed specifically for train photographers, while photographer-created groups on general photo-sharing websites like Flickr and Facebook offer similar opportunities.

TRAINS' own website offers the chance to appear in our "Photo of the Day," or the biweekly "Trackside with TRAINS" competition.

New point-and-shoot digital cameras start around $120, and their quality is ever-improving. Digital single-lens-reflex cameras, which start at around $500 for a camera-lens kit, offer better photos with almost no shutter lag.

For a more personal experience, host a digital slideshow and invite your friends. Digital projectors cost $600 and up, but all you need is one friend who has one. Software like ProShow ($69.95) enables you to easily synchronize your photos with music.

Videotape goes beyond still photography by adding movement and sound. Like digital still photography, video offers the photographer an immediate result without waiting for film processing.

To learn more, talk to experienced rail photographers, visit your local camera store or hobby shop, or consult books on photography, both rail-oriented and general.

LISTENING IN

Safe and efficient railroad operations depend on radio communications. Crew members use radios to talk to each other while switching; radio enables dispatchers and train crews to stay in constant contact; trackside defect detectors report their findings. The railroads' reliance on radio is of great help to the train-watcher. Thanks to widely available, easy-to-use radio communications receivers (scanners), one can listen in on railroad radio talk and get information on train locations and operations.

A scanner continuously checks, or scans, a group of user-selected frequencies for radio transmissions. When it finds a transmission, it stops to allow the user to hear it; when the transmission ends, it resumes scanning. In many areas, more than one of the 97 frequencies allotted to railroads may be in use; a scanner enables a person to monitor several of them at once.

Scanners come in two basic configurations. Their compact size and battery power enables the user to take portable scanners anywhere. Base scanners run off A.C. house electricity, and many can be mounted in a vehicle and run off the car's battery. Virtually all railroad communications are carried out on the VHF high band (around 161 MHz), so it's not necessary to buy a scanner that covers many frequency bands. Regardless of the scanner type, reception range can be vastly increased through use of an external antenna.

A caution: Some states prohibit mobile use of scanners. To learn more, visit your local electronics store. Happy listening!

RAILROAD PARKS

Several communities have created safe, comfortable places to enjoy railroad action. Some of the more notable include:

- Railroad Park, Rochelle, Ill.: At the crossing of Union Pacific and BNSF Railway main lines. To see a live picture, visit www.trainsmag.com and click the "Web Cams" link.
- Horseshoe Curve National Historic Landmark: Near Altoona, Pa., overlooks Norfolk Southern's triple-tracked main through the "Amphitheater of the Alleghenies." More information is available at www.railroadcity.com.
- Manchester, Ga., 65 miles southwest of Atlanta, features a covered observation deck that overlooks the CSX yard.
- Crossroads Park, at the crossing of two CSX lines in Deshler, Ohio, features a picnic area, and space to park a camper. Deshler is about 40 miles south of Toledo. Marion, Ohio, also has a restored railroad tower open to the public, overlooking a CSX-Norfolk Southern junction.
- North Platte, Neb., offers the Golden Spike Tower, which overlooks Union Pacific's Bailey Yard, the world's largest railroad yard. See www.goldenspiketower.com for details.
- Folkston, Ga., located at the so-called "funnel" of CSX lines coming from the north heading into Florida.
- Austell, Ga., in suburban western Atlanta, offers a train-watching post at the split of two Norfolk Southern main lines.
- Flatonia, Texas, shows off Union Pacific main lines in a location between Houston and San Antonio.

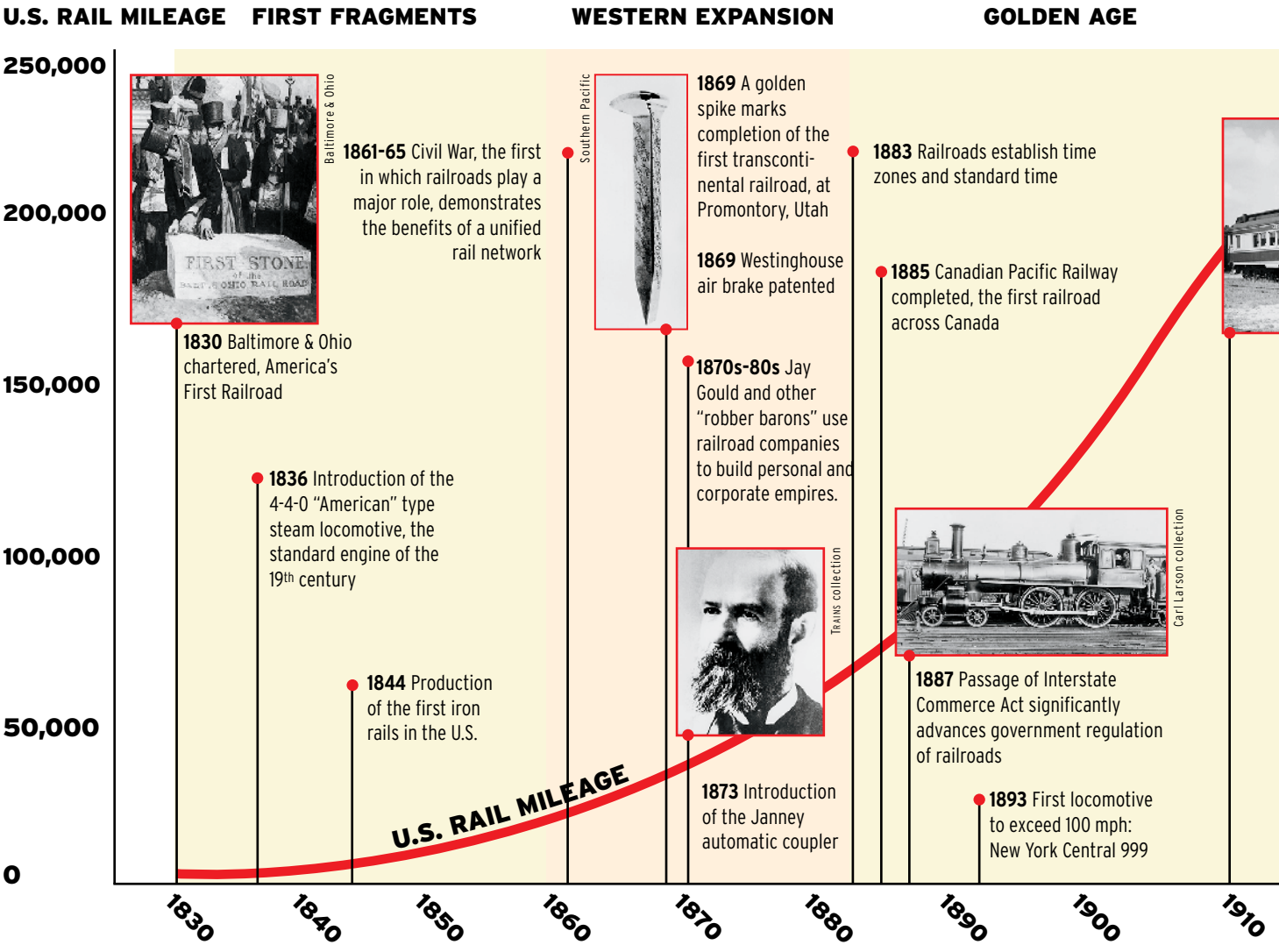
timeline of an AMERICAN

Before the railroads, North America's primary transportation arteries were coastal waters, rivers, lakes, canals, and crude roads. The first true common-carrier railroads were built as connections between waterways. Most such enterprises were undertaken to join individual East Coast cities with the interior, not with an eye toward developing a unified network. Early on, horses pulled stagecoach-like cars, but soon steam locomotives took over.

By the Civil War, railroads were still confined largely to the territory east of the Mississippi River, but had begun to form an interconnected system, especially in the Northern states. After California joined the U.S. in 1850, efforts to build a railroad to the West Coast began. The track gauge of the great transcontinental line (4 feet, 8½ inches) helped set a national standard, though the cheaper 3-foot gauge enjoyed brief popularity. Numerous Western routes were built in the 1870s and 1880s, many with the aid of land granted to the railroads by the federal government.

The "Golden Age" of railroads saw track mileage continue upward, and the emergence of railroads as a major force in American life. Thousands of towns were established along new rail lines, and existing communities eagerly sought train service. Across the nation, people benefited from, and became dependent on, the railroads. The depot became the hub of activity for many communities as the gathering place to see who was coming and going.

As the first big businesses, railroads often put profit before public welfare, leading to calls for their regulation. Trains got bigger, faster, and safer as the maturing industry adopted technological improvements. By 1915, railroads were peaking, both in physical extent and societal influence. Electric interurban railways boosted mileage during their heyday of 1890-1920, but mostly took business away from "steam" railroads. Automobiles and trucks proved the more formidable and enduring competitors, aided by publicly funded highways and restrictive regulation of railroads.



INDUSTRY

Abandonment of unprofitable lines slowly began. Despite the industry's sagging fortunes, railroading of this period was a glorious spectacle, with the carriers running their operations with ever-heavier "standard" equipment.

Buffeted by competition and the Great Depression, the railroads in the post-World War II era sought to win back travelers with sleek, lightweight, diesel-powered passenger trains.

Once diesels had shown their superior efficiency, the industry rushed to replace steam power. This colorful period saw bright, new passenger trains and diesel locomotives sharing the rails with the last of the great steam engines.

Diesels helped, but the slide continued. Jet aircraft and the Interstate highway system helped to empty the wonderful postwar streamliners. As fewer people rode trains, the railroads sought to discontinue them, and then exited the passenger business altogether. An overabundance of lines in the Northeast and Midwest led to several failures and abandonments.

While the practice of combining small railroads into larger ones was hardly new, the late 1950s marked an increase in mergers that saw many familiar railroad names disappear. Other efficiencies were achieved through new freight-hauling equipment and practices like jumbo covered hopper cars for grain, unit coal trains, and piggyback transportation of truck trailers.

Since deregulation in 1980, railroads have experienced a renaissance that has seen them shed mileage, focus on unit trains of Western coal and doublestack intermodal, and embrace technological advances. They've merged, become bigger, grown more efficient, and hired thousands.

Today's railroads are in the best shape they've been in decades. They boast more and newer cars, more miles of double track, and lots of traffic. The early 21st century is an excellent time to enjoy an industry that is growing once again.

STANDARD ERA | **STREAMLINING AND DIESELIZATION** | **MERGERS AND BANKRUPTCIES** | **DEREGULATION** | **TECHNOLOGY**

Ray Meates

1910s Steel begins to replace wood in the construction of railroad cars

1917-1920 World War I traffic congestion prompts U.S. government to take control of railroads

Mid-1930s Streamlining applied to many passenger trains in an answer to highway and air competition

1939 General Motors FT No. 103 proves practicality of diesel power for all services

1941-45 World War II doubles freight traffic and quadruples passenger traffic, but the railroads do the job

Don Wood

1955 Trailer Train Co. formed to standardize intermodal equipment, facilitating growth of piggyback traffic

Trains collection

1960 Last regular use of steam locomotives on mainline railroads

Early 1960s Unit freight trains begin operation, boosting efficiency and lowering costs for bulk shipments

1971 Quasi-governmental corporation Amtrak assumes operation of one-third of intercity passenger trains; remainder discontinued

Dale W. Woodland

1980 Staggers Rail Act substantially deregulates railroads, allowing greater route and rate freedom.

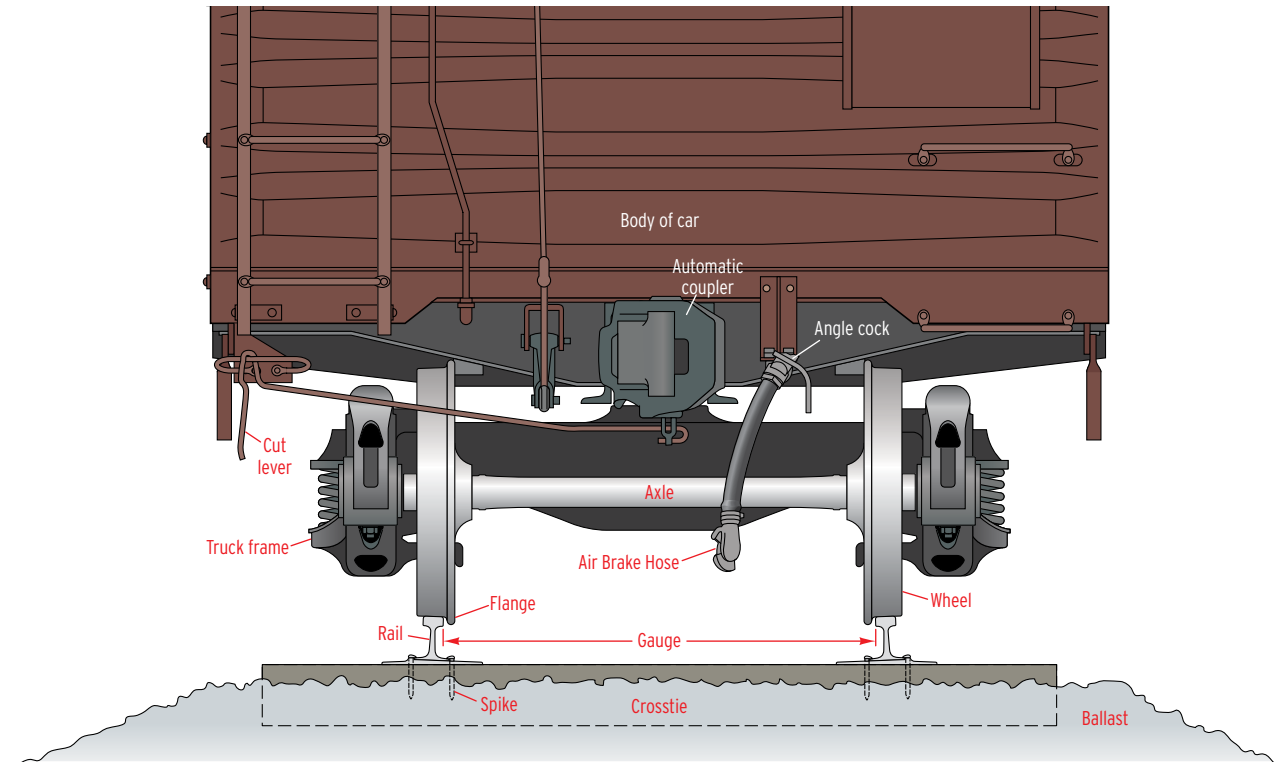
Late 1990s "Mega-mergers" reduce the number of U.S. Class I systems to seven

Steve Smallinger

2010 Warren Buffett's Berkshire Hathaway buys BNSF for $26.7 billion

1920 1930 1940 1950 1960 1970 1980 1990 2000 2010

how trains MOVE FREIGHT



AUTOMATIC COUPLER: Couplers work like clasped hands. A movable knuckle locks in place automatically when two cars come together. Uncoupling is accomplished by manually operating the cut lever, which unlocks the knuckle, allowing it to open as the cars are separated. Other automatic designs are used on "captive" equipment such as commuter cars.

ANGLE COCK: In the open position, it allows brake-pipe air to flow from car to car; closed (as on the end of a train), it keeps air in the system.

AIR BRAKE HOSE: Brakes work by air pressure. Cars are linked by hoses to each other and the locomotive, whose air compressor maintains pressure in the brake pipe (also called the train line). To set brakes, the engineer reduces pressure in the line, causing a valve on each car to draw air from a reservoir, increasing pressure in the car's brake cylinder. As the cylinder's piston moves, linkages force brake shoes against the car's wheels. The system is nearly fail-safe if it is fully charged at the start of a run: Any event causing a loss of pressure in the line causes the brakes to apply.

WHEEL: Each pair of wheels, connected by an axle, is called a wheelset. Most cars have eight wheels, grouped in two sets of four in swiveling assemblies called trucks. Bearings on the outer ends of the axles are connected to truck frames (sometimes called bogies).

FLANGE: A key element of railway technology: a small lip on the inner edge of the wheel that keeps rolling stock on the rails. Flange depth is only about 1 inch.

TRACK: Can be straight (called tangent) or curved. Track curvature is measured in degrees: Most mainline curves are 1 or 2 degrees; track in rough terrain can have 10-degree curves or sharper. Slope, or grade, of track is measured as a percentage of distance climbed per distance traveled forward. Therefore, a 1-percent grade is a significant challenge to a heavy train; grades steeper than 3 percent are rare.

RAIL: Made of high-quality steel, and comprising three parts: head, web, and base. Measured by weight per yard, most mainline rail is in the 130- to 140-pound range; some light-duty track has lighter rail. Standard rail length was once 39 feet, with sections joined by bolts and angle (or joint) bars. Jointed rail still makes up most lightly used track, but the standard on main lines is continuous welded rail. Joined into 1,500-foot lengths at special plants, welded rail is transported to the field, where even more joints are welded after it is laid.

GAUGE: The distance between the inner faces of the rail heads is 4 feet, 8½ inches, also called standard gauge. Used throughout North America and Europe, it originated in England. Variations from standard (rare in the U.S. and Canada) are termed either narrow gauge or broad gauge.

SPIKE: Four or six per tie (three or four per rail, more on curves) are driven through tie plates into crossties to secure the rail in place. Clips and special tie plates are used with concrete and sometimes wood ties.

BALLAST: Crushed rock laid over gravel sub-ballast and earth sub-grade to keep track in horizontal and vertical alignment and properly drained.

Dispatching centers are the high-tech "brains" of the railroad. Kevin Fuller closely monitors trains at BNSF Railway's San Bernardino, Calif., dispatch center on Jan. 6, 2009. Steve Crise

Railroads are fixed-guideway systems for transporting goods or people. Their basis is the low friction, and hence high efficiency, of a hard wheel rolling on a hard surface. They are made up of many elements: people doing different jobs, and hardware for them to use. The jobs range from laborer to strategic planner. The tools can be as simple as pieces of wood and steel fastened together, or as sophisticated as computerized dispatching systems. The technology is both ancient and modern; its basics have changed little in 150 years, yet some elements are spin-offs of space exploration.

The two features that set railroads apart from other modes of transportation and make them so appealing to so many people are their rolling stock (locomotives and cars) and their roadway (track). By examining the diagram on the facing page of the end of a freight car on a standard section of track, you can learn about the most important tools of railroading.

A Union Pacific signal maintainer examines the moving parts behind a signal that gives instructions to engineers. Howard Ande

As with many things, it's the details that make the difference. When all the parts are operating correctly, and working together, railroads are a mechanical marvel. But when a part fails, whether it's as small as an angle cock or as large as a section of rail, the results can be quite serious, and sometimes disastrous. It's the constant maintenance by those who work on the railroads, and the vigilance of those who operate the equipment, that keep the freight and passengers rolling.

BOXCAR

For general service, especially loads needing protection from the elements. Loaded and unloaded through side doors. Refrigerator cars are similar, but are equipped with mechanical cooling equipment, and often condition monitoring devices.

TRAINS: Jim Wrinn

TANK CAR

For gases and bulk-quantity liquids like corn syrup, petroleum products, and chemicals, including hazardous materials. Two types: pressurized and non-pressurized.

Ray Kenley

HOPPER CAR

For bulk commodities not needing protection like coal or stone. Sloped floor sheets at the ends facilitate unloading through doors in funnel-like bins in the bottom of the car.

Patrick Yough

COVERED HOPPER

For bulk commodities like grain that require protection from weather and contamination. Loaded through roof hatches, unloaded like an open hopper. May have flat or rounded sides, and come in several lengths.

Thomas E. Hoffmann

GONDOLA

For loads like iron and steel products, scrap, etc. Some have removable roofs or special body designs to accommodate specific commodities. High-side types carry coal, and are turned upside down to empty.

TRAINS: Andy Cummings

FLATCAR

For loads, often large objects, not requiring protection from weather. Cars with end or center bulkheads are used for wood products. Intermodal cars carry truck trailers and containers.

Jim Hediger

AUTO RACK

A heavily modified 89-foot intermodal flatcar fitted with decks, walls, roof, and end doors for carrying automobiles and light trucks. May have two or three levels.

Jim Hediger

DOUBLE-STACK CAR

Depression (or "well") in car enables intermodal containers to be stacked two high. Some fitted to carry trailers, too. Single unit, or articulated (sharing trucks) with adjacent cars.

TRAINS: Andy Cummings

railroading's BIG POWER

Locomotives are railroading's most potent and popular symbols. The major types that have been used in North America are steam (now confined to museums, tourist lines, and the occasional mainline excursion), diesel-electric (the standard of the industry), and straight electric (always a tiny minority).

Steam locomotives burn coal, oil, or (in early days) wood in a firebox attached to the boiler. Hot gases from the fire pass forward through tubes called flues inside the boiler, which contains water. The gases heat the water, turning it to steam. By opening the throttle, the engineer admits steam to the dry pipe, which takes it to the two valve chests (one on each side). Moving back and forth according to the engineer's setting of the valve gear with the "reverse lever," the valves admit steam to the cylinders so the steam can push the pistons as it expands. The piston rods are linked to main rods, which are connected to side rods, which are attached to the driving wheels. After the steam has done its work, it exhausts through the smokebox and out the smokestack, pulling the hot, smoky gases from the flues with it in the familiar chuff-chuff cadence.

The major locomotive builders were Baldwin, American (Alco), Lima, and several railroads themselves.

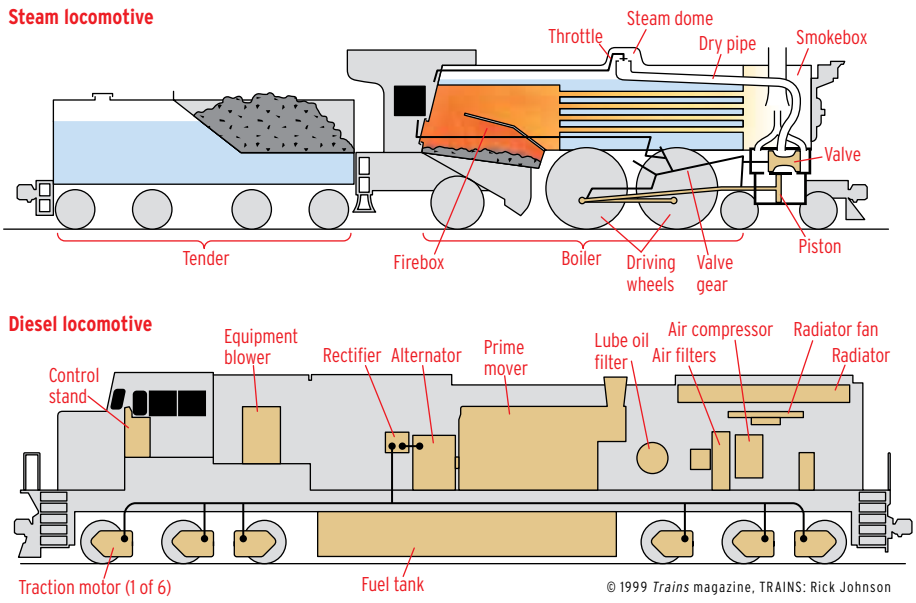
Diesel-electric locomotives have a large diesel engine, or prime mover, which turns an alternator or generator, which ultimately produces a D.C. electric output. On a D.C. locomotive, that power is regulated and sent to axle-mounted electric traction motors. On an A.C. locomotive, a further step is required. An inverter takes the D.C. output from the alternator and inverts it to three-phase A.C., which in turn feeds the electric traction motors directly. A.C. has advantages because the traction motors can be of simpler design and maintenance, as well as of lighter weight. Much of the space inside a diesel locomotive's long hood is occupied by auxiliary items such as radiators, blowers, and dynamic brake equipment, as well as an air compressor, and associated equipment.

Diesel (and electric) wheel arrangements are expressed in terms of axles, not wheels. "A" indicates a single powered axle, "B" means two together, "C" is three, etc. Non-powered axles are indicated as numbers. A handful of old A1A-A1A units remain, but virtually every locomotive today has all axles powered and is either a B-B (two 2-axle trucks) or C-C (two 3-axle trucks, as in the diagram).

Today's builders are Electro-Motive Diesel and General Electric. Formerly, General Motors, Alco, Baldwin, Fairbanks-Morse, and Lima also built them. Electric locomotives generally draw current from a third rail or overhead wires via roof-mounted pantographs, modify it, and use it in their traction motors. They share many advantages with diesels, but are not as flexible because they can't operate beyond their power supply.

Typical of modern power roaming the rails, a new Electro-Motive Diesel 4,300-hp BNSF Railway SD70ACe leads a westbound coal train at Buda, Ill., on June 29, 2008. TRAINS: Tom Danneman

Two brand new CSX General Electric-made ES44AC locomotives with the CSX new "boxcar" logo move southbound train Q696-03 at Slant, Va., on Nov. 4, 2011. The units each pack 4,400 hp each and weigh about 216 tons each. Chris Starnes



COMMON STEAM LOCOMOTIVE DESIGNS

Wheel arrangement	Name or type
0-4-0	-
0-6-0	-
0-8-0	-
2-6-0	Mogul
2-6-2	Prairie
2-8-0	Consolidation
2-8-2	Mikado
2-8-4	Berkshire
2-10-0	Decapod
2-10-2	Santa Fe
2-10-4	Texas
2-6-6-2	-
2-6-6-4	-
2-8-8-2	-
2-8-8-4	Yellowstone
4-4-0	American
4-4-2	Atlantic
4-6-0	Ten-Wheeler
4-6-2	Pacific
4-6-4	Hudson
4-8-2	Mountain
4-8-4	Northern
4-6-6-4	Challenger
4-8-8-2	Cab-forward
4-8-8-4	Big Boy

RIDING the RAILROAD

One of the best windows on the railroad world is the passenger train. Although rail accounts for only a tiny fraction of travel today, there are plenty of places to ride trains.

Amtrak is America's national passenger railroad. A government corporation, in 1971 it took over operation of nearly all intercity passenger trains, which had become an unprofitable burden to the private railroads. The 21,000-mile network includes 500 stations in 46 states served by about 300 trains each day. Service ranges from hourly on part of the busy Boston-Washington Northeast Corridor to triweekly on some long-distance runs.

Amtrak rolling stock varies with geography and length of run. Tight overhead clearances dictate the use of single-level cars in the Northeast, while most trains west of Chicago (and a few to the east and south) are comprised of double-deck Superliners. Shorter runs have high-capacity coaches and, often, cafe cars; the big cross-country trains have coaches, sleeping cars, dining cars, and lounge cars. To arrange a trip or obtain timetables and a travel planning book, consult a travel agent, call (800) USA-RAIL, or visit www.amtrak.com.

VIA Rail Canada is the Canadian passenger rail system. It covers about 8,500 miles spanning from Halifax, N.S., to Vancouver and Prince Rupert, B.C., and north to Churchill, Man. Service is most frequent in the Quebec-Windsor, Ont., corridor. For more information on VIA, consult a travel agent, call (888) VIA-RAIL, or visit www.viarail.ca.

Canada also is home to two independent passenger operators: Ontario Northland Railway and Canadian National (which operates services in British Columbia and on its Algoma Central Railway subsidiary in Ontario). The only major independent intercity rail passenger service in the U.S. is run by the Alaska Railroad; call (800) 544-0552 or visit www.akrr.com for more information.

Commuter trains move people around major metropolitan areas and are managed by governmental agencies. Most commuter rail operations are concentrated in the major cities along the East and West coasts. Service into New York and Philadelphia is dominated by single-level electric multiple-unit (M.U.) cars, while diesel-powered bilevel push-pull trains (locomotive on one end, cab-control car on the other for bidirectional operation) are common elsewhere. Service levels vary from line to line and city to city, but are highest during the morning and afternoon rush hours.

Commuter rail differs from light-rail and heavy-rail electric transit systems in that the trains operate over standard-gauge tracks that are part of the continent's railroad network, and the equipment is built to full-size railroad standards. Over the past couple of decades the number of commuter and transit systems has expanded greatly, giving more people in more places the opportunity to ride trains.

Amtrak's *Acela Express* rockets through Odenton, Md., at 125 mph on its way from Washington to Boston. Michael McFadden

Amtrak 145 leads the *California Zephyr* eastward at Helper, Utah, on Aug. 1, 2007. TRAINS: Andy Cummings

HISTORIC TRAIN RIDES

Most passenger trains serve the travel needs of the general public, but more than 150 operations are devoted to railroading as recreation as museums or scenic railroads. Some are privately run, while other are organized as non-profits. Many depend on volunteers to conduct their daily business. Tourist trains generally operate only a few miles, with a round trip of an hour or two on vintage equipment, but some like the Cumbres & Toltec Scenic (right) extend for 64 miles.

Dinner trains are similar, but feature longer rides and fine dining. Excursion trains, or fantrips, are special, often day-long outings. Relatively rare, fantrips may feature special rolling stock, routings, or both. A handful of private-car operators offer "rail cruises" on luxurious private cars.

TRAINS: Jim Wrinn

SELECTED RAILROAD TERMS

AAR: Association of American Railroads. The lobbying group that is the voice of large American railroads.
AIR TEST: application of a train's air brakes at the start of a run to ensure they are functioning properly.
BALLAST: layer of material (usually crushed rock, cinders, or gravel) on top of the roadbed that holds the ties in position and facilitates drainage. Also used to describe any extra material added to a locomotive to bring it up to a desired weight.
BRIDGE TRAFFIC: freight received from one railroad to be moved by a second railroad for delivery to a third; also "overhead traffic."
CENTRALIZED TRAFFIC CONTROL (CTC): traffic control system whereby train movements are directed through remote control of switches and signals from a central control panel.
CLASS I RAILROAD: a railroad with annual gross operating revenue of $346.8 million or more (for Class II, $28 million to $346.8 million; for Class III, under $28 million).
COMMON CARRIER: a transportation company that offers its services to all customers in exchange for compensation, as differentiated from a contract carrier, which carries goods exclusively for one shipper.
DISTRIBUTED POWER UNIT (DPU): an unmanned locomotive controlled remotely from the lead cab and placed in the middle or at the rear of the train.
DYNAMIC BRAKING: an auxiliary system that uses locomotive traction motors as generators, producing a powerful braking effect.
END-OF-TRAIN DEVICE (EOT): end-of-train marker placed on the rear coupler of a train to monitor air-brake system integrity and air pressure.
FEDERAL RAILROAD ADMINISTRATION (FRA): federal agency that's responsible for railroad safety.
GEEP: nickname for General Motors' GP (General Purpose) diesel locomotives, particularly early models of the 1950s (pronounced "jeep").
HEAD-END POWER (HEP): electricity from either a locomotive's main generator or an auxiliary generator, used for heating, lighting, and cooling passenger cars.
HELPER: a locomotive added to a train for a portion of its run to provide extra power to climb a grade.
HIGHBALL: a signal from a crew member to an engineer by hand motion, lantern, or radio to proceed, from old-time ball signals that were hoisted high to show "clear."
INTERCHANGE: junction of two railroads where cars are transferred between them.
INTERMODAL: traffic moving by more than one mode on its trip from shipper to receiver. The term is most frequently used for piggyback or trailer-on-flatcar (TOFC) traffic, but it also includes containers transferred from seagoing ships to special rail cars. Piggyback is a type of intermodal equipment.
LIGHT RAIL: a passenger transit system powered by overhead electric wires, typically with some portion of the route running in city streets; often of lighter construction than a heavy-rail system where vehicles operate on a private right-of-way. The modern equivalent of a trolley or interurban system.
RIGHT-OF-WAY: the track, roadbed, and property encompassing the track owned by the railroad.
SHORT LINE: a small railroad, typically with less than 100 miles of track. There is no official or legal definition of the term, although Class III railroads are often called short lines.
SWITCHER: a locomotive designed specifically for yard service, which calls for good visibility from the cab and pulling power rather than speed.
TRACTION MOTOR: an electric motor that turns a locomotive's wheels, providing traction with the rail and making the vehicle move. There is usually one traction motor geared to each axle.
UNIT: commonly, a single machine (usually a diesel-electric), characterized by a single frame and a coupler at each end; technically, the smallest indivisible portion of a locomotive, which is made up of one or more units coupled together controlled by one engineer.
UNIT TRAIN: a train carrying a single bulk commodity, such as coal or grain, from one shipper to one consignee without any switching or classification en route.
WYE: an arrangement of tracks forming the letter Y used for turning cars and locomotives.
YARD: a system or grouping of tracks connected to, but not part of, a main line; used for switching or storing cars, or making up trains.

A northbound Norfolk Southern freight rolls on former Southern Railway tracks at Kannapolis, N.C., in May 2011. TRAINS: Jim Wrinn