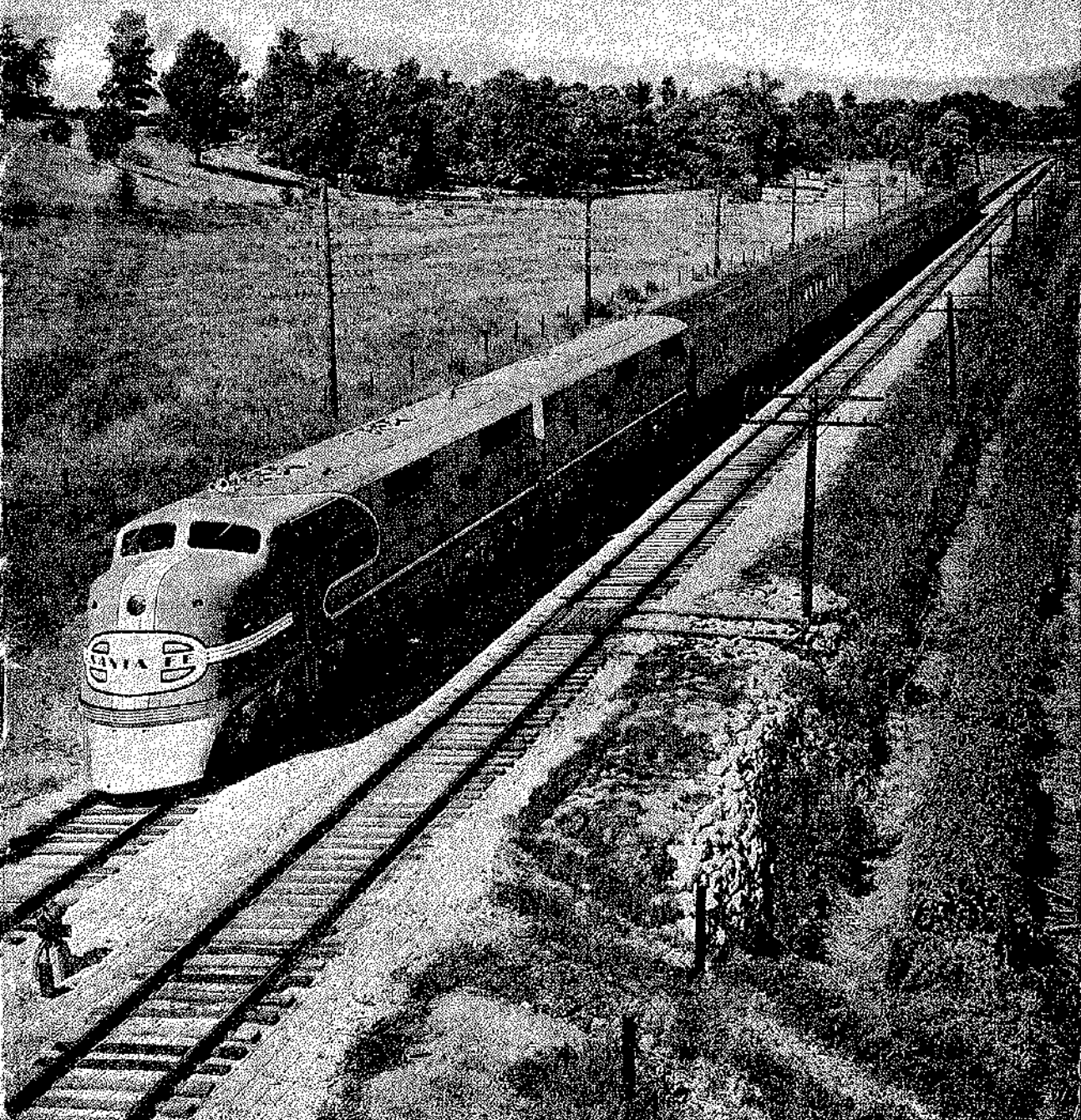
The (No. 2)

Santa Fe Today



The Santa Fe Today—No. 2

Explanatory note: Expansion of the Santa Fe from a small Kansas enterprise into a vast transcontinental transportation system has brought about many changes in its operations. This article is the **second** in a series to explain the workings of this modern railroad plant with its shops, yards, offices and other physical properties which go to make up the Santa Fe today. These articles have been prepared by Leo J. Martin of the public relations department with the co-operation of the various department heads and the editors of The Santa Fe Magazine. The remaining articles in the series will be published and distributed from month to month until all departments of the railroad have been included.

Employees are urged to retain this pamphlet and all others in the series so that at the conclusion they may have a complete story of The Santa Fe .Today.

The Santa Fe Today

Operating Department

ALL trains and trains movements, the acquisition, allocation and repair of motive power, tools, machines and equipment, maintenance of shops and roadway mechanical facilities, and the assurance that all Santa Fe right of ways, station and yard facilities, signals, bridges and roadbed installations are in proper repair, comprise a major portion of the responsibility vested in the Santa Fe's vice-president in charge of operation, George H. Minchin, located in Chicago. Included in Mr. Minchin's Chicago staff are four assistants to the vice-president, who handle, respectively, operating, mechanical, personnel, and lease and contract matters.

It is difficult to dissociate the details and problems which daily confront the Santa Fe's vice-president in charge of operation. But if we visualize the movement of trains only and, for the moment, consider mechanical, telegraph, safety, employment, and other responsibilities of the operating vice-president as factors contributing to proper and expeditious train movement, we shall obtain a clearer picture of the Santa Fe's physical operations.

The movement of trains involves the transportation of persons and commodities, the prompt departure and arrival of which is a basic obligation to all Santa Fe patrons. To effect proper train movement a system-wide Santa Fe department, called the operating department, has been set up. Operating details are cleared through O. L. Gray, assistant to the vice-president.

For operating convenience, the Santa Fe's system lines are divided into four grand divisions, which in turn comprise twenty-three local divisions. The grand divisions and the local divisions embraced in each are as follows:

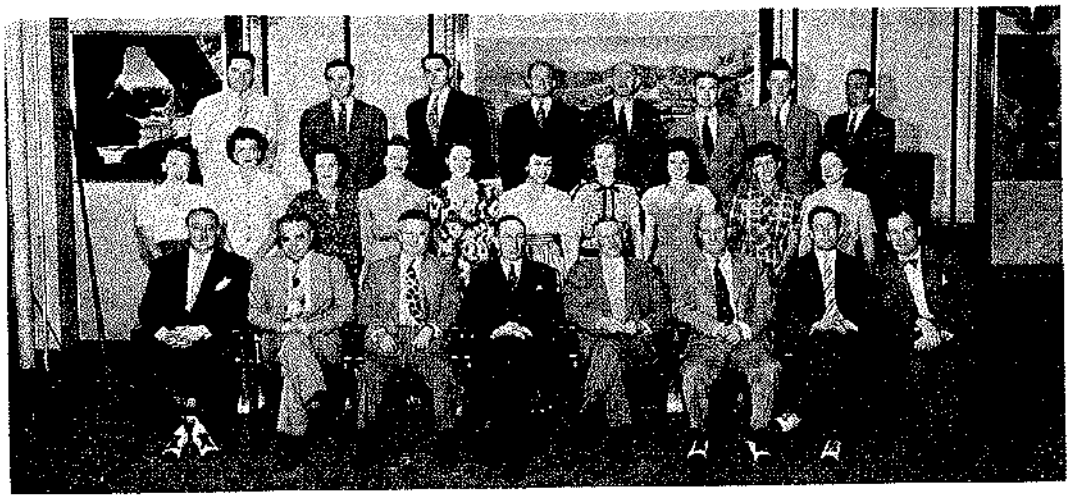
Eastern Lines	Western Lines
Chicago Terminal Div.	Panhandle Div.
Illinois Div.	Plains Div.
Missouri Div.	Slaton Div.
Kansas City Tml. Div.	Pecos Div.
Eastern Div.	Western Div.
Southern Kansas Div.	Colorado Div.
Middle Div.	New Mexico Div.
Oklahoma Div.	

Coast Lines	Gulf Lines
Albuquerque Div.	Northern Div.
Arizona Div.	Southern Div.
Valley Div.	Gulf Div.
San Francisco Tml. Div.	
Los Angeles Div.	

The Eastern Lines are comprised of all Santa Fe lines in Illinois, Iowa, Missouri, and portions of the lines in Kansas and

VICE-PRESIDENT in charge of the Santa-Fe's operating department in conference with his assistants at Chicago. Right to left—George H. Minchin, vice-president; S. C. Kirkpatrick, personnel; O. L. Gray, operating; J. M. Nicholson, mechanical; W. C. Hilton, lease and contract, and L. D. Comer, director of employment.

Oklahoma. The Western Lines embrace portions of the lines in Kansas and Oklahoma, all lines in Colorado and the Texas Panhandle southwest to Presidio, Tex., and lines in New Mexico east of Belen and Albuquerque, including those to Silver City, N. M., and El Paso and Pecos, Tex. The Gulf lines include all the Gulf, Colorado and Santa Fe Railway, which extends from Purcell, Okla., south to the Gulf of Mexico, eastward to Oakdale, La., and westward to Sweetwater and San Angelo, Tex. The Coast Lines embrace all Santa Fe lines west of, but not including, Isleta, N. M., and Belen to Los Angeles, west to Wilmington, south to National City, and north to San Francisco.



MEMBERS OF VICE-PRESIDENT MINCHIN'S STAFF IN CHICAGO

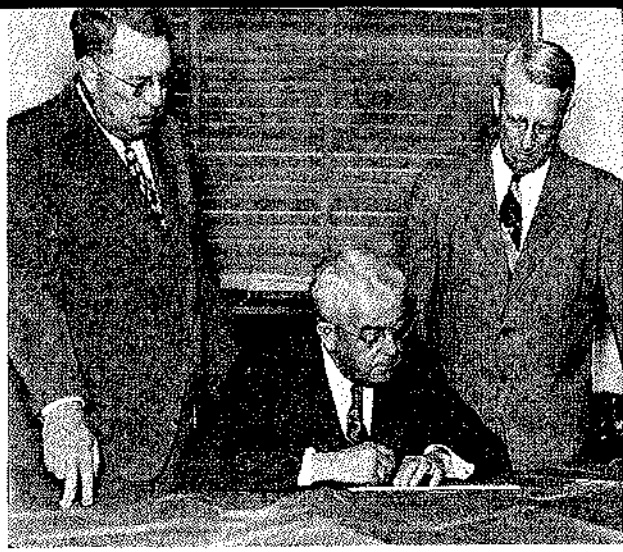
Each grand division is in charge of a general manager who reports to the vice-president in charge of operation. On each general manager's staff is a chief engineer and a mechanical superintendent, who, with operating specialists, correlate the many details of maintenance of facilities, train operation, and the transportation of persons and commodities.

The general manager, with all that the title implies, is the ranking Santa Fe officer in his territory. His immediate assistants are one or more assistant general managers, each of whom assumes responsibility for a group of local divisions, called a district, thereby relieving the general manager of direct administration of local divisional functions and carrying out the general manager's plans and policies on the divisions. They co-ordinate the division superintendents in a uniform policy with fullest use of facilities, equipment and tools available.

Train operation consists of train movements from one operating division to another, or locally within the division. Each of the Santa Fe's twenty-three local divisions is under the supervision of a superintendent, who is the ranking officer on the division. Because of the geographical divergence of Santa Fe's territory, conditions on its local divisions vary greatly. Some divisions are located in mountainous terrain, others in desert or plateau areas; some experience few freezing temperatures, others must cope with severe winter conditions; still others are in zones where periodic floods can be expected, others where dry spells necessitate hauling sufficient water to permit train operation and to safeguard resident and employee welfare. Some divisions are densely populated and local traffic is heavy, others are sparsely settled providing only a small quantity of local traffic. All, however, originate and move the 2,200 trains which the Santa Fe operates each twenty-four hours, classified as passenger and freight, super-speed, through-scheduled, extra or special, and local. Those distinctions provide a basis for determining the priority of train movement.

The superintendent is directly in charge of and responsible for all transportation and maintenance matters on his division. In the transportation end, he is assisted by trainmasters, a chief dispatcher and dispatchers, who direct the movement of trains and switching and terminal operations. In

H. B. LAUTZ (right), general manager of the Eastern Lines, and Assistant General Managers C. S. Cravens (center), Western District, and P. O'Sullivan, Eastern District.



G. C. JEFFERIS (center), general manager of the Western Lines, and Assistant General Managers E. P. Dudley (left), Southern District, and G. R. Buchanan, Northern District.

the maintenance of right of way, buildings and structures, he is assisted by the division engineer, general foreman of bridge, building and water service, a signal supervisor, roadmasters, and their staffs.

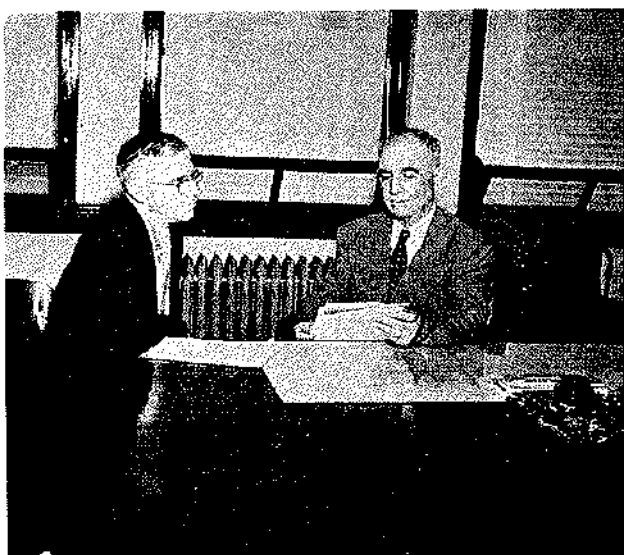
The superintendent's personal staff consists of a chief clerk; timekeepers, who record train, engine, yard, track, signal and other division department pay roll data; contract, schedule and personal record clerks; tally and claim clerks, who investigate and voucher outside bills applicable to the division, and handle correspondence and bills in relation to leases and contracts. The superintendent originates forms and estimates concerning additions and betterments to facilities, retirements and renewals of facilities, leaves of absence, rates of pay, establishments of new positions, and matters concerning time-tables, personnel and schedules.

All local stations and depots on the division are the superintendent's responsibility. He closely checks train performance, corrects mishandling, holds formal investigations when expedient, meets with authorized representatives of employee groups. Frequent inspection trips over the division are necessary. There are meetings of various natures and social and civic obligations. A division may comprise any number of communities and the superintendent is a Santa Fe ambassador to them all.

The trainmasters are assigned to specified territories within the local division. Each trainmaster's territory may be all or

C. R. TUCKER (right), acting general manager of the Coast Lines, and F. A. Baker, assistant general manager. Due to wartime activities, W. L. More, acting assistant general manager, was unable to be present for this picture.

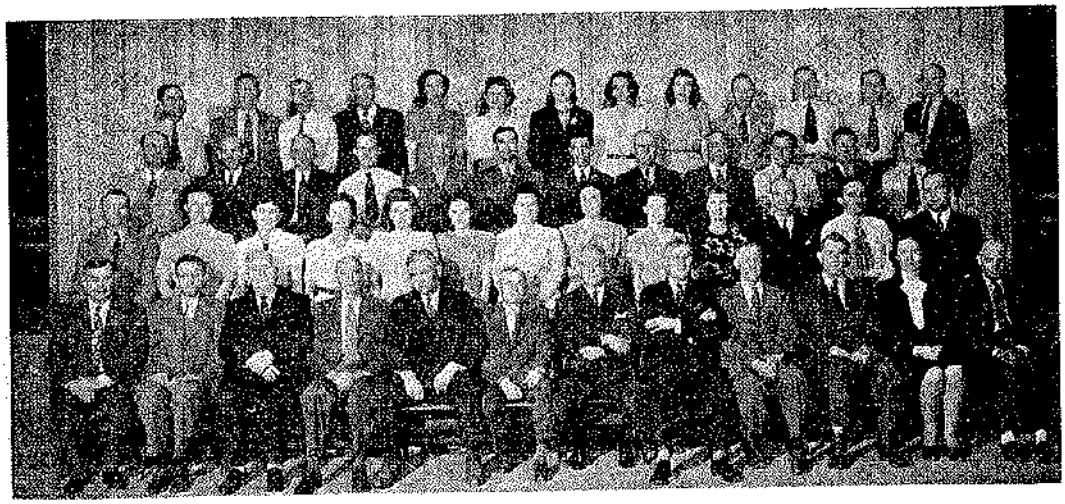
R. B. BALL (right), vice-president and general manager of the Gulf Lines, and J. P. Cowley, assistant general manager.



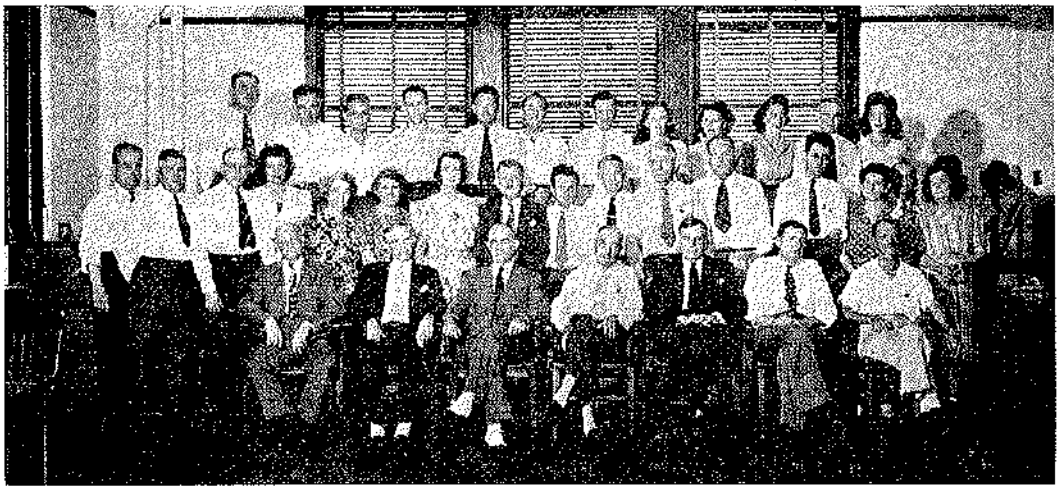
GENERAL MANAGER LAUTZ AND STAFF IN TOPEKA, KANSAS

part of a division, usually one or more districts. The trainmaster spends most of his time on line, riding trains, checking train operation and schedule performance, examining new employees on the book of rules or for promotion, investigating delays and accidents. He employs all brakemen and switchmen, issues bulletins pertaining to train and yard operation, maintains running record on time service registration and pool turns (crews for trains to move), advertises or posts runs, and arranges relief for trainmen when they lay off. A general yardmaster assists the trainmaster and local agents in handling cars and trains at terminals.

All Santa Fe train and enginemen must be familiar with the rules and regulations of the Santa Fe operating department: train rules, time-tables, signals—including interlocking and block, color, hand, flag and lamp, whistle and communicating—superiority of trains, train orders, and all details incident to the position each occupies. Trainmen must have a copy of the current division timetable *with them* when on duty. They are regularly examined physically, also orally in regard to operating rules and to local conditions peculiar to each division as set forth in the division timetable. In addition, periodic efficiency tests are made by the trainmaster covering such items as signals, markers, whistle signals, train orders, clearances, fusees, air tests—some twenty-nine classifications. Engineers and firemen, in all matters relating to the mechanical efficiency of their equipment, report to and receive their instructions from the master mechanic or road forman of engines; in all matters con-



GENERAL MANAGER JEFFERIS AND STAFF IN AMARILLO, TEXAS



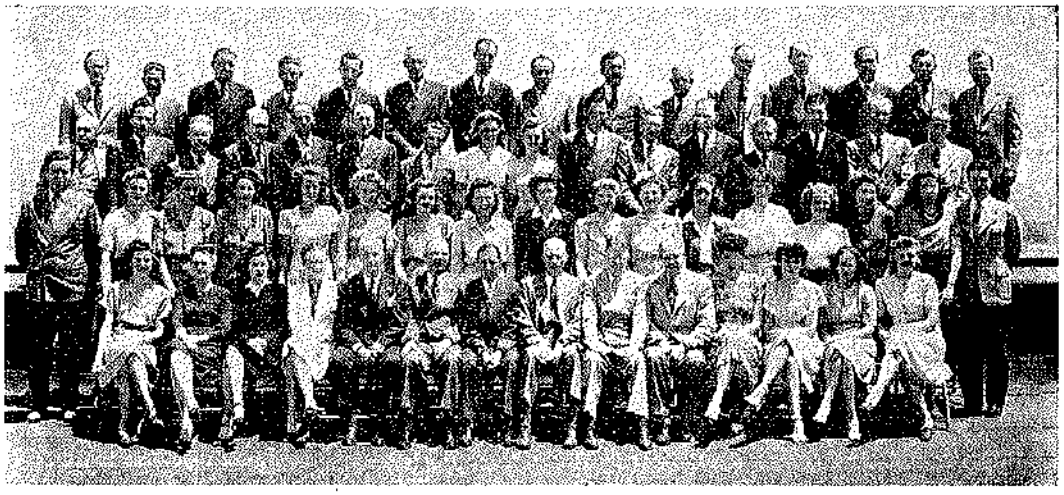
VICE-PRESIDENT AND GENERAL MANAGER BALL AND STAFF, GALVESTON, TEXAS

nected with the movement of trains they receive their instructions from the trainmaster.

Trainmen, and all other employees involved in the operation of trains, must be constantly alert. There is no place for a mediocre performance of their duties. The lives and property of Santa Fe patrons are entrusted to their care. Every human effort is made to insure safe operation of trains and proper maintenance of all facilities which influence that operation.

The heart of every divisional operation is the office of the chief dispatcher, who is directly in charge of and responsible for train movements and car distribution on the division. It is a point on the division where a responsible officer directs its operations every moment. The trick dispatcher knows the whereabouts and the current movement of every train, over the entire territory, which he records on train sheets. The chief dispatcher makes a continuous check of business being offered for movement, ordering trains to handle the flow of business, either passenger or freight. He closely checks the motive power situation to see that locomotives and crews are available at terminals to protect all business without delay.

All telegraph operators on the division are examined and employed by the chief dispatcher. Trick dispatchers work around the clock devoting their entire time to train movements through the medium of train orders issued over telegraph or telephone to local stations, terminals and signal towers along the line. The chief dispatcher instructs his dispatchers in regard to order-



COAST LINES GENERAL MANGER'S STAFF IN LOS ANGELES, CALIFORNIA

CHIEF DISPATCHER'S office at Newton, Kan., showing trick dispatchers working train movement sheets. Left to right, clockwise around the table—R. W. Guy, J. M. Utterback, dispatchers; W. W. Cochran, car distributor; W. S. Lyon, dispatcher; B. D. Usher, assistant chief dispatcher. Standing at right, rear, is C. L. Myers, chief dispatcher.

ing train crews, where to pick up and set out freight cars, tonnage to be handled by a given train, preference to be given train movements, and assists them in making the often difficult decisions encountered in the detailed work each day. Dispatchers must know the location of all spurs and sidings, of fuel and water stations, of curves, the extent and degree of grades and a first-hand appraisement of grades both ascending and descending. They must know the tonnage capacity of locomotives, the location of automatic and other signals, the interlocking plants, and all matters and conditions which may influence train movements. The assistant chief dispatcher usually handles the details incident to movement of special cars, main trains and government freight. He investigates delays, mechanical failures en route, and other conditions which arise.

No one of the Santa Fe's 2,200 daily trains completes its run without having been ordered and directed throughout by the train dispatcher. Listed on the train movement sheet, always before the dispatcher, are the engineers, firemen, conductors, brakemen, and telegraphers on line who are to receive his orders. The train movement sheet also records the train's number, when each member of crew started to work and how much time rested previously, the engine number, the loaded or empty car consist of the train and the total tonnage. Trains moving in one direction are recorded on left-hand side of the sheet; those moving in the opposite direction on the right. As each train passes an open telegraph office the operator on duty advises the dispatcher by telephone or telegraph the number of the train and the time it passed; if a stop is made, the time of arrival and departure. If a freight train, the operator advises whether cars were set out or picked up. The operator also informs the dispatcher of any unusual conditions such as storms, floods, fires, and the like. With that information before him and continuous advice reaching him, the dispatcher is enabled to guide his trains toward the ultimate objective of all railway operation —the maintenance of schedules and the efficient solution of operation problems which may have arisen.

One train is superior to another by Right, Class or Direction. Right, which is conferred only by train order, is superior to both Class and Direction. Class is superior to Direction except between trains of the same class. Trains of the first class are superior to trains of the second; those of the second are superior to the third. Extra trains are inferior to regular trains.

All Class One railroads in the United States are governed by a standard code of train orders. Formerly forms were used, known as the "nineteen" and the "thirty-one." The latter required the conductor's signature and, on many lines, the engineer also was required to sign the order. At the present time, the "thirty-one" form is practically eliminated and the use of the

CHECKING TRAIN ORDERS prior to departure of their train from Amarillo. Left to right—C. W. Houston, brakeman; H. R. Sager, conductor, and Mike O'Neil, engineer.

Division Superintendents

R. D. CLOUSING
Chicago

R. J. YOST
Illinois

M. M. KILLEN
Missouri

J. B. NOE
Kansas City

L. V. LIENHARD
Eastern

W. H. JONES
Southern Kansas

H. G. ARNOLD
Middle

H. O. WAGNER
Oklahoma

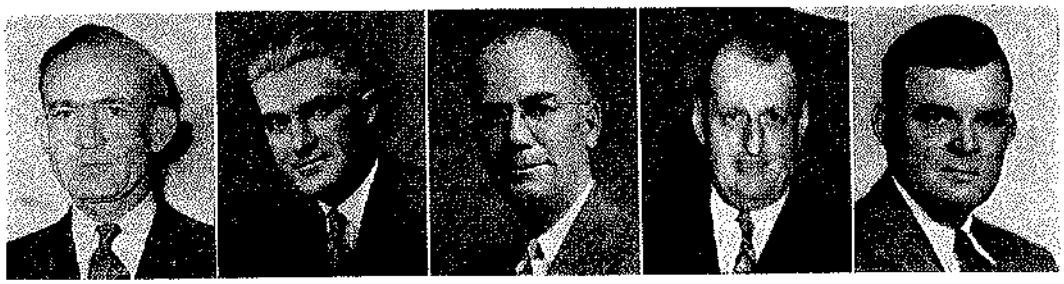
W. C. BAISINGER
Western

J. E. LESTER
Colorado

D. M. RANKIN
New Mexico

R. W. PRENTICE
Panhandle

J. B. BRISCOE
Plains



L. M. OLSON
Slaton

D. TRAHEY
Pecos

A. B. ENDERLE
Albuquerque

A. J. SMITH
Arizona

J. W. MURPHY
Los Angeles

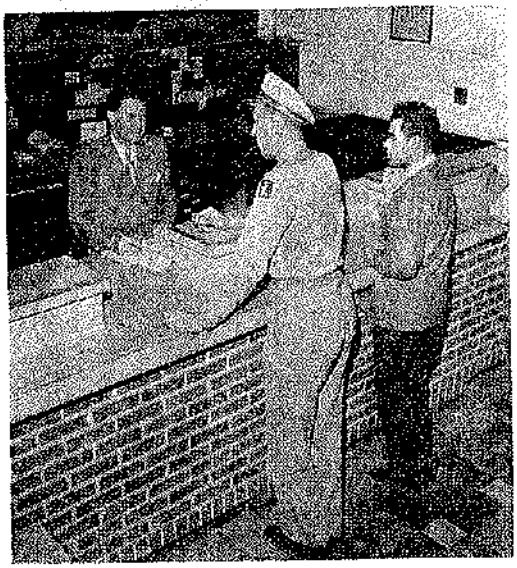
E. B. HEBERT
Valley

R. J. BRETON
Terminal

W. A. J. CARTER
Northern

A. B. CLEMENTS
Southern

C. S. NEAL
Gulf



AMONG THE MANY DUTIES of an agent are his contacts with the shipping and traveling public. Here P. E. Rizer, ticket clerk at Albuquerque, is shown serving two Santa Fe patrons.

"nineteen" is almost universal, protected by strict rules as to its preparation and delivery. The "nineteen" form does not require the stopping of trains as the order is completed by the train dispatcher following the signature of the telegraph operator. The latter delivers the order to the engine and train crews as the train passes his station by placing it in a light rattan hoop or by means of an especially designed high speed train order delivery crane.

On some of the Santa Fe's lines, centralized traffic control installations are in use. Centralized traffic control is a system of train operation by means of which the movements of trains through blocks are authorized and directed by signal indication controlled from a central point without the use of written train orders. No train has superior rights over another; it is not necessary for crews to have any official knowledge of other trains on the road. Trains are guided solely by the signal indication which confronts them. Centralized traffic control permits the dispatcher to use his intimate knowledge of the territory, motive power, train tonnage, and the ability of the various engine crews to the greatest advantage.

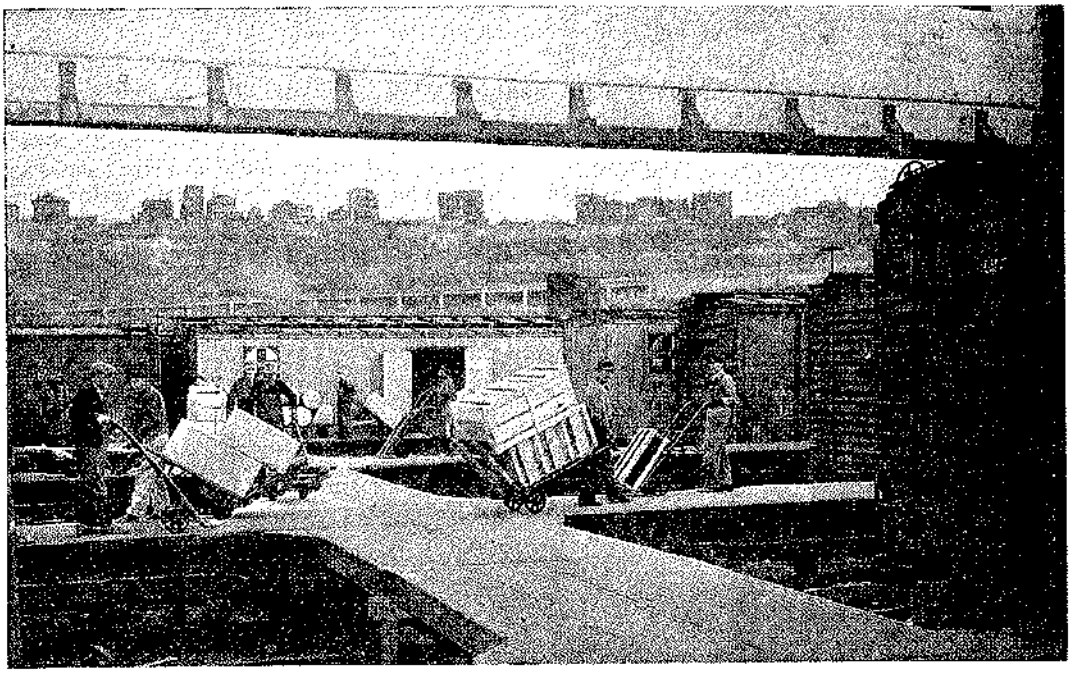
The train dispatcher's train movement sheets, bound and carefully preserved, are permanent records of all train movements. These sheets are the basis for computing the service performed by trainmen and enginemen.

The superintendent directs local station agents in the conduct of station affairs. The passengers and freight transported by a railway are the greater responsibility of the local agent. He makes the contact at the time the transaction is undertaken. In larger terminals, agents assume greater responsibilities, handling thousands of passengers and millions of dollars in freight revenues. Each agent must evaluate the transportation needs peculiar to his community, accumulate a fund of first-hand knowledge and keep up with local trends. Often he is a leader in community life.

It is railway operating tradition that all freight and passengers must be cleared each day. Industrial centers have many spur track facilities necessitating complicated switching operations. Daily carloadings, in and out, attain sizable figures. It is up to the agent to get the freight rolling. He must supply the equipment and order the loaded cars pulled from the shippers' docks, have them weighed and carded, trains assembled and checked. The agent also must aid the shipper in the various loading procedures.

In his freight warehouse the agent, with a force of foremen, truckers, stevedores and checkers, loads and unloads the less-than-carload freight delivered to the warehouse either by the shipper or the contract drayman handling the Santa Fe's pickup

AT SMALLER STATIONS the agent or a member of his force handles operating department communications. In this picture, C. B. Higginson, operator, "hoops" a message to William E. Schneidwind, fireman, at Cajon, Cal.



A TYPICAL FREIGHT WAREHOUSE and loading platform where foremen, truckers, stevedores, checkers, and other employees load and unload the less than carload freight. This picture shows a portion of the Santa Fe facilities at Kansas City.

and delivery service to or from the industry's door.

The agent may have a considerable office staff, depending on the size of the station. He must keep accurate accounts of all transactions, make cash collections, maintain records of all ladings, waybills, tickets, Pullman sales, yard checks, train checks, car seals, cars, demurrage and storage, per diem, switching operations, and issue many daily, weekly and monthly reports to the heads of various Santa Fe departments; also governmental reports, state, county and municipal reports, covering, in the main, shipments of fruits, vegetables, various products of the farm and range, and the mine. A large agency will have a sizable claim department to investigate over, short and damaged freight, to seek out the cause in order to prevent recurrence.

At the smaller stations the agent handles the telegraph wire and the train dispatcher's telephone.

The agent must be conversant with freight and passenger traffic rules, regulations and charges, Interstate Commerce Commission rulings, quarantine laws, and details pertaining to the diversion, reconsignment, stopping-in-transit, and other in-transit operations permitted freight by tariff regulations. He must know how to care for livestock and what commodities to load in various types of freight cars. Each article transported in railway freight service has a designated method of packing and loading.

Time, here as elsewhere throughout the entire Santa Fe organization, is an important factor. Time, on the Santa Fe, is the particular responsibility of the operating department which is entrusted with the preparation of the Santa Fe's operating timetables. All Santa Fe passenger trains except those running extra are governed by timetable superiority. Freight trains have no timetable superiority.

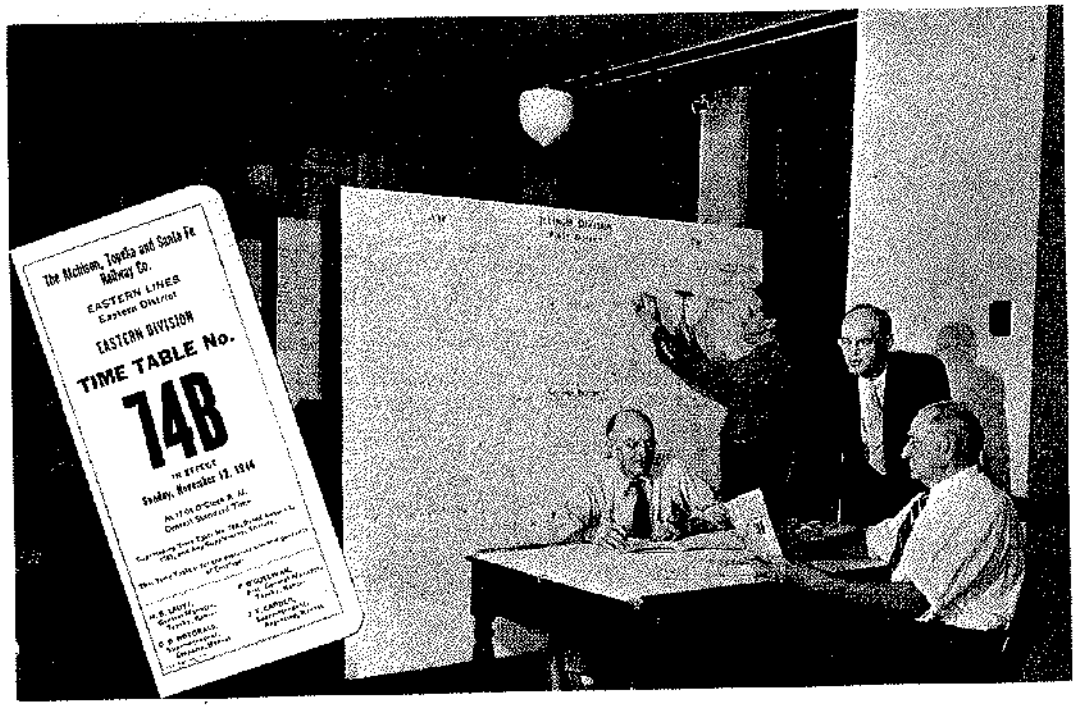
In normal times, once each year or oftener, the Santa Fe's four general managers go to Chicago where, with the vice-president in charge of operation and the general superintendent of transportation, they meet with the passenger traffic manager and his staff to construct new or revised passenger train schedules for the Santa Fe system lines. The over-all time allotted each train, the time of arrival and departure at important terminals and passenger centers, and the time allotted to each grand division, are determined in hours and minutes.

With his assistant general managers, superintendents, and trainmasters, the general manager works out the details incident to the distribution of time between

stations, local connections with branch line service, and printing of the timetable. Those details which pertain only to the grand division in the way of branch line service and connections are worked out in conjunction with the general passenger agent at grand division headquarters.

Timetable boards, usually about six feet square, are used, one for each operating division. The face of the board is used for main line trains; the back for branch line trains. The board is ruled both horizontally and perpendicularly, one-half allotted to A.M., the other to P.M. Each perpendicular line represents a five-minute period. Each station on the division appears on the left, also the mile-post location and mileage between stations. Red perpendicular lines designate five-minute periods; green lines, fifteen-minute periods; blue lines, the half hour; black lines, the hour. Pins are stuck in the board for each station and threads are run from the bottom toward the top for eastward train and from the top toward the bottom for westward trains. Intersection of threads designates normal train meeting points. Occasionally a speedier train will overtake another, in which case the passing point is designated by thread intersections. A clear picture thus is presented of the actual time at each station.

After detailed checking, new timetables are printed and distributed to each division employee whose duties require one. Copies are sent to the U.S. Postal Service, Railway Express, and interested connecting railway lines. The division timetable carries special changes in operating rules (as carried in the official Santa Fe Rules and Regulations, Operating Department), speed restrictions, locations where trains must secure clearance cards, joint track facilities, location of spring switches, and numerous rules and regulations pertaining to train operation.



TIMETABLE BOARD ROOM where major timetable changes are made covering the Eastern District. Left to right—D. J. Kelly, passenger transportation clerk; E. K. Noe, stenographer; C. F. Krammes, chief of transportation department, and A. J. Delaney, chief clerk to the general manager. Insert shows the front cover of a division timetable.

The popular system timetable, issued by the Santa Fe to its patrons, and other popularly distributed local or regional Santa Fe timetables, are compiled from the division timetables.

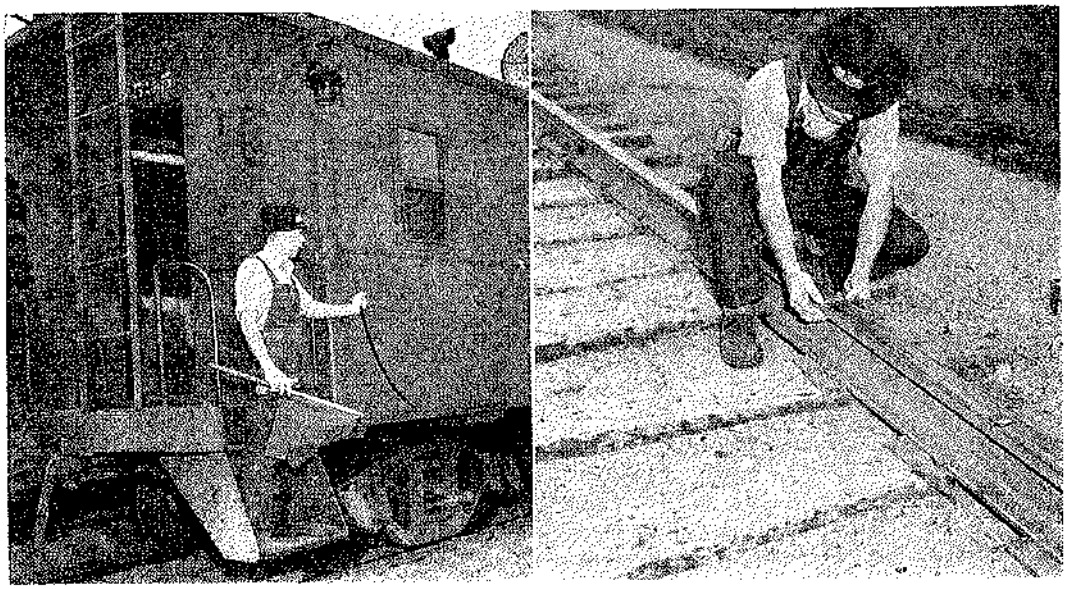
The assistants to the general manager handle operating, transportation and maintenance matters, also details incident to the Santa Fe's agreements with the various organizations which have been duly authorized by the various classes of grand division employees to represent them in their relations with the company. Some general

managers' territories, in emergency periods, require an employment department, a housing supervisor, a labor placement supervisor, and a supervisor of local station or depot functions. The general manager's transportation department follows closely the movement of all trains over the respective local divisions, the supply and distribution of motive power, freight and passenger cars for loading or service, disposition of empty cars, train and engine performance, delays, schedules, and general traffic movements.

Everything on the grand division must move as planned or scheduled. If there is any hitch, the general manager soon knows about it and directs his subordinates in the application of quick remedies. A volume of mail flows into each general manager's office, but his principal tools are the telephone and telegraph. During war years, countless directions confront each general manager, specifying what trains, troops and commodities to move and when and how to move them. Much attention is directed to prevent bottlenecks at break-up or consolidation terminals, a task not always easy of accomplishment when traffic is moving in unprecedented volume. Transportation inspectors analyze switching operations at terminals, inspect trains in regard to equipment, crew performance and delays, as well as stations and yards for rule violations, damaged cars or merchandise, and difficult loading procedures, reporting to the general manager, assistant general manager or to the division superintendent.

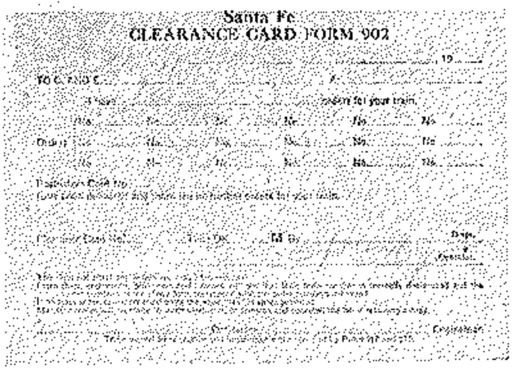
RELAXING BETWEEN RUNS. A typical scene in the Railroad Y. M. C. A. at Argentine, Kan.

The general manager's maintenance department is responsible for the allocation of rails, ballast, and incidental supplies needed in grand division roadway maintenance work. The progress of rail relaying programs and general track work is followed and reported. Each general manager has a chief engineer and each assistant general manager a district engineer. The general manager is responsible for the condition of all right of way in his territory and must see that all track work, rail laying, ballasting, surfacing, grading, filling and incidental tasks, weed killing, sign



NECESSARY ADJUNCTS in the equipment of every trainman include a red flag, torpedoes and fusees. C. J. Hood, rear brakeman at Amarillo, demonstrates the use of two of these in the above photographs. At left, he uses the flag to stop an approaching train. At right, he attaches two torpedoes to the track warning the engineer of a following train that he is nearing a point where he may be flagged. The fusee (used at night or on foggy days) serves the same purpose as a red flag.

posting, fence, cattle-guard and other right of way maintenance programs are energetically pursued. There are supervisors of the various work equipment, pile drivers, shovels, compressors, power jacks, weed-mowers, ballast agitators, power track drills and other machines who inspect and look after the maintenance of such equip-


Santa Fe
CLEARANCE CARD FORM 902

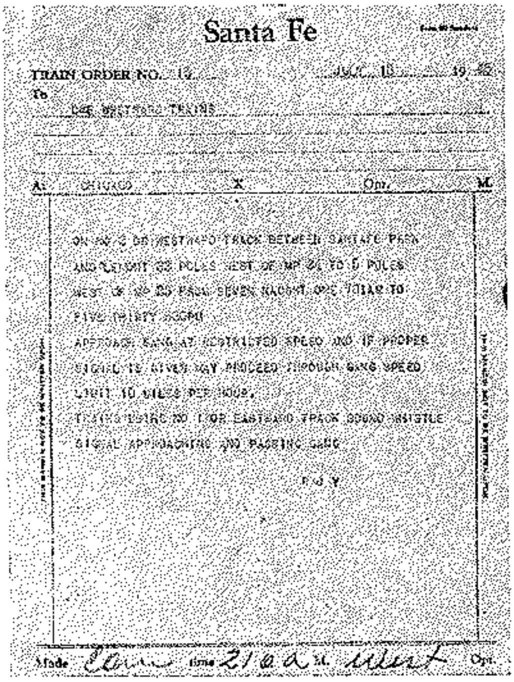
A SANTA FE CLEARANCE CARD

ment. General track foremen, under direction of roadmasters, organize and supervise extra gangs engaged in track work.

The compilation of the general manager's annual improvement program for submission to the vice-president in charge of operation is a function of the maintenance department, also the handling of the "Authority for Expenditure" forms, prepared by the superintendents, involving items chargeable to the capital account which must be authorized by the president. Facilities to be retired and authorizations for general repairs or renewals chargeable to operating expense are cleared by the department, as well as amortization matters in relation to installation of new facilities due to war emergency. There is a monthly progress report of all programs under way, rails and ties on hand, work equipment, personnel, daily and weekly rail and surfacing data, annual test statements and others—every phase of right of way maintenance is covered.

The division engineer is directly responsible for track, bridge and building maintenance on his division, devoting the major portion of his time on the line to the inspection of construction and maintenance work. The division engineer passes on all engineering problems presented by his staff, checks and approves requisitions for material. He is assisted by an office engineer and transitmen, rodmen and chainmen in the field, who make necessary preliminary surveys, set grade and center stakes, survey completed projects, prepare estimates, and furnish the auditor with necessary data for rendition of completion reports. The division engineer delegates the supervision of the various work gangs to roadmasters, general foreman of bridge, building and water service, signal supervisor and track supervisors.

Division roadmasters are responsible for the proper maintenance of track, roadbed, culverts, crossings, fences, cattle-guards,


Santa Fe
TRAIN ORDER NO.
To
At CHICAGO X Opr. M
Made Time M. Opr.

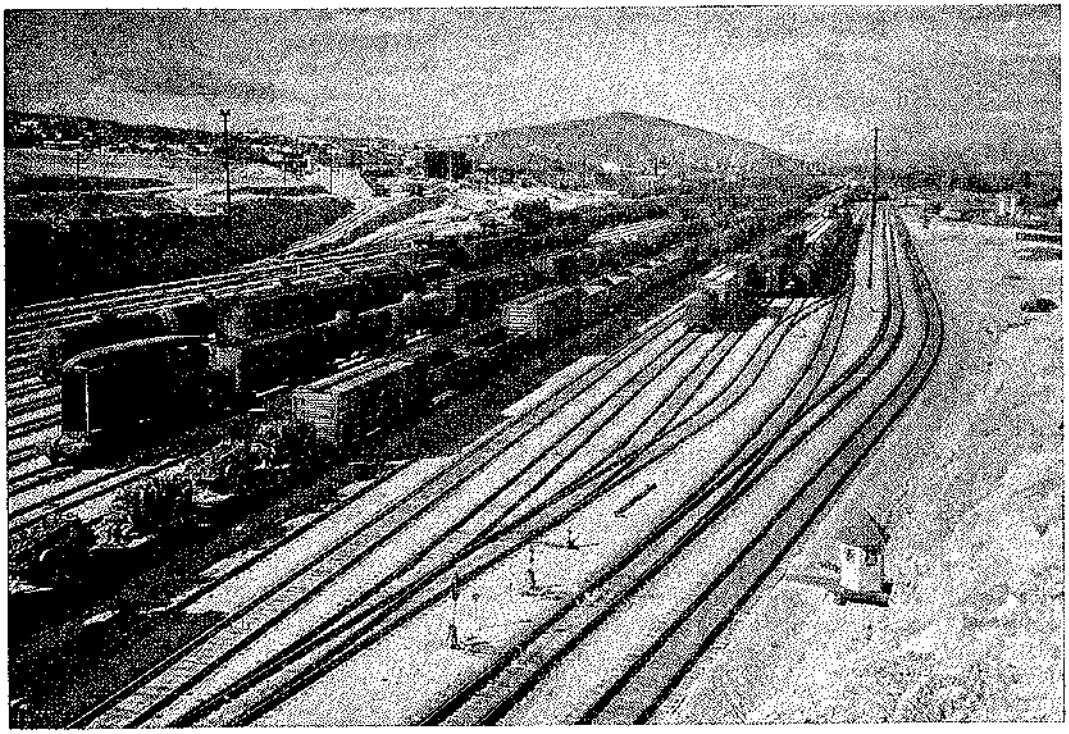
A SANTA FE TRAIN ORDER

roadway signs, and for the tidy appearance of station grounds, buildings and surroundings, also for the safekeeping of material and supplies in their department. They supervise track maintenance work, including that performed by work trains, and must make frequent motor-car inspection trips as well as walking inspection trips over the district under their care. They also must frequently ride locomotives over their districts, preferably passenger engines. They have supervision over the section foremen, many of whom live on the premises, and are responsible for the safe and economical maintenance of track and roadbed within their allotted section. Roadmasters are assisted by track supervisors who daily inspect their assigned territories and direct the section foremen where to work each day.

SIGNALS play an important part in railroading. In the above pictures are shown a few of the signals used by trainmen and yardmen on the Santa Fe. Signals indicated are, left to right—Get into the clear; couple cars and pull out of track; take water; engine or train should back away.

Maintenance of bridges, buildings and water service functions are directed by the division engineer assisted by general foremen, who supervise the various bridge and paint gangs, line up repair or construction projects, compute bills of material to be requisitioned, and, generally, when on line, inspect bridges, buildings, and other right of way structures to determine if in need of repair. The signal supervisor, with his group of signal maintainers located at strategic points throughout the division, cares for all details pertaining to maintenance of signals and interlocking plants. The signal supervisor investigates signal failures, employs all mechanics for his department and tests signal appliances for efficiency of operation.

The general manager's contract department handles details in relation to leases



IMPORTANT CONSOLIDATION YARDS, such as at Barstow (above), are natural converging points for hundreds of cars of freight. At such places trains are broken up, cars are switched and new trains are made up as efficiently as possible to speed the railroad's traffic on its way with the least amount of delay and interruption.

and contracts between the Santa Fe and other railways for the joint use of tracks, stations and facilities; with industries in relation to industry tracks, leases, and sale of right of way property; with public utilities in relation to power, water and other

S. D. COREY, trainmaster, and O. W. Morrison, transportation inspector, check over operating conditions in the yard at Gallup, N. M.

services; and with individuals for the leasing of pasture or agricultural lands, private roadway and private crossings, use of Santa Fe buildings, sale of such buildings, and many other matters. Contractual matters are governed by municipal, county and state laws, Interstate Commerce Commission and Santa Fe executive rules. Included are pipe line licenses, installing communication lines across or along Santa Fe property, wire attachments to pole lines. drainage contracts, oil and gas leases, and items in relation to the Santa Fe's contracts with Western Union, the Pullman Company, and Fred Harvey.

In his statistical department, the general manager compiles a record of the daily, weekly, monthly and yearly activities on his grand division. This includes, in addition to various personnel and labor reports, reports of new rail laid by mile post assignments, comparative operating revenue and other statistics, accident reports, tie plate statement, rail on hand by divisions, tie statements, current bills, efficiency test statements, cost of freight handling at stations, train and other features, monthly condition of power and many others.

The general manager's claim prevention bureau investigates all freight damaged, short or over at stations, ascertaining the cause of such failures and following through to prevent recurrence. It should be noted that this procedure is uniform practice throughout the general manager's territory. Investigations are thorough and ways and means of preventing damage from any cause are continually being considered and adopted.

The pass bureau takes care of annual and trip passes and requests for such passes. Those with ten or more years of service receive a grand division annual; those with twenty or more years of service receive a Santa Fe system annual. Special gold lettered passes are issued to those with thirty or more years of service with the company. Engine and train permits are issued by the pass bureau and details incident to securing transportation for Santa Fe people over lines other than the Santa Fe are handled.

Each week, the general managers forward to the vice-president in charge of operation a summary of the previous week's operations and conditions throughout the grand divisions. Those summaries begin with weekly reports furnished the assistant general managers by the superintendents. The general manager consolidates those data and others to provide the vice-president in charge of operation with details on through passenger train performance, tickets honored, freight cars loaded and received from connecting lines, all trains operated, industrial situation throughout grand division territory, agricultural and weather conditions, the equipment situation, pay roll increase or decrease, work performed by surfacing crews, new rail laid, ballast received, and details on labor needs and available supply.

Many of those items previously have been before the vice-president in charge of operation, either for approval or for guidance. Many of the Santa Fe's undertakings are system-wide in scope with proper execution depending on various system factors—the transfer of motive power and equipment, availability of both, regional weather and operating conditions and many others. The vice-president in charge of operation is the only authority and, in many instances, the only Santa Fe operating ex-

ecutive in a position to weigh matters on a system basis.

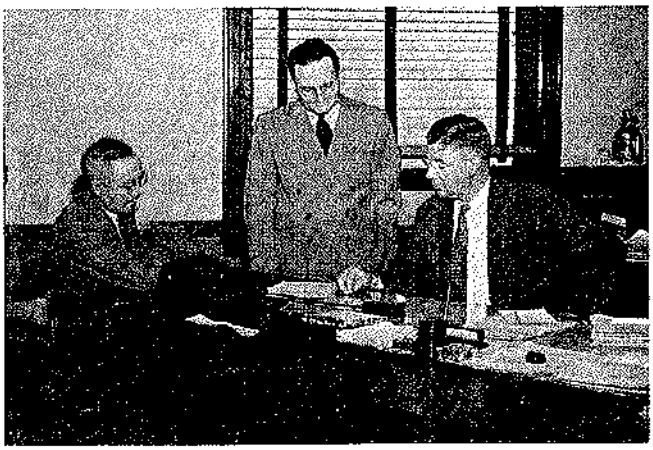
From the detailed functions of the superintendent, trainmaster, chief dispatcher, dispatchers, station agents and operators, the grouping of those functions into district operations by the assistant general manager and into grand divisional operations by each general manager, the physical operation of all Santa Fe trains is effected.

The successful conduct of the Santa Fe's broad operations is attributable in a large measure to the cohesion existing between the four grand operating divisions, and the system-wide co-ordination of the grand divisional operations by the vice-president in charge of operation.

WAR BABIES WOULD BE an appropriate title for these giant freight Diesel locomotives. Introduced early in 1941, less than a year before the Jap's sneak attack on Pearl Harbor, 78 of these 5,400-horsepower, four-unit engines now are operating on the Coast Lines between Winslow, Barstow, San Bernardino and Bakersfield, Cal., and moved much of the materials needed by Uncle Sam in the Pacific to deal the enemy a final blow.

Transportation Department

THE transportation department under the direction of J. J. Mahoney, general superintendent of transportation, Chicago, is that division of the Santa Fe's operating department which co-ordinates and supervises the movement of traffic originating on Santa Fe rails and traffic received from connecting railway lines at Santa Fe junctions. The Santa Fe's system-wide traffic situation is appraised, the distribution of passenger and freight equipment for loading is regulated, and minute check is made on all Santa Fe trains operated.



J. J. MAHONEY (right), general superintendent of transportation, with two members of his staff at Chicago: K. W. Brintnall (left) and O. R. Satterlee, assistants to the general superintendent of transportation.

Maintenance of schedules is a fundamental principle of railway operation. Not only the Santa Fe's operations demand that traffic be kept moving, but, more important, the comfort and well-being of some ten million passengers and the safe and efficient handling of more than fifty million tons of freight yearly entrusted to the Santa Fe's care constitute a basic obligation and a prime reason for on-time departures and arrivals.

Congestion at terminals can stalemate the most efficient train operations, rendering such operations ineffective if not inactive, depending on the volume of con-

ARRIVAL OF A TRAIN increases the tempo around the railroad station. This is a panorama of the Albuquerque station following arrival of The Chief.

gestion. The general superintendent of transportation and his office and field forces co-operate with Santa Fe operating, mechanical and traffic departments to insure the uninterrupted free-flowing movement of Santa Fe traffic.

The department's staff, headed by J. A. Lusk, assistant general superintendent of transportation, three assistants to the general superintendent of transportation, a chief clerk, two assistant chief clerks, and a supervisor of weights, supervising freight and passenger car service, weighing, car distribution, statistical and claim divisions, with two traveling car clerks and a supervisor of red ball reports, are trained specialists in matters pertaining to traffic movement.

J. A. LUSK

By comprehensive on-line surveys and preparation; by continuous telegraphic contact with key operating terminals on the Santa Fe's lines and with transportation representatives of foreign railroads with which the Santa Fe connects, the transportation department supervises and coordinates the following:

Passenger and freight train schedules on the Santa Fe's system lines when those schedules extend beyond the territory of one local operating division.

Instructions as to the make-up of passenger trains as well as the freight car blocking plan (specified position of freight cars in train) to reduce switching operations at intermediate terminals.

Daily operations under schedules, receiving daily reports from all divisions on system lines and handling unusual delays.

All interchange of carload traffic with those railways having track connections with the Santa Fe or with belt or terminal switching lines.

Distribution of passenger and freight equipment to and between Santa Fe grand divisions.

Correction of impairment in service involving either loaded or empty cars, terminal congestion, uneven flow of empty cars for loading, unusual traffic volume and other emergencies. This is effected, in part, by field forces which are dispatched throughout the system.

Special performance reports for Santa Fe executive officers, based on daily movements of trains as reported by the local divisions; and special reports for Military Transportation Bureau, Washington, covering movement of military personnel and military impedimenta moving under symbol (governmental) routing.

The compilation and transmission of red ball (fast freight) reports from operating terminals covering the movement of all carload manifest (Santa Fe symboled) freight.

The rules, regulations and stated charges embodied in *per diem, mileage, demurrage* and *reclaim*, which are accounting factors incident to switching and interchange operations between railways at terminals and junctions; the payment to owner lines for use of their cars on Santa Fe rails; payment to the Santa Fe of similar charges for use of Santa Fe equipment by other lines.

Claims resulting from delays, investigating and determining to what extent Santa Fe is responsible for delay.

All embargoes, the official Santa Fe notification of unusual conditions on sections of its lines where service may be temporarily impaired or industries, docks, wharves and other public or private facilities can not handle specified traffic; dissemination throughout the Santa Fe system of similar embargoes received from other railways; the determination when and to what extent embargoes should be issued.

Supervises the Santa Fe's car service department, Topeka, which handles all car recording and car accounting matters for the Santa Fe system lines.

A schedule is that part of a timetable which prescribes time, class, number, movement and direction of regular trains. Santa Fe schedules are constructed to safeguard the interests of patrons by rendering the greatest service to the greatest number.

Passenger train schedules are influenced by the flow and distribution of U. S. mail, gateway or passenger terminal connections with important trains of other lines, and local conditions peculiar to communities and areas where the volume of traffic determines schedules and frequency of service. Converging lines and branch lines throughout the Santa Fe system are importantly considered.

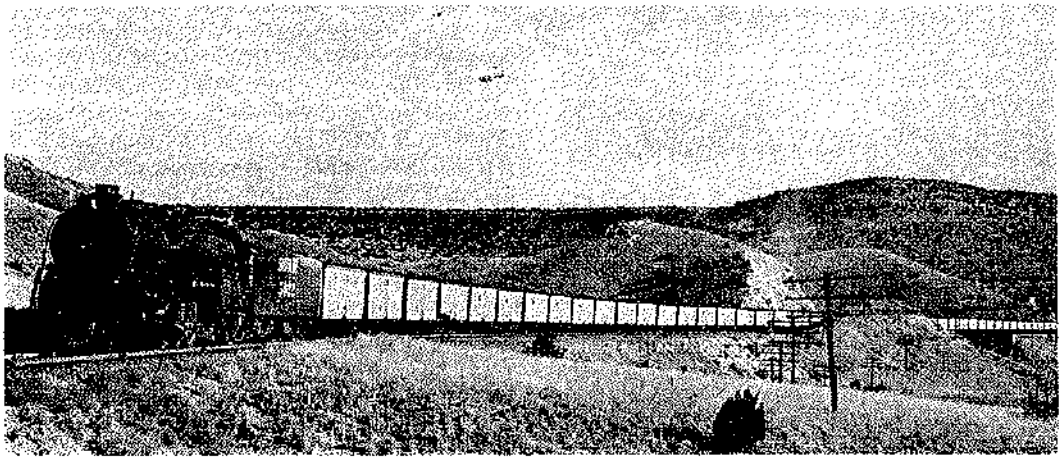
Freight schedules are influenced by the requirements of industries and consumers. The volume of business, terminal connections and facility of interchange, routing of cars and the nature of traffic have a bearing on freight schedules. Fresh fruits and vegetables, meat and packing house products and other perishable freight often travel great distances and must be expedited to reach the consumer in preferred condition.

One may visualize the quantity of freight

originating at New York, Boston, and manufacturing centers of New England, the Great Lakes, Pennsylvania, Ohio, and the Atlantic Seaboard, converging on Chicago, Kansas City and other Santa Fe gateways as those products find their outlet and their market in the Middlewest, Southwest, Northwest and Pacific Coast. Mingling with all that is a similar movement of Santa Fe freight from the Pacific Coast, the Southwest, and the Middlewest, to the East and Southeast.

The movement of citrus fruits, winter vegetables, San Joaquin Valley potatoes, runs, along with the popular 34 and 44 and sections from San Bernardino and Bakersfield. The NCX and CSX provide co-ordinated service between Seattle and Los Angeles. There are daily departures in each direction between Denver and El Paso, Denver and Texas, Kansas City and Denver, and Houston and Fort Worth and Dallas to California. Added to those expedited trains are local freights on all divisions serving all stations throughout the Santa Fe's system lines.

The Santa Fe's westbound freights rival the Super Chief and Chief in popularity.



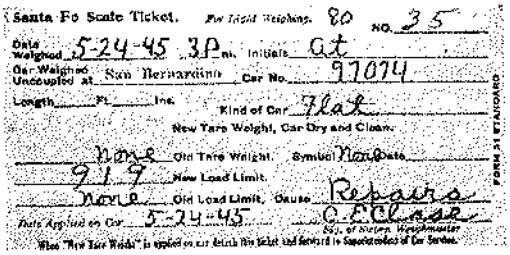
CERTAIN COMMODITIES, such as fruits, livestock and other important freight run on specified schedules, the performance of which is closely supervised. Such trains are designated by lettered symbols according to their date of departure from originating terminals, and are known as red ball trains. Above is a red ball freight train in the vicinity of Winslow, Ariz. In addition to red ball trains, other commodities of lesser importance are handled as "fillers" on red ball trains and on extra trains, while traffic to and from intermediate or local points is protected by regular way freight service.

lettuce, cantaloupes and other agricultural products from California, Arizona's Salt River Valley and New Mexico; the seasonal movement of Panhandle and Middlewestern wheat, corn and various grains; cotton and sulphur from Texas as well as oil, carbon black and lumber; all products of Southwestern mines, potash from New Mexico, and the extensive shipments of livestock and many other products throughout Santa Fe territory—all converge on Santa Fe terminals and interchange points in volume.

Perishable movements from northern and central California and citrus fruits from southern California are protected by the Santa Fe's daily GFX's, fast freights, the daily CTX, out of San Bernardino, with perishable and other red ball freight for south Texas and southeastern United States, and, in season, Arizona's Salt River Valley perishables by the fast PGX. Those trains highlight Santa Fe eastbound freight Number 39, the fast overnight merchandise train, Chicago to Kansas City and south; No. 37, Chicago to Texas, and the various sections of 33 and 43, fast transcontinental freights, accommodate interchange with eastern connections and the volume of traffic originating on the Santa Fe's Eastern Lines. Solidly blocked trains of transcontinental freight roll out of Kansas City west. Fast freight No. 41, out of Belen, handles livestock from Middlewestern points to the Pacific Coast. There are many stock specials, way freights, and mixed trains on the Santa Fe's numerous branch lines.

The transportation department anticipates traffic flows at Argentine, Belen, Corwith and Barstow, important Santa Fe consolidation points, also at local division points and throughout large shipping areas —Chicago, Los Angeles and southern California, the San Francisco Bay and Central

Valley areas, Kansas City, Houston and Galveston, Fort Worth and Dallas, Denver, the Arkansas and Rio Grande valleys, Carlsbad and Bluewater, N. M., Emporia, the Texas Panhandle, Wichita, Oklahoma City and many others---regulating traffic flows


Santa Fe Scale Ticket. For Freight Weighing. 80 No. 35
Date Weighed 5-24-45 3P.M. Initials GT
Car Weighed Uncoupled at San Bernardino Car No. 97074
Length ___ Ft. ___ Ins. Kind of Car Flat
New Tare Weight, Car Dry and Clean:
None Old Tare Weight. Symbol None Date ___
919 New Load Limit.
None Old Load Limit. Cause Repairs
Date Applied on Car 5-24-45 C. F. Clause
Sig. of Master Mechanic
When "New Tare Weight" is applied on car detach this ticket and forward to Superintendent of Car Service.
FORM 31 STANDARD

FREIGHT CHARGES usually are assessed on actual weight of shipments. This necessitates the installation of weighing facilities throughout the system, which are maintained and operated in accordance with the specifications of the U. S. Bureau of Standards. A Santa Fe scale ticket is reproduced above.

to avoid congestion, spreading unavoidable delays to safeguard perishable and other red ball freight from deterioration and to protect the marketing factor characteristic of most products moving by rail.

The red ball division, with men in the field and continuous wire advice reaching the car service department in Topeka as to the whereabouts of all cars moving under red ball symbol, polices this traffic to the end that proper notification and all service factors are complied with. This is done by noting and pointing out delays and irregularities and co-operating with grand division staffs in relieving the situation. The car service department serves as a central tracing or service bureau furnishing practical and complete reports to Santa Fe traffic offices for use in notifying shippers and consignees of car movements. Indiscriminate tracing of cars thus is eliminated.

Some one hundred and thirty-five Santa Fe stations have been designated as red ball billing stations. When a car of red ball freight is received from an industry or from a connecting line at a Santa Fe junction, the car is given an individual red ball symbol number by which it is known throughout its journey. The train consist (23 report), wired by originating terminal, gives the origin and destination, route, shipper, consignee, icing, and other special instructions as carried on the waybill. As the car passes those stations designated as red ball reporting stations, it is reported on a wired red ball report (1306 report) by its symbol number, the 1306 report serving as an arrival, passing and forwarding report. If car is set out for any reason, a set out report (21 report) is wired. When car is delivered to a connecting line at a junction, an interchange (33 report) is wired. At designated stations, eastbound or westbound, which at present are Corwith, Fort Madison, Argentine, Wellington, Amarillo, Belen, Barstow, San Bernardino and Bakersfield, a wire wheel report, which in content includes all information contained in the consist and passing reports, is dispatched. The wheel report also serves as an advance terminal switch list. Modern teletype installations are used in the rendition of wire red ball reports.

All other red ball billing stations on the Santa Fe's transcontinental main lines or feeders thereto not included in the wheel report and switch list set-up make regular red ball consists and comply with all other conditions with respect to the movement of red ball cars by the rendition of standard forms. Teletype wheel and switch list reports are contemplated for those Santa Fe districts not embraced in the present set-up.

The passenger transportation section checks the daily movement of passenger trains and cars. Records are maintained covering individual cars. The movement of both foreign and system passenger cars is checked to protect per diem and mileage due the Santa Fe and to expedite return of foreign cars to owner lines. The passenger section has charge of Pullman equipment and checks bills rendered against the Santa Fe's contract with the Pullman Company. Every effort must be made to keep passenger trains on schedules and to remedy quickly any existing circumstance which could contribute to the delay or discomfort of Santa Fe passengers. The passenger section also surveys the Santa Fe's system lines to protect the flow of passenger equipment to those points on grand division territories where passenger movements originate. In wartimes, the movement of troops necessitates the fullest use and quick allocation of passenger equipment.

Freight car supply for the system lines is a responsible function of the transportation department. While it is the responsibility of each general manager to foresee and protect necessary cars for loading on his grand division, the general manager often must go beyond his grand division to secure equipment. The transportation department equalizes system car distribution to render cars available in proper quantity for all system loadings; and disposes promptly of excess cars if a surplus occurs.

The interchange of empty cars with connecting rail lines is closely checked to protect the Santa Fe's position in the matter of switching arbitraries and reclaims.

Particular attention must be given the efficient allocation of cars during seasonal movements—wheat, livestock and many others throughout the Santa Fe's twelve states. When Santa Fe cars are inadequate to protect loading requirements it is necessary to augment the available supply with cars from other lines or of private ownership. This is true of Santa Fe refrigerator department cars, many of which are dispatched by Santa Fe shippers to eastern destinations. Close estimates of anticipated perishable loadings and the return of Santa Fe refrigerator department cars from connecting lines must be made. Perishable products must move in season. It is often difficult to locate a source of supply for needed freight or passenger cars particularly in times of general car shortage.

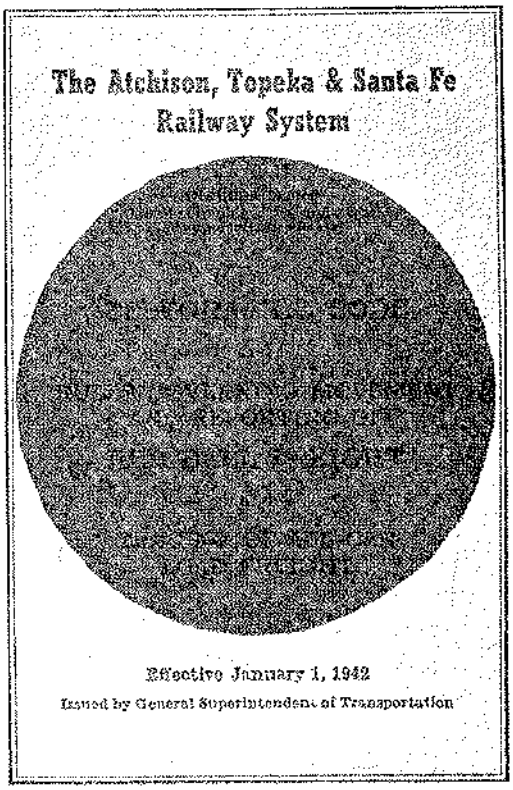
Per diem, mileage and reclaim, as well as demurrage, involve many factors. Under the per diem and mileage plan, payments are made by railroads for use of cars owned by other railways. The plan dates back as far as can be determined to the year 1867. At first all payments were made on a mileage basis but this plan of car hire settlement proved unsatisfactory. In 1902, the per diem rules were adopted which with changes and amendments are now in effect. Per diem rules give railroads a choice of operating railroad owned refrigerator and tank cars on a mileage or per diem rate—whichever will protect the largest rental fee for the owner carrier. Privately owned cars of all classes operate on a mileage basis.

Reclaim is that remuneration of per diem charges in instances where cars are switched from one railroad to another (reciprocal switching service) at a terminal. The road performing the switching service is remunerated by the road receiving the freight revenue or line haul for the per diem. All rules covering per diem, mileage and reclaim are set forth in the Code of Car Service Rules and Code of Per Diem Rules issued by the Association of American Railroads.

Demurrage is the charge assessed shippers and receivers of freight for detention of cars beyond the reasonable free time granted shippers or consignees to load, unload or otherwise dispose of shipment contained in the car. Charges for demurrage are covered by carefully drawn tariffs, the result of conferences between shippers, railways and the Interstate Commerce Commission.

The transportation department compiles numerous statistics for Santa Fe executives and other Santa Fe departments, also the car service division of the Association of American Railroads. Such reports are the basis for numerous data furnished the Interstate Commerce Commission. A daily telegraph report (88 report) of cars loaded and loads received from connecting lines throughout the system is prepared. From all local divisions, train movements (87 reports), giving the train movement from terminal to terminal, engine number, total cars and tons, passing time and cause of delays, reach the general superintendent of transportation. A master "87 memo" is compiled from this daily system-wide information.

About 1:00 p.m. each day the chief dispatchers throughout the Santa Fe system collect information from each local station and compile and wire to the general superintendent of transportation the daily telegraphic report of cars on hand and required



SANTA FE'S BIBLE governing red ball freight. It contains a special telegraphic code and rules pertaining to the movement and reporting of red ball freight, and the tracing of all carload freight.

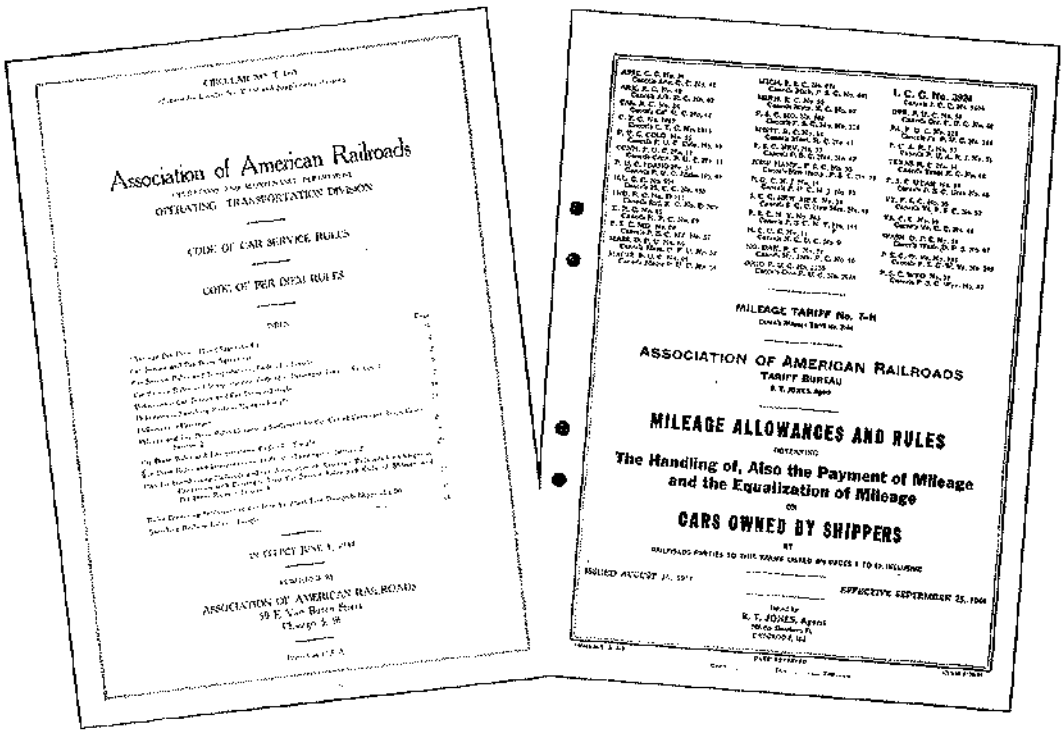
for loading (89 report). A consolidated "89 report" for the entire system is compiled in Chicago, reaching the transportation department each morning.

A night transportation force handles emergencies and telegrams. Many of the latter concern passenger movements wherein it is necessary to allocate passenger equipment and otherwise protect the movements. The night force enters in the record books information from daily wire reports of freight trains handled on each division, providing a running record of practically all freight trains operated, indicating the number of cars, tonnage, and time in and out of terminals at point of origin and destination. Santa Fe train operations are continuous and operating and transportation details are endless.

The weighing department polices the weighing of freight cars throughout the system lines. Current rules of the Association of American Railroads penalize originating carriers failing to weigh cars where actual weight is necessary to protect freight charges. To avoid such penalties, the weighing department checks all bills rendered against the Santa Fe for such failures and handles for correction. The failures usually result from oversight or a desire to forward the car promptly at which times waybill is marked to weigh en route. Freight charges in most cases are assessed on actual weight of the shipment. When the latter is not established or published weight (tariff or standard) it is obtained by track-scaling the car or through a regional railway weighing and inspection bureau's agreement weight obtained by investigation and certification of shipper's weights.

A national code of weighing rules governs most interstate movements. Railway weighing facilities are installed, maintained and operated in accordance with specifications of the U. S. Bureau of Standards, which checks a portion of those facilities each year. Santa Fe scales, year after year, are well within the prescribed tolerance.

The freight delay claim bureau investigates all delay claims. This bureau handles correspondence with other Santa Fe departments. It quotes applicable schedules on all claim cars, requested by foreign lines as well as Santa Fe departments, explains causes of delays, and handles inquiries concerning alleged rough handling when more than one grand division is involved; "87 reports" reflect reportable delays. Later,

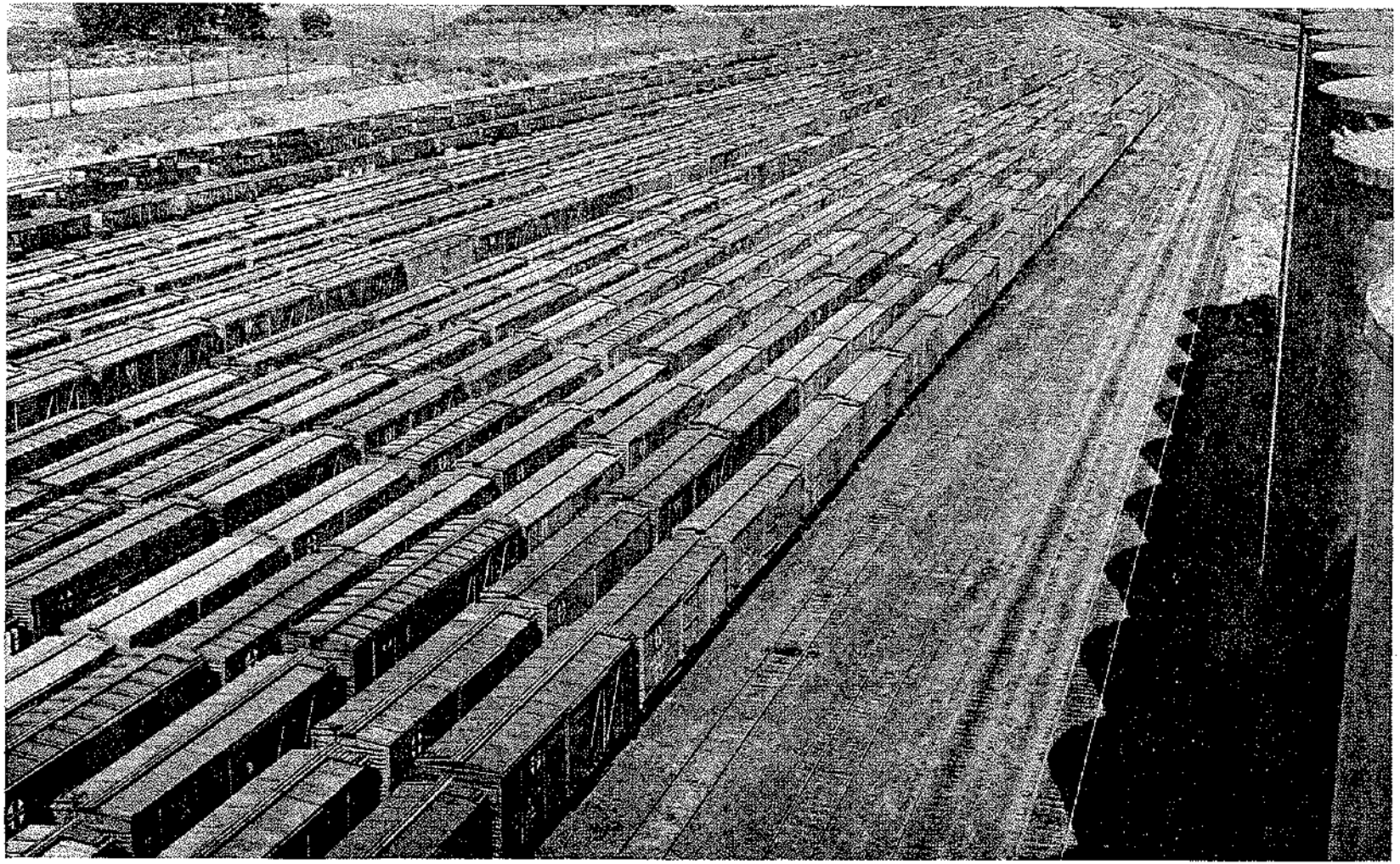


METHODS OF ACCOUNTING for per diem and mileage charges on cars are uniform on all railroads, and are governed according to rules prepared under the supervision of the Association of American Railroads. Reproduced above are the front covers of the books containing these rules.

by mail, details of delay are forwarded to the transportation department for future reference.

Clearances authorizing the movement of extreme dimension loads (freight cars loaded with commodities unusually high or broad) are issued by the general superintendent of transportation. There is published a *Railway Line Clearances* which proves helpful, but commodities often are so unusual as to require close check with the engineering department for bridge, tunnel and other right of way clearance. When cars are destined to a point beyond the Santa Fe's lines, desired routing must be checked for clearance and alternate routing suggested if former will not clear. Requests from other railways for Santa Fe right of way clearances are handled.

The desires of other carriers in relation to traffic and equipment must be known and appreciated. Conditions peculiar to each Santa Fe junction must be understood. There are not rules or precedents to cover all emergencies which may confront the transportation department. With the time element always involved, decisions must be prompt and all factors must be followed through to insure that desired results are obtained.



CONVERGING FROM MANY PARTS of the system, this dramatic photograph taken from atop elevator "A" at Turner, Kan., shows some of the 2,200 trains that move over the Santa Fe every 24 hours.

Car Service Department

THE car service department with W. P. Dolan, superintendent, and R. H. Weeks, car accountant, is located in the Santa Fe general office building in Topeka. A staff of four hundred complements this centralized car reporting and statistical bureau, into which daily flows by mail, telegraph and teletype a volume of reports of passenger, freight and work train, steam and Diesel locomotive, Santa Fe system, foreign line and private line car and numerous related data.

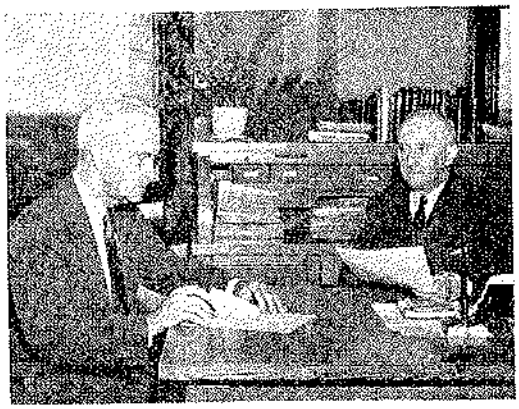
All Santa Fe train, locomotive and car movements, carloadings, the disposition of empty cars and the dismantling or sale of retired equipment are embraced in the car service department's permanent records. That includes the location and movement of the Santa Fe's 88,000 passenger, freight and miscellaneous cars, the large number of foreign line and private line cars on Santa Fe rails, the compiling and transmitting of reports on carload red ball or manifest freight and also military personnel and impedimenta.

Santa Fe patrons are benefited by the various service available for the prompt location of cars and general tenor of movement. The Interstate Commerce Commission, Association of American Railroads, governmental, state and railway groups, as well as all Santa Fe departments, are furnished statistical data of various nature, including car and train movements, ton miles, car miles, locomotive and train miles and other operating statistics. Settlements for per diem and milage for all classes of equipment are prepared and reported to car owners and to various state tax commissions.

The car service department has five main divisions which are responsible for receipt, maintenance and distribution of the following:

Car records and movements,
Per diem, mileage and reclaim,
Statistics,
Miscellaneous matters,
Red ball freight.

Each car, locomotive and item of railway work equipment owned by a railway or a private car line is identified by a number and preceding initials painted or mounted on sides, ends and other positions. Throughout its life, in most instances, each piece of rolling stock retains that same number. It is the only immediate means of identification other than the car's construction records.



W. P. DOLAN (right), superintendent of car service, is here shown in conference with R. H. Weeks, car accountant, in the former's office at Topeka.

The nearly 2,000,000 freight cars owned and operated by railways and private car lines in the United States, Canada and Mexico are listed in the official *Railway Equipment Register*, which discloses size, type and weight-capacity of each car. Passenger equipment owned by railways in the United States and Canada, totaling some 45,000 cars, are listed in the *Official Register of Passenger Train Equipment*. Those registers are in daily use by all American railways. The information they contain in regard to Santa Fe equipment has been furnished the publisher by the car service department. New Santa Fe cars, old Santa Fe cars retired, dismantled or sold, locomotives acquired or scrapped—all are recorded. New equipment is first assigned a number which is entered in the car service historical records. Car is then placed in service and all its movements are followed.

The Santa Fe's basic and fundamental car movement records begin with the train conductors' wheel reports and reports covering interchange of cars with other lines. Some 1,400 freight and 1,200 passenger wheel reports are received by mail each day. To those reports are added interchange and junction reports from some two hundred and fifty-five Santa Fe interchange points which list interchange of cars between the Santa Fe and foreign lines. Interchange reports are made by the delivering carrier. With Santa Fe's daily interchange report (form 1305), the original (yellow) is mailed

to the connecting line, the second copy (pink) to the car service department. Cars in and out of shops are reported on a green (1155) form. The color arrangement facilitates identification. Cars forwarded, received and on hand at stations are reported daily.

Upon receipt, the car record department sorts the wheel and junction reports into individual car slips which are sorted as to Santa Fe, Santa Fe refrigerator and tank, foreign line railways and private car lines. The slips are re-sorted into numerical and date order, all of which is a sizable task involving as high as 105,000 car slips in a single day. Postings are then made into the car movement books. Needless to say, there are many tracers reaching the car record division not only on Santa Fe system cars but from all other railways. These are handled promptly, as are the details incident to the semi-monthly compilations of foreign cars in general managers' territories, the location of those cars by classes, and similar data on system or Santa Fe owned cars, the latter for more frequent periods.

The per diem, mileage and reclaim section issues reports that are paid and checks reports received from other railway lines covering those matters. An average of 80,000 cars per month are included in the monthly statements of foreign cars on Santa Fe rails. These are detailed, recapped and reported to owners; two months later they are rechecked and readjusted. Per diem reports received from foreign lines show car-days on those lines, also mileage earned by Santa Fe refrigerator department cars and mileage on passenger cars. These are checked for errors and totals reported to auditor. Cards are punched for each car reported and listed in the per diem record in numerical order. The per diem record is compared with car records and claim made for any per diem underpaid. Passenger car mileage is checked in detail. Master Car Builders' repair cards on Santa Fe system cars are checked with records for correct location on dates repaired and auditor makes counterbill for any exceptions found by this check.

Per diem is computed from interchange reports; mileage from wheel reports. Refrigerator, tank and passenger cars are computed on a mileage basis. To facilitate payments, per diem and mileage are consolidated with reclaims. Claims for unreported per diem received from car owners are checked with car records and payments made, or handled with interested connecting line if necessary. All procedures are uniform, governed by Association of American Railroads' published rules.

Car accounting dates back to 1873. The English plan, known as mileage and demurrage, was tried out in the early seventies. In 1876 the trunk lines in this country entered into an agreement to pay fifty cents per diem, such agreement to remain in effect for two years. A number of plans subsequently were tried by the roads both on a per diem and mileage basis until 1887, when a number of lines put into effect mileage rates ranging from one-half to three-quarters of a cent per mile and introduced the rate of fifteen cents per diem. Settlements were made on a mileage basis, which varied from six-tenths of a cent to two cents per mile. This method of making settlements was in effect until July, 1902, when the present plan was adopted by all the principal railroads of the United States and Canada. Rates, however, changed many times until the early 1920's when the rate of one dollar per day, with penalty for delayed reporting, was made applicable to cars of railway ownership.

Mileage on cars of private lines is computed on a loaded and empty basis and totals reported to owners at the various rates prescribed in mileage tariff 7-N and per diem rules.

In the statistical section many of the basic factors for determining system-wide efficiency and economy of operation are grouped, computed and made available to interested Santa Fe departments. Such performance reports likewise are furnished the Association of American Railroads and other railway and official groups, particularly the Interstate Commerce Commission, in line with section 20 of the Interstate Commerce Act, which requires "annual, periodical or special reports from carriers."

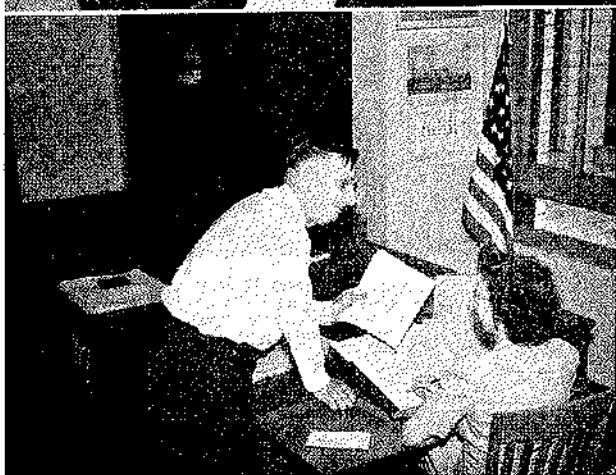
Only by comparative figures may some phases of railway operation be comprehensively appraised and checked. The statistical section computes for the Santa Fe system, train-miles, which is the movement of a train a distance of one mile, for all Santa Fe passenger, freight, and work trains operated; locomotive miles by class groups, operating divisions and classes of service—freight, passenger, train and yard switching, work train, light and helper service; individual locomotive mileage by assigned divisions and services; daily report of engines and men employed in yard switching or transfer service. Car miles

are computed, loaded and empty, for all classes of passenger and freight equipment and for work cars.

The various reports group mileages and other computations by operating divisions, states, districts, grand divisions and system. Detailed reports are prepared on Diesel passenger and freight operations, maintenance, transcontinental operation, freight, switch and work locomotive mileage and various other headings including special reports on Diesel engines.

Joint facility operating statements, which is the use or operation of trackage and accompanying facilities by the Santa Fe and other railways as lessee, lessor, owner or joint owner, are prepared by the statistical division. This involves mileage, number of passengers and freight tons, cars, trains, motor cars, and many other factors in relation to the Santa Fe's operation over such rails and use of depot, terminal, and right of way installations in connection with the trackage involved. By means of those detailed computations the cost of operation in relation to the existing contract is determined for each joint arrangement the Santa Fe has with other railways.

All home routes on foreign cars and freight equipment and the tracing of empty cars are handled by the miscellaneous division. A "home route" is the route via which an empty foreign car returns to the owner's rails. When a foreign car is received by the Santa Fe at an interchange point, a home route card showing road and interchange point is attached to waybill covering the car. An empty car is either returned via that route, or delivered to other roads which, by reciprocal arrangement, facilitate the return of cars to the owner roads. An example of the latter is the Southwest "short route" plan by which Southwestern lines assist each other in short routing foreign cars on their rails to owner lines. This is done on a mileage equalization basis. It is also possible, at times, to return cars under load to a "home district," a district intermediate with a loading point and a home district, or to a district beyond or adjoining a home dis-



VARIOUS DIVISIONS of the car service department at Topeka. Top—Wanda Schinder, mail clerk; Olive Ware, clerk, lightweight record case, miscellaneous section. Second—Alberta Bell, key punch operator, foreground, with two co-workers in the machine room of the statistical section. Third—Viola Klinow, Henrietta May, Walter Thomas, supervisor, and Rose Lacey in the red ball section. Bottom—H. E. Tasker, supervisor, and Genevieve Hayner, clerk, in the per diem-mileage section.

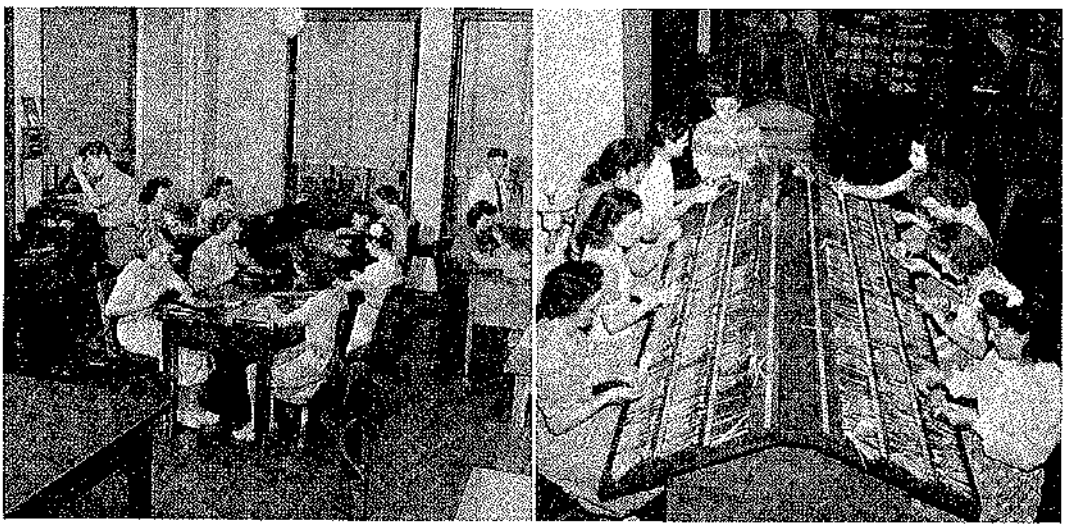
trict. "Home districts" are nineteen geographical areas throughout the nation assigned to principal railway car owners. Cars at a junction point with owner should be loaded via owners' rails.

The inspection of interchange reports and correction notices therewith is a responsibility of the miscellaneous division, which also maintains card records of all Santa Fe cars light-weighed; a copy of all scale or weighing tickets is forwarded to the department. Bills and vouchers covering rental of equipment from foreign roads are handled. Such rental is on a daily basis, the rates varying with the type of equipment. The department also maintains the historical records for all locomotives, cars and rolling equipment owned by the Santa Fe and all changes in the classification of such equipment. Monthly lists are compiled covering Santa Fe cars and others destroyed, dismantled or otherwise put out of service on Santa Fe rails and similar treatment to Santa Fe cars while on foreign rails; also Santa Fe cars renumbered or sold and new Santa Fe cars placed in service. Proof sheets are prepared for the latter's inclusion in the various railway equipment registers, which also receive data on Santa Fe cars removed from service.

The miscellaneous division also prepares the Santa Fe's daily traffic or passing report (report No. 20), which includes all carloads moved except livestock. Information for the report is secured from daily record of interline waybills received from connecting lines and record of carload interline waybills for freight delivered to connecting lines. This report, possibly the most voluminous daily report on the Santa Fe system, gives the car number, shipper, consignee, destination, routing, contents and Santa Fe point of interchange. Copies of the report are mailed daily to all Santa Fe traffic offices. The report is useful in many ways and, in some instances, complements the wired red ball consists and passing reports which continuously reach the car service department and in turn are disseminated to the Santa Fe's traffic offices.

The red ball division, previously outlined, is an important division of the car service department. It operates on a twenty-four-hour basis and every effort is made to render it the most efficient traffic reporting bureau in the nation. Red ball functions are closely allied with the Chicago operations of the general superintendent of transportation.

Throughout the war the transportation department has worked with the War and Navy departments, Office of Defense Transportation, War Production Board, Maritime Commission, Interstate Commerce Commission, Reconstruction Finance and Defense Plant corporations, War Food Administration, National Housing Agency, and the various purchasing committees operating under lend-lease, or indirectly with those agencies through various defense plants and manufactories. Thus does the Santa Fe participate in and co-ordinate the world-wide movement of troops and military impedimenta, war materials (raw and fin-



AMONG THE MANY OPERATIONS of the car service department at Topeka is the handling of the wheel and junction reports. These are first cut by employees shown at the left, and then are sorted and hung on spindles for posting in the car movement books. As many as 105,000 of these slips are received in a single day.

CAR RECORDS ROOM at Topeka where the car slips are posted by the girls at the left. Close-up of Mary Jane Haracek posting car slips after they have been sorted is shown at the right.

ished products), railway equipment pools and other war emergency measures. Close contact always is maintained with the various sections of the car service division of the Association of American Railroads and the Shippers Advisory Boards with their some 500 local car efficiency committees.

The oil emergency which followed the Japanese attack on Pearl Harbor found the Santa Fe prompt in affording relief to eastern outlets. Under the symbol oil train program adopted August 1, 1942, an average of 4,000 cars per day, more than 850,000 barrels, moved by rail to the East. The Santa Fe's direct service between oil producing centers and eastern gateways contributed much toward the success of that movement.

It is a war task of the transportation department to insure utilization of all freight cars on Santa Fe rails to fullest service limits. This means the dissemination and enforcement of governmental rulings in regard to capacity loading of cars, use of cars in local or switching hauls, and many other mandatory regulations. Movement and disposition of empty cars is a matter of concern, involving many problems at ports, supply centers and terminals.

Chicago, Illinois

September 1, 1945


Santa Fe