WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XVI, No. 1

JANUARY • 1941

25 CENTS A COPY
$2.00 PER YEAR

ANNUAL REVIEW NUMBER

Thousands of Truck Engines Giving

ENTIRELY NEW RESULTS

FILTERS CLEANER

NO SLUDGE DEPOSITS ---

SCREENS CLEANER

CORROSION PREVENTED

OIL LINES OPEN

NO CARBON DEPOSITS ---

OIL RINGS FREE

They Prefer **TEXACO**

★ MORE SCHEDULED AIRLINE MILEAGE WITHIN THE U. S. AND TO OTHER COUNTRIES IS FLOWN WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE BUSES, MORE BUS LINES AND MORE BUS-MILES ARE LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE STATIONARY DIESEL HORSEPOWER IN THE U. S. IS LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE DIESEL HORSEPOWER ON STREAMLINED TRAINS IN THE U. S. IS LUBRICATED WITH TEXACO THAN WITH ALL OTHER BRANDS COMBINED.

★ MORE RAILROAD ROLLING EQUIPMENT IN THE U. S. IS LUBRICATED WITH TEXACO THAN WITH ANY OTHER BRAND.

★ MORE TOURISTS USE TEXACO FIRE-CHIEF GASOLINE THAN ANY OTHER BRAND.

WITHIN the past few months thousands of heavy-duty gasoline and Diesel engines have been giving a greatly stepped-up performance. These engines are keeping free from carbon, piston rings free in their grooves, filters, screens and oil lines open, free from sludge, increasing life of modern bearings.

The change made to bring this about was the adoption of *Texaco 303 Motor Oil.*

Texaco 303 Motor Oil assures freedom from sludge and carbon deposits over longer periods of time.

The outstanding performance that has made Texaco preferred in this field has also made it preferred in the fields listed in the panel.

These buyers are enjoying many benefits. You, too, will find important advantages when you use Texaco Lubricants and Fuels.

A Texaco Lubrication Engineer will gladly cooperate in making savings in *your* plant. Phone the nearest of more than 2300 Texaco distributing plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York, N. Y.

TEXACO DEALERS INVITE YOU TO ENJOY

FRED ALLEN in a full-hour program every Wednesday night. CBS, 9:00 E.S.T., 8:00 C.S.T., 10:00 M.S.T., 9:00 P.S.T.

METROPOLITAN OPERA every Saturday afternoon, NBC. See local newspaper for time and station.

TEXACO REG. T.M.

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

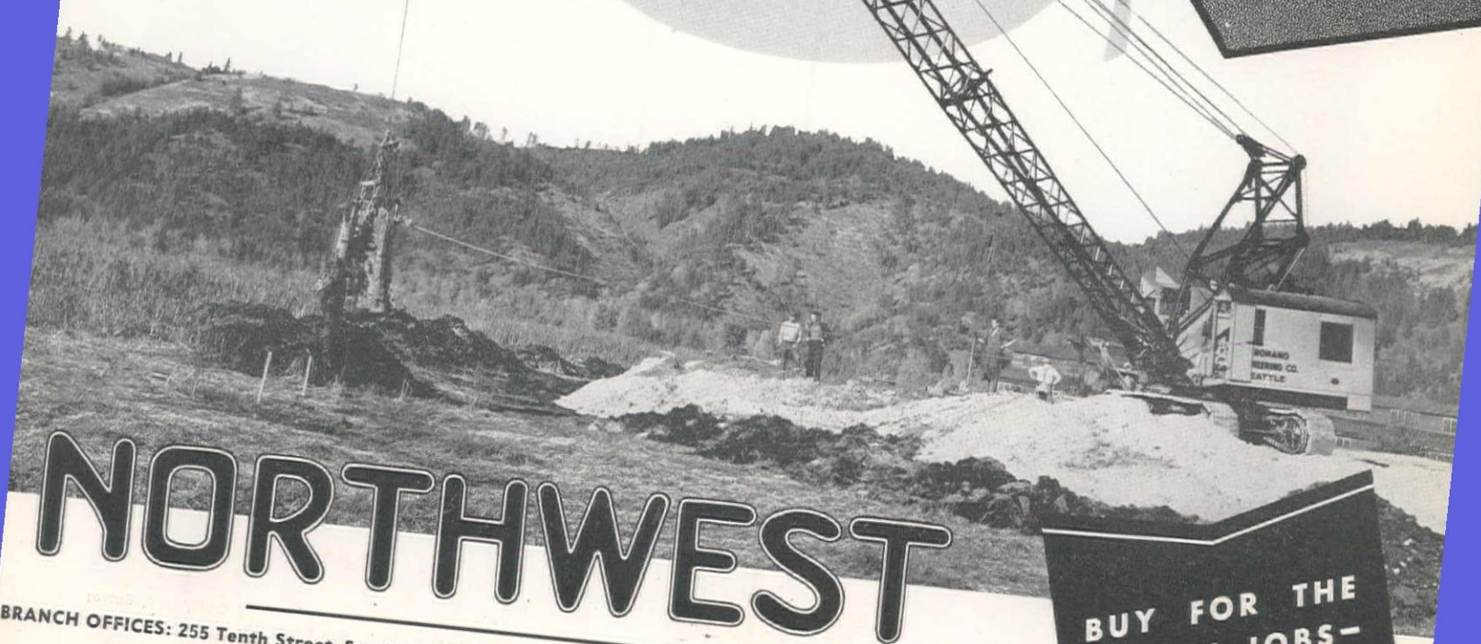
13 is a LUCKY NUMBER when it's a NORTHWEST

HAVE you ever asked yourself, or a Northwest user, why so many Northwest owners buy Northwests again and again? For nearly 20 years one out of every three Northwests sold has been a repeat order. That doesn't "just happen!"

The advantages that Northwest brings you are money-making advantages—and repeat orders from such responsible concerns as L. Romano Engineering Co. are the best possible proof of it. Northwest features make money for others—let them make money for you.

NORTHWEST ENGINEERING COMPANY
1738 Steger Bldg., 28 E. Jackson Blvd., Chicago, Illinois

This is the 13th NORTHWEST for L. ROMANO ENGINEERING COMPANY Seattle, Wash.



NORTHWEST

BRANCH OFFICES: 255 Tenth Street, San Francisco, California; J. L. TALLMAN, 1631 - 16th Ave., Seattle, Washington; 3707 Santa Fe Avenue, Los Angeles, California

NORTHWEST SALES AGENTS: ARNOLD MACHY. CO., INC., 149 W. 2nd South St., Salt Lake City, Utah; MINE & SMELTER EQUIPMENT CO., P. O. Box 788, Phoenix, Arizona

BUY FOR THE TOUGH JOBS—AND THE EASY JOBS WILL TAKE CARE OF THEMSELVES!

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

ABC

D. F. STEVENS, Acting Editor

Contents for January, 1941

SUBSCRIPTION RATES

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CARL C. VENEMAN, Mgr.

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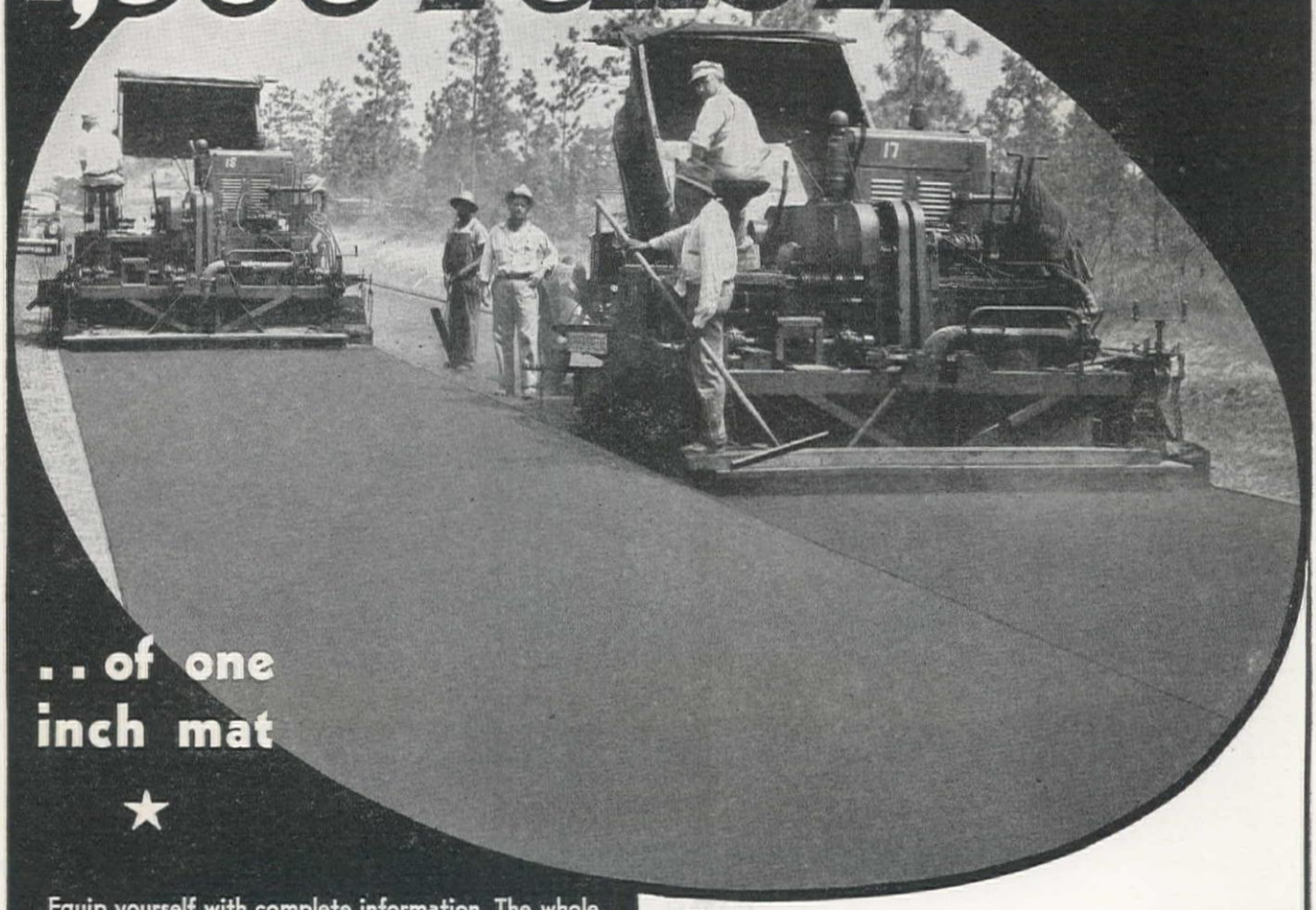
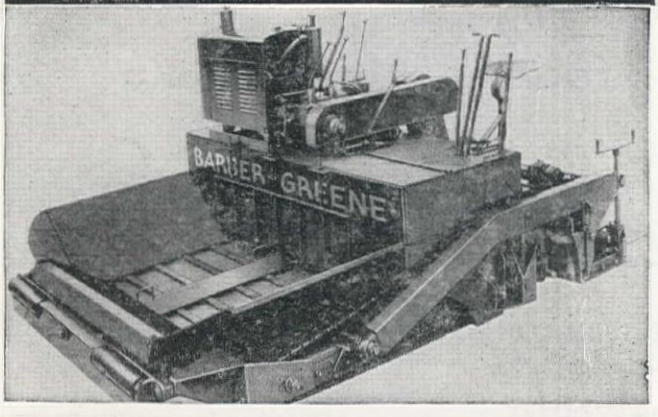
AVERAGING 1,000 TONS A DAY



. . of one inch mat

★

Equip yourself with complete information. The whole story is in the Barber-Greene Finisher Booklet. Send a card or letter for your copy. There is no obligation.



IT takes systematic organization to lay 1,000 tons of 1" x 22' mat any day. But to average 1,000 tons a day for 31 miles of the most beautiful sand asphalt you have ever seen, perfectly leveled, and uniformly compacted, takes more than organization and good intentions—it takes Barber-Greene Tamping-Leveling Finishers.

The State of Georgia is using two of its Barber-Greenes on this two course job from Jesup to Nahunta, not only proving the excellence of Barber-Greene pavement and the economy of B-G operation, but the way in which Barber-Greenes set the pace for the whole project.

40-13

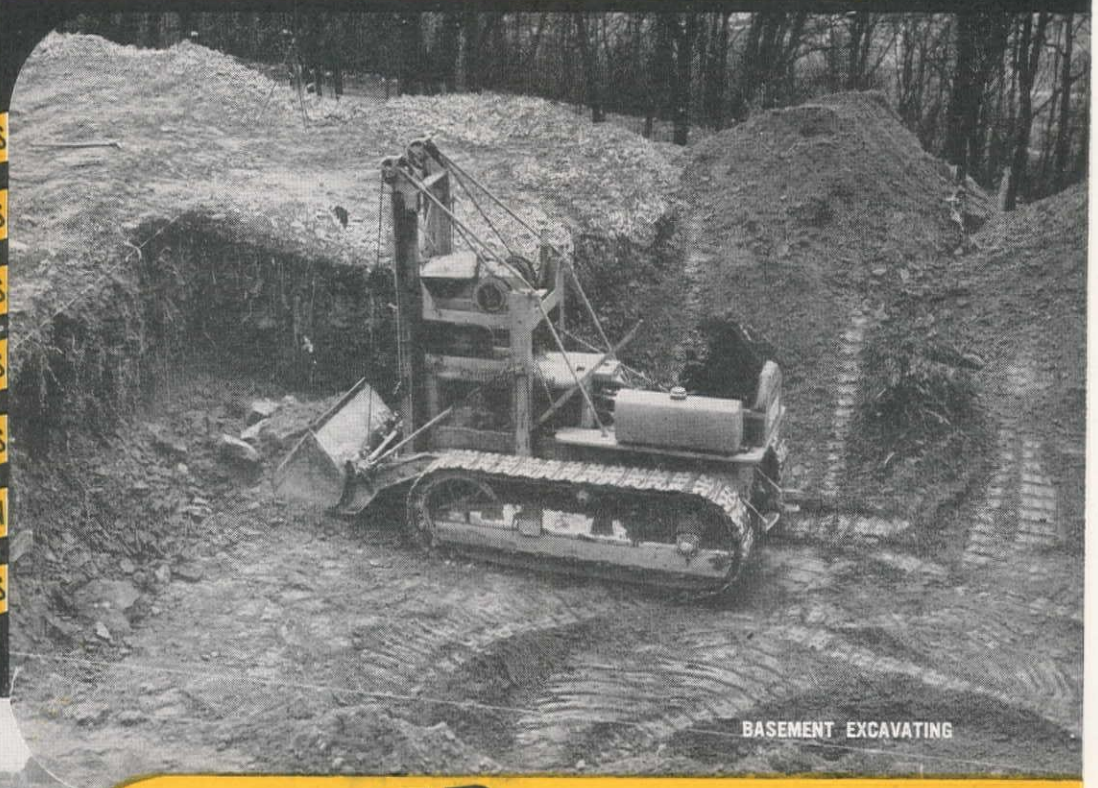
BARBER GREENE

STANDARDIZED MATERIAL HANDLING MACHINES

AURORA ILLINOIS

TRAXCAVATOR*

EXCAVATES • LOADS
GRADES • STRIPS
BULLDOZES • LEVELS
CLEARS LAND • PULLS
BACKFILLS • CASTS
DIGS • REMOVES SNOW
SPREADS • DITCHES

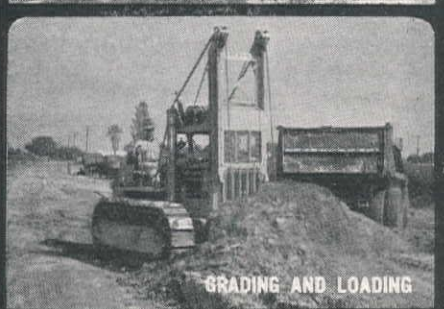


BASEMENT EXCAVATING

STRIPPING

PIONEER OF MODERN METHODS

SNOW REMOVAL



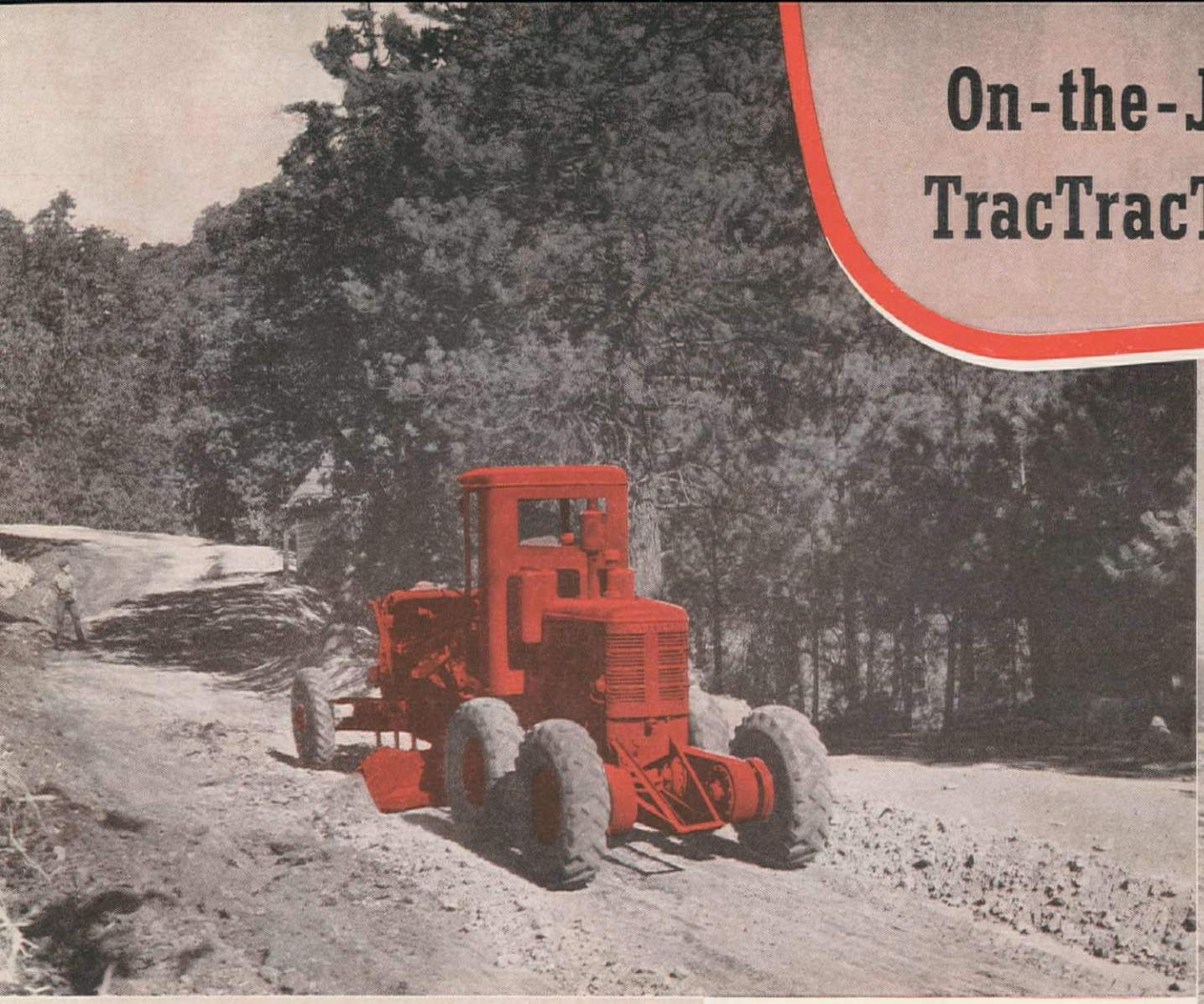
GRADING AND LOADING

"TRAXCAVATORS" are powerful digging and loading machines which are blazing new trails in the modernization of excavating, dirt moving and material handling. They combine in one machine the usefulness of many, and will do more kinds of digging and material moving jobs than any other single piece of equipment. "TRAXCAVATORS" are highly mobile — can travel around a job on their own power at speeds better than 5 miles per hour. Powered by "Caterpillar" track-type tractors and built in three sizes with bucket capacities from ½ to 2½ cubic yards. Ask your "Caterpillar" dealer to show you why a "TRAXCAVATOR" is the Pioneer of Modern Methods. For illustrated catalog write Trackson Company, Milwaukee, Wis., U.S.A.

* REG. U.S. PAT. OFF.

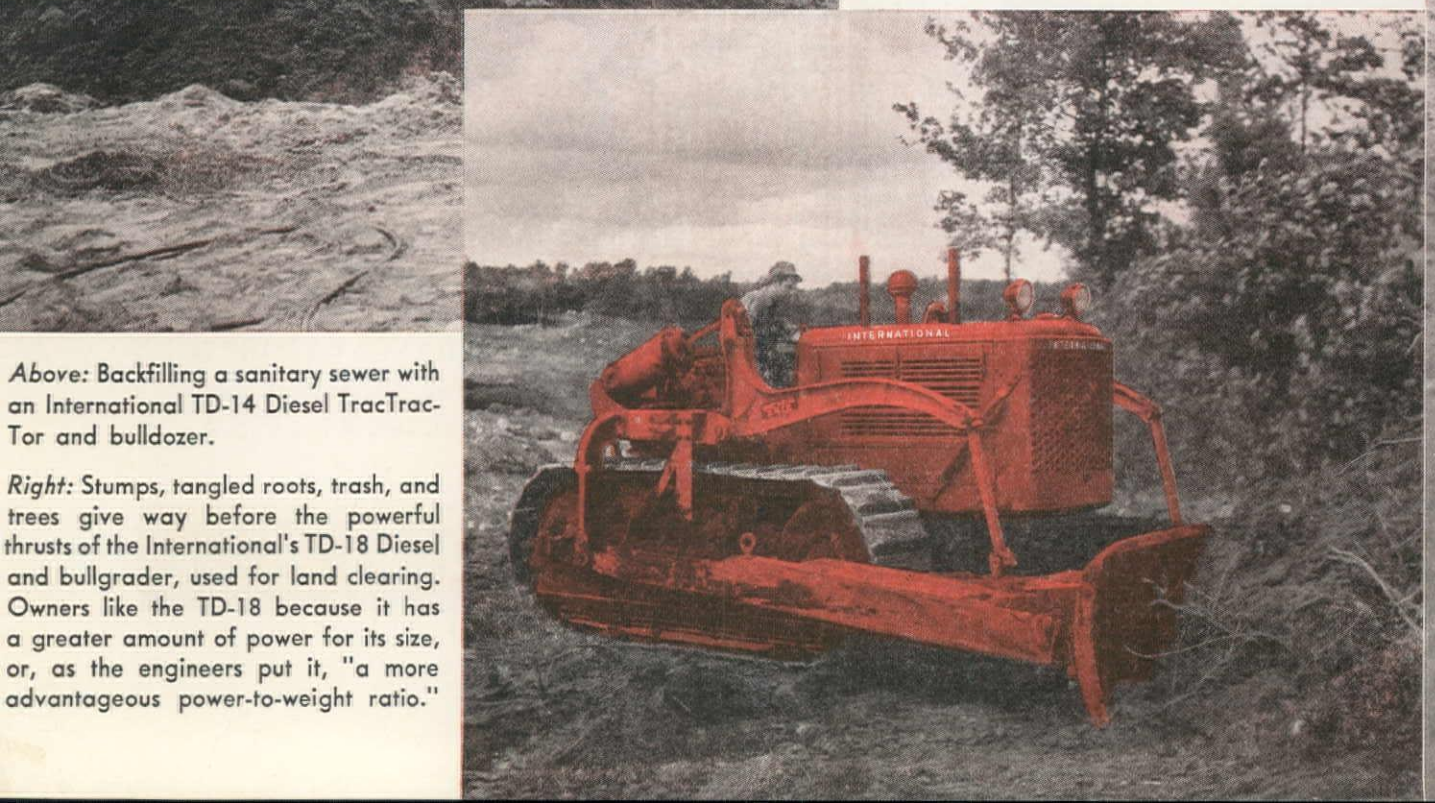
TRAXCAVATORS ARE PROFIT-MAKERS

On-the-Job TracTracTor



Above: Resurfacing a mountain road near Crestline, Calif., with an International-powered motor grader. The oiled surface of the old road was scarified and graded to one side, the windrow then graded back and forth to pulverize the material, and the pulverized material spread over the road again as a new surface.

Above: Backfilling a sanitary sewer with an International TD-14 Diesel TracTrac-Tor and bulldozer.



Right: Stumps, tangled roots, trash, and trees give way before the powerful thrusts of the International's TD-18 Diesel and bullgrader, used for land clearing. Owners like the TD-18 because it has a greater amount of power for its size, or, as the engineers put it, "a more advantageous power-to-weight ratio."

PERFORMANCE Explains International ACCEPTANCE!

● Enthusiasm for the New International Diesel TracTracTors grows by leaps and bounds. On job after job, TracTracTors are getting the call because of their work output, their ability to cut costs, their low maintenance, and their stamina to stand up under the toughest operating conditions.

A new year is ahead. The industry hums with activity, laying plans for the next 12 months. *Power* is the key to the speedy, successful completion of a good many jobs—power to get things done on time at the lowest possible cost.

The FOUR NEW INTERNATIONAL TRACTRACTORS have proved themselves able to fit into any project. Look into their record—and build your work program around these sound, reliable power partners. The nearby International industrial power dealer or Company-owned branch will give you complete details.

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue **Chicago, Illinois**

International Industrial Power Dealers: **Smith Booth Usher Co., Los Angeles; O. S. Stapley Co., Phoenix; Howard-Cooper Corp., Portland, Seattle, Spokane; Intermountain Equipment Co., Boise; J. D. Adams Co., Billings; The Lang Co., Salt Lake City; Motor Equipment Co., Albuquerque; Clark County Wholesale Mercantile, Inc., Las Vegas; H. W. Moore Equipment Co., Denver; Allied Equipment, Inc., Reno; Wilson Equipment & Supply Co., Cheyenne.**

International Harvester Branches **at San Francisco, Los Angeles, Portland, Seattle, Spokane, Salt Lake City, Denver, and Cheyenne.**

INTERNATIONAL Industrial Power

KOEHRING POWER — built into the shovel from engine to clutches, gears, and crowd—power that flows without loss or interruption to the digging dipper — is the "stuff" that counts to maintain high speed maximum production on day and night working schedules.

KOEHRING STRENGTH — built into the shovel to "take" the power — strength without a weak link — Heavy-Duty construction—from crawlers to dipper—is the quality required for high speed digging in all types of material. Dirt or rock, Koehring strength is digging strength.

Koehring equipment is noted for its quality and honest workmanship. Profits are made from working, not buying a shovel. Buy Koehring for working qualities and profit.

KOEHRING COMPANY MILWAUKEE, WISCONSIN

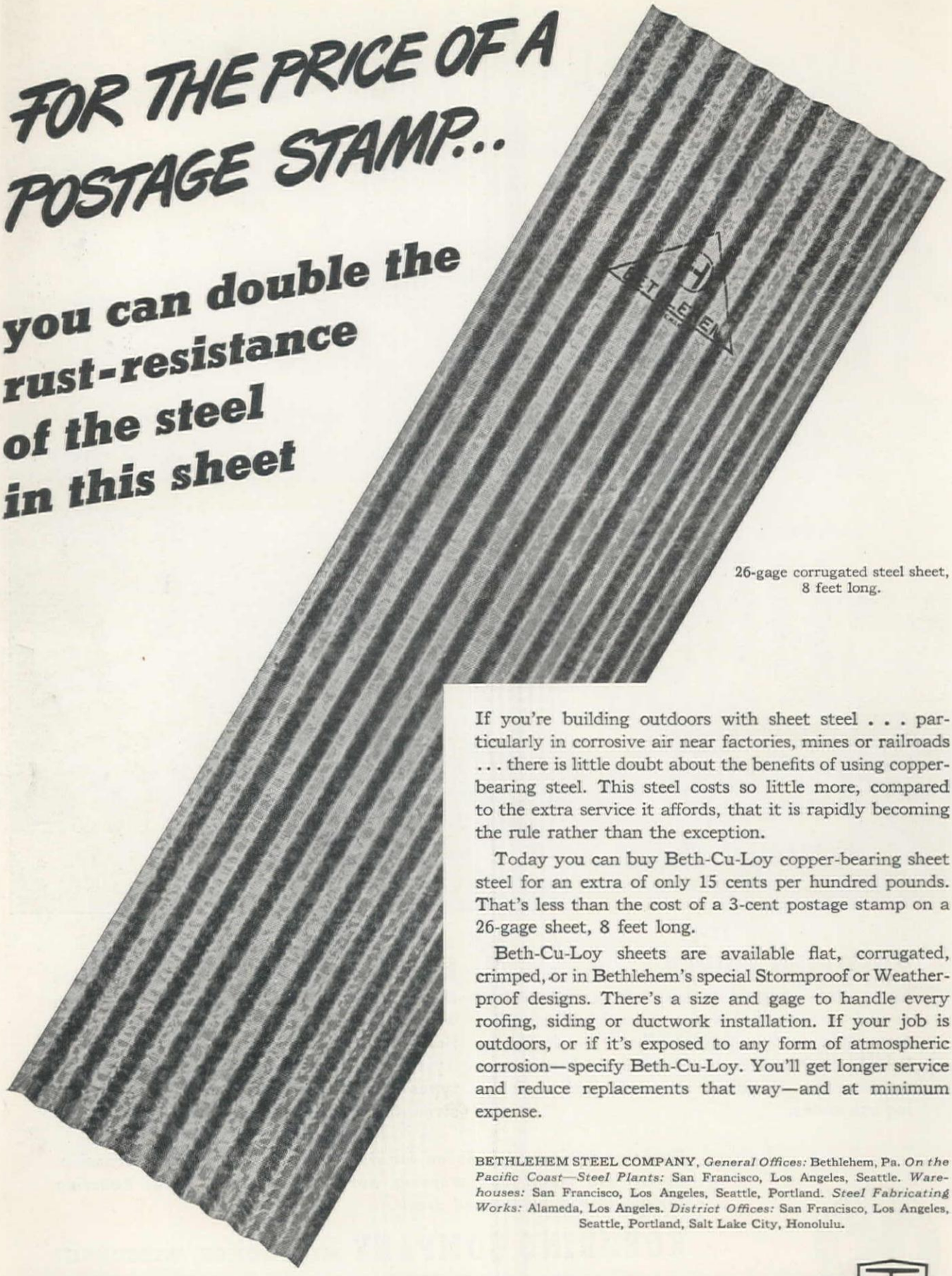
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

HARRON, RICKARD & McCONE CO., San Francisco-Los Angeles • L. A. SNOW CO., Seattle-Spokane • EMPIRE EQUIPMENT CO., Billings
CONTRACTORS EQUIPMENT CORP., Portland • LUND MACHINERY CO., Salt Lake City • NEIL B. McGINNIS CO., Phoenix, Ariz.

FOR THE PRICE OF A POSTAGE STAMP...

you can double the rust-resistance of the steel in this sheet



26-gage corrugated steel sheet, 8 feet long.

If you're building outdoors with sheet steel . . . particularly in corrosive air near factories, mines or railroads . . . there is little doubt about the benefits of using copper-bearing steel. This steel costs so little more, compared to the extra service it affords, that it is rapidly becoming the rule rather than the exception.

Today you can buy Beth-Cu-Loy copper-bearing sheet steel for an extra of only 15 cents per hundred pounds. That's less than the cost of a 3-cent postage stamp on a 26-gage sheet, 8 feet long.

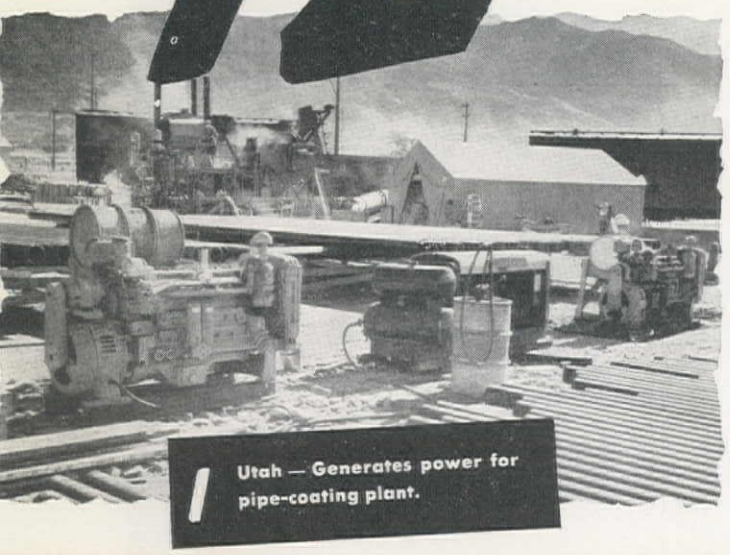
Beth-Cu-Loy sheets are available flat, corrugated, crimped, or in Bethlehem's special Stormproof or Weatherproof designs. There's a size and gage to handle every roofing, siding or ductwork installation. If your job is outdoors, or if it's exposed to any form of atmospheric corrosion—specify Beth-Cu-Loy. You'll get longer service and reduce replacements that way—and at minimum expense.

BETHLEHEM STEEL COMPANY, *General Offices:* Bethlehem, Pa. *On the Pacific Coast—Steel Plants:* San Francisco, Los Angeles, Seattle. *Warehouses:* San Francisco, Los Angeles, Seattle, Portland. *Steel Fabricating Works:* Alameda, Los Angeles. *District Offices:* San Francisco, Los Angeles, Seattle, Portland, Salt Lake City, Honolulu.

BETHLEHEM STEEL COMPANY

BETHLEHEM STEEL

12 IDEAS FOR CUT



1 Utah — Generates power for pipe-coating plant.

2 Oregon — Operates crushing and screening plant.

. . . with "Caterpillar" Diesel Engines

THE PREFERENCE shown by Western contractors for "Caterpillar" Diesel Engines as stationary power units is a direct result of their outstanding economy and performance in "Caterpillar" track-type Tractors.

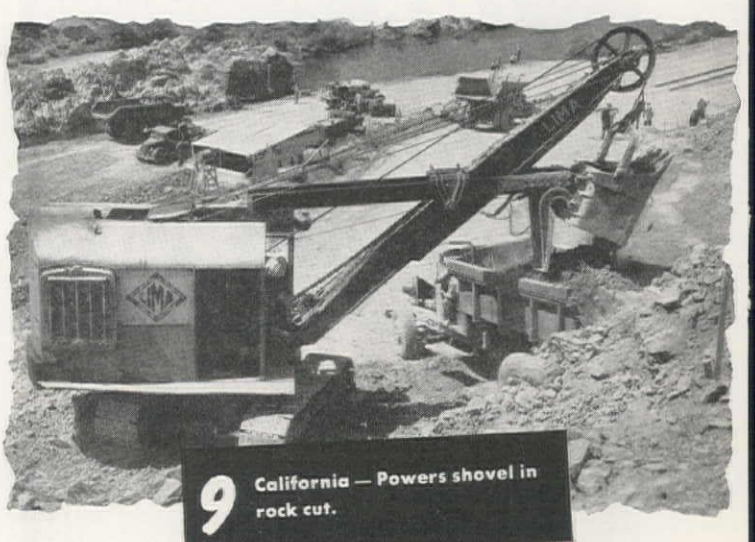
Contractors wanted this engine in their shovels, compressors, locomotives and other heavy-duty machines. Today, more than 100 leading manufacturers of this equipment offer their products with "Caterpillar" Diesel Power.

These rugged engines are popular as portable power units — operating gravel plants, mixing outfits, electric generators, pumps, etc. — because they're easily moved, cost little to run, require a minimum of servicing and have proved their ability to deliver full-rated horsepower continuously, hour after hour.

Your "Caterpillar" Dealer will gladly give you more facts on any of the cost-cutting operations shown on these pages. Better yet, he'll help you apply to your own job these and other new ideas for reducing power costs with "Caterpillar" Diesels.

CATERPILLAR TRACTOR CO. · SAN LEANDRO, CALIF. · PEORIA, ILL.

6 Idaho — Compresses air for rock drills.



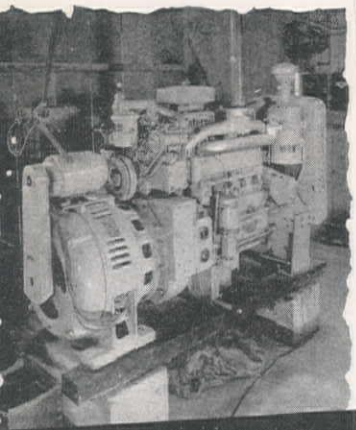
9 California — Powers shovel in rock cut.

TRACK-TYPE TRACTORS · DIESEL ENGINES
AND ELECTRIC SETS · ROAD MACHINERY

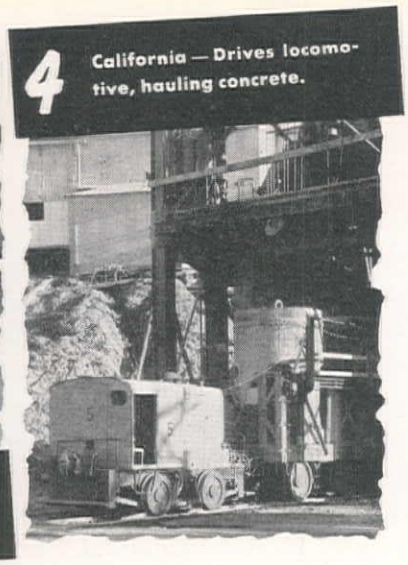
CATERPILLAR

REG. U. S. PAT. OFF.

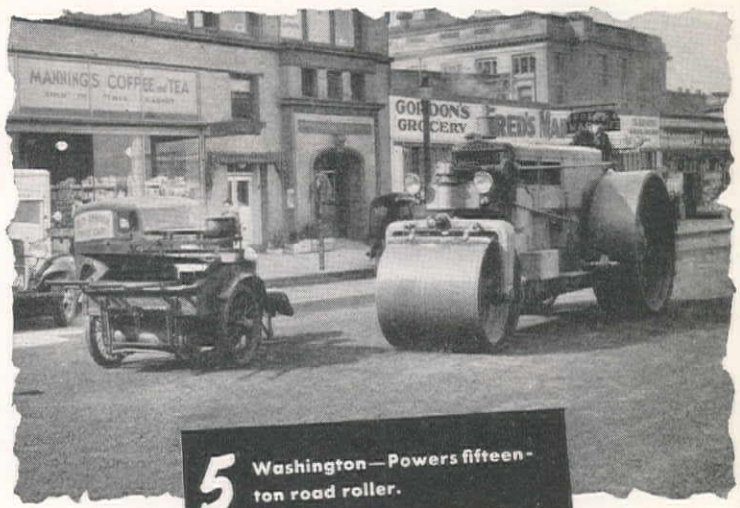
TING POWER COSTS...



3 Arizona — Generates lights and power for construction camp.



4 California — Drives locomotive, hauling concrete.

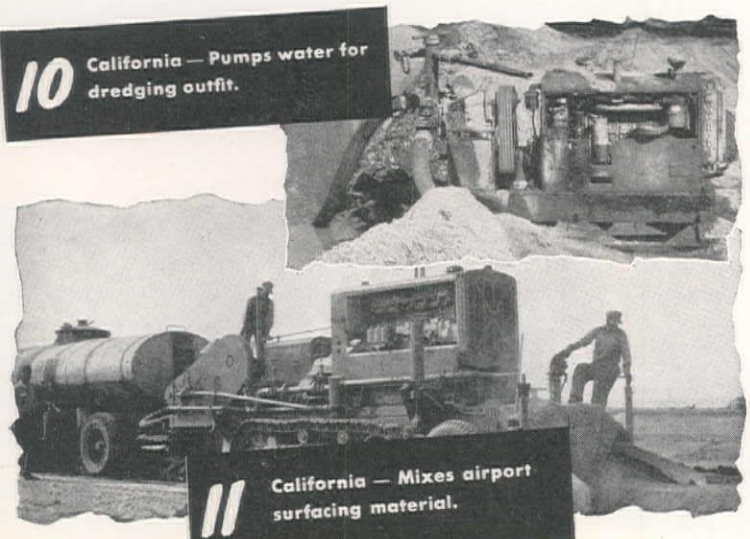


5 Washington — Powers fifteen-ton road roller.

7 California — Pumps lubricant to mobile equipment.

8 California — Powers portable asphalt plant.

10 California — Pumps water for dredging outfit.



11 California — Mixes airport surfacing material.

12 Oregon — Runs dragline, sloping channel banks.

DIESEL ENGINES

Before you buy—

CAST AN EYE AT

● In 1941 Adams enters its 56th year of service to the road building and earth moving fraternity. The Adams line for 1941, more than ever before, reflects the progressive leadership which has long been Adams' . . . Leading the line are six new and improved models of motor graders which have definite operating advantages. Then there are Adams leaning wheel graders, elevating graders, hauling scrapers, tamping rollers, and a new high-speed road maintainer in which all highway officials will be interested . . . Before you buy any machine of the types illustrated on these pages, you will be smart to let your local Adams representative show you his latest offerings. Adams equipment is sold throughout the United States, Canada, and most foreign countries by local distributors. Write or phone

J. D. ADAMS CO. Los Angeles - Billings - San Francisco

Western Distributors: Howard-Cooper Corp., Portland, Klamath Falls, Seattle, Spokane; The Lang Co., Salt Lake City; O. S. Stapley Co., Phoenix, Ariz.; McKelvy Machinery Co., Denver; McChesney-Rand Equipment Co., Albuquerque, New Mexico; Intermountain Equipment Co., Boise, Idaho.

A NEW LINE OF MOTOR GRADERS —31 TO 68½ H.P. —GASOLINE AND DIESEL POWER

● Adams Heavy-Duty Motor Grader No. 511 with 68½ h.p. Diesel engine; same machine available with 66½ h.p. gasoline engine.

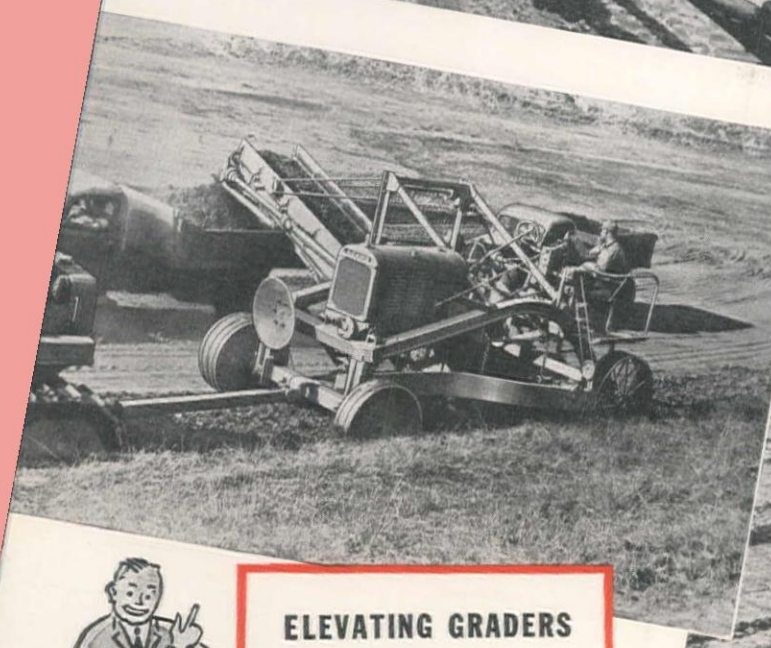
● Adams Motor Grader No. 311 with 50 h.p. Diesel engine; same machine available with 45 h.p. gasoline engine. Same type machine also available with 68½ h.p. Diesel engine—a high-speed, heavy-duty machine.

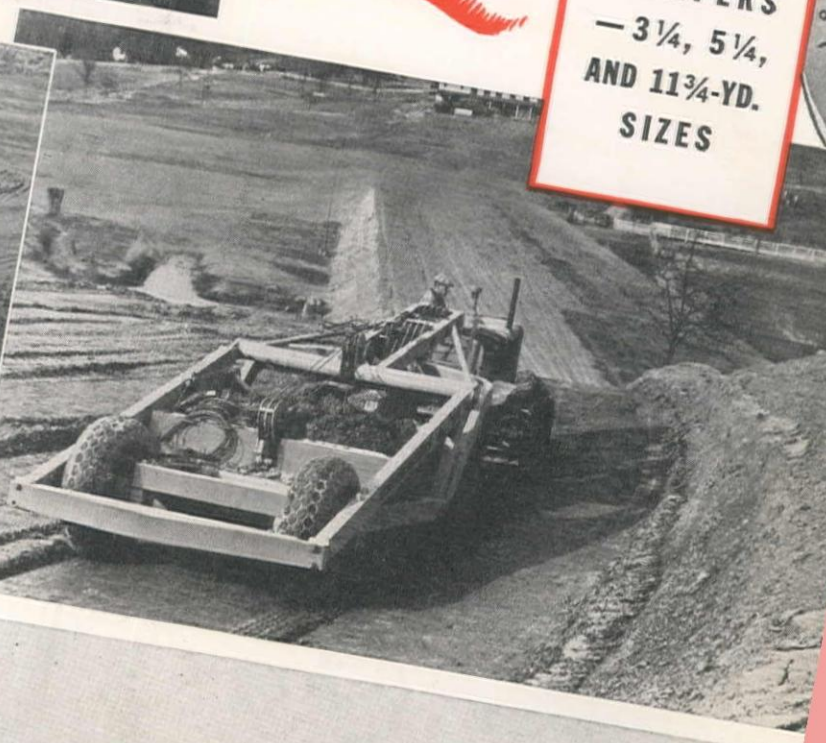
● Motor Grader No. 201 with 31 h.p. gasoline engine—a low-price machine for surface maintenance and light ditch and bank work . . . All Adams motor graders are of the high-lift, bank-cutting type.

ADAMS

LEANING WHEEL GRADERS IN 7 MODELS —POWER OR HAND OPERATED

HAULING SCRAPERS —3¼, 5¼, AND 11¾-YD. SIZES



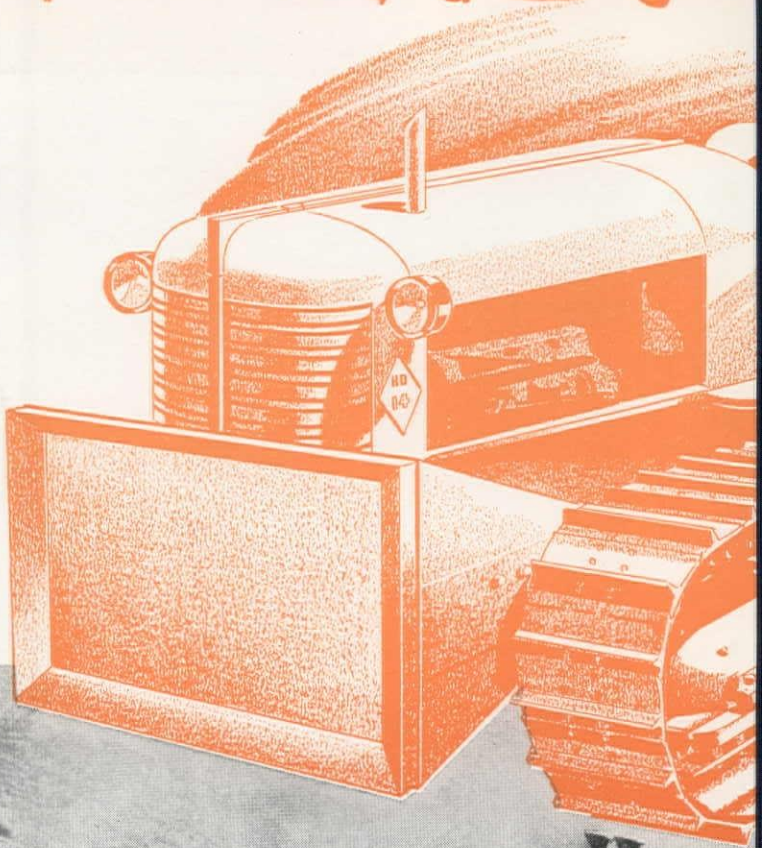


ELEVATING GRADERS IN 2 MODELS —FULLY POWER OPERATED

HIGH-SPEED MAINTAINER— COVERS 15 M.P.H. BEHIND TRUCKS

WAKE UP "LAZY

PUT MORE ZIP BEHIND THE BOWL WITH HD-14 PUSHERS



LOADING"

Push your scrapers without shifting gears. You "gun" it and go with 2-cycle Diesel Power! Like "steam power"—operator keeps one hand on the throttle ... feeds fuel as he pushes. Saves valuable seconds—loads more scrapers every hour. Does it smoother—saves on repair bills. Clicks every second—displays razzle-dazzle maneuvering, in turning and traveling in high, in quickly getting into position for every load.

This same power on the front of your Gar Wood scraper assures bigger loads ... more trips every hour ... longer profitable haul distances.

Put an extra shot of life into your dirt-moving. Let your Allis-Chalmers dealer prove you can do it.

2-CYCLE DIESEL POWER

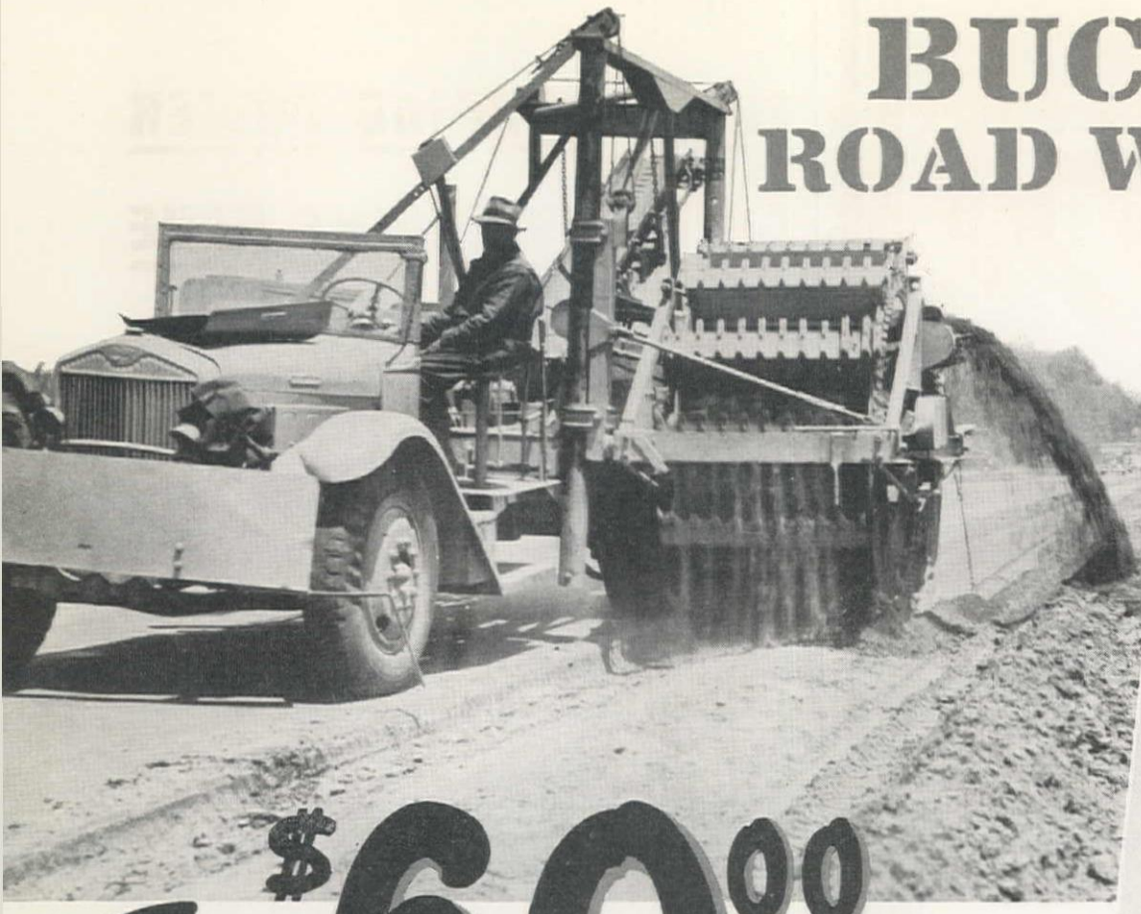
THREE SIZES
HD- 7, 54 H.P.
HD-10, 79 H.P.
HD-14, 108 H.P.

ALLIS-CHALMERS

TRACTOR DIVISION—MILWAUKEE, U.S.A.

Ralph Aldridge, Council Grove, Kansas, speeds up his Canning Creek Dam project with a fleet of HD-14's—several shown here with Gar Wood Cable Controlled Scrapers.

BUCKEYE ROAD WIDENER



Saves $60.00 per day

ON SOUTH CAROLINA JOB!

JOB FACTS

CONTRACT: Four foot widening on one side of Highway 117 in South Carolina between Calypso and Dudley.

CONTRACTOR: Wm. F. Bowe, Jr., Augusta, Georgia.

METHOD OF WIDENING: Subgrade trench dug with a BUCKEYE Model 16-R-4 Highway Widening Machine. Concrete poured between existing slab and 8" steel forms.

DIMENSIONS OF WIDENING TRENCH: 4' - 9" wide from edge of existing slab, to allow 4' widening and 9" for setting forms. 8 inches deep—7" for slab and an additional inch below finished finegrade for form line.

SPEED OF TRENCHING: Widening trench cut to specifications at the rate of a mile per day!

DOLLAR SAVING: $60.00 per day saved over previous method of trenching due to speed and accuracy of Buckeye machine!

SAVING ON CONCRETE: Excess of aggregate on 3 miles of work done prior to use of Buckeye Road Widener was 8%. Ability of machine to cut to accurate depth reduced this to 2%!

OTHER ADVANTAGES: Buckeye Widener served as "spark plug" or pace setter for entire job.

Go out and look for road widening jobs this year. You can bid low and make a good profit if you base your figures on using a Buckeye Road Widener for the job! Write to Buckeye today and ask for complete information and a bulletin on these money-making machines.

BUCKEYE TRACTION DITCHER CO., Findlay, Ohio

Built by Buckeye

Convertible Shovels

Trenchers

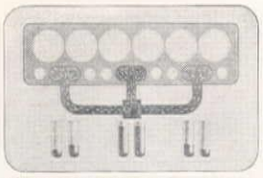
Tractor Equipment

R-B Finegraders

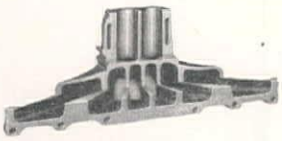
Road Wideners

Spreaders

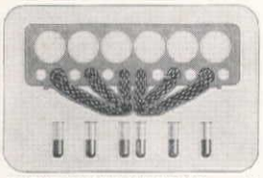
WHITE SUPER POWER'S EXTRA EARNING POWER COMES FROM FEATURES NO OTHER TRUCKS HAVE



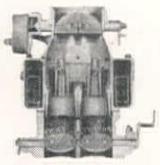
ORDINARY MANIFOLD . . . fails to supply the proper proportion of fuel to each cylinder. Exposed areas of long intake pipes cause fuel to condense and go to waste.



METERING MANIFOLD . . . Six graduated ports, fed by a dual carburetor, assures that each cylinder receives the same balanced mixture. Condensation is reduced to an absolute minimum. No "starved" end cylinders.

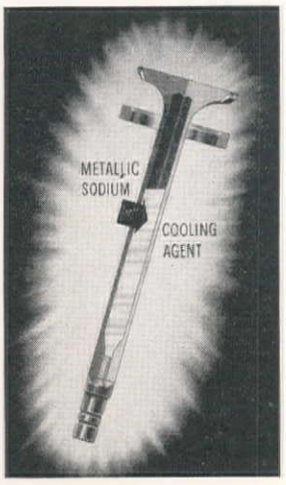


SUPER POWER MANIFOLD . . . with duplex carburetor saves fuel and increases power by supplying each cylinder with a perfect proportion and amount of fuel mixture.



DUPLEX CARBURETOR . . . acts as *two* carburetors—one for each set of three cylinders, further contributing to proper amount and mixture of fuel and air in each cylinder.

OIL TEMPERATURE CONTROL . . . holds oil within narrow limits of proper temperatures the year 'round, giving most efficient viscosity and constant pressure.

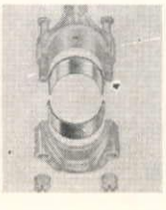


SODIUM-COOLED VALVES . . . Internally cooled by means of Metallic Sodium—a pure metal which turns to liquid at 110°. (Standard in all medium and heavy duty models; available in light at slight extra cost.)

HYDRAULIC VALVE LIFTERS . . . Used only on White products, airplanes and America's most expensive passenger car—they *eliminate* "tappet adjustment." Valve timing is 100% accurate. Fuel is saved. Power is improved.

STELLITE-FACED VALVES & SEATS . . . Stellite is one of the hardest substances that's known. Used as only White uses it on exhaust valve seats and on the valves, it eliminates pitting and oxidizing at high temperatures.

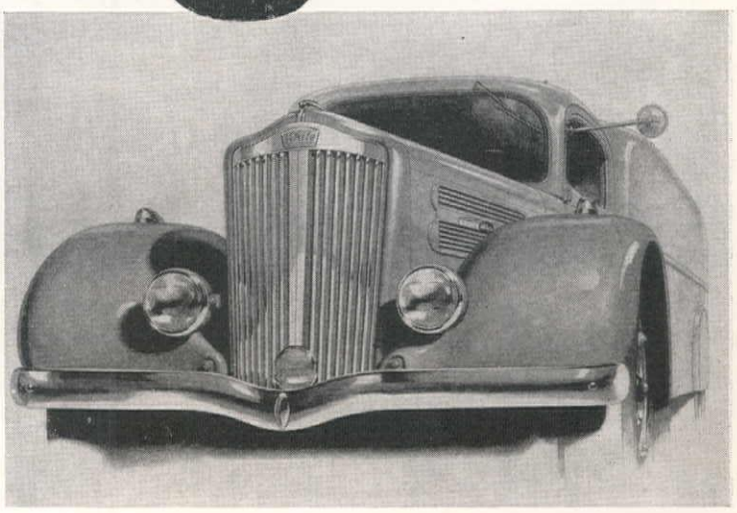
INDIUM TREATED BEARINGS . . . Aviation-type copper lead, impregnated as in high power output engines—with Indium. Prevents deterioration due to acid condition in the oil.



PACIFIC COAST OPERATORS, for many months, have been testifying to the extra money-earning ability of White Super Power in the heavy duty field. Now this same superiority in design and performance has been brought to the entire line of White Trucks . . . from the lightest to the heaviest . . . from every type of transport service, from pick-up to the heaviest tractor-trailer operation.

Pictured here are some of the *exclusive* engineering features that are the reason why White Super Power earns more, saves more. They will help you to understand what Super Power *is* . . . to find out what it *does* in increasing your profits, do what hundreds of other Pacific Coast operators have done—ask for a demonstration, in your own service with your own driver at the wheel. Phone you local White Branch or Dealer or write THE WHITE MOTOR COMPANY, Cleveland.

SUPER White POWER



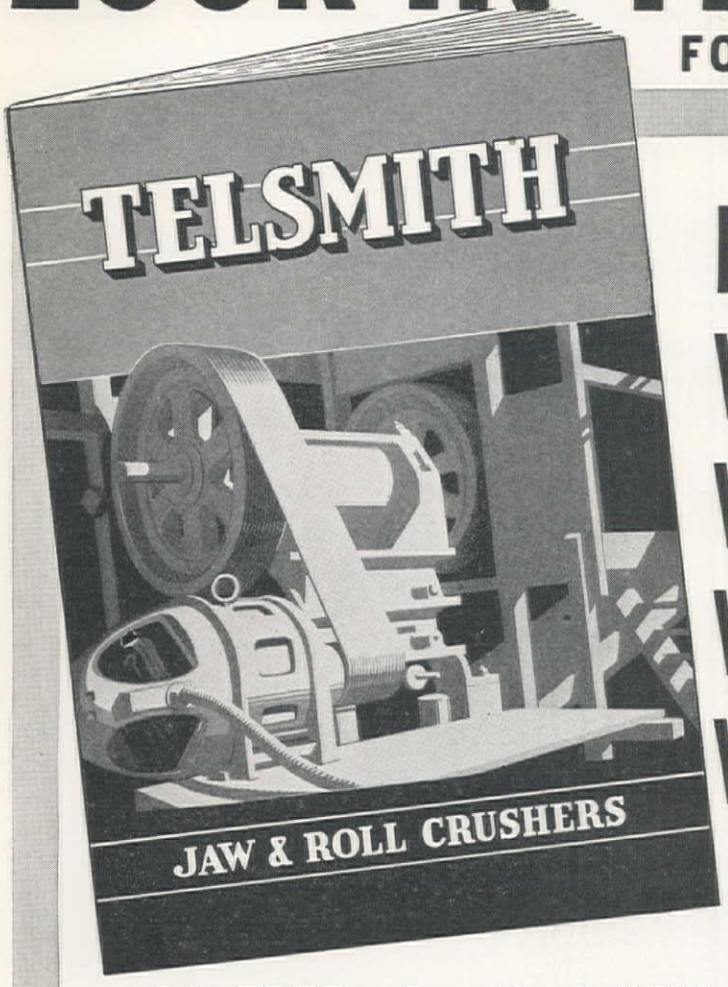
These and many other features found in no other trucks add up to make the new complete line of White Super Power trucks America's finest transportation equipment. New 1941 styling! Sealed beam headlights! Every modern feature!

White

for 40 years the greatest name in trucks

LOOK IN THIS BOOK

FOR PRACTICAL IDEAS—



HOW you can solve your crushing problem.

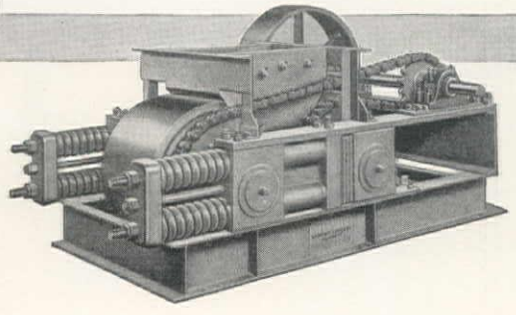
WHICH size and type crusher is best for you.

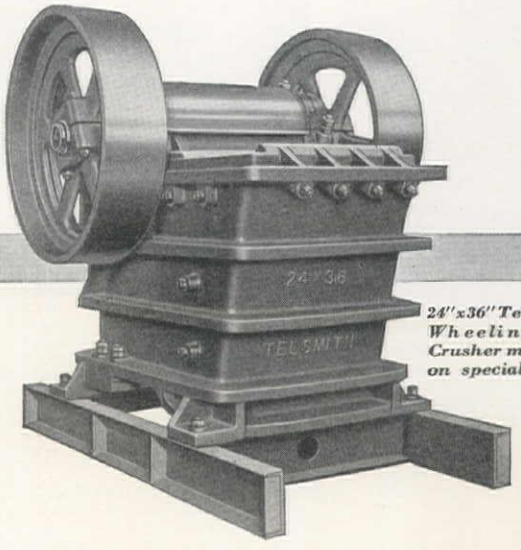
WHAT is new in jaw and roll crushers.

WHEN to use a roll crusher and when not to.

WHY you get better results with these crushers.

It's FREE... Send for it NOW





24"x36" Telsmith-Wheeling Jaw Crusher mounted on special skids.

TELSMITH DOUBLE ROLL CRUSHERS for large output of *fine aggregate* at reduction ratios not over 3:1. Less oversize than with any other type of secondary crusher. Compact structure saves headroom and weight. Anti-friction bearings and spring release give high-speed, continuous, trouble-free operation. Low first cost. *Get Bulletin JR-30.*

TELSMITH-WHEELING JAW CRUSHERS for *high speed coarse or intermediate crushing.* Give you greater reduction in one process than any other type of breaker. All steel! Force feed! Cylindrical roller bearings! You get almost double capacity, with less power, lower upkeep, longer life.

Write for Bulletin JR-30.

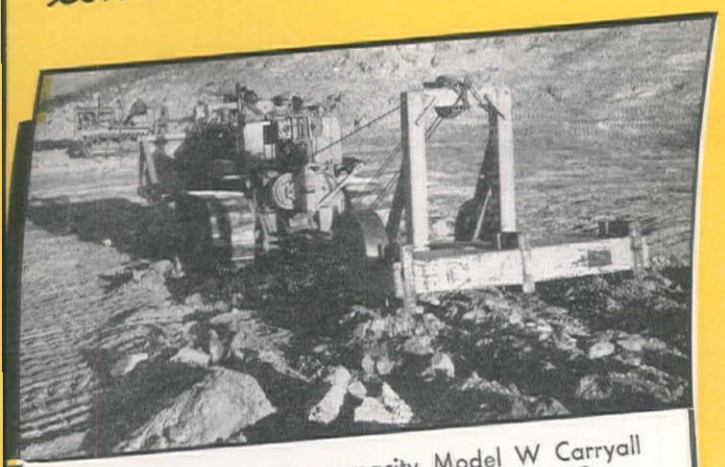
SMITH ENGINEERING WORKS, 4010 N. HOLTON STREET, MILWAUKEE, WISCONSIN

Smith-Booth-Usher Co. Los Angeles, Calif.
Mines Eng. & Equip. Co. San Francisco, Calif.
Clyde Equipment Co. Seattle, Wash.
Clyde Equipment Co. Portland, Ore.
General Machinery Co. Spokane, Washington
Arnold Machinery Co. Salt Lake City, Utah
Gordon Russell, Ltd. Vancouver, B. C.

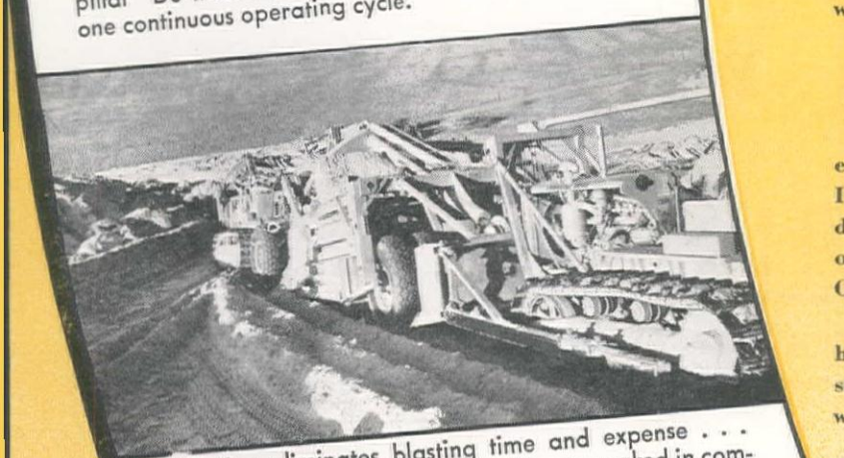
JR-1

Geo. R. Patterson of Patterson Brothers, prominent West Coast contractors, writes . . .

"Success Largely Due to LeTOURNEAU EQUIPMENT"



Two LeTourneau extra-capacity Model W Carryall Scrapers (23 heaped yards) working behind "Caterpillar" D8 tractors, dig, load, haul and spread all in one continuous operating cycle.



Rooting eliminates blasting time and expense . . . makes easier Scraper digging. 'Dozer, worked in combination with the Rooter, boosts the Carryalls to capacity in the quickest possible loading time. Smart time-and-money saving operation!

He continues . . . "I purchased my first LeTourneau equipment in 1934, and except on few occasions, have used it successfully on every one of my jobs. I sincerely believe that it is responsible in large measure for what success I have had in my leveling and construction contracts.

Experience Proves LeTourneau Best

"There have been times in this period when I have listened to sales talk about other equipment, but experience has always brought me back to LeTourneau.

"On our present stripping contract for the Silica Sand Company, near Brentwood, California, I am using three 'Caterpillar' low gear D8 tractors, two LeTourneau Model W (23 yards heaped capacity) Carryalls, a LeTourneau 'Dozer and Rooter . . . and if it were not for the efficiency and low cost operation of this equipment, I am sure that I could never have taken this contract and expected to complete it with a reasonable profit.

2 W Carryalls—2 Shifts
1650-Foot Round Trip Haul—4400 Pay Yards

"The two Model W Carryalls are averaging about 1100 pay yards each per eight-hour shift on a 1650-foot round trip haul; and frankly, I don't know of any equipment that will stand up under the hard conditions which we have encountered on this job, with the small amount of repair and upkeep cost that I have found necessary on these Carryalls.

"Whatever small service I have needed has been tended to promptly by you or your Distributor; and in addition, I have found that every statement made to me by your representative when this equipment was being purchased was conservative and truthful."

Like Mr. Patterson, you can profit from dependable LeTourneau performance and low equipment maintenance. See for yourself by a demonstration right on your own job. Call your LeTourneau-"Caterpillar" dealer . . . NOW!

CARRYALL* SCRAPERS, ANGLEDOZERS*, BULLDOZERS, ROOTERS*, POWER CONTROL UNITS, DRAG SCRAPERS, CRANES, PUSHDOZERS, SHEEP'S FOOT ROLLERS, TOURNAPULLS*, TOURNATRAILERS*. *Name Reg. U. S. Pat. Off.

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

LET US DEMONSTRATE THE TIMKEN BIT

It may save you thousands of dollars

For nine years the TIMKEN Rock Bit has over and over again demonstrated its worth on every type mining, quarrying, and contracting job. Practically every user, there are thousands, will testify that TIMKEN Bits are saving money, saving time, simplifying work and transportation schedules, reducing accident risks.

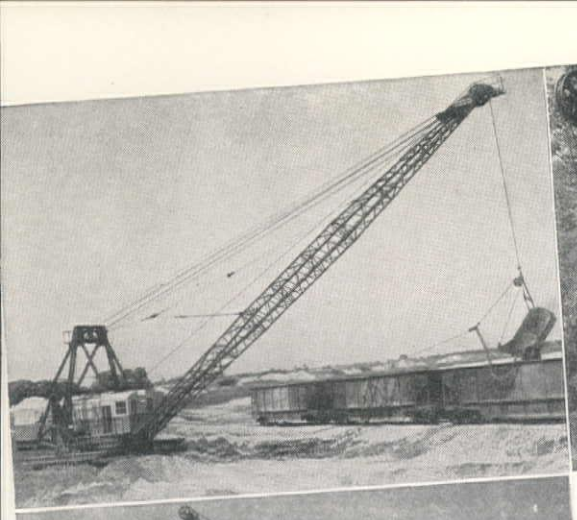
Yet, today, there are many operators who have not tested this revolutionary tool. Are you one of them? Why not let us demonstrate what the TIMKEN Bit will do for you? It very likely will prove that important savings in drilling costs can be effected.

Here is how you can arrange for the demonstration. Write your name and address on the bottom of this advertisement. Tear out the advertisement. Put it in an envelope addressed to The Timken Roller Bearing Company, Canton, Ohio, c/o Rock Bit Department.

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN
ROCK BITS

Manufacturers of TIMKEN Tapered Roller Bearings for automobiles, motor trucks, railroad cars and locomotives and all kinds of industrial machinery; TIMKEN Alloy Steels and Carbon and Alloy Seamless Tubing; and TIMKEN Rock Bits.

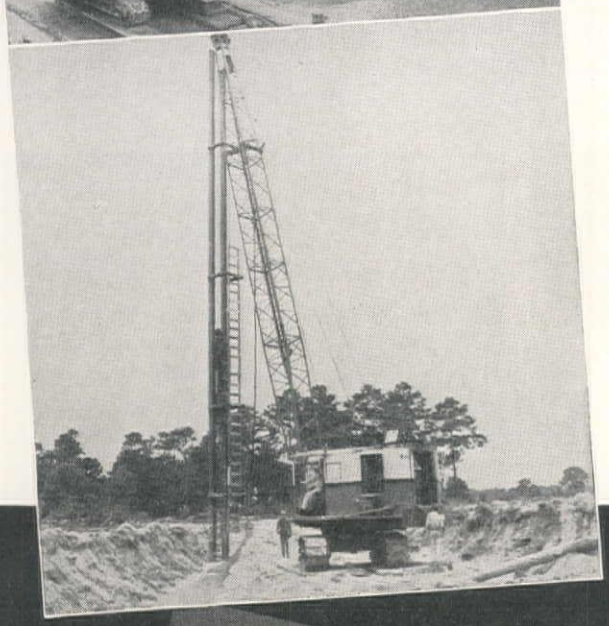


TOOL UP FOR MORE YARDAGE at Lower Cost

MODERNIZE WITH MARIONS for 1941

With millions being spent for military roads, army training camps, landing fields, and new industrial plant sites, you as a contractor will play a major role in speeding up this phase of the national defense program. Are you prepared to take some of these contracts . . . to stay within the close time limits . . . to make a real profit? How is your present excavating equipment? Will it measure up to the new task of moving millions of yards of rock, earth, clay or shale? It will if it is a MARION . . . for every MARION shovel, dragline, crane, clamshell, pull-shovel or walking dragline has the necessary speed, power and reliability to meet such an emergency . . . to make every yard of material moved pay a dividend. Write for bulletins describing MARION machines in detail.

THE MARION STEAM SHOVEL CO., • Marion, Ohio, U. S. A.



See us at The 38th Annual Convention
American Road Builders Association
Pennsylvania Hotel—New York City
January 27—31, 1941

from ¾ cu. yd. to 35 cu. yds.
GASOLINE • DIESEL • ELECTRIC

MARION

SHOVELS • DRAGLINES • CLAMSHELLS
PULL-SHOVELS • CRANES • WALKERS

DISTRIBUTED BY: Brown-Bevis Equipment Co., 4900 Santa Fe Ave., Los Angeles, Cal.; Howard-Cooper Corporation, Seattle, Spokane; The Marion Steam Shovel Co., 571 Howard St., San Francisco, Cal.; Edw. R. Bacon Co., Folsom at 17th, San Francisco, Cal.; H. L. Niles, Howard-Cooper Corp., 307 S. E. Hawthorne Blvd., Portland, Ore.; H. W. Moore Equipment Co., 6th and Acoma Sts., Denver, Colo.; The Sawtooth Co., Boise, Idaho.

Here is what LINDE has to offer you

To help put across your Construction Program in the Least Time . . . at the lowest cost

IF your company has contracts that call for a stiff construction program—and a limited time in which to push it to completion—you will find the Linde organization ready to render helpful service. Linde has made available dependable products and processes which today are widely used to overcome bottlenecks, speed up the job, and lower costs in the construction of bridges, dams, factories, airports, tunnels, waterworks, highways, power plants, refineries, and other engineering projects. Important to you is the service which the Linde organization offers to assure profitable use of these processes. Even if you have not used Linde's services in the past, we suggest that you call on us now if you feel we may be able to help.

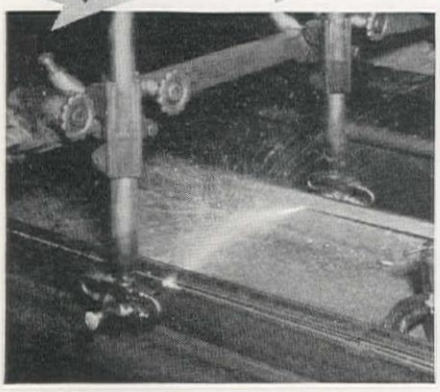
THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

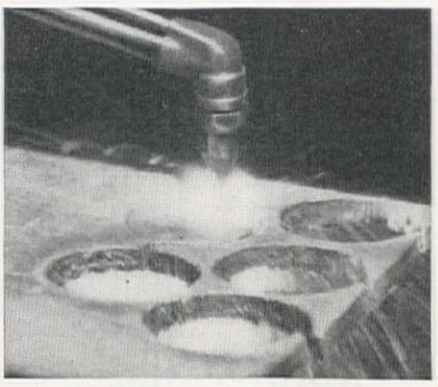
General Office, New York, N. Y. UCC Offices in Principal Cities

In Canada: Dominion Oxygen Company, Limited, Toronto

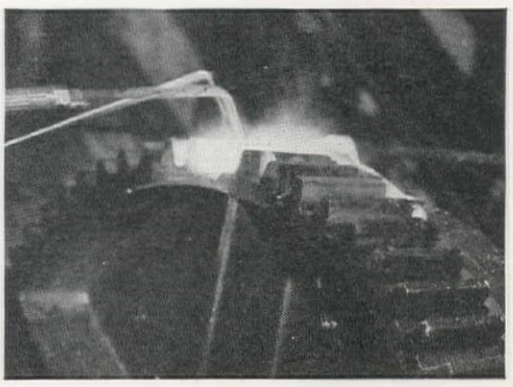
TIME SAVING PROCESSES



In The Shop—Flame cutting is one of the fastest methods of shaping steel—in straight lines, circles, or irregular shapes. It reduces, and in many cases eliminates, subsequent machining.



On The Job—The hand-cutting blowpipe is used to cut structural members to length, to cut pipe, to cut off reinforcing bars, to remove rivets rapidly, and to produce small steel parts as needed, right on the job.



For Maintenance — Oxy-acetylene welding reclaims worn or broken parts and helps produce essential new parts from stock materials as needed. Hard-facing and flame-hardening make wearing parts last longer.

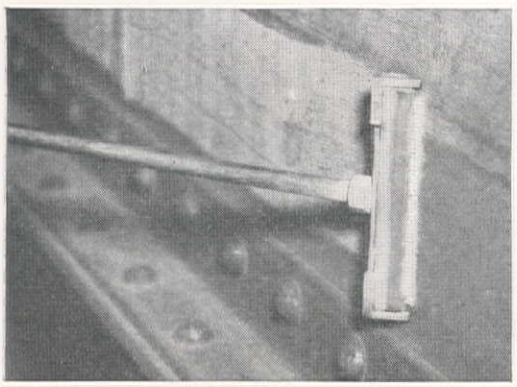
LINDE OXYGEN · PREST-O-LITE ACETYLENE · UNION CARBIDE · OXWELD, PREST-O-WELD, PUROX

A DEPENDABLE SOURCE OF SUPPLY

Oxygen . . . Acetylene . . . Carbide—Linde Oxygen, Prest-O-Lite Acetylene, and Union Carbide are manufactured or warehoused at over 267 points throughout the country. Today, more than ever before, this complete distribution system is important. *It is your best assurance that you can use the many time- and money-saving oxy-acetylene processes without fear of interruptions because of undue delays in delivery of essential materials.*

Apparatus and Supplies—The Oxweld line includes welding rods, fluxes, welding and cutting blowpipes, portable and stationary cutting machines, acetylene generators, bar and billet cut-off machines, descaling and flame-cleaning apparatus, and flame-hardening equipment. *All Oxweld apparatus is built to deliver the best in quality, durability, and performance that over 30 years of manufacturing experience can give it.*

ENGINEERING AND PROCESS SERVICE

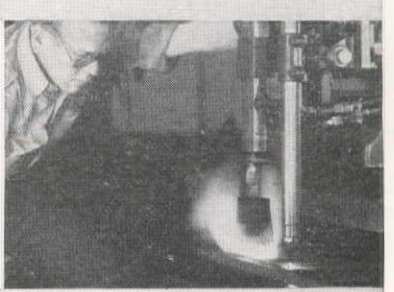


Before Painting—Flame-cleaning of steel before painting removes loose scale and surface moisture, the major causes of subsequent paint-flaking. In addition, the paint goes on faster, bonds tighter, and dries quicker.

Service Operators – Linde operators bring on-the-job help to customers and show them how to use Linde processes.

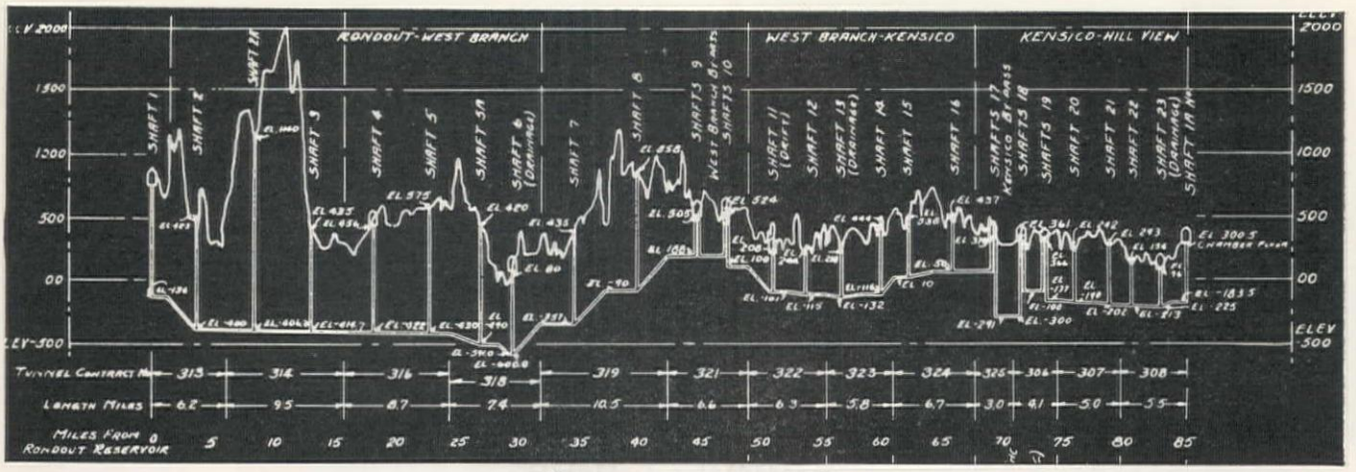
Field Engineers—Linde engineers can go out on the job and help you work out the answers to process problems.

Process Literature – Linde literature, and a monthly magazine, OXY-ACETYLENE TIPS, tell operators "how it is done."



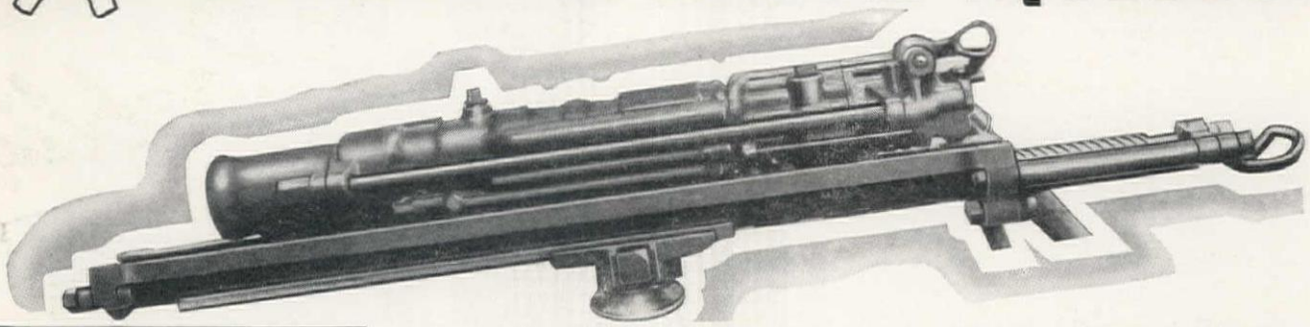
Research—From Linde's laboratories come new processes and apparatus ready to go to work for Linde customers.

APPARATUS · OXWELD SUPPLIES



Correction!

GARDNER-DENVER AF-99 DRIFTERS USED ON ~~37.8%~~ OF ALL HEADINGS ON THE DELAWARE AQUEDUCT



GARDNER-DENVER AF-99 AUTOMATIC FEED DRIFTERS ARE DRIVING MORE THAN ONE-THIRD OF THE HEADINGS

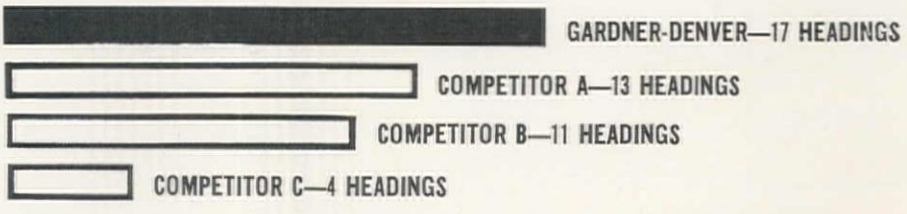
Total length of tunnel . . . 85.42 miles

Being driven by Gardner-Denver AF-99 Drifters . . . 25.50 miles

Percentage of headings equipped with Gardner-Denver AF-99 Drifters . . . 37.8%

RECENTLY we told you that powerful Gardner-Denver AF-99 Drifters were in use in 32% of the headings on the Delaware Aqueduct job. Added installations of AF-99's have since increased this figure to 17 headings of the 45—or 37.8% of the total.

What's more, these drifters were used in *four* more headings than competitor A, in *six* more than competitor B, and *thirteen* more than competitor C! Here is the Gardner-Denver "Acceptance Chart," which tells the story of preference:



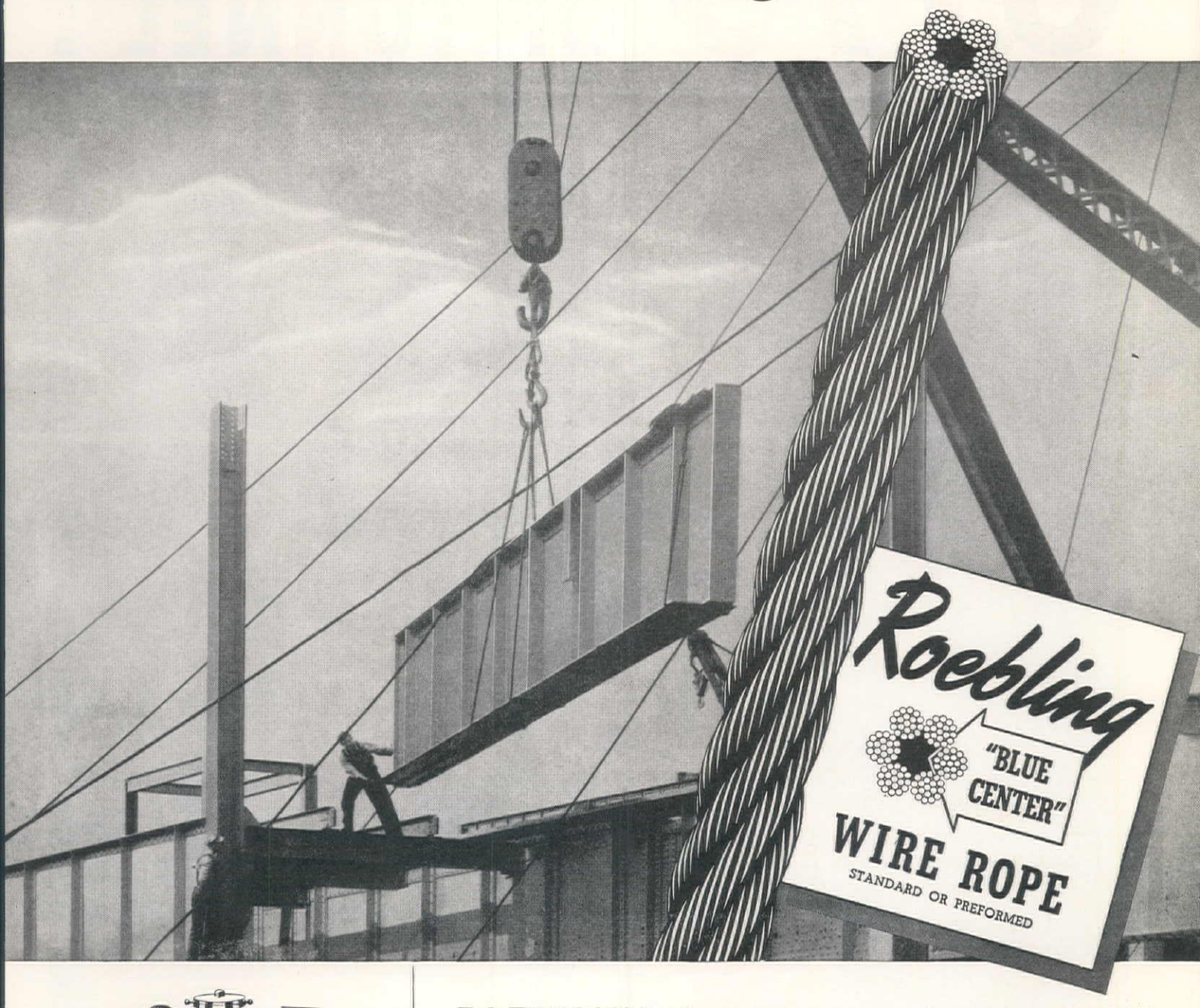
Other Gardner-Denver equipment that "led the parade" on the aqueduct are the sharpeners, which predominate *four to one*—and the grout pumps which are ahead *three to one!*

Write us today and learn—in detail—why Gardner-Denver AF-99 Drifters are used on so many major tunnel jobs. Gardner-Denver Company, Quincy, Illinois.

Western Branch Offices: Butte, Mont.; Denver, Colo.; Los Angeles, Cal.; Portland, Ore.; Salt Lake City, Utah; San Francisco, Calif.; Seattle, Wash.; Wallace, Idaho. 112 S. E. Belmont St., Portland, Ore.

GARDNER-DENVER SINCE 1859

Profit from Roebling Research!



YEARS OF RESEARCH DEVELOPED "BLUE CENTER"

Years of research have gone into the development of Roebling "Blue Center" Wire Rope.

Furthermore, the development and improvement of Roebling "Blue Center" is a never-ending process. A planned program of research is carried on ceaselessly in the Roebling Research Laboratory — one of America's most modern and completely equipped research units.

WHAT DOES Roebling Research mean to you? It means just this — that when you install Roebling "Blue Center" Wire Rope you can be certain that you will get in return the very last notch of service and safety which scientific rope development can assure.

When buying wire rope keep in mind that Roebling is not content to "follow the pack". Roebling's efforts to give you a rope that will assure the longest and safest service possible, means constant research—checks and investigations out in the field. It means constant laboratory research—in one of the country's most modern research units. Equally important—it means up-to-date thinking.

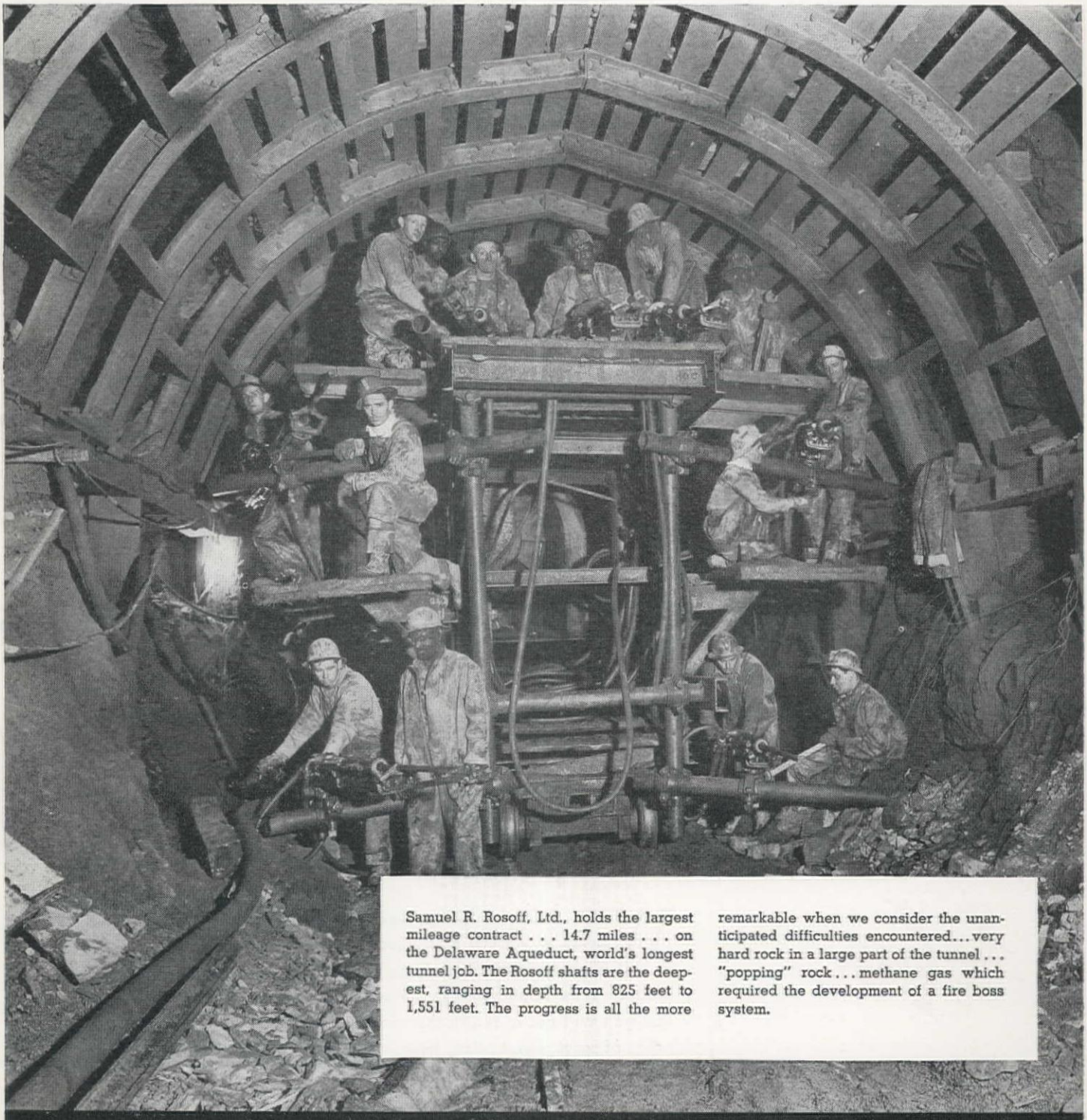
However, it's the service Roebling "Blue Center" Wire Rope is actually giving that's "proof of the pudding". Ask our local representative to give you the facts. Then install Roebling "Blue Center". Keep accurate service records. Compare. We are confident you will agree with others that Roebling "Blue Center" Wire Rope assures the utmost safety and lowest rope replacement cost.

JOHN A. ROEBLING'S SONS COMPANY OF CALIFORNIA

San Francisco, Seattle, Los Angeles, Portland

ROEBLING "BLUE CENTER" The Finest of all Roebling Wire Ropes

6,779 LINEAR FEET OF TUNNEL.



Samuel R. Rosoff, Ltd., holds the largest mileage contract . . . 14.7 miles . . . on the Delaware Aqueduct, world's longest tunnel job. The Rosoff shafts are the deepest, ranging in depth from 825 feet to 1,551 feet. The progress is all the more remarkable when we consider the unanticipated difficulties encountered... very hard rock in a large part of the tunnel . . . "popping" rock . . . methane gas which required the development of a fire boss system.

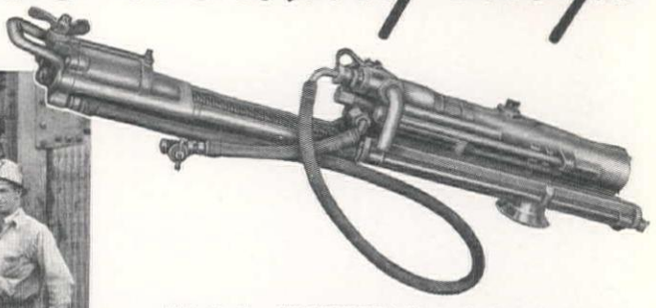
CHICAGO PNEUMATIC

GENERAL OFFICES: 6 EAST 44th STREET, NEW YORK, N.Y.

SAN FRANCISCO: 855 Bryant St. — LOS ANGELES: 655 Santa Fe Ave.

. . . AND STEEL SUPPORT

in 31 consecutive working days



This is the CP MOTORdrifter which is helping Rosoff crews to outstanding performance on the Delaware Aqueduct.

Operating Staff, Samuel R. Rosoff, Ltd.:
David E. Stinson, General Master Mechanic;
James Fisher, General Superintendent;
Philip S. Miller, First Assistant Engineer;
Fred W. Stiefel, Chief Engineer;
Arthur H. Diamant, Vice President;
W. Quick, Superintendent, Shaft No. 2-A;
Walter Dunham, Superintendent, Shaft No. 3;
L. S. Penland, Superintendent, Shaft No. 2.

Board of Water Supply Engineers:
John G. Mergott, Asst. Engr. — Max F. Freund, Division Engr.
Roderick C. St. Leger, Asst. Engr. — Arthur E. Hilliard, Asst. Engr.
Francis J. Colgan, Asst. Engr. — John Horn, Asst. Engr.

Through typographical error, the above group was referred to as Inspectors instead of Engineers in a previous advertisement.

Samuel R. Rosoff, Ltd., is setting new progress records on the Delaware Aqueduct, New York.

Here are some typical figures:

At Shafts Nos. 2, 2-A and 3; six headings; 6,779 linear feet of tunnel were driven in 31 consecutive working days, with steel support directly to the face of each heading, using crown bars.

3,760,000 pounds of structural support were erected in the same period; 176,200 feet board measure of timber were used.

This is equivalent to driving 10,075 linear feet of unsupported tunnel for the same period, 31 consecutive working days.

The actual value of the work performed during this period was $1,117,987.00.

CP-60 Drifters were used exclusively in drilling this footage.

For complete data on the CP-60 MOTORdrifters which are giving such outstanding performance on the world's longest tunnel job, send for copy of Catalog No. 600, "CP Contractors' Equipment".

TOOL COMPANY

SALES OFFICES AND SERVICE STATIONS THROUGHOUT THE WORLD

SEATTLE: 1928 First Ave., So. — SPOKANE: E. 217 Montgomery

The Hardest-Working Trucks in America!

Dual wheels and heavy duty tires as shown at slight additional cost.

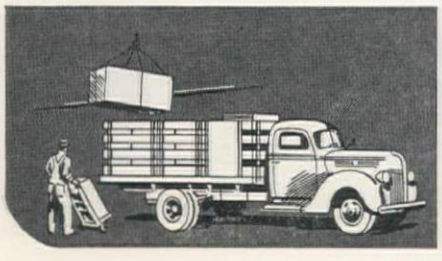
FORD TRUCKS *are on more jobs today than any other truck.* More Fords are in use by actual registration. There are Fords in nearly all of the nation's biggest fleets. What do these *facts* indicate? Just this: Large and small operators are entirely satisfied with the *high efficiency* at *low cost* of Ford hauling equipment. There are Ford units for practically all America's trucking jobs. There's one for yours. Without cost or obligation, call any Ford Dealer for an "On-YOUR-Job" Test.

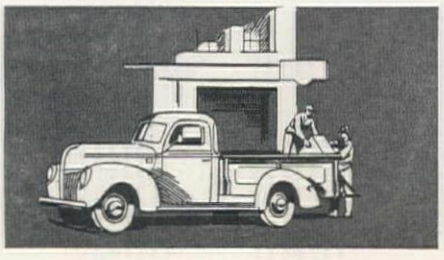
★ ★ ★

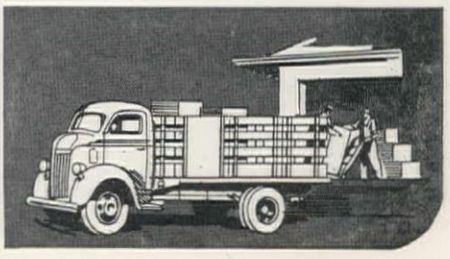
Three engines: 95 and 85 hp V-8—new 30 hp 4-cylinder economy engine for light duty. Six wheelbases — 42 body and chassis types.

FORD TRUCKS

AND COMMERCIAL CARS







STRAIGHTEN OUT those SURFACES at the LOWEST POSSIBLE Per Mile COST

You can do it in "nothing flat" with a speedy, long life, low upkeep Huber. The reasons: HUBER ROAD ROLLERS are built with a full knowledge of their job; they have four speeds forward and four speeds reverse for rapid transportation and versatility in rolling; they have a short wheel base which makes them easy to maneuver; and together with the Huber hydraulic scarifier and Huber Tru-Plane make a combination that is hard to beat economically. And too . . . with a Huber . . . just push a button and away "she" goes. Every Huber Roller is now equipped with an Electric Starter. Check these and other important Huber features described on this page . . . and your next roller is bound to be a Huber.

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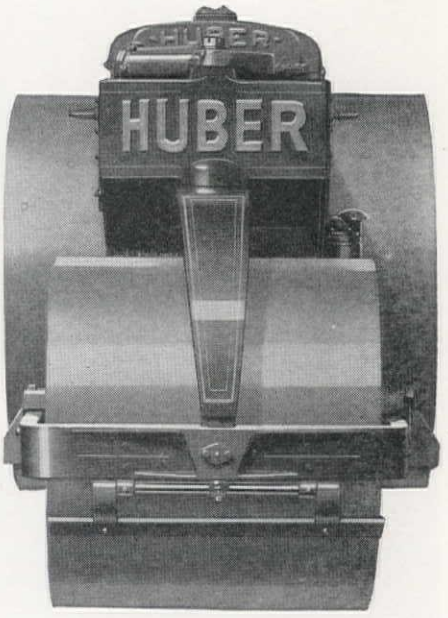
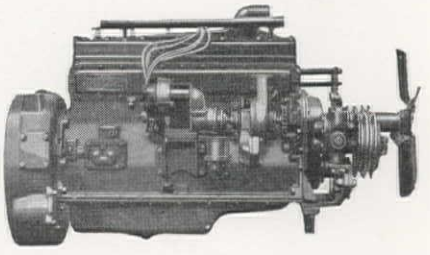
BIG!

HUBER ROLLERS are sturdily built and properly balanced to meet the severest rolling conditions.



The heavy duty 6 cylinder gasoline engines with which **HUBER ROLLERS** are equipped assure steady power without vibration and plenty of reserve to overcome all obstacles. Diesel power is also available if you desire it.

POWERFUL!



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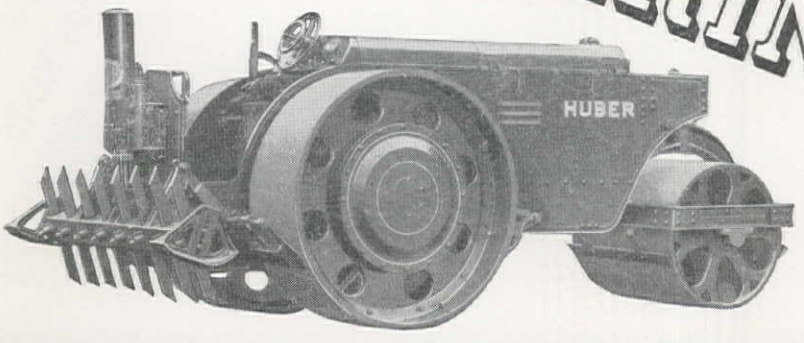
HUBER'S Dual Hydraulic Steering requires little effort on the part of the operator. All controls are centrally located for quick, easy operation. This also includes the new **HUBER ELECTRIC STARTER** button.



Be sure to write for catalog describing **HUBER ROLLERS** in detail.

HUBER *Automotive Type* ROLLERS

5 • 6 • 7 • 8 • 9 • 10 • 12 TONS

"VIC" THE WELDER SAYS -

I KEEP THE TRACTORS ON THE PAYROLL — IT'S ALL IN KNOWING WHERE AND HOW TO USE THE TORCH OR ARC

★ **LUGS OR GROUSERS**—Take worn lugs, for instance—they can be quickly and easily built up with high carbon, or a new rib of plow steel can be welded on and fastened with mild steel electrodes or self-hardening rods. Tractor treads are often made of malleable or cast iron. Here it is often best to apply cast iron welding rods with the torch and a final overlay with self-hardening rods.

★ **ROLLERS**—Idle and thrust rollers take a bad beating from dirt and sand. Many of them can be built up to original size with high carbon and an overlay of self-hardening rod. I tell you what—write VICTOR for the 14-page catalog entitled—"Five Ways To Cut Road Making Costs."

★ **TRACKS**—also, take a severe beating and will last longer if you build up the top surfaces with High Carbon Rod (electrically) and, if necessary, face with hard-surfacing material.

★ **SPROCKETS**—will wear longer if you surface them with a coated self-hardening electrode. This hard metal deposit polishes as it wears and reduces friction between the pins and the sprocket teeth. That is one thing I like so much about VICTOR—they can furnish promptly anything needed for either gas or electric welding and cutting.

If you would like a welding suggestion why not write to me—"Vic". I will be glad to help you whether or not you are a VICTOR customer.

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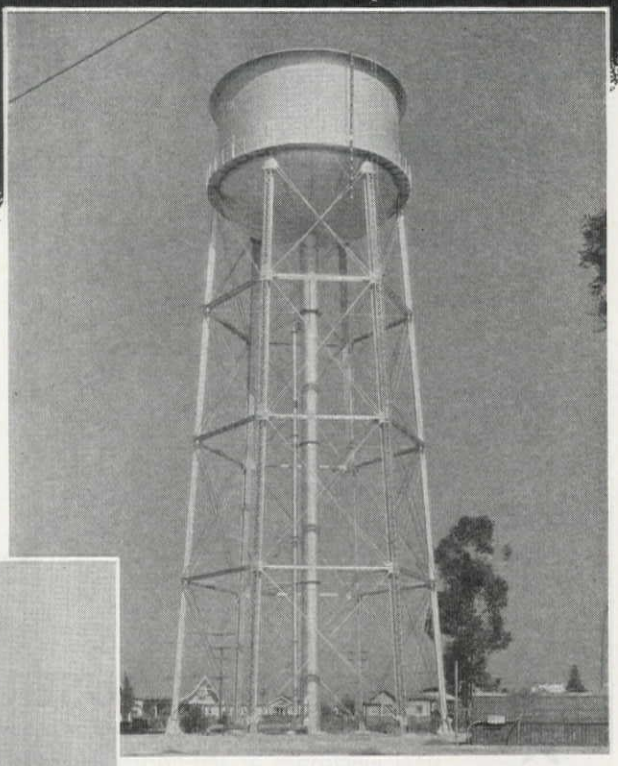
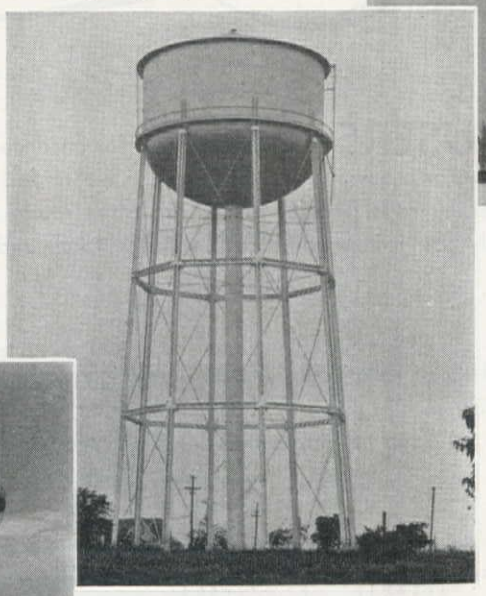
HOW MUNICIPAL ENGINEERS ARE *Cutting Operating Costs with Modern* ELEVATED STORAGE



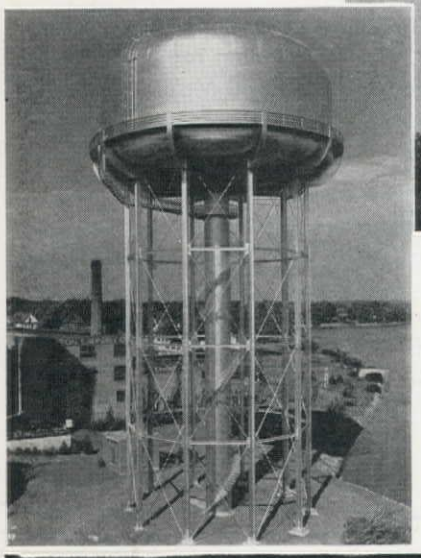
ELEVATED STORAGE REDUCES PUMPING AND LABOR COSTS IN CALIFORNIA

The 250,000-gal. elevated tank shown at the right was the essential unit of an improvement program completed by the Southern California Water Co. on its Utilities System near Los Angeles, Cal. For the first three months after this tank was installed, power costs averaged 1.18 cents per 100 cu. ft., compared with 1.42 cents for a previous similar period. This represents a saving of $920, and indicates a yearly power saving of at least $3,000, plus an additional $1,500 in labor because of the elimination of one pump. Thus the entire indicated savings amounts to $4,500 per year.



ELEVATED STORAGE REDUCES ANNUAL OPERATING COSTS FOR TEXAS CITY

The 500,000-gal. elevated tank shown at the left is installed in the University Park, Texas, waterworks system. When this improvement was planned it was found that the most economical method of operation was to use a continuous running pump with enough excess capacity to keep the tank filled well above the minimum for handling all peak periods. The saving thus secured by eliminating extra demand charges amounts to approximately $2,400 per year.



MINNESOTA MUNICIPALITY SAVES OVER $2,000 PER YEAR WITH ELEVATED STORAGE

1,000,000-gal. elevated tank shown at the left is installed at Albert Lea, Minn. Through its installation, the City was able to secure a lower rate per Kwh, with the provision that all pumping would be handled during off-peak periods. According to the City Engineer of Albert Lea, it is estimated that savings in pumping costs will be approximately $2,432.78 per year, based on the previous year's pumping figures.

Please address our nearest office for complete information or estimating data covering Horton elevated storage tanks for municipal and industrial requirements.

CHICAGO BRIDGE & IRON COMPANY

San Francisco	1013 Rialto Bldg.	Dallas	Praetorian Bldg.	Cleveland	Builder's Exchange Bldg.
Los Angeles	1444 Wm. Fox Bldg.	Houston	918 Richmond Avenue	New York	165 Broadway Bldg.
Birmingham	1598 N. Fiftieth Street	Tulsa	Hunt Bldg.	Philadelphia	1700 Walnut St. Bldg.
Chicago	McCormick Bldg.	Detroit	Lafayette Bldg.	Boston	Consolidated Gas Bldg.

Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PA. *In Canada:* HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

January, 1941

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 16, No. 1

National Defense and Highways

ESTIMATES of improvements to California highways which are included in the strategic road system indicate that the necessary work to bring these roads to military standards will cost some $150,000,000 according to a recent statement by C. H. Purcell, state highway engineer. An additional expenditure of $11,000,000 will be required for the construction and improvement of access roads to cantonments, military and naval reservations. With these figures as a basis it can be estimated that, for all of the eleven Western States, there would probably be required more than $900,000,000 (based on relative highway mileages and annual construction expenditures) to bring the strategic road system of the West up to the standards required for tactical military use. For access roads, actually required at the present time for the transportation of troops and supplies in the vicinity of military reservations, more than $33,000,000 ought to be expended.

Reports from Washington, D. C., indicate that the President expects the various states to allocate all Federal aid highway funds to the improvement of military highways. Available Federal Aid funds for all eleven Western States during the fiscal year 1942 will amount to $24,958,000 or nearly $9,000,000 less than will be required for the construction of access roads alone without considering the strategic road system.

During the present session of Congress, various interested groups will ask large appropriations from the National Defense Program funds for the construction of strategic roads and will do so justly. Obviously the state highway departments should not be expected to abandon their regular systems in order to provide a part of the National Defense Program which is being financed in all other cases by the Federal Government. Maintenance of the present programs of construction and improvement must be continued and even enlarged in order to care for the increased highway use due to the demands of the National Defense Program on industry as a whole.

Take Advantage of Facilities

IN ANNOUNCING its 15th annual Highway Engineering Conference, held this month at Boulder, the University of Colorado points out that the fulfillment of its true purpose lies not only in the classroom, but also by affording trained personnel to co-operate with Colorado citizens in the solution of their particular problems.

Engineers and contractors of each of the eleven Western States can benefit by using the facilities available at the various colleges and universities. Laboratories are available for experiments which will aid in solving our particular Western problems; libraries bring to the personnel news of other experiments which may throw light on a troublesome problem.

On the other hand, men in the field can bring to the universities practical solutions which do not lend themselves to laboratory experiments and developments which have appeared in actual operation. This will aid in giving the end product of the university, the graduate, a more practical approach before his formal education is completed.

Finally, such conferences cannot but be of material assistance in solving those problems which are peculiar to each state and the West as a whole. The sponsoring of these meetings is a definite step toward the improvement of engineering construction and their value should not be overlooked.

Doing a Job

WHEN asked to what he attributed the success of his organization in maintaining a record construction schedule on the Fort Ord cantonment project, R. M. Conner, project manager for Ford J. Twaits Co. and Morrison-Knudsen Co., Inc., replied that they were just good Americans doing a job without interference.

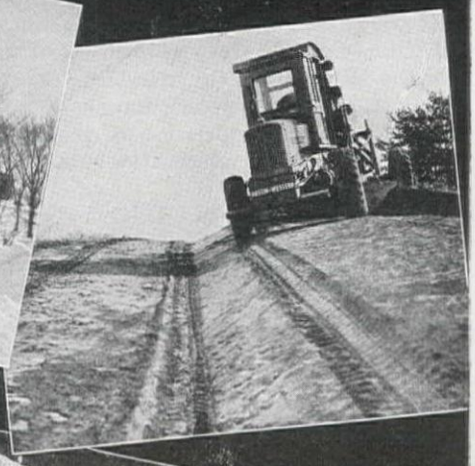
Now, there is obviously much more to the management of a multi-million dollar construction job than that, but the statement sums up the attitude with which construction work, or any other type of work for that matter, should be undertaken. As an important third of an important nation, the West has a big job in preparing the facilities needed for National Defense and the job must be conceived and executed carefully and speedily in order that later parts of the program not be delayed.

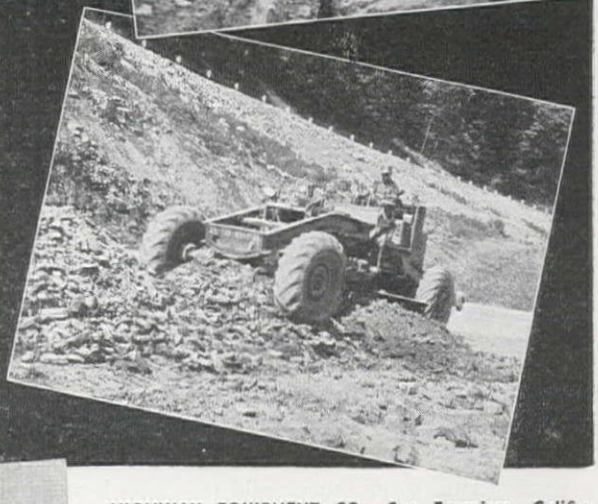
Red tape must be cut and engineering procedure speeded. Contractors must plan their jobs to eliminate delays, materials must be ordered far enough ahead to be ready when needed. Inspection must be adequate but "polishing" should not be required when speed is essential. And contractors should not be punished for doing a good job by long delayed estimate payments due to involved accounting or inconsequential differences of opinion.

A Change in Staff

WITH this January, 1941, issue, *Western Construction News* has a new editor, Mr. Dudley F. Stevens, succeeding Mr. James I. Ballard, who has resigned. For a number of years, Mr. Stevens has been assistant editor of this magazine, with special responsibility for the interpretation of contracting practice and methods in the Construction West. Mr. Stevens is a civil engineer, with an extensive background in field work in construction, and under his editorial supervision, we propose that *Western Construction News* shall continue, and if possible improve, the work of providing the construction industry of the West with authentic and practical construction and engineering information.—Publisher.

THE "99" FITS INTO YOUR PICTURE TOO!





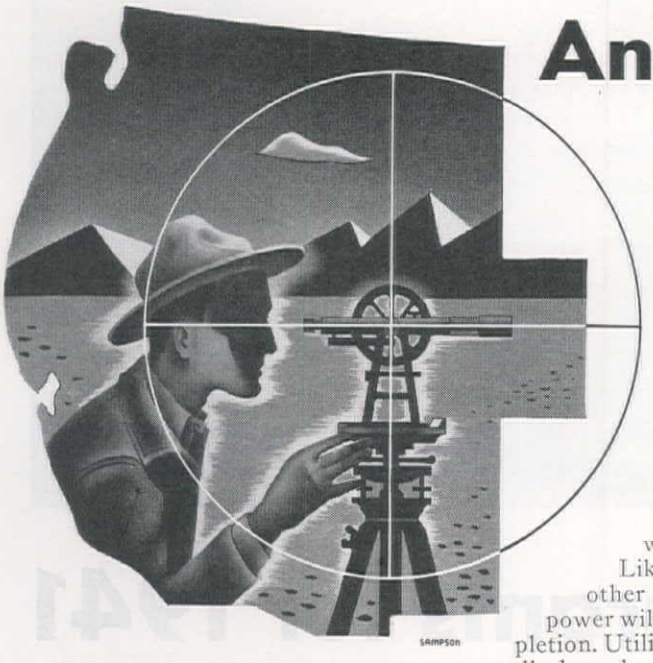
● North — South — East — West . . . highway officials and contractors find they get more done with an A-W "99" Power Grader. And, no matter what the job . . . maintenance or construction . . . on ice-coated, snow-blocked roads, in wet, heavy soil or blow sand . . . a "99" does it quicker, cheaper and better. Thanks to the extra traction, power and maneuverability provided by *All-Wheel Drive* and *All-Wheel Steer* you can tackle any job in sight with a "99". You can swing into Spring clean-up work earlier, get through faster, start Summer construction weeks ahead of less efficient equipment; and the "99's" *Extra Working Month a Year* efficiency means more profit on low bid work . . . more work with limited budgets. Ask us to prove it! THE AUSTIN-WESTERN ROAD MACHINERY CO., Aurora, Ill.

AUSTIN-WESTERN

HIGHWAY EQUIPMENT CO., San Francisco, Calif.; COLUMBIA EQUIPMENT CO., Portland, Ore.; SMITH BOOTH USHER CO., Los Angeles, Calif., and Phoenix, Ariz.; MOTOR EQUIPMENT COMPANY, Albuquerque, N. M.; LIBERTY TRUCK AND PARTS CO., Denver, Colo.; WESTERN MACHINERY CO., Salt Lake City, Utah; C. D. ROEDER COMPANY, Reno, Nev.; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyo.; WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Mont.

WESTERN CONSTRUCTION NEWS

JANUARY • 1941



Annual Review Number

A Survey of 1940

WITH the volume of contract awards at an all time high, 65% above the previous year, construction activity in the eleven western states shows definitely the effect of the National Defense Program undertaken during the last six months. The year 1940, had it not been for the sudden boom in defense construction projects, would probably have shown a moderate gain over 1939 as an indication of the steady increase in construction activity that has occurred over the past five years in the West. At the end of the first six months and before construction of any defense projects under the emergency appropriations had begun, the volume of construction contract awards was well above the same period of 1939 in all classifications.

Prospects for 1941, as outlined by the articles in this issue, appear to be as good or better than last year. Reports from Washington, D. C., indicate that about half of the construction program of the military and naval forces is under contract and by far the greater proportion of the work which is under contract has not yet been completed. The Civil Aeronautics Administration has just announced an extensive program of airport improvement which will require the expenditure of nearly $15,000,000 in the eleven Western States, Alaska and Hawaii. Plans for highway construction are not being made definitely until requirements of the Army are made known. Regular appropriations are slightly less than last year, but there is a good possibility that a large appropriation for military highways will be made by Congress next year.

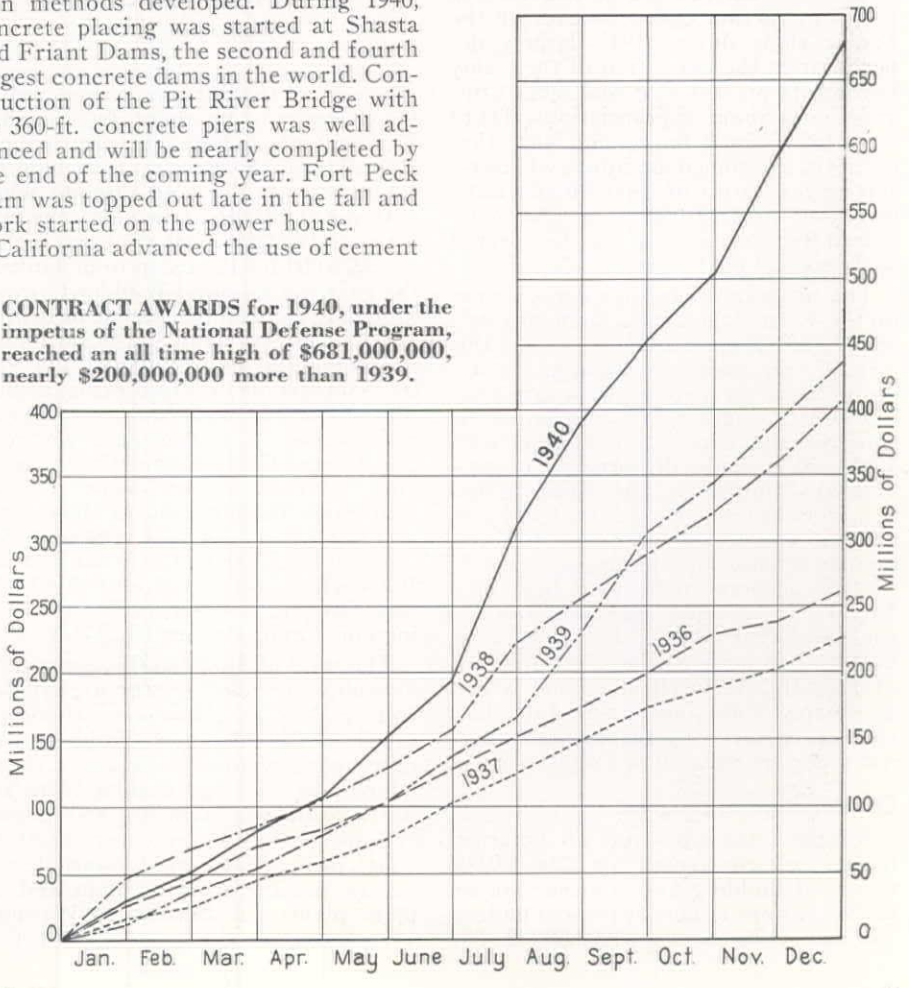
There are indications of a power shortage in the West which means that installation of generators at Boulder, Bonneville, Grand Coulee and Fort Peck Dams will probably be rushed. Likewise, work on Shasta and other dams designed to provide power will be carried on toward completion. Utility companies will undoubtedly have larger construction programs than for many years in the past. The Bureau of Reclamation plans to continue work on all projects now under way but may not start many new projects.

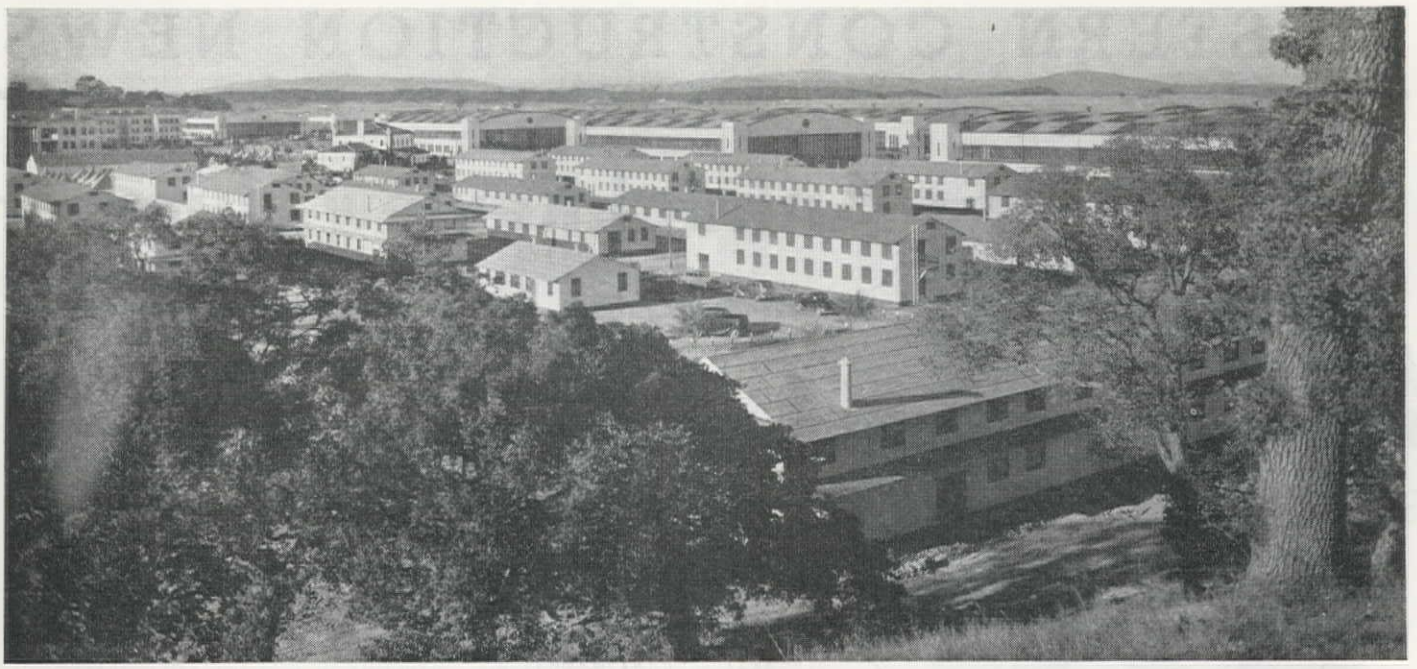
The outstanding advance of the West in the field of engineering and construction continues to be emphasized by the projects undertaken and the construction methods developed. During 1940, concrete placing was started at Shasta and Friant Dams, the second and fourth largest concrete dams in the world. Construction of the Pit River Bridge with its 360-ft. concrete piers was well advanced and will be nearly completed by the end of the coming year. Fort Peck Dam was topped out late in the fall and work started on the power house.

California advanced the use of cement stabilized bases for highways by constructing eight projects of that type, several of which were prepared by plant mix instead of the road mix methods used previously. Utah established the first use of synthetic resin admixture in cement in an effort to reduce scaling of concrete pavements. Washington completed and opened to traffic an unprecedented concrete pontoon bridge.

Failure of the Tacoma Narrows bridge, which brought forcibly to the attention of engineers throughout the world the factor of aerodynamic forces in light structures, should not be omitted in reviewing the year.

CONTRACT AWARDS for 1940, under the impetus of the National Defense Program, reached an all time high of $681,000,000, nearly $200,000,000 more than 1939.





Army-Navy Programs for 1941

Construction Quartermaster

By ARNOLD KRUCKMAN
Washington, D. C.

EXTENT of activities of the Construction Quartermaster on the Pacific slope during 1941, largely depends upon the expansion of the Army beyond its present size, and what Congress does about appropriations. There is a well defined impression here that events of the immediate future will cause this citizens' army of 1,400,000 men to be increased to 2,800,000. It is also murmured that the age limit may be lowered to 20 instead of the present 21.

The program of further construction on the West slope at this moment totals $82,471,820. It should be understood this virtually represents the amount left unspent from the defense appropriations of the last Congress. It is anticipated the Congress that comes into existence with 1941 will undoubtedly proceed to provide fresh funds for more building and construction, even before this fiscal year expires, and it will naturally make its regular defense appropriations to replenish the account to be used beginning July 1. The defense appropriations for the fiscal year 1941-42 will at least be every bit as large as the appropriations of 1940-41, and in all likelihood larger. The Army is not able to reveal its plans that are covered by the future budget until they are released by Congress itself.

Construction in progress

Roughly, the Construction Quartermaster has contracted for $200,000,000 worth of building and construction on the West slope under the present budget. The sum, to be exact, is $199,868,145. The jobs are at this writing considered by Washington to be about 35% finished. The new jobs, which will start immediately during the new year, include the cantonment at Portland, Oregon, which will cost $1,142,056. Arizona is scheduled for a total of $2,957,000, the items including $375,000 for the camp to be built for the garrison to guard Boulder Canyon; $1,382,212 to build the Air Corps cantonment at Tucson; and $1,140,346 for the cantonment at Ft. Huachuca. The $10,000,000 scheduled for California includes jobs at Ft. Mason; at Mather Field near Sacramento; a replacement center at San Diego; Camp Nacimento in the vicinity of Paso Robles; some buildings near Santa Barbara; and at Benicia and at Ft. Ord. Idaho will receive a cantonment for 2,500 Air Corps soldiers near Boise which will cost $1,700,000. Pendleton, Oregon, will get an airport building community costing $1,234,000.

The total of $10,000,000 to be spent in Washington includes structures at Vancouver Barracks; new construction at McChord Field; new buildings and other construction work at Ft. Lewis which will cost approximately $5,000,000; and the new Air Corps cantonment at Spokane. In Colorado over $36,500,000 worth of new work will be started at Ft. Logan and for an arms plant and airplane plant near Denver. In Wyoming over $2,000,000 will be spent at Ft. F. E. Warren near Cheyenne. In Alaska $179,000 will be spent at Sitka and at Kodiak. New work will be started immediately in Hawaii totalling $4,999,520; Hickam Field receives $1,687,100, Wheeler Field $3,305,500; and the balance is scattered around.

Building and construction at the General QM Depot, Ogden, Utah, call for expenditure of $3,750,000.

Housing problem

This program virtually completes the Construction Quartermaster work under the present budget on the Pacific slope. It is hoped that most of the jobs already under way will be completed by the middle of March. All work is planned to be completed by July 1. But the one great open subject is the question of housing. There is an impression here that somewhere between $75,000,000 and $100,000,000 worth of dwelling units must be provided for the workers and the Government people who are needed to complete the industrial and defense activities assigned to West slope. The program is yet rather vague; but it is known that at least $9,000,000 worth of low-cost housing units should be built at one locality in the Pacific northwest.

It is reported that large groups of housing units are required at Ft. Ord, at Riverside, Fresno, Sunnyvale, Vallejo, Mare Island, San Pedro, Stockton, Sacramento, San Rafael, Benicia, and particularly at San Diego. It is reported here that San Diego requires approximately 15,000 new dwelling units to take care of the workers and defense personnel that will be added to its population. We

are also told that additional housing must be provided at Tucson, and probably at other places in Arizona. The survey reveals the need for more housing at Boise, Idaho; and near Lowry Field, as well as at other points around Denver. The report indicates the need for more homes at Tacoma, Spokane, Portland, and in the neighborhood of Seattle; and there is reported to be particularly pressing need for housing at Bremerton. Ft. Lewis and McChord Field are listed as short of dwellings for lower-income renters. Albuquerque, N. Mex., is said to require additional housing units; and Anchorage, Alaska, is listed as short of housing. There is reported to be pressing need for more housing at Ft. Kamehameha, Oahu Island, and at other points in the Hawaiian Islands.

The housing problem is regarded as a joint job for the Army, the Navy, the U. S. Maritime Commission, and for private interests. It will undoubtedly come up for further discussion in the sessions of the 1941 Congress. It has been the subject of particular study by the housing section of the National Defense Advisory Commission.

Location of projects

The study of the 1941 Construction Quartermaster program presents a summary of the work now under way. The total in progress in California amounts to $92,498,676; it includes the jobs at Forts Scott, Funston, Miley; at San Diego, Muroc Lake, Moffett Field, March Field, San Francisco, Sacramento Air Depot, Ft. McArthur, Hamilton Field, Stockton Airport, Camp Ord, McClellan Field, Camp Merriam, Mines Field, Benicia, Long Beach, Downey, Camp Nacimento, Los Angeles, Ft. Mason, Camp McQuaide, San Bruno, Ft. Barry, Monterey, and Salinas. New Mexico is listed for a total of $8,573,289. Montana has a total of $651,906. Wyoming, $1,342,000. Colorado lists $4,691,507 with work progressing at Lowry Field, Ft. Logan, and in Denver.

Hawaii has a total of $16,934,191. Utah is considered one of the important Army centers of the West slope. It lists construction and building jobs totalling contracts of $24,689,191, with $14,288,000 at Ogden where the General Depot, the Ordnance Depot and the Air Corps Depot are being built. Hill Field, in the vicinity of Ogden, is separately listed with various jobs that total in value $6,252,297. Other work is progressing at Ft. Douglas, at Wendover Field and at the Salt Lake Airport.

The work under way in Arizona is concentrated at Ft. Huachuca with expenditures totalling $2,537,772. Oregon is listed for $4,841,854, with jobs in progress at Ft. Stevens, Portland and elsewhere. Washington is listed with a total of $28,882,758, the principal expenditures, of course, focussing at Ft. Lewis. The Army plans this to become the greatest troop center on the West slope. It is already expending in current work $26,705,606 at Ft. Lewis. Other work is going on at McChord Field, Ft. Worden, Ft. Casey, and Ft. Flagler.

Development in Alaska

The work at the Army centers in Alaska thus far under way totals a value of $12,657,000. They are spending $11,770,000 at Anchorage; $327,000 at Point Campbell, and $630,000 at Fairbanks. These sums are regarded as merely an indication of the totals that will yet be expended on the Army jobs in Alaska. It is anticipated there will be wide and very general development of airports and of landing facilities and that numerous buildings and other structures must be constructed.

The work under way and the work scheduled is generally listed as buildings, housing, airports, utilities, roads, highways, paving, underground facilities, bridges, railroads, and similar classifications.

Some of the work is unlisted for obvious military reasons. The total expenditure therefore obviously is greater than indicated.

Bureau of Yards and Docks

PLANS of the Navy Bureau of Yards and Docks, the agency which does Navy building and construction, indicate an expenditure of $140,742,773 during 1941. This estimate does not include any plans and program covered by the budget now before Congress for the fiscal year 1941-42. Government agencies avoid any revelation of budgets until the figures are released.

The plans covered by the $140,000,000 estimate are based upon unexpended funds in the 1940-41 Navy appropriations and defense appropriations, and upon authorizations in laws heretofore enacted by Congress which permit the Navy authorities to contract to pay for work at a stated future time.

The program provides for the expenditure in California of $68,371,500. Of this sum San Francisco is scheduled to receive $6,000,000; San Pedro, $19,750,000; San Diego, $12,930,000; St. George, $2,500; Point Arguello, $33,000; Oakland, $300,000; Alameda, $20,434,000; Eureka, $15,000; Mare Island, $9,390,826. The Bureau of Ships, another agency of the Navy, will spend for building and similar construction, in San Francisco, $1,500,000; in San Pedro, $1,600,000. This brings the total for San Francisco to $7,500,000; and for San Pedro to $21,750,000.

Plans for Northwest

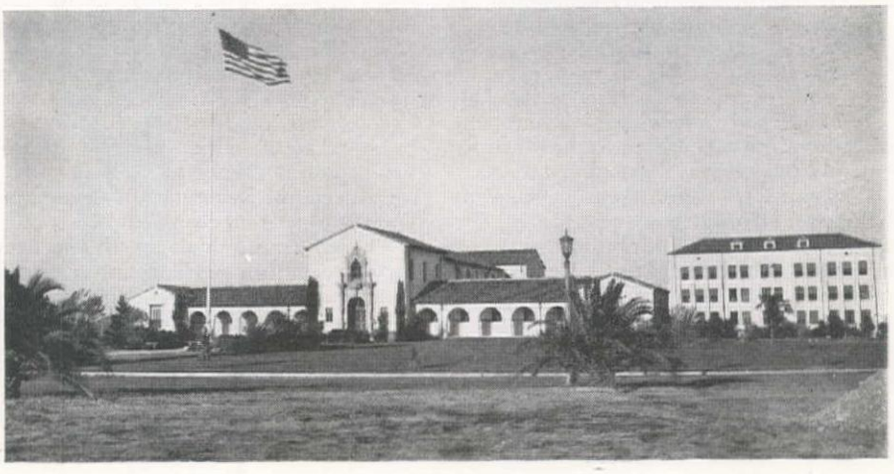
The total allocated to Washington is $14,388,500. The Puget Sound area receives a total of $641,500; Bainbridge Island will spend $75,000; Keyport is listed for $922,000; and the Seattle area receives $6,250,000 from the Bureau of Yards and Docks, and $6,500,000 from the Bureau of Ships. This total of $12,750,000 will be spent on building or similar construction in some form.

Oregon is listed for $1,229,897 which is all spent on buildings and construction at Tongue Point. Nevada is on the list for $832,000 to be spent on additional building at Hawthorne, the Navy Munitions Depot. Alaska will receive $6,353,050; to be spent at Sitka, $950,000; Unalaska, $2,900,000; Kodiak, $2,500,000, and at Dutch Harbor, $3,050. In the Pacific the budget totals $12,282,000, not including Hawaii. The Pacific allocation will be spent at Wake Island, $7,600,000; Samoa, $480,000; Midway Island, $3,850,000; Guam, $352,000.

Hawaii will spend $38,215,000. The various Navy activities at Pearl Harbor will absorb $13,527,000; the 14th Naval District will build $9,450,000 worth of structures and works. At Kaneohe Bay, works costing $11,913,000 will be erected. At Oahu the Navy will spend $3,325,000.

At Pearl Harbor the Government will build quaywalls, wharves, utilities, buildings, improvements to aviation facilities, underground storage tanks, roads, landing fields, munitions warehouses, and radio stations. At Kaneohe Bay the

HAMILTON FIELD in Marin County, California, is one of the well established fields of the Army Air Corps. Construction of the field was under the direction of the Quartermaster Corps.



BARRACKS recently completed at the Presidio of San Francisco. All facilities at Army posts and cantonments are built under the direction of the Construction Quartermaster.

Naval Air Station is to have new roads, newly paved airplane runways, and improved landing fields and new hangars and quarters.

New works in California

The schedule at San Diego calls for a variety of buildings, for drydocks, for piers, aviation fields, and for many different structures of military use. At San Francisco, buildings, warehouses, quarters, drydocks, piers and similar Navy structures are programmed. San Pedro includes extension of breakwaters, docks, piers, new buildings, and improvements to the Navy aviation facilities. At St. George improvements are planned to the radio station. At Pt. Arguello a new radio building will be erected. Oakland will have a new Naval Supply Depot building. At Alameda various buildings will be added to the existing Naval Air Station and the field will be largely improved and expanded. Eureka will have a new building. Mare Island is to have new quaywalls, new buildings, installation of new utilities, a new radio station, new piers, and a new ammunition depot. At San Francisco $1,500,000 will be spent in expanding a shipbuilding plant. At San Pedro $1,600,000 will be spent to expand the facilities of another plant.

In the Puget Sound area a number of buildings will be erected and many new utilities are to be installed. In the Seattle area buildings, air fields, hangars, underground gasoline storage facilities, and similar improvements are scheduled. At Keyport, Washington, the schedule calls for an elaborate program of paving, installation of utilities, many new buildings, and other construction. Bainbridge Island will have a new radio station, and in the vicinity there is to be built an entirely new Naval Torpedo Station.

The funds in Alaska are to be spent on hangars and quarters and air field improvements at Sitka, for buildings at Unalaska, for the creation of an up-to-the-minute Naval Air Station with paved runways, underground storage facilities and proper quarters at Kodiak, and for buildings at Dutch Harbor.

The improvement at Tongue Point is designed to make a fully equipped Naval Air Station. In Nevada, at Hawthorne, it is purposed to build platforms, railway facilities, warehouses and other buildings.

At Wake Island the Navy will build one of the finest Naval Air Stations in the world. Another great air station will be created at Tutuila, Samoa. Midway Island will be further improved as a Pacific air station for Naval uses. At Guam it is planned to erect a new hospital, and similar facilities.

Shipbuilding plants

The Bureau of Ships, in addition to the foregoing program, has a fund of $500,000,000 which will be spent in the San Francisco, Seattle and Tacoma area. The lion's share will be spent, according to present plans in San Francisco and the Northwest. Los Angeles is down for only a modest share. The same program calls for the expenditure of $150,000,000 on the expansion of the shipyards and the shipbuilding plants that produce the ships.

In addition to these plans the U. S. Maritime Commission also has programmed a considerable production schedule at Seattle, in the Puget Sound yards, and at Oakland. The program calls for the expenditure of $70,000,000. The Seattle shipyards will receive approximately $28,000,000 worth of orders; the Puget Sound plants are scheduled to make ships totalling in value $20,000,000; the Bremerton yards are down for $14,273,000; and Oakland for $8,550,000.

Expenditures last year

During 1940 the Bureau of Yards and Docks of the Navy, and the Bureau of Supplies and Accounts, and the Bureau of Ships, have collectively spent for building and similar construction on the Pacific slope, the total sum of $484,152,382. All but a very small part of this sum was spent by the Bureau of Yards and Docks. It is interesting to note that $20,000,000 was spent in Washington; $2,199,500 in Nevada; $21,393,410 in Alaska; $2,831,943 in Oregon; over $60,000,000 in the Pacific islands; $68,142,145 in Hawaii; $132,178,114 in California; and the Bureau of Ships separately spent on shipbuilding plant improvements the sum of $176,834,920. The U. S. Maritime Commission during the same period spent in excess of $75,000,000 on ships and on the extension of plant facilities.

The record reveals that during 1940 the Navy and the Army and the U. S. Maritime Commission together spent on construction in the Pacific area, from the ridge of the Rockies westward to the mid-Pacific, the impressive total of $926,679,447. There is every indication that this total will be exceeded during this year. And this rapid survey does not take into account the money spent by the Federal Government for the improvement of airplane factories, and for aviation fields to serve the civil needs of the manufacturers of defense planes.

Columbia River to be Widened

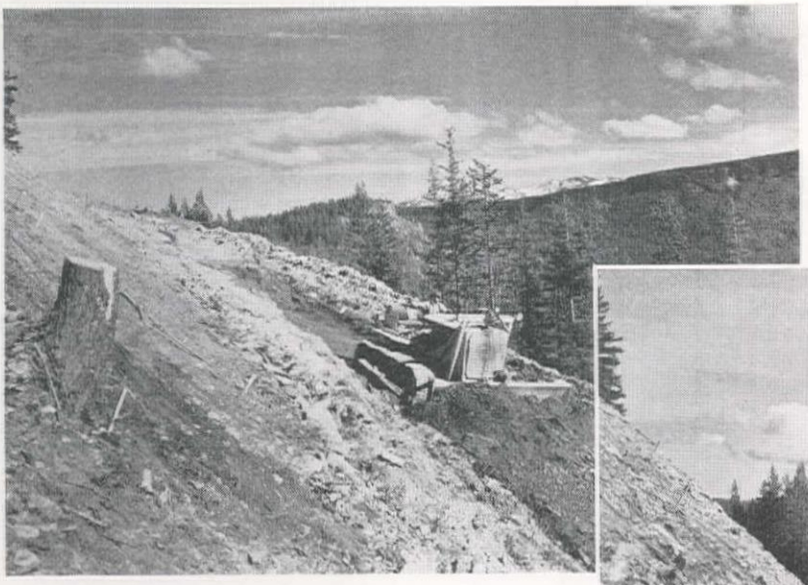
WIDENING a section of the Columbia River channel in the Little Dalles area near the Canadian border in Washington to prevent the flooding of Canadian lands above the 151-mi. reservoir being formed back of Grand Coulee Dam was covered in a contract awarded late in November by the Bureau of Reclamation. The Max J. Kuney Co. of Spokane, Wash., was awarded the contract on a bid of $249,000, which was the lowest of six proposals received and opened by the Bureau of Reclamation at its Coulee Dam project office on Nov. 13.

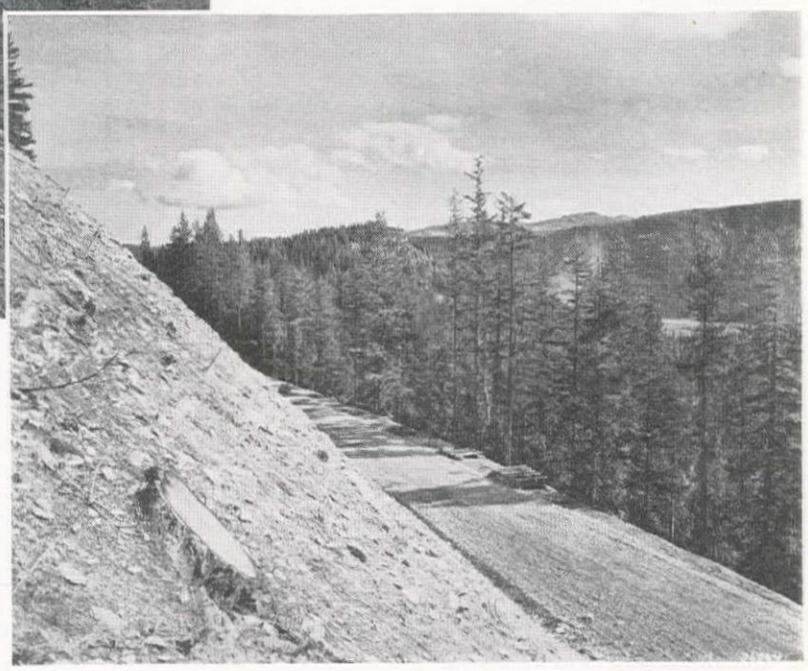
The contractor will do all the necessary excavation work required for the widening of the river channel and for shore protection at and near the Little Dalles. The contract involves the excavation of 300,000 cu. yd. of material, including the removal of islands, and the placing of 18,000 cu. yd. of rip-rap for the protection of the river slopes.

This is the only section of the river channel that will be widened. A peculiar combination of circumstances makes it necessary in the Little Dalles, where groups of little islands or pinnacles would prevent a steady flow of the river at a rate that would be sufficient to care for high flood waters. By widening the river channel and excavating the islands the danger of floods above the Little Dalles in Canada will be eliminated.

This particular section of the river was made a subject for study and investigation by the Denver laboratories of the Bureau of Reclamation, where practical research problems are studied in connection with the construction of irrigation projects. A hydraulic model was built to scale and simulated operations of the river observed and tested. Officials of the Canadian government observed the operation of the model and approved the plan of widening the river channel.

Public Roads Administration Program for 1941





Federal highway funds of $26,457,835 apportioned to Western States—Special studies of strategic military roads and construction of flight strips along highways provided for in Federal Act of 1940

FEDERAL highway funds in the amount of approximately $37,000,000 have been expended by the Public Roads Administration in the 11 Western States during the 12-month period from Dec. 1, 1939, to Nov. 30, 1940. Over $29,000,000 of this amount has been expended in co-operation with the State highway departments, as shown in Table I, and nearly $8,000,000 under the immediate direction of the Public Roads Administration on National Forest and National Park highways.

The unobligated balance of all funds available to the Public Roads Administration for the 11 Western States on Dec. 1, 1940, was $20,800,000. An estimated $24,000,000 will become available on January 1, 1941, from the 1942 apportionment of "regular" Federal-aid, Federal-aid Secondary and Federal-aid Grade Crossing funds.

Federal-aid Highway Funds

The Federal-aid and Federal-aid Secondary funds must be matched by the States, except that preliminary and construction engineering of certified national defense roads may be done by the States with full reimbursement of Federal funds, and 1½% of these two classes of funds may be used for the highway planning surveys without matching. Federal-aid and Federal-aid Secondary projects may be financed from Federal funds to the extent of the following maximum percentages, which are based on the area of unappropriated public land in each state:

Arizona	72.20
California	58.39
Colorado	56.36
Idaho	61.68
Montana	56.43
Nevada	87.18
New Mexico	60.28
Oregon	61.64
Utah	76.42
Washington	53.64
Wyoming	63.92

The matching requirement is set forth in the legislation authorizing the appropriations and stating the purpose for which each class of funds shall be used.

The Federal-aid funds are required to be spent on the Federal-aid system, which is essentially a connected system of main roads of interstate or intercounty character. Programs of projects to utilize the funds for each fiscal year are initiated by the State highway departments. Construction is carried out by the respective states in accordance with approved plans and specifications under the general supervision of the Public Roads Administration.

Federal-aid Secondary funds must be applied to construction of a designated system of secondary or feeder roads. Under an interim procedure, projects are approved after certification that they qualify for inclusion in the Federal-aid Secondary highway system, which is being designated in each state on the basis of information developed by the highway planning surveys. Partial Federal-aid Secondary highway systems have been approved by the Public Roads Administration in California and Utah, and action is pending in Washington, D. C., on the Idaho system. In each of the other western states the selection of the system is in various stages of completion.

Grade Separation Projects

Projects for elimination or protection of railroad grade crossings may be financed from Federal-aid Grade Crossing funds. These projects also are initiated by the State highway departments, but Federal funds may be used to pay the entire cost, without matching with State funds. Selection of projects is made on the basis of hazard to traffic, and there is no limitation regarding location on Federal or State highway systems.

Federal Lands Funds

Federal Lands funds are authorized for expenditure on "main roads" through

unappropriated and unreserved public land or Federal reservations (except Forest Reserves). These funds do not require matching with State funds. Apportionments of Federal Lands funds to the western states are shown in Tables II and III. The 1940 appropriation for the United States was $1,000,000. The 1941 authorization was $2,000,000, but only $1,000,000 has been appropriated.

Table I shows the amounts of the different classes of funds available for cooperative road work with the states (except Forest and Park funds) which were obligated and expended during 1940, and the unobligated balances.

Reduction of Funds

The Federal Highway Act of 1940 authorizes for the United States the appropriation of $100,000,000 of Federal-aid funds for the fiscal years 1942 and 1943. This will result in the apportionment of Federal-aid funds to the western states for each of these fiscal years of approximately the same amounts as shown in Table II, or about 13% less than the amounts apportioned for the fiscal year 1941. The 1942 and 1943 authorizations for Federal-aid Secondary funds are 16.6% above the 1941 figures, and the Federal-aid Grade Crossing funds are reduced one-third. The total of all funds for each of the fiscal years 1942 and 1943 will be about 13.6% less than given in Table III for 1941.

National Forest Highways

The Federal-Aid Highway Act of 1938 authorized the sum of $13,000,000 for the fiscal year ending June 30, 1941, for the improvement of Roads and Trails in and adjacent to the National Forests. Two-thirds of this sum, or $8,666,667, has been apportioned for improvements of the National Forest Highways under the supervision of the Public Roads Administration. The remaining one-third, or $4,333,333, has been apportioned for expenditure under the supervision of the Forest Service for the improvement of Forest Development Roads and Trails.

The following table lists the apportionment of the Forest Highway funds in the Western States and Alaska:

Arizona	$ 503,547
California	1,237,745
Colorado	636,191
Idaho	893,720
Montana	695,750
Nevada	157,822
New Mexico	355,284
Oregon	1,171,755
South Dakota	98,671
Utah	292,752
Washington	599,310
Wyoming	384,535
Alaska	400,000
Total	$7,427,082

There has been programmed or recommended for programming for major construction projects from the $7,427,082 to December 1940, as follows:

State	Projects	Allotment
Arizona	5	$ 305,000
California	6	875,000
Colorado	6	430,000
Idaho	9	670,000
Montana	6	654,000
Nevada	1	136,000
New Mexico	4	266,000
Oregon	16	1,095,000
South Dakota	1	69,000
Utah	3	198,000
Washington	4	426,000
Wyoming	3	272,000
Alaska	4	232,000
Total	68	$5,628,000

It is expected that several of the programmed projects will be canceled and projects substituted which are needed on the military strategic network. As appropriations for the fiscal year 1941 included only $1,000,000, to meet contractual obligations during the fiscal year, on the foregoing projects, only 15 of them were either under contract or had been advertised for bids as of December 1, 1940.

Funds for location surveys, maintenance and administration, during the fiscal year 1941 were provided from the appropriations made to complete the amount required to cover the authorization for the fiscal year 1939.

National Park Highways

The Federal-Aid Highway Act of 1938 authorized for construction and improvements of roads in the National Parks and Monuments for the fiscal year ending June 30, 1941, $5,000,000. Of this sum the National Park Service has programmed for expenditure by the Public Roads Administration, Western Region, the sum of $3,205,932, distributed as follows:

MAJOR PARK PROJECTS—FISCAL YEAR 1941

Contract Construction

Parks	Programmed No.	Programmed Funds
Glacier	2	$ 160,000
Mt. Rainier	3	382,564
Boulder Dam Rec. Area	3	771,000

TABLE I—Federal Funds Obligated and Expended

Dec. 1, 1939 to Nov. 30, 1940

Funds	Obligated During Year 12-1-39 to 11-30-40	Expended During Year 12-1-39 to 11-30-40	Unobligated Balance Available 12-1-40
Federal Lands Highway	$ 1,243,309	$ 1,470,096	$ 1,333,270
Federal Aid	22,076,426	21,452,414	11,317,623
Federal Aid Secondary	3,138,692	2,903,897	2,253,653
Federal Aid Grade Crossing	4,149,531	3,384,278	4,583,008
Totals for 11 Western States	$30,607,958	$29,210,685	$19,487,554

TABLE II—State Programs for Expenditure of 1940 Fiscal Year Federal Funds

State	Federal Aid Apportioned $	Federal Aid No. Proj.	Federal Aid Length (Mi.)	Federal Aid Secondary Apportioned $	Federal Aid Secondary No. Proj.	Federal Aid Secondary Length (Mi.)	F. A. Grade Crossing Apportioned $	F. A. Grade Crossing No. Proj.	F. A. Grade Crossing Length (Mi.)	Federal Lands Apportioned $	Federal Lands No. Proj.	Federal Lands Length (Mi.)
Arizona	1,423,400	30	149	213,510	5	20	125,461	6	1	154,949	2	20
California	3,793,823	47	150	569,073	17	51	728,856	5	1	94,859	2	8
Colorado	1,807,919	45	130	271,188	8	19	251,215	7	2	37,837	2	3
Idaho	1,223,119	45	162	183,468	13	40	161,779	43[a]	1[a]	52,015	2	7
Montana	2,032,384	53	200	304,858	3	8	261,252	22	89	55,200	4	6
Nevada	1,275,938	17	79	191,391	12	39	97,500	9[a]	—[a]	212,442	5	62
New Mexico	1,595,294	29	245	239,294	6	43	166,957	3	14	84,982	2	15
Oregon	1,638,823	56	125	245,823	17	54	224,953	2	1	60,542	1	10
Utah	1,124,731	38	128	168,710	9	40	129,236	52[a]	—[a]	108,843	3	14
Washington	1,563,815	19	55	234,572	7	29	300,063	6	1	14,512	1	2
Wyoming	1,249,044	33	225	187,357	5	29	132,134	1	1	80,083	1	10
Total 11 Western States	18,728,290	412	1648	2,809,244	102	372	2,579,406	156	111	956,264	25	157

[a] Nevada, Idaho, Utah—Mostly projects for installation of grade crossing signals.

Grand Canyon	1	230,000
Organ Pipe Cactus Mon.	1	275,000
Kings Canyon & Sequoia	1*	345,000
Yosemite	1	98,582
Yellowstone	3	626,574
Zion-Bryce Canyon	1	141,630
Total	16	$3,030,350

Post Construction—Day Labor

Glacier	1	$ 4,565
Crater Lake	1	7,304
Mt. Rainier	1	8,864
Yosemite	2	15,064
Mesa Verde	1	22,825
Rocky Mountain	1	13,695
Yellowstone	2	15,704
Zion-Bryce Canyon	1	13,000
Totals	10	$ 114,982

Surveys

Glacier	$ 10,000
Boulder Dam	16,000
Organ Pipe Cactus Natl. Mon.	10,000
Mesa Verde	2,000
Rocky Mountain	2,600
Yellowstone	15,000
Zion-Bryce Canyon	5,000
Totals	$ 60,600
GRAND TOTAL	$3,205,932

*There are four surfacing projects to be under one contract.

Highway Planning Surveys

Most of the initial work undertaken by the highway planning survey organizations of the 11 Western States in co-operation with the Public Roads Administration has been completed and various summaries of the data are being made available in the several series of maps, reports, and tables issued from time to time. Current programs include items designed to keep the information up-to-date; especially on those phases relating to the rural road inventory and traffic volumes. The highway planning surveys are now a continuing function in all of the 11 Western States.

Special studies are undertaken as particular problems arise. In California, a detailed survey of traffic movements was made this year of the Bayshore Highway (U. S. 101 By-Pass) between San Francisco and Palo Alto to assist in determining the location of approach and crossing structures and service roads necessary in connection with the proposed reconstruction of this highway as a freeway. A similar type of survey was made last year in the vicinity of Denver, Colorado, in connection with possible plans for rerouting main highways through the metropolitan area.

Some of the states are compiling data to form the basis of reports to forthcoming sessions of their respective legislatures.

The highway planning surveys are supplying considerable information which will serve to indicate the extent of needed reconstruction of sections of those highways which are of strategic importance for national defense.

Highway planning data have been found very useful in selecting systems of Federal Aid secondary highways in the States. The status of this activity in the 11 Western States is outlined under the previous general statement.

The following table illustrates the fact that only a very small percentage of rural roads in the 11 Western States carries a large volume of traffic. Consequently, the Federal-aid Secondary highway systems will serve principally low traffic roads.

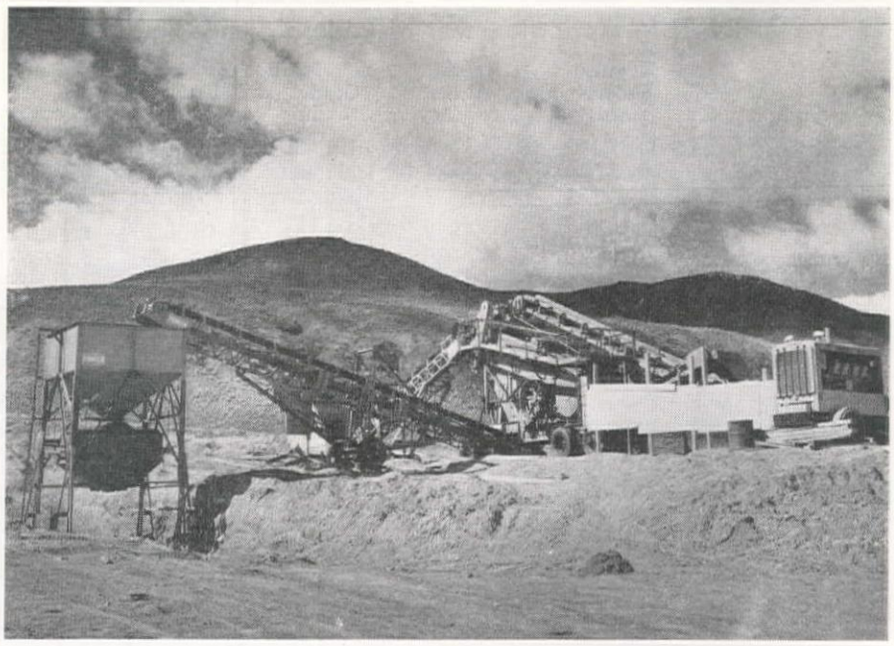
Daily Traffic Volumes At and Over	Percent of Total Rural Road Mileage
1,500	1.1
1,000	1.9
500	4.3
100	14.0
50	20.5
25	29.2
10	45.0

Less than 2% of the total rural road mileage carries 1,000 vehicles per day and over. Fifty-five per cent carries less than 10 vehicles per day.

At the present time approximately $5,500,000 of Federal and State funds have been obligated for conducting the highway planning surveys in the 11 Western States.

Roadside Improvement

The assignment of a limited percentage of Federal funds to roadside im-



PORTABLE EQUIPMENT BUILDS MILES OF WESTERN HIGHWAYS

Allotments of Federal Highway Funds to the West for the Next Fiscal Year

THE ELEVEN Western states were allotted the funds as shown in the table at the right in the apportionment of Federal Aid Highway Funds made on Dec. 30. The attention of the states has been directed to the provision of the act which permits the Commissioner of Public Roads to expedite the construction of projects that are recommended by Federal defense agencies as important to national defense. First priority is to be given to access roads to military camps and defense plants.

Apportionment of Highway Funds for the Fiscal Year 1942

State	Regular Federal Aid	Secondary or Feeder Roads	Grade Crossings	Total
Arizona	$ 1,435,382	$ 251,192	$ 129,679	$ 1,816,253
California	3,982,125	696,872	799,099	5,478,096
Colorado	1,798,524	314,742	252,705	2,365,971
Idaho	1,235,985	216,297	167,025	1,619,307
Montana	2,018,907	353,309	262,484	2,634,700
Nevada	1,274,718	223,076	97,500	1,595,294
New Mexico	1,620,981	283,672	170,673	2,075,326
Oregon	1,647,906	288,383	228,715	2,165,004
Utah	1,123,714	196,650	129,466	1,449,830
Washington	1,580,939	276,664	304,376	2,161,979
Wyoming	1,246,353	218,112	131,610	1,596,075
Total	$18,965,534	$3,318,969	$2,673,332	$24,957,835

TABLE III—Apportionment of Federal Funds for 1941

State	Regular Federal Aid	Federal Aid Secondary	Federal Aid Grade Crossing	Federal Lands	Totals
Arizona	$ 1,637,140	$ 213,540	$ 191,626	$ 310,546	$ 2,352,852
California	4,367,576	569,684	1,111,429	190,476	6,239,165
Colorado	2,080,133	271,322	376,426	76,775	2,804,656
Idaho	1,410,297	183,952	242,861	107,029	1,944,139
Montana	2,330,932	304,035	396,693	107,034	3,138,694
Nevada	1,462,071	190,705	146,250	436,062	2,235,088
New Mexico	1,843,554	240,464	248,930	143,487	2,476,435
Oregon	1,884,937	245,861	335,220	129,201	2,595,219
Utah	1,294,360	168,829	193,595	227,611	1,884,395
Washington	1,809,062	235,965	450,343	38,805	2,534,175
Wyoming	1,440,222	187,855	197,023	165,990	1,991,090
11 Western States	$21,560,284	$2,812,212	$3,890,396	$1,933,016	$30,195,908

provement projects is continued by the 1940 legislation, with the new provision that approval may be given to "the purchase of adjacent strips of land of limited width and primary importance for the preservation of the natural beauty through which highways are constructed."

Financing Right of Way

Federal loans to assist in the acquisition of right of way are contemplated by a new provision of the Federal Highway Act of 1940, by which the Reconstruction Finance Corporation is authorized to advance funds to the State Highway Departments for right of way purchase after approval of the project by the Public Roads Administration. This provision will expedite the construction of many urgently needed improvements, particularly in urban areas where right of way costs often equal or exceed the cost of construction.

Flight Strips

The matter of the construction of "flight strips" as an adjunct to highways has been made a matter of consideration by Federal and State highway engineers by the inclusion of Section 13 in the Federal Highway Act of 1940, which reads as follows:

> "The Commissioner of Public Roads, in co-operation with the State Highway Departments of the respective States, is hereby authorized, upon the request of any State, to investigate the location and development of flight strips adjacent to public highways or roadside development areas, for the landing and take-off of aircraft."

Ideas and policies with respect to the locations, functions, and physical dimensions of the flight strips have not crystallized to date, and will be a matter of early conference between the Public Roads Administration, the War Department, and the Civil Aeronautics Authority.

National Defense Roads

The Public Roads Administration has co-operated with the State Highway Departments in special studies and recommendations of routes considered important to the national defense. Section 18 of the Federal Highway Act of 1940 provides that Federal-aid highway and grade crossing funds may be used to pay the entire cost of surveys, plans, specifications and estimates, and supervision of construction of projects for improvement of strategically important highways. The most important classes of projects to which this section applies are access roads to reservations, rail terminals, and industrial areas, roads within army and navy reservations, and the military strategic network.

Designation of the strategic network is made by the War Department, as well as priority of posts and reservations in each Corps Area. After determination of the defense importance of individual projects, plans for improvement are worked out by a conference of local representatives of the War Department, Public Roads Administration, Work Projects Administration, and State highway department or other local highway authorities.

Preliminary or construction engineering surveys of projects certified as important to the national defense have already begun in several of the western states.

The necessity for a continuing and expanding program of highway improvement is emphasized by the current defense activity. Parts of the Federal-aid system of more than 41,000 mi. of main roads in the western states is in need of reconstruction to bring it up to modern traffic requirements, and many miles of new dustless surface remain to be built. Expensive construction into and through cities is urgently needed in many States to provide for existing civilian traffic, especially where industry has expanded for defense production needs. Federal assistance now available for the acquisition of right of way will permit important projects to proceed, but this will increase the demand for additional funds for construction.

Organization

The Public Roads Administration is a unit of the Federal Works Agency, which is headed by John M. Carmody, Federal Works Administrator. The Commissioner of Public Roads is Thomas H. MacDonald. Dr. L. I. Hewes, chief, Western Region, supervises the activities of the Public Roads Administration in the 11 Western States, Alaska, and Hawaii. J. S. Bright, chief construction engineer, is Dr. Hewes' principal assistant, in charge of the construction of National Forest and Park Highways in the Western Region. The district engineers reporting through regional headquarters are:

District No. 1—Oregon, Washington, Montana; W. H. Lynch, Portland, Oregon.

District No. 2—California, Arizona, Nevada; C. H. Sweetser, San Francisco, California.

District No. 3—Colorado, New Mexico, Wyoming; B. W. Matteson, Denver, Colo.

District No. 12—Idaho and Utah; B. J. Finch, Ogden, Utah.

District No. 11—Alaska; M. D. Williams, Juneau.

LONG DISTANCES CREATE A DISTINCTIVE WESTERN PROBLEM

Large Contracts Awarded During 1940

ARIZONA

W. A. Betchel Co.	Smelter	$ 750,000
Del E. Webb Construction Co.	Building	250,000
P. W. Womack Construction Co.	Housing project	399,618
Tanner Construction Co.	Highway	298,846
George W. Orr	Highway	270,534
Tanner Construction Co.	Highway	284,425
Charles J. Dorfman	Pumping plant	265,744
Del E. Webb Construction Co.	Cantonment	1,250,000
Del E. Webb Construction Co.	Building	350,000

CALIFORNIA

A. Soda & Son	Bridge	$ 329,989
Engineers Ltd.	Bridge	455,580
J. E. Haddock, Ltd.	Highway	760,570
Oberg Bros.	Bridge	263,261
Heafey-Moore Co. and Fredrickson & Watson Construction Co.	Bridge	380,999
American Bridge Co.	Bridge	2,588,354
Moore & Roberts	Building	338,900
John J. Moore Co.	Building	500,000
K. E. Parker Co.	Housing project	378,000
M. H. Golden	Building	367,880
W. A. Bechtel Co.	Ice Rink	250,000
Johnson, Drake & Piper	Storehouse	954,690
K. E. Parker Co.	Building	657,450
Cahill Bros.	Salt Refinery	1,000,000
Robert E. McKee	Hangars	1,149,000
N. P. Severin Co.	Storehouses	1,050,000
James I. Barnes	Building	317,400
Monson Bros.	Storehouses	555,400
Moore & Roberts	Building	427,324
MacDonald & Kahn Co., Ltd.	Steam generating Plant	5,000,000
Robert E. McKee	Building	541,200
Baruch Corp.	Housing project	1,187,710
C. L. Peck	Housing project	1,149,000
B. O. Larsen	Housing project	1,237,470
C. L. Peck	Building	1,000,000
Joshua H. Marks-Charde Co.	Housing project	1,769,521
Austin Co.	Factory	250,000
Ford J. Twaits Co.	Factory	330,000
Fluor Corp.	Refinery	650,000
MacDonald & Kahn Co., Ltd.	Building	400,000
H. W. Baum	Building	300,000
Myers Bros.	Building	287,000
E. W. McKittrick	Factory	450,000
McNeill Construction Co.	Housing project	1,250,000
MacDonald & Kahn Co., Ltd.	Cantonment	343,000
Ford J. Twaits Co. and Morrison-Knudsen Co., Inc.	Cantonment	2,731,000
W. W. Petley	Hangars	281,793
P. J. Walker Co.	Cantonment	2,242,491
Pozzo Construction Co., Ltd.	Buildings	338,935
I. C. Curry	Cantonment	309,865
Los Angeles Contracting Co. and O. W. Karn	Cantonment	1,750,000
Charles Hoskins	Barracks	871,600
I. C. Curry	Buildings	1,125,000
William Simpson Construction Co.	Housing project	3,800,000
Barrett & Hilp	Housing project	2,079,352
Myer Construction Co.	Housing project	1,348,240
MacDonald & Kahn Co., Ltd.	Building	250,000
Clinton Construction Co.	Building	3,771,000
Cahill Bros.	Building	2,000,000
Meyer Construction Co.	Cantonment	284,639
Meyer Construction Co.	Cantonment	364,050
L. E. Dixon Co.	Cantonment	3,880,341
F. C. Stolte	Cantonment	448,500
Barrett & Hilp	Housing project	2,243,418
Jacobson & Wikholm	Labor camp	310,589
Tobin Quarries, Inc.	Dam	750,000
Engineers, Ltd.	Dam	469,397
Macco Construction Co.	Dam	355,322
Winston Brothers Co.	Dam	664,401
Heafey-Moore and Fredrickson & Watson Construction Co.	Highway	337,626
Denni Investment Corp.	Highway	367,865
Radich & Brown	Highway	279,694
Radich & Brown	Highway	667,570
A. G. Raisch	Highway	251,504
George Herz & Co.	Highway	367,305
N. M. Ball Sons	Highway	281,974
Granfield, Farrar & Carlin	Highway	356,275
Jahn-Bressi-Bevanda, J. A. Dowling and David G. Gordon	Dam	3,121,268
Utah Construction Co.	Canal	397,963
J. F. Shea Co., Inc.	Siphons	496,254
Macco-Robertson Co.	Reservoir Inlet Line	286,052
United Concrete Pipe Corp.	Pipe Line	359,111
American Concrete and Steel Pipe Co.	Pipe Line	296,781
American Concrete and Steel Pipe Co.	Pipe Line	999,399
Macco Construction Co.	Pipe Line	676,720
United Concrete Pipe Corp.	Pipe Line	523,426
Artukovich Bros.	Pipe Line	760,807
A. Teichert & Son, Inc.	Pipe Line	806,356
Hydraulic Dredging Co.	Dredging	350,000
M. H. Golden	Wharf	613,000
Rohl-Connolly Co.	Channel Impvt.	866,698
Shannahan Bros.	Channel Impvt.	271,839
Morrison-Knudsen Co., Inc.	Channel Impvt.	911,037
Guy F. Atkinson Co.	Fleet Base	18,012,500
Warren Southwest, Inc.	Wharf	382,000
Standard Dredging Co.	Dredging	788,557
Hydraulic Dredging Co.	Dredging	339,437
San Francisco Bridge Co.	Dredging	1,014,300
Standard Dredging Co.	Dredging	294,890
Ben C. Gerwick, Inc.	Drydock	1,545,706
Pacific Bridge Co.	Drydock	1,649,000
Ben C. Gerwick, Inc.	Pier	392,117
Morrison-Knudsen Co., Inc.	Levee	356,714
A. Teichert & Son, Inc.	Levee	324,345
J. A. Casson	Race Track	1,250,000
Johnson, Drake, & Piper	Buildings	9,800,000
Johnson, Drake, & Piper	Seaplane Ramp	283,950
Emsco Derrick & Equipment Co.	Transmission line	675,000
M. H. Golden	Buildings	3,521,000
Consolidated Steel Corp., Ltd.	Wind Tunnel	788,000
United Concrete Pipe Corp.	Channel Imprvt.	648,414
K. E. Parker Co.	Buildings	394,289
Johnson, Drake, & Piper	Housing project	1,897,000
Monson Bros.	Housing project	938,831
Joshua H. Marks-Charde Co.	Warehouse	350,000
P. J. Walker Co.	Factory	5,000,000
Ford J. Twaits and Morrison-Knudsen Co.	Cantonment	6,018,733
W. E. Kier Construction Co.	Cantonment	650,000
W. E. Kier Construction Co.	Cantonment	2,199,492
Leo Epp	Housing project	251,877
Barrett & Hilp	Building	1,000,000
Cahill Bros. and Ben C. Gerwick, Inc.	Housing project	858,000
Zoss Construction Co.	Building	484,660
Clinton Construction Co.	Building	1,800,000
Griffith Co.	Highway	385,638
N. M. Ball Sons	Highway	251,087
Mojave Corp. and Person & Hollingsworth Co.	Pier	1,530,000
Henry J. Kaiser Co.	Piers	3,300,300
E. S. McKittrick Co.	Factory	450,000
C. L. Peck	Building	500,000
Zoss Construction Co. and McNeill Construction Co.	Housing project	9,500,000
B. O. Larsen	Factory	6,500,000

Barrett & Hilp	Building	660,900
Carl N. Swenson Co.	Building	324,872
Baruch Corp.	Hospital	1,040,000
Harvey A. Nichols	Housing project	450,000
Dinwiddie Construction Co.	Hangar	700,000
Fred J. Early, Jr.	Housing project	481,000
C. T. & W. P. Stover	Buildings	400,000
Ford J. Twaits Co. and Morrison-Knudsen Co., Inc.	Cantonment	1,351,642

COLORADO

A. S. Horner	Bridge	$ 298,831
Manhattan Construction Co.	Hangar	433,800
F. J. Kerchof	Building	867,000
Joseph A. Bass and W. C. Smith Co.	Cantonment	523,680
N. G. Petry	Hospital	275,000
W. E. Callahan, Gunther & Shirley and Rohl-Connolly Co.	Dam	7,160,754
Horner Bros. Construction Co.	Highway	300,000
Platt-Rogers	Tunnel	389,370
Ed H. Honnen Construction Co.	Tunnels	272,246
S. S. Magoffin Co.	Tunnel	471,123
J. B. Betrand, Inc.	Airport	322,966

IDAHO

Bird Finlayson	Building	$ 339,446
Olof Nelson Construction Co.	Highway	211,802
L. Romano Engineering Co.	Levee	214,449

MONTANA

Lease & Leighland	Housing project	$ 551,790
Alloway & Georg	Hotel	600,000
Lovering Construction Co.	Housing project	774,774
McNutt Bros.	Highway	299,736
S. Birch & Sons Construction Co.	Highway	223,650
Collison & Dolven, Inc.	Highway	243,009
W. A. Bechtel Co.	Gas line	1,000,000
W. A. Bechtel Co. and Williams Brothers Corp.	Oil pipe line	2,500,000
Woods Brothers Construction Co.	Substructure	412,358

NEVADA

Midstate Construction Co.	Hotel	$ 250,000
W. W. Clyde & Co.	Highway	287,429
Gibbons & Reed	Highway	299,470
Dodge Construction Co., Inc.	Highway	274,460
Wm. P. Neil Co., Ltd.	Buildings	2,146,000

NEW MEXICO

Cook & Ransom	Highway	344,533
Ernest W. Everly	Highway	239,816
Henry Thygesen & Co.	Highway	317,521
Jahn & Bressi-Bevanda Constructors, Inc.	Tunnel	1,309,582
Utah Construction Co.	Canal	562,027
Lembke Construction Co.	Housing project	300,000

OREGON

H. J. Settergren	Hangar	$ 310,000
Western Construction Co.	Buildings	279,350
MacDonald Building Co.	Cantonment	751,120
L. H. Hoffman	Factory	250,000
Puget Sound Construction Co.	Powerhouse	3,131,606
Morrison-Knudsen Co., Inc.	Dam	723,592
T. E. Connolly, Inc.	Dam	769,930
Roy L. Houck	Highway	219,892
Morrison-Knudsen Co., Inc.	Levee	376,623
Parker-Schram Co.	Levee	385,254
Kern & Kibbe	Jetty	603,746
General Construction Co.	Dredging	286,299
Fritz Ziebarth	Transmission line	248,989
McNutt Bros.	Highway	236,390
Strong & MacDonald, Inc.	Jetty	342,250
Kern & Kibbe	Jetty	723,320
Hauser Construction Co., George H. Buckler Co. and Natt McDougall Co.	Cantonment	1,142,056
Columbia Construction Co.	Jetty	554,120

UTAH

Peter Kiewit Sons Co.	Buildings	279,603
Peter Kiewit Sons Co.	Building	711,711
Mead and Mount Construction Co.	Hangar	494,000
N. P. Severin Co.	Warehouses	1,030,000
Utah Construction Co.	Tunnel	727,575
Utah Construction Co.	Transmiss'n line	2,000,000
Al Johnson Construction Co., and James Leck Co.	Warehouses	1,705,000
Mead & Mount Construction Co.	Building	248,000
James I. Barnes Construction Co.	Building	751,000

WASHINGTON

L. Romano Engineering Co.	Superstructure	$ 349,122
Norris Bros.	Superstructures	258,317
American Bridge Co.	Superstructure	499,319
Drake, Wyman & Voss	Buildings	301,000
MacDonald Building Co.	Cantonment	751,120
Teufel & Carlson	Hospital	300,000
Gjarde Construction Co.	Building	416,097
MacDonald Building Co.	Hospital	271,550
Bailey Construction Co.	Cantonment	340,125
Sound Construction and Engineering Co., and Peter Kiewit Sons Co.	Cantonment	7,786,000
MacDonald & Kahn Co., Ltd.	Hospitals	1,627,955
James Leck Co.	Building	526,550
The Austin Co.	Factory	500,000
Howard S. Wright & Co.	Building	267,913
Parker-Schram Co. and Eaton & Smith	Dam	905,570
Columbia Construction Co.	Jetty	1,720,354
General Construction Co.	Shipyard	5,000,000
Warren Northwest, Inc.	Airport	600,297
The Austin Co.	Building	265,575
The Austin Co.	Buildings	7,300,000
Drake, Wyman and Voss	Buildings	257,900
J. A. Terteling & Son	Relocation	1,044,336
N. Fiorito, Inc.	Highway	274,736
MacDonald & Kahn Co., Ltd.	Cantonment	1,550,000
Puget Sound Bridge & Dredging Co., and Rumsey & Co.	Pier	2,000,000
Henrikson-Alstrom Construct. Co.	Housing project	464,450
West Coast Construction Co.	Housing project	1,812,300
L. H. Hoffman	Cantonment	404,983
MacDonald Building Co.	Distr'b'n Systems	307,082
Sound Construction & Engineering Co., and Peter Kiewit Sons Co.	Cantonment	3,075,000
L. H. Hoffman	Cantonment	984,304
S. S. Mullen, Inc.	Buildings	587,331

WYOMING

C. C. Warrington	Highway	$ 222,789
Lowdermilk Bros.	Highway	279,553
Mead & Mount Construction Co.	Cantonment	1,970,720
John M. Keahey	Highway	327,114

Canada to Argentina by Road

Pan-American Highway is passable for more than three-quarters of its length through both Central and South America—Central American section extends 3,267 mi. from Laredo, Tex., to the Columbia Border—South American section extends 8,097 mi. from Panama to Buenos Aires—Development started in 1925

By A. DIEFENDORF

Head of the Department of Civil Engineering
University of Utah, Salt Lake City

PRESIDENT Luis Montes de Oca of the Mexican Automobile Association, speaking before the Thirty-eighth Annual Convention of the American Automobile Association in Washington, D. C., in November, 1938, said, "It has been especially gratifying to us to have met with the representatives of the other two countries of North America and to again assure ourselves that we share the same principles of life and government. This has been a memorable occasion in which we join hands to pay tribute to Canada, a nation very dear to the hearts of Mexicans. May its noble defense for its present cause allow the United States and Mexico to assist in preserving its future." Our Pan-American Highway, when completed, will further cement our bond of friendship with Canada and our southern neighbors.

Birth of the idea

The idea of joining the countries of America from the extreme north of Canada to Rio de la Plata, Argentina, was born at the first "Pan-American Conference" held Oct. 2, 1889, at which delegates from all of the Americas were present. The subject was further discussed during the second conference at Mexico City on Oct. 22, 1901. The plan then discussed was a railway connecting all of the Americas, but the rapid change in automobile development and improvement of road-building methods and equipment changed the trend of thought. A highway was then promoted.

On June 30, 1924, a group of Latin American engineers, representing nineteen countries, assembled to draft the Constitution of the Pan-American Highway Confederation. The fourth object of the Confederation was: "To study the best ways and means to unite with one another the different national highway systems with a view to the establishment of a Pan-American Highway system." From that time, enthusiasm rapidly increased for this ideal of a Pan-American Highway connecting the capitals of all the Latin American countries. This Constitution was ratified at the First Pan-American Highway Congress held at Buenos Aires in 1925. Funds were then appropriated by the various governments, and since that time construction has continued at the rate of about 600 mi. per year.

The Congress of the United States and the Public Roads Administration have played an important part in stimulating the continuance of this project. The Congress of the United States in 1929 authorized the appropriation of $50,000 to enable the Secretary of State to cooperate with the several governments' members of the Pan-American Union in reconnaissance surveys of possible routes, probable cost, economic service, and other important data.

The Seventy-fifth Congress authorized on March, 1938, $34,000, and on June 25, 1938, $50,000 for the continuance of engineering advice and service to countries requesting further aid in highway and bridge construction. In 1939 and 1940 $40,000 and $75,000 were further authorized. In June, 1939, an engineer was furnished the Republic of Ecuador on request to study the Andean routes as part of the highway system, much of which is in the high Andes.

U. S. aid given

The Public Roads Administration made a reconnaissance survey through Panama, Costa Rica, Nicaragua, Honduras, and Guatemala—a line of survey of about 1400 mi. This was done over the period 1930-33.

In 1934 the Congress of the United States authorized two appropriations—one of $1,000,000 for survey and construction operations, and one for $75,000 for the continuation of co-operative reconnaissance surveys.

The co-operative work with the Latin American Republics has been conducted under a diplomatic arrangement where the United States agreed to furnish all necessary engineering, including supervision, products of American heavy industry such as steel, cement, and equipment necessary in the work, and the transportation of such materials to the construction sites. The other countries agreed to furnish all local materials, to furnish and pay all labor, and to build all bridge substructures and approaches, to provide all rights of way and easements.

The "Inter-American Section" of the Pan-American Highway extends from Nuevo Laredo on the Rio Grande to Panama City, a distance of 3267 mi. which is equal to that from New York to San Francisco. This highway traverses seven countries; namely, Mexico, Guatemala, El Salvador, Honduras, Nicaragua, Costa Rica, and Panama.

At the present time there are completed 1792 mi. of all weather roads, paved or being paved (including 765 mi. from Nuevo Laredo to Mexico City, and 300 mi. from Panama City to David); 653 mi. of dry season roads, generally impassable during the rainy season; and 822 mi. of trails, including cart trails and those impassable to wheeled vehicles at any time.

Laredo to Mexico City

My first introduction to the Pan-American Highway was on June last, after I had crossed the International Bridge at Laredo, Texas, en route to Mexico City as guest of the Department of Communications and Public Works of the Mexican government. My official documents were in order for entrance into Mexico. The Mexican custom and immigration officials were most courteous and efficient, and I was on the way after a brief delay.

Shortly after we left Nuevo Laredo, we drove on the famous long tangent 47 mi. This straight road ended just before we reached Vallecillo. The country just south of Nuevo Laredo is in the arid part of Mexico, the land of cactus and chaparral. As we traveled southward, we climbed to the highest point on Manulique Pass, to El. 2280 in the pass about 20 mi. south of Sabinas Hidalgo. This is the first spur of the Sierra Madre Oriental. The Mexican engineers have done a fine piece of location work in getting us through this first high range.

We arrived at Monterrey, the capital of the state of Nuevo Leon and the leading industrial city of the Republic, and which has a population of 140,000. The city is located in a great valley at the foot of the famous Saddleback Mountain. We found fine hotels and restaurants. After locating for the day, we hired a chauffeur-guide for 30 cents per hour and visited many points of interest. The most fascinating was the Bishop's Palace on Chepe Vera Hill, built in 1782. This palace became famous in 1846 during the Mexican-American war, later again became a fort in 1864 during a war

with the French, and later was occupied by Villa and Carranza forces.

After a breakfast at the famous Sanborn's restaurant, served by charming Mexican girls in Oaxacan costumes, we headed southward for Valles. Leaving the 1769 ft. elevation of Monterrey, we began a gradual descent. The vegetation changed from thorny bush to orange and lemon trees. Banana trees were becoming common, and suddenly we found ourselves in the real tropics. Three hundred forty-eight miles from Nuevo Laredo was a road marker, "Tropico de Cancer." Tropical birds were in abundance, with many-colored, low-flying parrots in profusion. We passed through Matemorelos, Linares, and Victoria, the capital of Tamaulipas. Valles, our night stop, is the lowest point on the highway; but we found the evening cool, the Hotel Valles charming, and the accommodations excellent. In the evening after a dinner in the thatched roof dining room, we sat in the hotel yard and listened to the Mexican troubadours sing ancient and modern serenades. Valles is about 467 mi. south of Laredo and 300 mi. north of the Federal District.

Leaving Ciudad Valles, whose elevation is 90 ft., we began an ascent to an altitude of 8300 ft. beyond Tamazunchale. This country between the two towns is most interesting. We entered the real Indian country, known as Huasteca—the land of Huastecas, practically inaccessible until the building of the Pan-American Highway. Many of these people speak only their ancient native tongue and maintain their native customs of many years ago. Palms and bamboo grow luxuriantly, as well as many other tropical plants. All the huts are of thatched bamboo and palm.

Rugged terrain

Tamazunchale, at El. 2490, 68 mi. south of Valles, is a picturesque tropical town in the valley of the Moctezuma River. South of Tamazunchale the real climb began and never ended until we reached the plateau of Central Mexico, a mile and a half high. The mountains closed in on all sides above and below, the Moctezuma River shrank to a mere thread, and an indescribable panorama began to unfold. The road was wide with innumerable reverse curves. Drive carefully through this country, sound your horn often, and hope that you escape the mountain fogs.

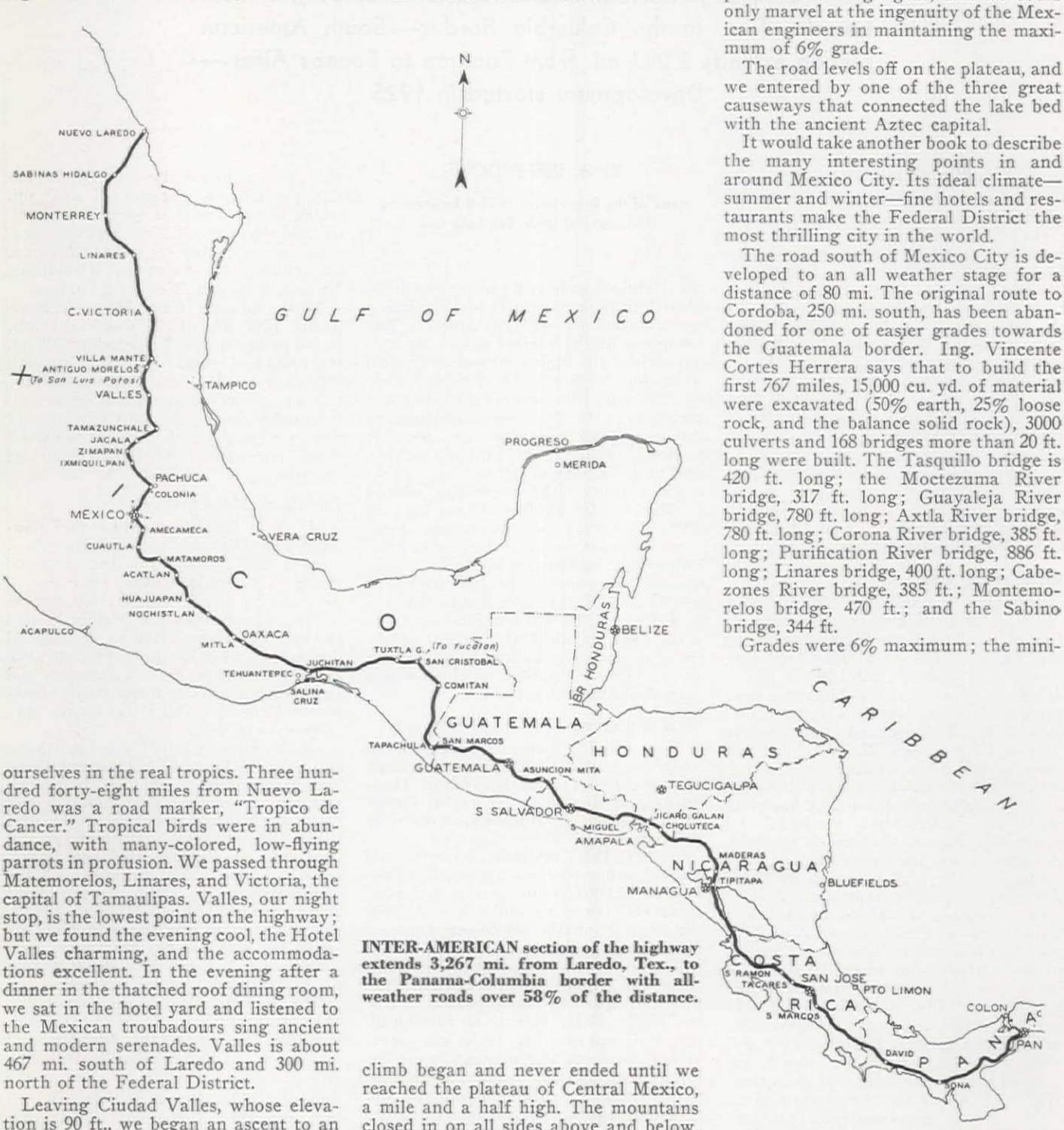
We paused at Zimapan for refreshments, 125 mi. north of Mexico City. We took pictures of the huge cypress, 42 ft. in circumference, and visited the ancient Parish Church. Zimapan is an old mining town developed shortly after the Conquest. The vegetation at the high altitudes reminds one of the western mountains or the Berkshires. Corn fields are cultivated on the steep hillsides. This climb to 7000-ft. altitude was accomplished all in high gear, and we could only marvel at the ingenuity of the Mexican engineers in maintaining the maximum of 6% grade.

The road levels off on the plateau, and we entered by one of the three great causeways that connected the lake bed with the ancient Aztec capital.

It would take another book to describe the many interesting points in and around Mexico City. Its ideal climate—summer and winter—fine hotels and restaurants make the Federal District the most thrilling city in the world.

The road south of Mexico City is developed to an all weather stage for a distance of 80 mi. The original route to Cordoba, 250 mi. south, has been abandoned for one of easier grades towards the Guatemala border. Ing. Vincente Cortes Herrera says that to build the first 767 miles, 15,000 cu. yd. of material were excavated (50% earth, 25% loose rock, and the balance solid rock), 3000 culverts and 168 bridges more than 20 ft. long were built. The Tasquillo bridge is 420 ft. long; the Moctezuma River bridge, 317 ft. long; Guayaleja River bridge, 780 ft. long; Axtla River bridge, 780 ft. long; Corona River bridge, 385 ft. long; Purification River bridge, 886 ft. long; Linares bridge, 400 ft. long; Cabezones River bridge, 385 ft.; Montemorelos bridge, 470 ft.; and the Sabino bridge, 344 ft.

Grades were 6% maximum; the minimum radius of curvature, 132 ft. Surfacing averaged 22 ft. wide. Most of the surface was constructed in three lifts, using an asphalt emulsion a total of 1 in. thick. Some stretches north of Monterrey were built by the mixed-in-place method. The greater percentage of the labor was hand labor, which in most



INTER-AMERICAN section of the highway extends 3,267 mi. from Laredo, Tex., to the Panama-Columbia border with all-weather roads over 58% of the distance.

cases was cheaper than machine work and gave employment to many families along the route.

South of Mexico

Guatemala reports that it has unpaved, all weather roads across the republic. This country had more miles of existing roads than any other Central American country, partly because each citizen is required by law to spend 20 days on the road. Practically all of their roads now are built by hand labor.

At the Tamasulapa River in Guatemala is a long suspension bridge, 486-ft. span, which was completed several years ago, financed by the United States Export Bank.

Guatemalan labor is cheap. The story is told that the electric railroad built from Quetzaltenango to the Pacific Railroad went out of business because it could not compete with the porters. They would carry 51 lb. of coffee on their backs 15 or 20 mi. down from Quetzaltenango down the mountain at a cheaper rate than the freight tariff on the railroad.

In San Salvador about one-third of the highways are paved. One-third has an all weather surface, and the other third are dry weather roads.

In Honduras was constructed the largest suspension bridge on the route. It was built over the Choluteca River, which is one of the widest on the west coast, with an over-all length of 1088 ft., with a span length of 880 ft.

In Nicaragua very little has been accomplished. There are only a few miles of paved highways, with the balance dry weather roads. Three bridges were built.

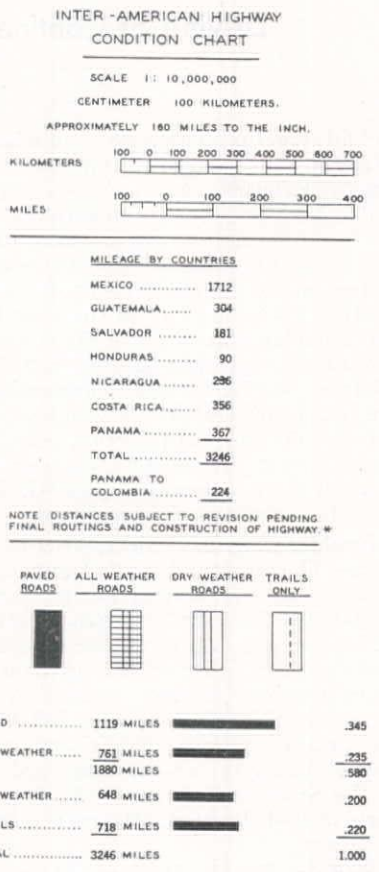
In Costa Rica a few miles of paved roads are built, the balance dry weather roads. Difficulties are being encountered in finding suitable road metals. Much of the stone is of volcanic origin. The country has some very difficult location work in the Sevegre Hills, where the ranges reach heights of 10,000 ft. and flare out like the fingers of the hand.

Paved highways in Panama

Panama has about 50% of its highways paved; the balance is in all weather roads. Across from the Costa Rica-Panama border the first area of real jungle is found along the route. The clearing of this route was a real engineering feat because up to this time a crossing through had not been effected. At the Canal, New York type ferries are provided. From the west end of the ferry the Panama Canal has also built an 18-ft. concrete road across the Canal Zone connecting the Central Highway with the Republic of Panama.

The South American portion of the Pan-American Highway is three-fourths passable during all seasons of the year. This part of the highway (8,097 mi.) has improvements as follows: paved, 2,015 mi. or 25%; all weather surfaces, 4,147 mi. or 51%; dry weather surfaces, 1646 mi. or 20%; and trails 289 mi., or 4%. The figures cover the route from the Columbia-Panama border south through Columbia, Ecuador, and Peru to Victor, Peru, and also separate branches leading to Buenos Aires, one passing south to Santiago, Chile, and east across Chile and Argentina to Buenos Aires, and the other passing east to La Paz, Bolivia, and south and east through Bolivia and Argentina to Buenos Aires.

Outstanding improved sections are along the coast of Peru between Cordoba and Buenos Aires in Argentina. It has a bituminous surface with excellent alinement and grades extending from Chiclayo south through Lima, the capital, to



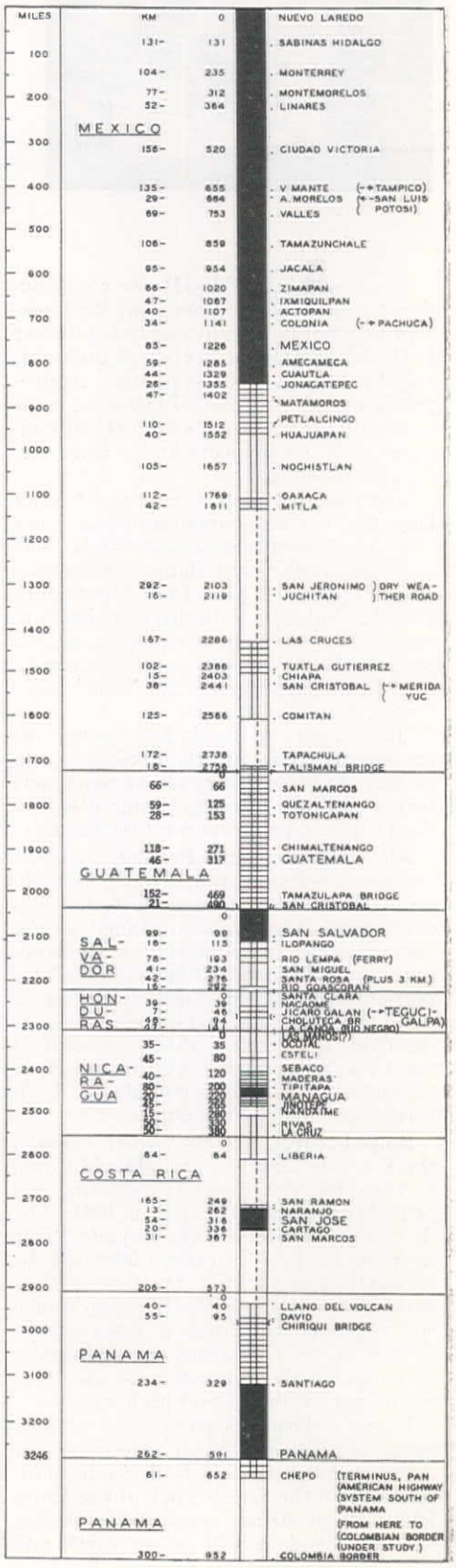
Nasca. The section in Argentina is paved with concrete and bituminous mixes from Buenos Aires to a point 30 mi. north of Cordoba, a distance of 500 mi.

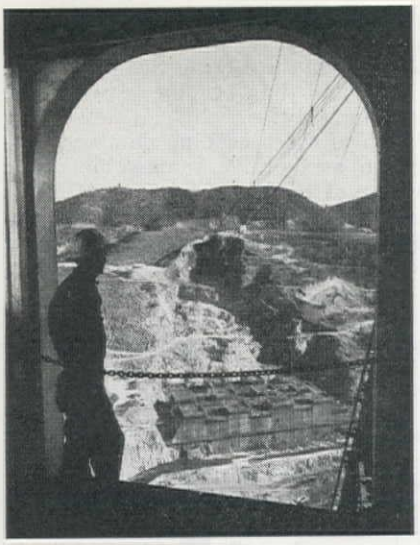
Fairbanks to Buenos Aires and more

Points where the highway will cross international boundaries have not been finally determined in all cases. Wherever construction has progressed to the frontier, there has been generally a definite agreement between the respective countries as to the point of crossing. This agreement has been reached between Columbia and Ecuador. The line between Chile and Argentina by way of Mendoza and Los Andes has been determined, as has that between Peru and Bolivia near the shores of Lake Titicaca.

A great deal of imagination is not required to appreciate the great potentialities of this magnificent highway. Economically it should make the Americas self-sufficient. The great endeavor to instill a "know thy neighbor" policy will be developed by interchange of tourist travel, which is a rapidly increasing factor on this highway. This highway is envisioned in its final stages to extend from northern Alaska to the southern tip of South America. Why not from Northern Alaska cross the Bering Sea via tunnel to Asia, and thus become a round the world highway?

Much of the preceding data was furnished to me by E. W. James, chief of the Division of Highway Transport, Public Roads Administration, who has been in intimate contact with the entire project since its inception.





Reclamation Program

Current projects of the Bureau of Reclamation will be carried on as scheduled—Grand Coulee Dam nearly completed during 1941 while concrete placement was started in Shasta and Friant Dams—Marshall Ford, Vallecito and Deer Creek Dams also near completion—Driving of Continental Divide Tunnel started

ALTHOUGH the construction program of the Bureau of Reclamation may not be greatly expanded during 1941, the current projects will undoubtedly be carried on as scheduled. Appropriations totalling $60,847,000 were made available for the fiscal year 1941 to continue work on projects under construction or investigation.

The year 1940 saw the Grand Coulee Dam approaching completion while concrete placement was actively under way on Shasta and Friant Dams and the final stage of Marshall Ford Dam. Deer Creek Dam in Utah and Vallecito Dam in Colorado were nearing completion. Rapid progress was also made on the contracts for the excavation of the Continental Divide Tunnel.

The amount of funds for the various projects is shown on the accompanying table. A brief summary of the work performed by the Bureau during 1940 and the proposed program for 1941 follow:

All American Canal Project, Arizona-California—Excavation of the first 40-mi. section of the Coachella Canal was completed. Work was continued on the excavation of and construction of structures on the second 40-mi. section. This section involves the construction of 32 monolithic siphons and 4 wasteways. At the close of the year about one-half of the excavation in this section and 20 of the siphons had been completed. L. J. Foster is construction engineer.

Boise Project, Idaho—Construction of the Cascade Dam, to provide additional storage for the Payette Division, will probably be started early in 1941. The dam, to be located on the Payette River near the town of Cascade, Idaho, will be an earth and rockfill structure with a maximum height of 90 ft., crest length 800 ft., and will form a reservoir of 700,000 ac. ft. Construction of the dam will require the relocation of about 11 mi. of both railroad and highway.

Plans and specifications will be prepared for issuance when authorized for the Anderson Ranch Dam to be constructed on the South Fork of the Boise River about 40 mi. southeast of Boise, Idaho. The dam will be an earth and rockfill structure with a maximum height of 339 ft., crest length 1350 ft., and a volume of 8,700,000 cu. yd. A power plant will be built in conjunction with the dam.

The construction of extensions for the two main branches of the distribution system on the Payette division, for which contracts were let late in the year 1939, was completed as was also the construction of the wasteway started in 1939. A contract was let for the construction of the Graveyard Gulch and Langley Gulch wasteways and construction was well under way at the close of the year. This work will be completed in 1941. R. J. Newell is construction engineer.

Boulder Canyon Project, Arizona-Nevada—The present installed generating capacity at the Boulder power plant is 706,000 kw. During 1941 two additional 82,500-kw. generators will be completed and the installation of one of them will be in progress. Energy production is at the rate of approximately 340,000,000 kw.-hr. per month. Additional transformer capacity for the increased load of the State of Nevada will be installed early in 1941. Irving C. Harris is director of power.

Buffalo Rapids Project, Montana—Work was started on the construction of an extension of the main canal serving the first division in the vicinity of Glendive, Montana. Work was also started on the construction of the second division of the project in the vicinity of Terry, Shirley and Fallon. Construction of both of these divisions will continue during 1941.

The Shirley and Terry pumping plants will be completed in 1941. Each plant is designed for an ultimate installation of three pumping units, two of which will be installed at the present time. The pumping units will have a capacity of 37 c.f.s. with a 51-ft. head and 20.5 c.f.s. with a 109-ft. head, respectively. The pumps will be driven by vertical shaft electric motors. P. A. Jones is construction engineer.

Central Valley Project, California—The first concrete was placed in Shasta Dam on July 8, 1940. The dam, being constructed on the Sacramento River near Redding, California, will be a slightly curved concrete gravity structure with an earth and rockfill embankment on the left abutment. The dam will have a maximum height of 560 ft., crest length 3500 ft., and a volume of 5,800,000 cu. yd. The earth and rockfill embankment on the left abutment will contain about 1,450,000 cu. yd. of material. At the end of the year the dam was about 45% complete on a cost basis.

The Shasta power plant will be under construction during 1941. The installation of four 75,000 kv.-a. main generators and two 2,500 kv.-a. station service generators will be in progress during the coming year with completion of installation of the main units scheduled for early in 1942 and the station service units in 1941.

Friant Dam, located on the San Joaquin River near Fresno, California, will be a straight, concrete, gravity structure with a maximum height of 320 ft., crest length 3450 ft., and a volume of 1,850,000 cu. yd. The first concrete was placed in this dam on July 29, 1940, and at the end of the year the dam was about 45% complete on a cost basis.

The 8-mi. reach of the Contra Costa Canal, the construction of which was started in 1939, was completed as was also the headworks structure and the earth dam in the Dutch Slough. Bids for construction of an additional 8-mi. section of the Contra Costa Canal were received on January 6, 1941. A contract for the construction of the first 7½-mi. section of the Madera Canal was awarded late in the year and construction was started. Work on both the Madera and Contra Costa Canals will be in active progress during 1941.

The operation of the Contra Costa pumping plants was started in 1940. There are four pumping plants each having an initial installation of four pumping units. Six units will ultimately be installed in each plant. The pumping capacity of the installed units ranges from 35 c.f.s. to 70 c.f.s. at heads varying from 25 to 50 ft. All pumps are direct-connected to vertical shaft electric motors.

Specifications are being prepared for early issuance for the construction of the first stage of Keswick Dam to be located on the Sacramento River about 9½ mi. below Shasta Dam. The dam will include facilities for migratory fish control. During the coming year hatching and rearing pond facilities will be constructed in connection with this project.

Work was continued on the relocation of the Southern Pacific Railroad around

$60,847,000

Shasta Reservoir. At the close of the year all bridges with the exception of that over Pit River were practically complete. Work on the substructure for the Pit River bridge, contract for which was awarded in 1939, was in progress during the year. Contract was awarded for the construction of the superstructure for this bridge and shop fabrication was in active progress. Field erection will start shortly after the first of the year and will continue through 1941. It is anticipated that all track-laying and ballasting will be completed early in 1941. Construction of communication and traffic control systems and the siding and station facilities will soon be under contract and traffic will probably be routed over the new line early in 1942. R. S. Calland is acting supervising engineer, Ralph Lowry, construction engineer, Kennett Division; Oscar G. Boden, construction engineer, Delta Division, and R. B. Williams, construction engineer, Friant Division of the project.

Colorado - Big Thompson Project, Colorado—The purpose of the Colorado-Big Thompson Project is to divert water from the western slope of the Continental Divide to provide additional water for 615,000 ac. of land now under irrigation in northeastern Colorado. Several dams and power plants will be required on both sides of the Divide and a tunnel 69,023 ft. long for diverting the water to the eastern slope.

Green Mountain Dam and power plant, located on the Blue River about 16 mi. south of Kremmling, the first unit of the project, is now under construction. This dam is being built to provide storage for the protection of western slope lands during short water years and still permit diversion to the eastern slope. The dam will be an earth and rockfill structure with a maximum height of 270 ft., crest length 1200 ft. and a volume of 4,450,000 cu. yd.

The Green Mountain power plant installation will be completed in 1942. The installation consists of two 12,000 kv.-a. generators.

Seventy miles of 115-kv. transmission line and related work serving the towns of Greeley, Wiggins, Fort Morgan and Brush, were constructed and placed in operation in 1940.

During 1940 two contracts for construction of the Continental Divide tunnel were awarded, consisting of one for the excavation of 8,000 ft. at the outlet end and one for 6,600 ft. at the inlet end, and construction under both contracts was actively prosecuted. Bids for excavation of an additional 6,000 ft. at the outlet end will be received early in 1941, and for an additional section at the inlet end later in the year. Porter J. Preston is supervising engineer, R. B. Ward is acting construction engineer on Green Mountain Dam, and C. H. Howell is construction engineer on the Continental Divide Tunnel.

Colorado River Project, Texas—Two contracts for the completion of Marshall Ford Dam were awarded during 1940. One contract covers the construction of the final concrete section and the other the embankment section at the left abutment. The dam will have a maximum height of 265 ft., crest length 5,100 ft., and will contain 1,877,000 cu. yd. of concrete and 1,620,000 cu. yd. of embankment. E. A. Moritz is construction engineer.

Columbia Basin Project, Washington—Grand Coulee Dam was practically completed at the end of 1940, and the work remaining to be done will be finished during 1941. The dam has a maximum height of 550 ft., crest length 4,200 ft. and contains about 10,500,000 cu. yd. of concrete.

Installation of three 108,000 kv.-a. and two 12,500 kv.-a. generating units in the left wing of the powerhouse was started in 1940 and work will continue during 1941.

Work progressed during the year on the various features of construction required for migratory fish control on the Columbia River. The Leavenworth hatchery, rearing ponds and water supply were completed and the artificial spawning and rearing of young fish was carried on successfully. During 1941 the construction of two auxiliary stations at Entiat and Winthrop, Washington, will be completed. A game fish hatchery and rearing ponds for the purpose of stocking the reservoir and tributaries upstream from Grand Coulee Dam will also be constructed during the coming year.

Contract was awarded during the year for river channel improvement in the Little Dalles.

During 1940 the abutments and piers for the substructure of the Kettle Falls bridge over the Columbia River on the relocation of the Great Northern Railroad were constructed and a contract was awarded for the construction of the superstructure. Erection of the superstructure will be started shortly after the first of the year and will be completed before midyear. Contracts were also awarded for the substructures and superstructures for two railroad and one highway bridge over the Kettle River. Work on the construction of the substructures and shop fabrication of the materials for the superstructures was in active progress during the latter part of the year and all work on these bridges, including field erection of the superstructures, will be completed in 1941.

DIVERTING THE SAN JOAQUIN RIVER AT FRIANT DAM LAST JULY

Bureau of Reclamation Funds for 1941

Project	State	Appropriation Fiscal Year	Construction Features
Administrative Expense		$ 1,450,000	Denver and Washington Offices
All-American Canal	California	1,500,000	All-American Canal and appurtenances
Altus	Oklahoma	(1)	Altus Dam and appurtenant features
Boise	Idaho	900,000	Cascade, Anderson Ranch Dams and canals
Boulder Canyon	Ariz.-Cal. Nev.	4,000,000	Boulder Dam and Power Plant
Buffalo Rapids	Montana	(1)	Pumping Plant, canals and laterals
Buford-Trenton	North Dakota	(1)	Canals and laterals
Carlsbad	New Mexico	100,000	Canal lining
Central Valley	California	23,600,000	Storage dams and canals
Colorado-Big Thompson	Colorado	2,000,000	Storage dam and tunnel
Colorado River-Texas	Texas	3,000,000	Marshall Ford Dam
Columbia Basin	Washington	12,000,000	Grand Coulee Dam and power plant
Deschutes	Oregon	400,000	Canals and laterals
General Investigations	Various	600,000	Project Investigations
Gila	Arizona	(1)	Canal system and structures
Humboldt	Nevada	100,000	Water conservation
Kendrick	Wyoming	900,000	Canal system
Klamath	Oregon-Calif.	200,000	
Minidoka	Idaho	(1)	Enlargement of power plant
Mirage Flats	Nebraska	(1)	Box Butte Dam
Ogden River	Utah	(1)	Distribution system
Parker Dam Power	Calif.-Ariz.	3,500,000	Parker Dam power plant
Pine River	Colorado	400,000	Vallecito Dam
Provo River	Utah	1,250,000	Deer Creek Dam and Salt Lake Aqueduct
Rapid Valley	South Dakota	(1)	Pactola Dam and appurtenances
Rio Grande	New Mexico-Texas	72,000	Caballo Dam and Elephant Butte Power
Riverton	Wyoming	200,000	Canals and laterals
San Luis Valley	Colorado	150,000	Exploratory work
Secondary and Economic	Various	25,000	Investigations
Shoshone	Wyoming	350,000	Canal system
Sun River	Montana	50,000	Willow Creek Dam enlargement and canals
Tucumcari	New Mexico	(1)	Canals and laterals
Uncompahgre	Colorado	100,000	Repairs to canals
Water Conservation and Utilization	Various	3,500,000	Small dams and canal systems
Yakima	Washington	500,000	Canals and laterals
Total		$60,847,000	

(1) Unexpended funds available.

F. A. Banks is supervising engineer and A. F. Darland is construction engineer.

Deschutes Project, Oregon—Contracts for the construction of Crane Prairie Dam and the outlet works for Wickiup Dam were completed in 1940. The combined capacity of the two reservoirs will be about 250,000 ac. ft., the water to be used for irrigating 50,000 ac. of dry farm lands. Five miles of 66-kv. transmission line was constructed during 1940.

Excavation for the North Unit Main Canal was continued throughout the year and about 13 mi. of canal were completed. During 1941 canal excavation will be continued and construction of canal structures will be started. Early in 1941 bids will be received for the construction of 1½ mi. of canal, including the headworks and other appurtenant structures in the outskirts of the city of Bend. D. S. Stuver is construction engineer.

Gila Project, Arizona—The Fortuna wasteway was completed during the year. A contract was awarded for the construction of pumping plant No. 1 and the adjacent railroad and highway crossings and the diversion structure to the distributary canals. Bids will be received for construction of a portion of the distribution system on the Yuma-Mesa Division early in 1941. L. J. Foster is construction engineer.

Kendrick Project, Wyoming—Work was in progress throughout the year on the construction of the distribution system and will be continued in 1941.

Construction of 122 mi. of 66-kv. transmission line was completed during 1940. This line connects Casper and Thermopolis, Wyoming and the installation included the related substation equipment. I. J. Matthews is construction engineer.

Klamath Project, Oregon — During the latter part of the year a contract was let for the construction of the Tule Lake Tunnel on the Modoc Division. Work was started late in 1940 and will continue through 1941.

This tunnel is one feature of the works for drainage of the Tule Lake sump and the development of a wild life refuge in the basin of Lower Klamath Lake. B. E. Hayden is superintendent.

Mancos Project, Colorado—Designs are being prepared for the proposed Jackson Gulch Dam to be built in a dry gulch of that name near Mancos, Colorado. The dam will be an earth and rockfill structure 184 ft. high and 1,880 ft. long at the crest.

Minidoka Project, Idaho—One additional 6,000 kv.-a. generating unit was under construction in the Minidoka Power plant during 1940 and work will be completed in 1941. Power from this unit will be used for irrigation pumping purposes. Stanley R. Marean is superintendent.

Newton Project, Utah—This project will require the construction of a small earth and rockfill dam on Clarkston Creek to supplement the water supply for about 2,000 ac. of irrigated land in the vicinity of Clarkston and Newton, Utah. Construction will probably be started in 1941. I. D. Jerman is construction engineer.

Ogden River Project, Utah—During the year contracts were awarded for the construction of two units of the pressure distribution system under the South Ogden Highline Canal and work was started late in the year. Bids for construction of these three features will be completed during the coming year. E. O. Larson is construction engineer.

Parker Dam Power Project, Arizona-California—Construction of the Parker

power plant was in progress during 1940. Completion of the three 30,000 kv.-a. generating units is scheduled for the early part of 1942.

A 137-mi., 161-kv. transmission line between Phoenix and Parker was constructed and placed in service during 1940. Energy from the Boulder power plant is now being delivered over this line into the territory.

Construction of 116 mi. of 161-kv. transmission line between Parker and Gila Projects was completed during 1940.

One hundred-twenty miles of 66-kv. transmission line between Phoenix and Tucson, Arizona, and 39 mi. of 66-kv. transmission line between Phoenix and Sacaton, Arizona, and 50 mi. of 161-kv. transmission line between Blaisdell, Arizona, and Drop No. 4 on All-American Canal will be under construction during 1941. S. A. McWilliams is construction engineer.

Pine River Project, Colorado—The construction of Vallecito Dam on the Pine River near Durango, Colorado, was practically completed during 1940. The dam is an earth and rockfill structure with a maximum height of 125 ft., crest length 4,000 ft., and a volume of 3,700,000 cu. yd. C. A. Burns is construction engineer.

Provo River Project, Utah — Deer Creek Dam, an earth and rockfill structure with a maximum height of 230 ft., crest length 1,400 ft. and volume of 2,750,000 cu. yd. was practically completed during 1940.

Work was continued on the construction of the Olmsted and Alpine-Draper tunnels on the Salt Lake Aqueduct. The Olmsted tunnel was completed and the Alpine-Draper tunnel was holed through at the close of the year. Lining of the latter tunnel will be in progress during 1941. Work was also continued on the construction of the 8-mi. section of 69-in. diameter concrete pipe. This section will be completed during 1941. A contract was awarded for the excavation of three miles of the Duchesne tunnel at the outlet end and will continue during the coming year. E. O. Larson is construction engineer.

Rio Grande Project, New Mexico-Texas — Construction of a chain link fence along the Franklin Canal through the city of El Paso was in progress and at the close of the year was practically complete. Structures on the Riverside Canal extension adjacent to San Elizario Island were completed.

The installation of three 9,000 kv.-a. generating units at the Elephant Butte power plant was completed in 1940. Power delivery to the New Mexico Public Service Co. at Hot Springs, N. Mex., was begun in November, and delivery to the El Paso Electric Co. at Las Cruces, N. Mex., was begun in December, 1940.

Construction of 63 mi. of 115-kv. transmission line between the Elephant Butte power plant and the town of Las Cruces was completed in 1940.

During 1941 there will be constructed 117 mi. of 115-kv. transmission lines between the Elephant Butte power plant, Deming and Central City, N. Mex., and substations at Deming and Central City. Delivery of power will begin upon completion of these lines and substations. L. R. Fiock is superintendent.

Riverton Project, Wyoming — Bids will be received for construction of an extension of the Pilot Butte Canal and a portion of the lateral system thereunder early in 1941. H. D. Comstock is superintendent.

Shoshone Project, Wyoming—Work on the construction of the Shoshone Canyon conduit controlling works was in active progress throughout the year and only a small amount of work remains to complete this feature. The first unit of the distribution system was also practically completed. Bids were received for the construction of the second unit of the distribution system and this work will be in progress during 1941. W. F. Kemp is construction engineer on the Heart Mountain Division.

Sun River Project, Montana—Tunnel No. 1 at the head of the Pishkun Canal was lined with concrete during the year. The Willow Creek Reservoir supply canal diverting from the Pishkun Canal a short distance below the outlet of tunnel No. 1 was completed. Work was started on the construction of the Floweree Feeder canal to divert the discharge from Willow Creek Reservoir to a point on the Sun River above the intake of the Floweree Canal.

Specifications have been issued for the enlargement of Willow Creek Dam which involves raising the dam 14 ft., construction of dikes, and reconstruction of outlet and spillway facilities. A. W. Walker is superintendent.

Tucumcari Project, New Mexico—Work on the construction of the 20-mi. section of the Conchas Canal for which bids were received late in 1939 was in active progress during the year and will be completed during 1941. A contract was awarded and work started on the construction of the headworks at the irrigation outlet from Conchas Reservoir. Work was also in progress as a WPA and Government forces project on the construction of the Conchas Canal and appurtenant structures in the vicinity of the city of Tucumcari. This work will be continued during 1941. H. W. Mutch is resident engineer.

Yakima Project, Roza Division, Washington—Wasteway No. 3, construction of which was started in 1939, was completed. Contracts were awarded for the construction of wasteways Nos. 2 and 4, and two units of the distribution system. Work on these features was in active progress and at the close of the year wasteway No. 2 was practically complete. Work on the remaining features will be continued during 1941. Shortly after the first of the year, bids will be received for the construction of an additional 18-mi. section of the Yakima Ridge Canal. C. E. Crownover is construction engineer.

SECONDARY INVESTIGATIONS

Arizona

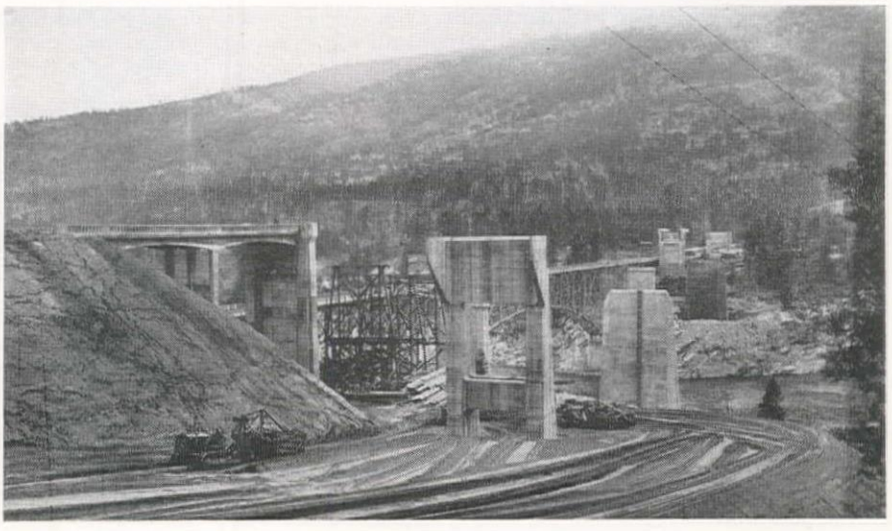
Investigations of the possibility of providing irrigation water for lands in the Hassayampa River Valley in the vicinity of Wittman and Wickenburg, by surface and underground storage augmented by inter-basin diversion, were continued throughout the year. Geologic examinations were made and topography taken at alternate storage sites on the Hassayampa River.

Foundation exploration by diamond drilling was completed at Alamo Dam site on Williams River to determine storage possibilities for irrigation and flood control purposes.

Studies were made of reservoir sites, diversion sites, and possible canal locations in connection with potential irrigation developments in the Little Colorado River Basin, in the vicinity of St. Johns, Holbrook, along Showlow Creek, and on Clear and Chevalon Creeks in the Winslow area. A geologic reconnaissance was made for the entire basin to assist in locating storage possibilities. In the Showlow Creek area, such plans were evolved for storage and intrabasin diversion that suitable storage sites could be brought into use.

Surveys were initiated on an aqueduct location leading from the Colorado River

RAILROAD RELOCATION ON COLUMBIA RIVER ABOVE GRAND COULEE



at or near Parker Dam to central Arizona lands in need of supplemental irrigation water.

Arizona-Nevada

Surveys and exploration were continued at the Bullshead Dam site on the Colorado River near Katherine, Arizona, in connection with investigations of storage possibilities for river regulation and power development. Detail topography was taken at alternate dam sites, and general topography over the reservoir area.

California

Lands in the Chucawalla Valley, irrigable by pumping from the Colorado River, were classified.

Report was completed for the Kings River Project near Fresno. Storage of 1,000,000 ac.-ft. is involved for irrigation, power and flood control.

Studies were made of present and future irrigation possibilities in the valley of the Sacramento River and tributaries. Lands in the upper American River service area were classified, and studies were made to determine the availability of water, storage requirements, and the most beneficial distribution and use of the water supply.

Work was initiated on an investigation of potential irrigation and power developments on Kern River, paralleling possible flood control developments.

Colorado

Studies relative to the suggested Blue River-South Platte transmountain diversion were continued.

Studies were continued for potential storage developments on Plateau Creek for the irrigation of lands in the vicinity of Collbran, and power production incidental thereto.

Hydrographic studies, reservoir site surveys, and geologic inspections were made in the upper Dolores River Basin to outline irrigation possibilities and sources of supplemental water supply for irrigation developments in the vicinity of Dove Creek.

Investigations were in progress covering storage possibilities on streams originating on the south slope of Grand Mesa to supplement the water supply to areas along these streams.

Water supply studies and canal line surveys were made in connection with alternate plans for furnishing a water supply to Mesa Verde National Park.

A report was prepared involving storage at the Wagon Wheel Gap Reservoir site on Rio Grande and at Platora and Mogote on the Conejos for flood control and supplemental irrigation in the San Luis Valley region.

Studies were made to determine the possible flood control benefits to be derived from storage on Purgatoire River near Trinidad, Colo., and the flood control capacity required at Sopris Reservoir site near that town.

Colorado-Wyoming

Investigations were continued in the Little Snake River Basin to outline irrigation possibilities.

Idaho

The Weiser River Basin was covered by a general investigation to outline potential irrigation, power, and flood control developments.

In the Salmon River area lands were classified, irrigable areas determined, reservoir sites surveyed, power possibilities studied, and data obtained on the surface and ground-water supply in connection with an investigation of irrigation and power possibilities in the Lemhi, Pahsimeroi and upper Salmon River valleys.

Studies were made to determine the power possibilities and irrigation and flood control benefits to be secured from the operation of a reservoir at the Grand Valley site on the South Fork of Snake River.

Comparative studies were made of storage sites in Malad Valley, and a dam site on Devil Creek was drilled to determine foundation conditions.

Investigations were initiated relative to providing supplemental irrigation water to lands in the vicinity of Lewiston.

Idaho-Utah-Wyoming

Extensive investigations were made with a view of outlining a coordinated plan of development of the irrigation and power resources of Bear River, and to determine the feasibility of a diversion from the Green River Basin to this watershed.

Montana

A general reconnaissance was made of possible irrigation, flood control, and power developments in the Missouri River Basin above Fort Peck with a view to developing the water resources of and coordinating project developments in this area.

Water supply and reservoir operation studies were made to determine storage possibilities for a supplemental irrigation water supply to Deadman's Basin area on Musselshell River. Surveys were made of reservoir sites on the Bitterroot River and tributaries and of natural lake storage sites on the divide west of the valley to determine the possibility of supplementing the water supply to lands in the Bitterroot River Valley and of developing new lands in this area. Canal line surveys were made for new canals and for extensions of existing distribution systems, and project lands were classified.

Montana-North Dakota-South Dakota

Investigations were concluded covering areas in Montana, North Dakota, and South Dakota, serviceable by pumping from storage at Fort Peck Reservoir and from the Missouri River between Fort Peck, Mont., and Yankton, S. Dak.

Tributaries of the Missouri River from the Little Missouri River to the White River were covered by a general reconnaissance, and detailed studies were made of likely storage and irrigation developments. Geologic explorations were made at the Angostura and Horse Camp Dam sites on Cheyenne River, and topographic surveys were made.

Montana-Wyoming

Investigations are in progress in the headwaters of Powder River covering storage possibilities to provide irrigation water for lands in the valley.

Nevada

Investigations were made of alternate plans of development involving storage on Truckee River and tributaries to provide for flood control, power production, and irrigation developments in Truckee and Carson River basins.

New Mexico

A survey was made of a canal line from San Juan River to lands in the vicinity of Shiprock, and a reconnaissance was made of reservoir sites on the San Juan River and tributaries in search of suitable storage sites to supply these lands. Water supply studies were made and irrigation requirements determined. Investigations were made of the possibility of irrgating lands in the vicinity of Hammond by means of a branch from the Shiprock canal.

Oregon

Studies were made of the feasibility of providing irrigation water to the Canby area by means of a pressure distribution system.

Investigations were conducted in the Rogue River Valley in Josephine and Jackson counties to determine storage possibilities for irrigation developments in that area, looking to the improvement and extension of existing systems and the irrigation of new lands. Project lands were covered by aerial photography and land classification surveys; and surveys were made of storage sites, diversion sites and canal lines.

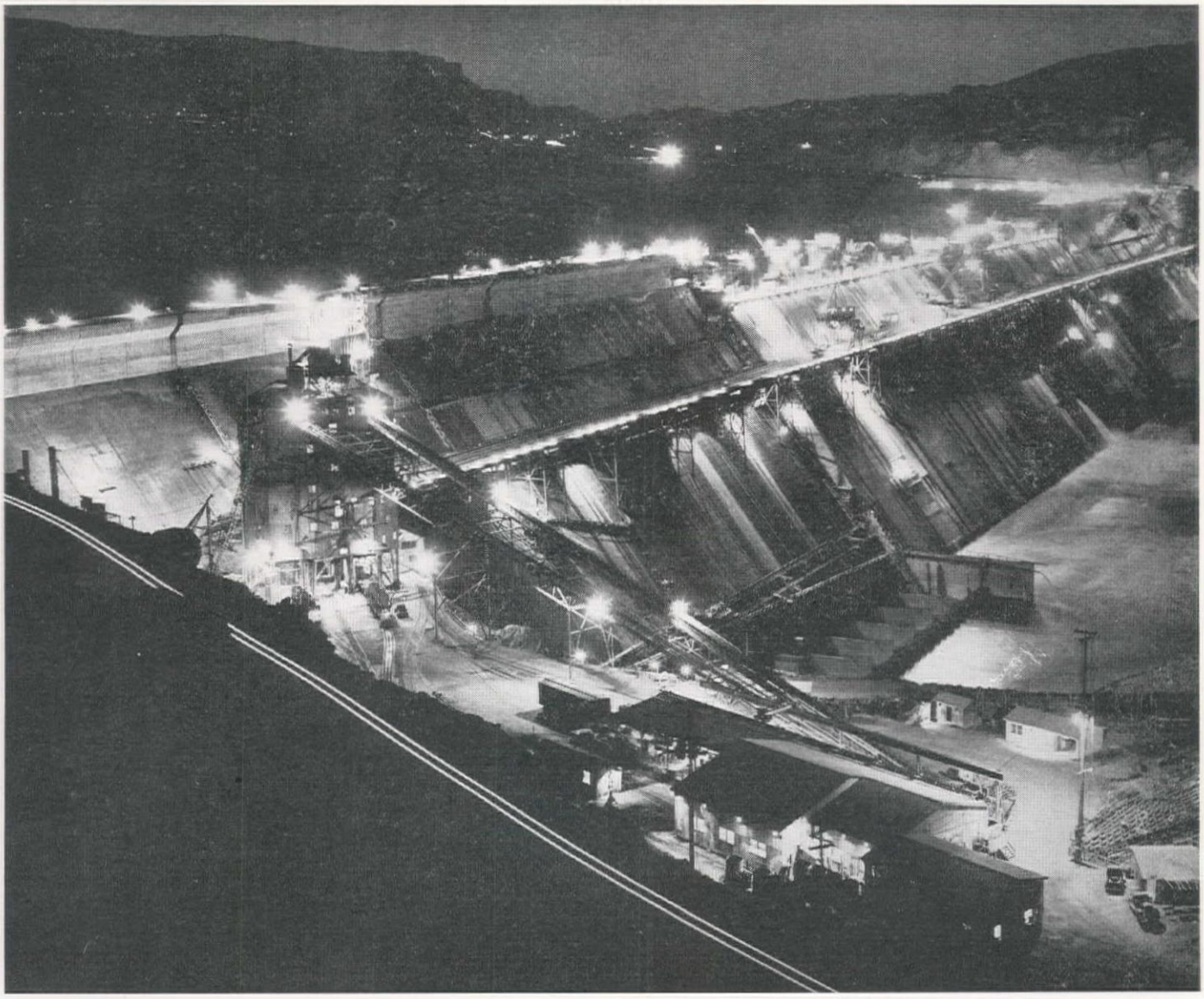
The Willamette River Valley was covered by a reconnaissance to determine the possibility of supplementing the water supply to irrigated areas and of irrigating new lands from proposed multiple purpose reservoirs. Reconnaissance work was followed by detailed studies on individual units to determine the requisite storage capacity and area that can be served.

The John Day, Umatilla, and Walla Walla River basins were covered by a reconnaissance to locate possible storage sites and irrigation potentialities. Studies were continued in connection with a comprehensive plan of development of irrigation, flood control, and power development in the Grande Ronde Basin.

Utah

Land classification was completed in the Great Basin area embracing portions of Tooele, Juab, Millard, Sevier, San Pete, Utah, and Salt Lake counties susceptible of irrigation by a diversion from the Colorado River watershed. Surveys and geologic explorations were made at storage sites, conduit lines were surveyed, and water supply and economic studies were conducted in connection with these investigations.

Investigations are nearing completion in connection with possible irrigation



GRAND COULEE DAM AT NIGHT

and storage developments in the San Rafael and Price River basins contemplating the use of the water of these streams to the best advantage for the irrigation of lands in these basins and also of lands in San Pete County serviceable from storage on Gooseberry Creek by means of a diversion into San Pitch River watershed.

All contemplated work was completed on investigations of the possibility of providing a supplemental water supply to irrigated lands on Woodruff Creek and on Newton Creek, both tributary to Bear River. A geologic study was made of a dam site on Porcupine Creek, a tributary of Little Bear River.

Water supply studies were made to determine the availability of water in Sheep Creek for diversion to Lucerne Valley.

Studies were made of probable irrigation requirements and necessary drainage provisions in the Weber River Delta.

Reconnaissance work is in progress in the Uinta River Basin and on Brush and Ashley Creeks to determine the possibility of supplementing the water supply to irrigated areas in this region.

The relation between the power market and possible hydroelectric power production is the object of an investigation in progress.

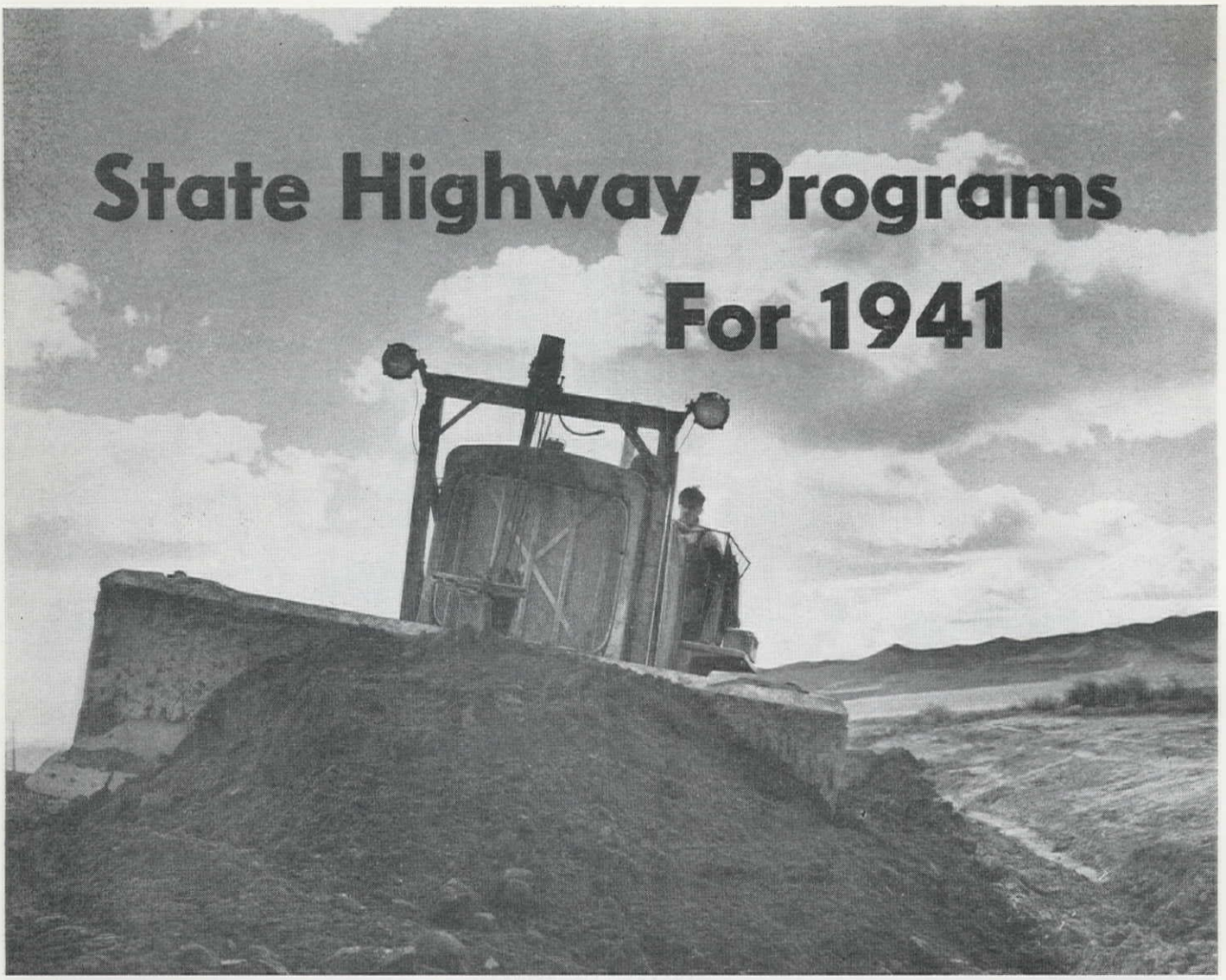
Wyoming

Following a general reconnaissance of the Green River Basin in Wyoming covering possible storage developments for supplementing the water supply to irrigated lands and the irrigation of new areas, the basin was subdivided into units to facilitate detailed studies. Investigations relative to the possible enlargement and extension of the Eden irrigation system were completed. The remaining projects in the basin were covered by reservoir site and canal line surveys. Control surveys are in progress for rectification of aerial photographs for use in connection with surveys of irrigated and irrigable areas preparatory to the formation of final project plans.

A general reconnaissance was made of the Big Horn River Basin in Wyoming in order to formulate a coordinated plan of development in the basin, involving storage for flood control, irrigation, and incidental power production. Detailed investigations were conducted in the Paintrock and Owl Creek areas to determine storage and irrigation possibilities. Operation studies were made of a storage site on Gooseberry Creek in connection with a plan involving intrabasin diversion of unappropriated waters to supplement the water supply to the Buffalo Basin lands. A reconnaissance of storage sites on Wind River is in progress.

ORGANIZATION

All operations of the Bureau of Reclamation are under the general direction of John C. Page, Commissioner, with headquarters in Washington, D. C. Engineering and construction work is under the supervision of S. O. Harper, chief engineer; W. R. Young, asistant chief engineer; and J. L. Savage, chief designing engineer. Other divisional heads of the Denver staff include: W. H. Nalder, assistant chief designing engineer; L. N. McClellan, chief electrical and mechanical engineer; K. B. Keener, senior engineer, dams; H. R. McBirney, senior engineer, canals; E. B. Debler, hydraulic engineer; I. E. Houk, senior engineer, technical studies.



State Highway Programs For 1941

Arizona

THE TOTAL estimated expenditures for all phases of highway work in Arizona during 1941 is $7,202,000. Of this total, $4,477,000 will be spent for construction; $1,500,000 for maintenance and betterments; and $1,225,000 for administration, purchase of equipment, and other capital accounts.

Under the construction program, it is planned to grade 180 mi., which will require approximately $2,500,000 cu. yd. of excavation and embankment, at an estimated cost of $1,800,000. Gravel or crushed stone surfacing of 280 mi. will require 1,400,000 tons of material at an estimated cost of $842,000. Oil treatment will be placed on 50 mi. of highway at a cost of $75,000. Ten miles of high type paving will be constructed at a cost of $300,000, and 220 mi. of low type paving at a cost of $1,100,000. Six bridges, costing about $360,000, will be constructed during the year.

The Arizona highway budget is made up in June of each year, and the above figures are estimates for the calendar year of 1941. It is difficult to forecast what effect the national defense program may have on the 1941 budget. It has not affected any design up to the present, and the most recent projects released by the Public Roads Administration were up to the standards required by military authorities.

W. R. Hutchins is state highway engineer for Arizona, and A. F. Rath is manager of the highway planning survey.

California

PRELIMINARY estimates indicate that revenue from the following sources will be available to the Division of Highways for the biennium between July 1, 1941, and June 30, 1943:

State's 1½-cent share and Cities' ½-cent share of the 3-cent gas tax	$73,000,000
State's ½ of net revenue from motor vehicle fees	8,474,000
Use fuel tax (diesel oil, butane, etc.)	1,300,000
Regular Federal Aid apportionments	7,600,000
Caravan fees	226,000
Total budgetary revenue	$90,600,000

It is expected that this amount will be allotted to highway work in the following amounts:

¼-cent gas tax to city streets not on state highway system	$ 9,125,000
Maintenance	18,400,000
Shops, equipment and buildings	700,000
Highway planning survey	210,000
Construction and improvement	57,940,000
Administration	3,900,000
Traffic engineering and investigation	325,000
Total	$90,600,000

The Division of Highways operates on a two-year fiscal period, and budgets are prepared on that basis. At the present time, the budget for the 1941-43 period is in the process of preparation, and a large portion of the work for 1941 is to be financed from the funds for these two fiscal years. At the present time, details of the proposed construction and main-

tenance activities are not available. However, the sum of $57,940,000 allotted to construction and improvement of the system for the coming biennium will be allocated about as follows:

¼-cent gas tax to state routes in cites	$ 9,125,000
Right of way and engineering	10,540,000
Joint highway districts	200,000
Construction projects and contingencies	38,075,000
Total	$57,940,000

In addition to the above, it is anticipated that California will receive some $1,480,000 in Federal Aid grade crossing funds and $1,330,000 in Federal Aid secondary or feeder funds.

With only $38,075,000 available for construction during the next two years, California is confronted with the proposed improvement of highways designated as of strategic importance in the national defense program. Estimates of improvements to the highways in California included in the proposed strategic road system indicate that the necessary work to bring these roads to military standards will amount to about $150,000,000. In addition, it is estimated that the cost of construction of access roads to cantonments and military and naval reservations will require about $11,000,000. In the face of these improvements for national defense, Federal Aid apportionments for the next two years are materially reduced.

During 1940, the California Division of Highways expended or placed under way improvements with a total estimated cost of $27,896,600. Of this total, $16,449,600 was allotted to major construction contracts, which provided the following types of improvements:

Grade and pave	46.8 mi.
Grade and plant-mixed surface	149.8 mi.
Grade and road-mixed surface	62.2 mi.
Grade and road-mixed surface treat.	111.6 mi.
Armor coat and seal coat	281.8 mi.
Grading only	39.3 mi.
Shoulder improvement only	17.3 mi.
Bridges and grade separations	65

Minor improvements, betterments and day labor accounted for $4,870,000; assistance to the City of Los Angeles for improvements to state route with WPA and PWA funds amounted to $1,822,000; and right of way and engineering required $4,755,000. Maintenance for the calendar year of 1940 amounted to $10,586,300.

During the year, the Division of Highways awarded seven contracts involving stabilization of the subgrade by admixture of portland cement. The work performed under these contracts covered 34.8 mi. of state highways. The projects were situated in Tehama, Merced, Santa Barbara and Riverside Counties.

C. H. Purcell is state highway engineer, and R. H. Wilson is office engineer.

Montana

EXPENDITURES for state highway work in Montana during 1941 will probably amount to about $8,520,000. Of this amount, approximately $5,700,000 will be spent for construction, and $2,200,000 for maintenance. Of the latter amount, purchases of new equipment will amount to about $260,000. The remainder of the total budget—$620,000—will be spent for various miscellaneous purposes.

The construction program for the year will probably include some 210 mi. of grading, about 225 mi. of crushed gravel surfacing, and 140 mi. of oil treated surfacing, one mile of paving, and 100 bridges.

Chief source of funds for 1941 will be the State gas tax, which will furnish an estimtaed $5,100,000. Federal Aid is expected to amount to about $3,400,000, and other miscellaneous sources will provide about $20,000.

D. A. McKinnon is state highway engineer of Montana, and W. O. Kivley is office engineer.

Colorado

ALTHOUGH Colorado's 1941 highway budget will not be finally determined for a month or so, indications are that approximately $5,250,000 will be provided for construction of highways, bridges, grade crossing eliminations and oiling of highways; $1,500,000 for maintenance and maintenance equipment and $800,000 for all other purposes, including $300,000 for the highway courtesy patrol, $250,000 for administration. What portion of the construction funds will be allocated to military defense highways is not known at this time.

As in 1939 and 1940, Colorado will not be able to match all of the Federal Aid available to the state. As yet no Federal Aid funds have been lost since the state first matches the carry-over then as much of the current allotment as possible.

Due to Colorado's limited funds for highway construction, the problem of determining how much money can be allocated to the military defense system and at the same time providing funds for badly needed improvements of other sections of the state highway system becomes a very serious problem indeed.

In 1940 the highway department spent $5,400,000 for construction and oiling and completed the following improvements:

Grading and gravel surfacing and bridges	115 mi.
Bituminous road mix, new surfacing	153 mi.
Bituminous road mix, retread surfacing	308 mi.
Seal Coat surfacing	386 mi.
Shoulder widening, oil surfacing	88 mi.
Grade separations	2

Chas. D. Vail is state highway engineer of Colorado.

Idaho

EXPENDITURES of the Idaho Bureau of Highways during 1941 for construction will total about $3,600,000. Of this amount, work, at an estimated cost of about $1,000,000, is now under construction, but was not completed during 1940. The latter included about 70 mi. of grading and surfacing and 12 mi. of plantmix bituminous surfacing. Construction work planned for the year, but not yet placed under contract, will include 30 mi. of grading and surfacing, 11 mi. of grading only, 16 mi. of crushed rock surfacing, 7 mi. of concrete paving, 81 mi. of bituminous surfacing, and one steel and concrete bridge. The total estimated cost of this work is $1,800,000.

Federal Aid for the next fiscal year will be $1,600,000. This allotment has not yet been programmed, but it is expected that about 30% will be spent for construction during 1941. During 1940, expenditures for construction amounted to $3,110,000. Completed during the year were 113 mi. of grading and surfacing, 235 mi. of low cost bituminous surfacing, and one-half mile of concrete paving.

C. P. Humphrey is director of highways for Idaho, and J. H. Clabby is staff engineer.

Nevada

ABOUT $3,000,000 will probably be available for highway construction in the State of Nevada during 1941, provided the regular Federal Aid funds are made available. It is estimated that the federal funds will amount to $1,917,000 for the fiscal year 1942, which is about $260,000 less than 1941. Matching funds provided by the State of about $500,000 will bring the total new funds to about $2,417,000. There is available a carry-over of 1941 funds of about $583,000. The highway department has tentatively programmed $2,645,000 of the total for definite projects. This is divided approximately as follows: For reconstruction with plantmix surface, 95 mi. at an estimated cost of $1,958,000; new construction with roadmix surfacing, 47 mi. at an estimated cost of $285,000; new construction with gravel surfacing only, 47 mi. at an estimated cost of $250,000; grade crossing protection program, consisting of grade separation structures

and crossing signals at an estimated cost of $152,000.

The program, as outlined by the Nevada Department of Highways is only tentative, depending entirely upon the appropriation to be made by Congress.

Robert A. Allen is state highway engineer, and H. D. Mills is assistant state highway engineer.

New Mexico

THE HIGHWAY budget for 1941 in New Mexico will probably total about $9,100,000, of which $6,000,000 will be spent for construction, $1,500,000 for maintenance, and $1,600,000 for the departmental expenses. It is expected that regular Federal Aid funds will provide $1,620,981 of the total amount available, and that other Federal funds will amount to about $454,345. The state gasoline tax will provide about $4,642,000, out of which the highway department debt must be serviced. Vehicle license fees, and the income, will amount to about $665,000. No data is available as to how the funds for construction will be used, since the Legislature will not make authorizations until it meets early this year. In addition, there is some uncertainty as to the requirements of the national defense program, and how Federal funds will be expended.

About $479,326 in construction contracts awarded during 1940 will be carried over into 1941. Last year, the state purchased equipment with a total value of $450,000, and paid about $500,000 in equipment rentals.

B. G. Dwyre is state highway engineer for New Mexico, and C. O. Faulk is office engineer.

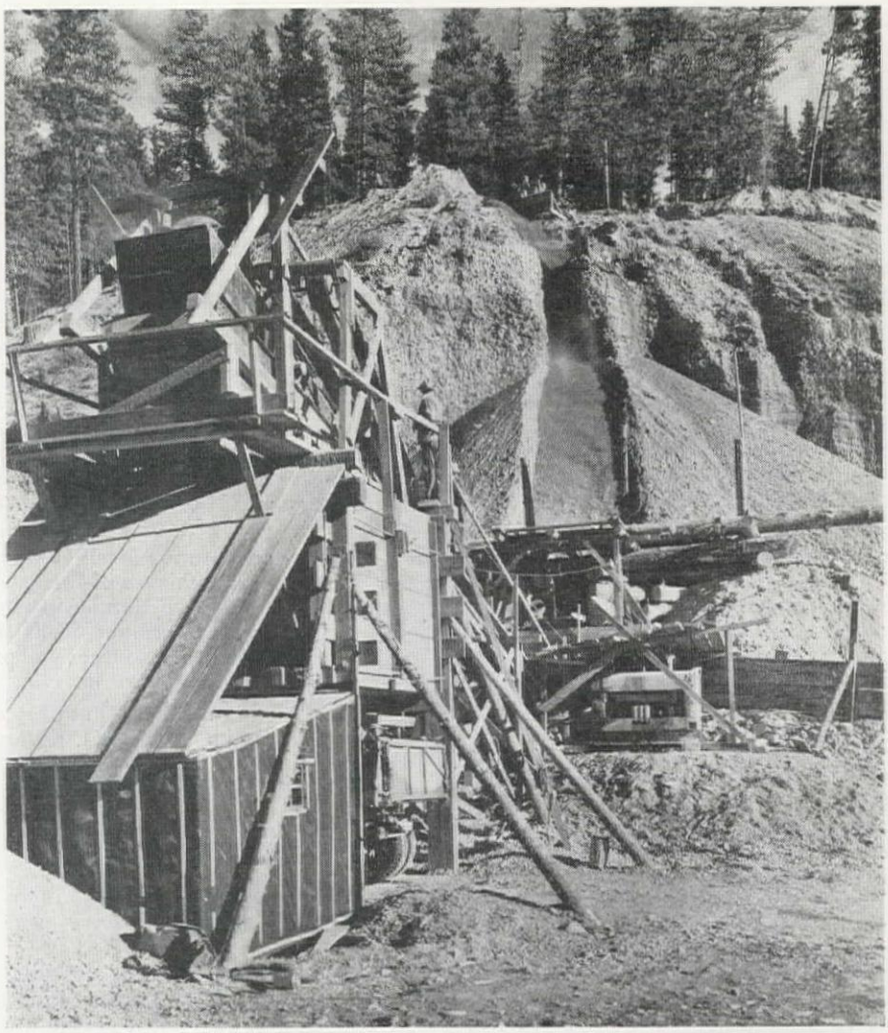
Oregon

ESTIMATED income for highway work in Oregon during 1941 totals $18,280,000, of which gas tax will provide $11,570,000, motor vehicle fees $1,409,000 (after deducting $2,410,000 for counties and $354,000 for state police), Federal Aid $3,871,000, and unexpended 1940 funds $1,430,000. Of these available funds, there will be required $2,740,000 for bond interest and maturities, $3,970,000 for maintenance and $930,000 for miscellaneous operation expense. The balance will be divided approximately $8,250,000 for construction, $1,400,000 for rights of way, and $990,000 for minor betterments, surveys, parks, buildings, equipment, etc.

The $8,250,000 for construction in 1941 will be disbursed in the approximate proportions of $3,300,000 for 280 mi. of grading, $1,800,000 for 450 mi. of rock surfacing, $1,050,000 for 600 miles of oiling, $900,000 for 35 mi. of high type paving, $400,000 for 40 mi. of low type paving, and $800,000 for 18 bridge structures.

Expenditures in 1940 amounted to $6,600,000 for construction, $3,600,000 for maintenance, $460,000 for rights of way, $2,760,000 for bond expense and $1,650,000 for other purposes. Construction work completed during the past year included 165 mi. of grading, 279 mi. of rock surfacing, 394 mi. of oiling, 77 mi. of paving, and 41 bridge structures.

R. H. Baldock is state highway engineer and S. H. Probert is office engineer for the Oregon State Highway Commission.



DIESEL POWER IS USED EXTENSIVELY BY WESTERN CONTRACTORS

Wyoming

NO PLANS are being made for the construction of main highways during 1941 until Federal funds are appropriated by Congress. If only State funds are to be available for construction during 1941, emphasis will be placed on the construction of secondary roads, which will consist, in general, of State-County-Federal Aid Co-operative projects on the heavier traveled secondary roads, and State-County co-operative jobs on the lighter traveled roads.

During the past year, $4,300,000 worth of construction has been completed. The building of oiled surface highways has been increased from 3,399 mi. to 3,742 mi., and there are now only 238 mi. on the State highway system not surfaced with an oil treatment. This increased mileage of oiled highway has been made largely on the lighter traveled mountain roads, but at the same time, there has been considerable reconstruction on the heavier traveled main highways of a much higher standard than the oiled surface. As had been the case during the past few years, the highway department had intended to continue its program of reconstruction and widening of the heavier traveled main highways. By the close of 1940, about 50% of U. S. Route 30 had been reconstructed to 60-mi. an hour, or higher, standards.

If the necessity arises for additional Federal funds to be made available for the construction of parking strips on any of these roads which might be necessary for national defense, the highway department has both the engineering and contracting organizations ready to start work on short notice.

Frank Kelso is superintendent of the Wyoming Highway Department and C. F. Seifried is chief highway engineer.

Utah

FUNDS for highway construction in Utah during 1941 will total about $2,550,000. Federal aid funds for the fiscal year 1942 include $1,125,000 as regular federal aid, $129,000 for grade crossings, $197,000 for secondary highways, and $171,000 Federal Lands funds. The total available fund will be utilized for constructing about 80 mi. of grading at an estimated cost of $1,300,000; 70 mi. of graveled surfaced roads at about $450,000; 60 mi. of oil treated surfacing at approximately $150,000; 14 mi. of high type paving will require $350,000; and the construction of 15 major bridges is estimated at $300,000. These figures are all based on the preliminary budget, and may be radically changed to meet the requirements of the defense road system.

During 1940, contracts were let covering a total of 190 mi. of highway at an estimated cost of $1,900,000, based on estimated quantities exclusive of engineering and force account work. High type pavement placed under contract amounted to 2.4 mi. The remainder of the surfacing consisted of bituminous treatment of crushed gravel surface, except for 4.3 mi. of natural rock asphalt. Excavation quantities during the year involved 2,700,000 cu. yd., and crushed gravel surfacing required 927,000 tons. Fifteen bridges, of more than 20-ft. span, were included in this program.

Ezra C. Knowlton is chief engineer for the Utah State Road Commission, and W. L. Anderson is design engineer.

Washington

ESTIMATED expenditures for highways in Washington during 1941 total $11,700,000, of which $7,000,000 will be expended for construction and purchase of rights of way. $3,800,000 will be spent for maintenance, including the purchase and rental of equipment, and $900,000 will be spent for miscellaneous department requirements.

The fund alloted to construction is expected to finance 170 mi. of grading and surfacing, 650 mi. of oil treatment, 14 mi. of high type paving, and 20 bridges. Among the major projects which will be undertaken during the year are the grading and paving of portions of Primary State Highway No. 1, between Vancouver and Woodland, and the 4-lane grading and surfacing on Primary State Highway No. 2, between Issaquah and North Bend.

During 1940, total expenditures of the department were $12,900,000, of which $7,500,000 was spent for construction, including the cost of location and rights of way. There were completed 8 mi. of high type paving, 357 mi. of bituminous surfacing, 163 mi. of untreated crushed stone surfacing, 30 bridges, and 6 grade separations. Maintenance of the highway system and the rental and purchase of equipment required an expenditure of $4,100,000, and miscellaneous expenditures amounted to $1,300,000.

James A. Davis is acting director of highways for Washington, and H. G. Porak is engineer of plans and surveys.

SCRAPERS ARE A WESTERN DEVELOPMENT IN EARTH MOVING

Grand Coulee Near Completion

AS COLD WEATHER compels the cessation of concrete placement at Grand Coulee Dam, the largest masonry structure in the world stands virtually completed. The concrete placed in the dam since 1934 when pouring began totals 10,453,000 cu. yd. or about 21 million tons —three times as much masonry as ever went into a single structure within the history of man. A long, straight slab of concrete over 30 stories high and 500 ft. thick at the base now stretches three-quarters of a mile between the hills that stand on each side of the Columbia River.

When concrete placement is resumed in the spring, probably in April, the major work will consist of putting the finishing touches on the dam and the west powerhouse. Workmen have been removing heavy machinery and are dismantling the mammoth concrete mixing plant that two years ago broke all world's records for the production of concrete. In May, 1939, it turned out 20,684 cu. yd. or more than 40,000 tons of concrete in a single day, 29 tons every minute.

Activity continues apace at the dam, however, despite the interruption in concrete pouring because of freezing weather. The installation of electrical equipment for the dam's great power plant—capacity 2,700,000 horsepower or 1,944,000 kilowatts, by far the largest in the world—is being pushed with all possible speed.

Two station unit generators of 14,000 h.p. or 10,000-kw. capacity each are the first units to go into the big plant. They are expected to be in operation in a few months. They will be followed by the first of the giant generating units with a capacity of 150,000 h.p. or 108,000 kw. Completion of installation of the first unit is scheduled for July.

Meanwhile work is going ahead on the installation of the 11 drum gates along the crest of the dam's 1,650-ft. overflow spillway. The huge gates are the steel barriers that will control the flow of the river over the dam. More than 9 mi. of heating cable and an acre of steel plates are also being placed along the spillway to prevent the gates from freezing to the spillway piers during cold months.

The relocating of 39 mi. of the Great Northern Railroad is also going ahead with the construction of highway and railroad bridges and other necessary structures such as trestles, underpasses and culverts. About 75 mi. of State and County highway have been completed.

With the exception of one concrete pour, the great pumping plant structure at the dam which will provide water for the ultimate irrigation of 1,200,000 ac. is completed. The structure has places for 12 pumps, each powered by a 66,000-h.p. motor, each with a capacity of 1,600 cu. ft. of water per second.

In the Grand Coulee reservoir area, Work Projects Administration forces continue to clear, grub, log and burn off the land to be inundated by the rising reservoir. The Columbia River has already been backed up 100 mi. or two-thirds the full length of the reservoir being created by the dam.

U. S. Corps of Engineers Plans

River and harbor improvements will be chief work undertaken during 1941—Santa Fe Dam on the Los Angeles County flood control program will be started

SACRAMENTO RIVER LEVEE WORK IN PROGRESS IN CALIFORNIA

THE principal navigation and flood control activities of the Corps of Engineers, U. S. Army, in the western United States are carried on under the direction of district engineers located at Seattle, Wash.; Portland and Bonneville, Ore.; San Francisco, Sacramento and Los Angeles, Calif.; Fort Peck, Mont.; and Caddoa, Colo., working under the supervision of the Division Engineers at Portland, Ore.; San Francisco, Calif.; Kansas City, Mo.; and Little Rock, Ark. The Omaha, Nebr.; Kansas City, Mo.; Tulsa, Okla.; and Galveston, Tex., Districts include territory in the States of Montana, Wyoming, Colorado and New Mexico, but at present those districts are not carrying on construction operations in the states named. The California Debris Commission, with headquarters in Sacramento, operates in the Sacramento and San Joaquin Valleys.

River and Harbor Improvements

The principal river and harbor improvement projects, grouped by states, prosecuted during 1940, are described below:

Washington

Willapa River and Harbor—Dredging to maintain the 26-ft. bar channel was carried out by Government seagoing hopper dredge.

Grays Harbor and Chehalis River—During the fall of 1940 more than 1,000,000 cu. yd. of material were removed by Government plant in maintenance dredging of the bar and inner channels. Reconstruction of the south jetty was completed during the fiscal year 1939. Contract has been entered into with the Columbia Construction Co. for reconstruction of the north jetty under a continuing form of contract, preparatory work thereon having been started during September, 1940.

Puget Sound and its tributary waters—Snagging and dredging were carried out during the year by Government plant and hired labor.

Tacoma Harbor—Contract has recently been awarded the General Construction Co. for dredging about 56,000 cu. yd. of material to restore the inner City Waterway Channel to project depths of 22 and 19 ft.

Swinomish Slough—Repair of dikes has been carried out during the fall of 1940 by contract with Cal. Branham, and by hired labor.

Washington-Oregon

Columbia River, Vancouver to Bonneville—Work on this project providing for a 27-ft. channel has been actively prosecuted under contracts with the General Construction Company, and by hired labor, the project being advanced to about 55% completion on Nov. 30, 1940.

Columbia River and Tributaries above Celilo Falls to Mouth of Snake River—Removal of rock reefs, pinnacle rocks and boulders was in progress at Devils Bend, Umatilla and Mill Rock Rapids, and near the mouth of Umatilla River.

The Dalles-Celilo Canal—Contract for reconstruction of the Tandem locks was awarded to the Tavares Construction Co., Inc., in June, 1940, the work now being in progress.

Columbia River at the Mouth—Repair of the north and south jetties, and dredging at Clatsop Spit, was carried out.

Columbia and Lower Willamette Rivers below Vancouver, Wash., and Portland, Ore.—Maintenance dredging in the 35-ft. channel by Government plant during the fall of 1940 resulted in the removal of 2,561,512 cu. yd. of material.

Oregon

Bonneville Dam—The dam, lock and fishways are in successful operation. Extension of the powerhouse structure to accommodate generating units 3 to 6 was nearly completed, and that for units 7 to 10 was initiated. Substantial progress was made on the installation of units 3 and 4 of 54,000 K.W. capacity each, as well as on the manufacture, under contract, of units 5 and 6 of the same rating. The main generating units Nos. 1 and 2 and the house unit previously installed were in operation throughout the year.

Coquille River—Bids for reconstruction of the north jetty were opened on Oct. 10, 1940, and contract awarded to Strong and McDonald of Tacoma, Wash.

Coos Bay—Maintenance dredging was carried out during the fall of 1940 with Government dredges, 696,186 cu. yd. of material being removed from the bar and bay channels. Contract was awarded during October, 1940, to Kern and Kibbe of Portland, for restoration of the south jetty under a continuing contract.

Umpqua River — Dredging 1,500,000 cu. yd. of material from the 22-foot channel between the mouth and Reedsport is being performed by contract with the Port of Astoria. Maintenance dredging of the bar channel by Government plant resulted in the removal of 366,118 cu. yd. of material. Restoration of the north jetty by continuing contract was awarded during November, 1940, to Kern and Kibbe.

Yaquina Bay and Harbor—Maintenance dredging by Government plant during the fall of 1940 resulted in the removal of about 150,000 cu. yd. of material from the bar channel.

Tillamook Bay and Bar—Maintenance dredging by Government plant was performed during the fall of 1940.

California

San Diego Harbor—Dredging 35- and 26-ft. anchorages, Area M, is in progress under contract with the Standard Dredging Co.; dredging areas A and Q-1 near Ballast Point is in progress under contract with the Hydraulic Dredging Co., Ltd.; dredging of areas N and O is in progress under contract with the San Francisco Bridge Co., and contract for dredging 3,700,000 cu. yd. of material from the 8-ft. anchorage in Area M was awarded to the Standard Dredging Co. during October, 1940.

Richmond Harbor—Widening of the inner harbor channel at Point Potrero under contract with the San Francisco Bridge Co. was completed during October, 1940, 10,389 cu. yd. of stone and 196,357 cu. yd. of mud and clay having been removed.

Humboldt Harbor and Bay—Repair work on the north jetty at the entrance to Humboldt Bay was completed during October, 1940.

San Joaquin River—Work of widening the 30-ft. channel to Stockton involving dredging and setting back of levees was substantially completed by contract and Government plant.

Sacramento River — Maintenance dredging and removal of snags was carried out.

Suisun Bay Channel — Maintenance dredging of the 30-foot channel by Government plant was carried out.

Montana

Fort Peck Dam—Construction of the dam and all work on the project with the exception of power installation is now substantially completed. The substructure for the power installation is being constructed under contract with Woods Bros., Construction Co.; work is in progress on the manufacture by contract of turbines and generators; and plans and specifications for the superstructure of the powerhouse are under way. The main features of the power project have been carried out under contract.

Flood Control Improvements

At the end of the calendar year 1940, construction was in progress on flood control projects described in the following paragraphs:

Washington

Skamokawa Creek Area, Wahkiakum County—The plan of improvement provides for the construction of a system of levees, diversion canals, bank protection and drainage facilities along the Skamokawa River, West Valley Creek, Grenn Slough, Middle Valley Creek, and Skamokawa Creek, at an estimated cost of $125,200. The contract for the construction of the project is about 15% completed.

Deep River Area, Wahkiakum County—This project provides for extension and reconstruction of the existing levee system for a length of about 5½ mi. and the construction of new tide boxes and excavation of drainage ditches, all at an estimated cost of $63,900. The contract for this work is 80% completed.

Diking Improvement District No. 11, Cowlitz County—This project provides for the construction of stone revetment along the existing levee system for a distance of about 3.4 mi. at an estimated cost of $190,000. Construction of the project has been placed under way by contract and is now substantially completed.

Mill Creek Reservoir, Walla Walla River Basin—The plan of improvement consists of the construction of a storage dam, outlet works, diversion works, division structures and improvement of a reach of the Mill Creek channel. The storage dam, which will form a reservoir of 6,000 ac. ft. capacity, is a rolled earth fill structure 145 ft. high, 3,200 ft. long at the crest, and 800 ft. wide at the base. The estimated cost is $1,608,000. Construction of the storage dam and appurtenant works by continuing contract has been placed under way and was about 35% complete at the end of the year.

Mud Mountain Dam, White River—This project, located on the White River in the Puyallup River Basin, provides for the construction of a rock fill dam 700 ft. long at crest elevation and rising 425 ft. above bed rock. The reservoir will have a capacity 130,000 ac. ft. This project will afford flood protection in the White and Puyallup River Valleys and in the Tacoma industrial district against floods about 50% greater than the maximum of record. Construction of the dam and appurtenances by continuing contract is now under way. The project is now 55% completed.

Oregon

Sandy Drainage District, Multnomah County—This project, located along the Columbia and Sandy Rivers, consists of the reconstruction of approximately 3 mi. of river front levee, placing bank protection riprap, installation of tide gates, and construction of a pumping plant, all at an estimated cost of $136,600. A contract for the construction of the levee and drainage works was about 60% completed at the end of the year and a second contract for the pumping plant was about 55% completed.

Multnomah Drainage District No. 1, Multnomah County—This project provides for the reconstruction of 11 mi. of levee along the Columbia River and 2 mi. of back levee along Columbia Slough, placing bank protection riprap, and the construction of drainage works and a pumping plant. The estimated cost is $563,800. Contracts for construction of the back levee and the pumping plant are about 50 and 85% complete, respectively. Construction of the river front levee by hired labor in conjunction with a Work Projects Administration project is about 25% complete.

Peninsula Drainage District No. 1, Multnomah County—This project consists of the reconstruction of about 1.2 mi. of levee and flood wall along the Columbia River, 1.5 mi. of back levee along Columbia Slough, and the construction of drainage works and a pumping plant, all at an estimated cost of $211,600. A contract for the construction of the back levee is practically completed, and a second contract for the

ROCK PLACING IN TOE TRENCH AT SEPULVEDA DAM

construction of the river front levee and a flood wall is about 10% complete. A third contract for the construction of the pumping plant has been awarded, and construction was scheduled to start at the end of the year.

Peninsula Drainage District No. 2, Multnomah County—This project provides for the reconstruction of about 2.2 mi. of levee along the Columbia River, 3.1 mi. of levee along Columbia Slough, the placing of bank protection riprap, and the construction of a pumping plant. All of the work involved in this project was completed by contract during the year except for minor repairs and extension of the existing bank revetment.

Sauvie Island (Areas A and B), Multnomah County—This project, located along the Columbia and Willamette Rivers and the Multnomah Channel, involves the construction of 15 mi. of river front levee, 5 mi. of back levee, the placing of bank revetment, and the construction of drainage works and a pumping plant. All of this project except certain portions of the proposed levee construction is now being undertaken by contract. The project as a whole is 45% complete.

Scappoose Drainage District, Columbia County—This project provides for the reconstruction of 10 mi. of existing levee along Multnomah Channel and Santosh Slough, construction of stone revetment, and the excavation of core trenches. A contract for the construction of all work involved in the project except the core trenches was completed during the year.

Deer Island Area, Columbia County—This project consists of the construction of about 6.5 mi. of new levee along the Columbia River, a diversion canal, bank revetment, and a pumping plant, all at an estimated cost of $541,500. Contracts for the construction of the levee and drainage works and for the pumping plant are about 50 and 25% complete, respectively.

Walluski River Area, Clatsop County—This project involves the construction of about 2.7 mi. of levee along the Walluski River, the reconstruction of about 0.6 mi. of existing levee along the Youngs River, and the construction of bank protection and drainage works. The estimated cost is $75,600. A contract for the construction of this project is about 30% complete.

Fern Ridge Reservoir—This project, located on the Long Tom River 38 mi. above the mouth, provides for the construction of an earth fill dam 6,360 ft. long at the crest and 2 auxiliary dikes 850 ft. and 3,680 ft. long, respectively, along the northeasterly boundary of the reservoir. The main dam will have a maximum height of 44 ft. above the stream bed. The reservoir, with a storage capacity of 95,000 ac. ft., will protect the Long Tom River Valley and will contribute to the protection of the Willamette River Valley. The estimated cost is $2,700,000. A contract for the construction of the earth dam, dikes, spillway and outlet works is about 75% complete.

Cottage Grove Reservoir—This project, located on the Coast Fork of the Willamette River 29 mi. above the mouth, consists of the construction of an earth fill dam 1,650 ft. long at the crest, rising 95 ft. above the stream bed, with a reservoir providing for storage of 30,000 ac. ft. The spillway is a concrete gravity overflow type structure, 264 ft. long, forming the right abutment of the dam. The outlet works will pass through the spillway section. The reservoir will be operated as a unit of the co-ordinated reservoir system to protect the Willamette River and to increase low water flows for navigation. The estimated cost of this reservoir is $2,450,500. The contract for the construction of the dam, spillway and outlet works is about 25% complete.

RIVER AND HARBOR IMPROVEMENTS

Washington		
Willapa River and Harbor	Dredging	Hired labor
Grays Harbor and Chehalis River	Dredging	Hired labor
Puget Sound	Dredging and Snagging	Hired labor
Columbia River at Bakers Bay	Dredging	Contract
Washington-Oregon		
Columbia River at the Mouth	Dike repair	Contract
Columbia River, Vancouver to Bonneville	Dredging	Contract and hired labor
Columbia and Lower Willamette Rivers	Dredging	Contract and leased plant
Columbia River and Tributaries above Celilo Falls to Mouth of Snake River	Dredging and Snagging	Hired labor
Snake River, Oregon, Washington and Idaho	Removal of rocks, boulders and gravel	Hired labor
Oregon		
Bonneville	Power facilities and Miscl. Items	Contract
Coos Bay	Dredging	Hired labor
Umpqua River	Dredging	Hired labor
Yaquina Bay and Harbor	Dredging	Hired labor
Skipanon Channel	Dredging	Contract
Youngs Bay and River	Dredging	Contract
Willamette River above Portland and Yamhill River	Dredging	Contract
California		
San Diego Harbor	Dredging	Contract
Los Angeles and Long Beach Harbors	Breakwater Repair	Contract
San Francisco Harbor	Dredging	Contract
Noyo River	Dredging	Contract
San Joaquin River	Dredging	Contract
Sacramento River	Dredging and snagging and repair of wing dams	Hired labor and contract
Suisun Bay Channel	Dredging	Hired labor
Oakland Harbor	Dredging	Hired labor
San Pablo Bay and Mare Island Strait	Dredging	Hired labor
Montana		
Fort Peck Dam	Power facilities and miscl. items of work	Contract and hired labor

FLOOD CONTROL

Oregon			
Sauvie Island (Areas A and B)	Levee construction		Contract
Fern Ridge Reservoir	Highway and railway relocation		Contract
Cottage Grove Reservoir	Highway relocation		Contract
California			
Prado Dam	Caretaker's quarters		Contract
Los Angeles River Channel	Addtl. channel imprvts		Contract
Santa Fe Dam	Dam and appurtenant structures		Contract

Idaho

Coeur D'Alene—This project provides for the construction of levees and flood walls along the Spokane River and Coeur D'Alene Lake at the town of Coeur D'Alene. The estimated cost is $143,200. A contract for this project is about 25% complete.

St. Maries—This work consists of the construction of levees and flood walls along the left bank of the St. Joe River at the town of St. Maries. The estimated cost is $242,000. The contract for the construction of the project is about 10% complete.

California

Prado Dam—This project, located on the Santa Ana River 30 mi. above the mouth, consists of a rolled-fill earth dam 2,280 ft. long and 105 ft. high, with a flood control basin of 224,500 ac. ft. capacity. The reservoir will control a drainage area of 2,264 sq. mi. The estimated cost is $8,834,000. A contract for the construction of the dam and appurtenant structures was substantially complete at the end of the year.

Fullerton Dam—This project, located in Orange County on East Fullerton Creek, 4 mi. above its mouth, provides for the construction of a rolled-fill earth dam 575 ft. long, rising 47 ft. above the stream bed, with a flood control basin of 830 ac. ft. capacity. The estimated cost is $400,000. The contract for the construction of the dam and appurtenant structures is about 85% complete.

Brea Dam—Brea Dam, located in Orange County on Brea Creek, 8 mi. above its mouth, consists of a rolled-fill earth dam 1,800 ft. long and rising 90 ft. above the stream bed, with a flood control basin of 4,200 ac. ft. capacity. The estimated cost is $1,407,000. The contract for the construction of the dam and appurtenant structures is 30% complete.

Sepulveda Dam—This project, located on the upper Los Angeles River 43 mi. above the mouth, provides for the construction of a rolled-fill earth dam 15,300 ft. long and rising to a height of 50 ft. above the stream bed, with a flood control basin of 16,700 ac. ft. capacity. The reservoir will effect a reduction of flood flows from 69,000 to 7,100 cu. ft. per sec. The estimated cost is $7,016,000. The continuing contract for the construction of the dam and appurtenant structures is 80% complete.

Los Angeles River Channel—This work consists of the improvement of the channel of the Los Angeles River by the construction of concrete channel sections and grouted rock bank protection, together with the raising or reconstruction of various highway and railroad bridges across the river. The estimated cost is $44,207,000. Contracts for the channel improvement works in 4 sections of the river were completed during the year and two other contracts are under way. The project as a whole is about 70% complete.

Colorado

John Martin (formerly Caddoa) Reservoir—This project, located on the Arkansas River in Bent County about 18 mi. above Lamar, Colorado, provides for the construction of a concrete and earth fill dam about 130 ft. high and 3 mi. long, including the earth dike extensions on each abutment. The reservoir will have a storage capacity of 270,000 ac. ft. for flood control and 385,000 ac. ft. for conservation. The estimated cost is $14,600,000. Relocation of the Atchison, Topeka, and Santa Fe Railway by contract is practically complete, and a contract for the earth embankment and spillway was started shortly before the close of the year.

California Debris Commission

Control of Floods, Removal of Debris, and Improvement of Sacramento River—At the end of 1940 the project as a whole was 95% completed. The status of the major units of this project is as follows: The channel improvement below Cache Slough, the construction of levees along the Sacramento, Feather, Yuba, and Bear Rivers, and various tributaries, and the construction of by-passes by contract, are 93% complete; the two cut-offs between Feather River and Colusa River, the construction of four by-pass weirs and outfall gates are completed; and the construction of setback levees and bank protection works below Cache Slough, by contract and by hired labor, is 34% completed. The construction of levees along Sacramento, Feather, Yuba, and Bear Rivers and the setback levees and bank protection works below Cache Slough will be continued by contract and hired labor during 1941. The estimated cost of the project (made in 1937) is $24,284,000.

PIPE LAYING AT SEPULVEDA

Sacramento River and Tributaries, Debris Control—The project provides for the construction of four reservoirs at the following sites: (1) the Upper Narrows of the Yuba River; (2) the North Fork site on the North Fork of the American River; (3) the Ruck-a-Chucky site on the Middle Fork of the American River; and (4) the Dog Bar Site on the Bear River. Construction of the North Fork Dam and the Upper Narrows Dam was continued under existing contract and the work at these sites is nearly completed. Investigations of alternate sites for the Ruck-a-Chucky and Dog Bar sites are under way. Construction of the North Fork and Upper Narrows Dams will be completed during 1941, and the investigations of alternate sites for the Ruck-a-Chucky and Dog Bar sites will be continued.

PROPOSED WORK

In 1941 work will be continued on contracts or hired labor work now in force on the projects described above. It is anticipated that the additional work described below and shown in the accompanying table will be initiated. Since funds for the fiscal year ending June 30, 1942, are not yet available, the table and descriptive statements below refer only to work contemplated under present appropriations.

Rivers and Harbors

Washington

Willapa River and Harbor—Redredging of the 26-ft. bar channel will be accomplished by Government seagoing hopper dredge.

Grays Harbor and Chehalis River—Maintenance dredging of the bar channel will be undertaken by Government plant and hired labor.

Puget Sound and its tributary waters—Snagging and dredging will be carried out by Government plant and hired labor.

Columbia River at Bakers Bay—Restoration of project dimensions of 10-ft. depth and 200-ft. width in the channel from Sand Island to Ilwaco will be carried out by contract.

Washington-Oregon

Columbia River at the Mouth—Bids for further repair of the south jetty under a continuing contract were received on Dec. 10, 1940, and a contract will be awarded shortly. Repairs to existing dikes by contract will also be placed under way.

Columbia River, Vancouver to Bonneville—It is planned to complete the 27-ft. channel project by contract and hired labor during 1941, with the exception of two additional dikes, removal of rock ledge near Mile 37 above Vancouver, and improvement of the lower entrance to the Bonneville Lock.

Columbia and Lower Willamette Rivers below Vancouver, Wash., and Portland, Ore.—Maintenance dredging in the 35-ft. channel will be continued by contract and leased plant, as necessary.

Columbia River and Tributaries above Celilo Falls to Mouth of Snake River—Removal of rock ledges and boulders at Umatilla and Homly Rapids, and maintenance dredging and snagging throughout the channel as needed will be done.

Snake River, Ore. and Wash. and Idaho—Removal of boulders and gravel by Government plant will be performed.

Oregon

Bonneville Dam—It is proposed to

complete powerhouse structures for units 3 to 6; complete manufacture and installation of generating units 3 to 6; continue construction of powerhouse for units 7 to 10; and commence manufacture of generating units 7 to 10. Also, construction of dwellings, viewpoint house, and a warehouse will be continued.

Coos Bay—Maintenance dredging with Government plant in bar and bay channels will be undertaken.

Umpqua River—Maintenance dredging by Government plant in bar and river channels will be executed.

Yaquina Bay and Harbor—It is proposed to carry out maintenance dredging in the bar and bay channels by Government plant.

Skipanon Channel—Maintenance dredging to restore the 30-ft. channel by contract will be undertaken.

California

San Diego Harbor—Dredging of the areas in progress at the end of 1940 will be continued.

Los Angeles and Long Beach Harbors—Specifications for repair of the 12,500-ft. detached breakwater are being prepared and it is expected the work will be placed under way.

San Francisco Harbor—Bids for dredging the 10-ft. channel and turning basin at the San Francisco Airport, by contract, were received during November, 1940.

Noyo River—Redredging the 10-ft. channel from the mouth to the highway bridge at Noyo will be performed by contract.

San Joaquin River—Dredging of a 9-ft. channel in Mormon Channel to Center Street, Stockton, will be placed under way by contract.

Sacramento River—Maintenance dredging, snagging, and repair of wing dams, will be performed by contract, leased plant and Government plant and hired labor, this work being necessary to maintain channels 10 ft. deep below Sacramento and 6 ft. deep above Sacramento to Chico Landing.

Suisun Bay Channel—Maintenance dredging of the 30-ft. channel by Government plant will be undertaken.

Oakland Harbor—Dredging of shoal areas will be undertaken in the inner harbor and entrance channels by Government hopper dredge.

San Pablo Bay and Mare Island Strait—Redredging of channel across Pinole Shoal and the channel and turning basin in Mare Island Strait will be undertaken.

Montana

Fort Peck Dam—Construction of the main control gates at the outlet tunnels will be completed, and grading and landscaping at the dam and reservations will be carried out. The powerhouse substructure will be completed and the superstructure will be placed under construction. Manufacture of the generating equipment and turbines will be continued.

Flood Control

In 1941 work will be continued on contracts or hired labor work now in force on the flood control projects described above, and additional contracts will be started on the following:

Oregon

Sauvie Island (Areas A and B)—Contracts will be started for the construction of additional sections of levee in this project.

Fern Ridge Reservoir—Contracts will be initiated for the relocation of highways and railroads.

Cottage Grove Reservoir—Highway relocation will be placed under contract.

California

Prado Dam—A contract will be initiated for the construction of the caretaker's quarters.

Los Angeles River Channel—Contracts will be initiated for additional channel improvements in reaches of the river between Arroyo Seco and Fourth Street, and between Atlantic Boulevard and Randolph Street.

Santa Fe Dam—This project is located on the San Gabriel River 29 mi. above the mouth, in Los Angeles County. The dam will be of the rolled-fill earth type, 23,900 ft. long and 82 ft. high. The reservoir will have a storage capacity of 36,000 ac. ft. A continuing contract for the construction of the dam and appurtenant structures will be awarded during the coming year.

Power Increased in Wyoming

HYDROELECTRIC POWER plants on four Bureau of Reclamation projects in Wyoming are now producing nearly half of the electric energy generated in that State and are supplementing the supply for nearby areas in Colorado and Nebraska. Energization of a transmission line from Casper to Thermopolis, Wyo., now in its first full month of operation, links plants on the North Platte, Riverton and Kendrick projects directly through a publicly owned system. The fourth plant on the Shoshone Project near Cody, now connected through an interchange arrangement with the Mountain States Power Co., will be linked with the others through a direct transmission line planned to extend from Thermopolis to Cody.

The combined capacity of the plants on the four reclamation projects in Wyoming is 45,600 kw., about half of the total generating capacity in the State. When operated to full capacity, the plants are capable of producing a maximum of 220,000,000 kw.-hr., 50% more than was generated in the entire State in 1939.

Power produced at the plants, which are operated with regard for the conservation of water for irrigation, is sold for distribution to municipalities, Rural Electrification projects, and private utilities, which serve more than 50,000 customers in the three States. In addition, power is available for construction activities in the Colorado-Big Thompson project in northeastern Colorado, where seven additional power plants with a capacity of 120,000 kw. will be constructed as the power market develops. This project will supply supplemental water for 615,000 ac. of land and will require a substantial volume of power for irrigation pumping purposes.

The transmission system constructed and operated by the Bureau of Reclamation covers about 550 mi. It links the Guernsey-Lingle plants of the North Platte project with the Kendrick and Riverton plants and extends to the Colorado-Big Thompson area in Northeastern Colorado. Lines from the North Platte project extend into western Nebraska, thence southwesterly to Cheyenne, Wyo., where connection is made with the transmission system extending from the other Wyoming plants into northeastern Colorado. The Kendrick plant, which began operations last year, is the largest in the State. Its maximum capacity is 32,400 kw.

During the 12-month period ending June 30, 1940, the four Reclamation project plants in Wyoming produced 64,870,000 kw.-hr. of energy. This compares with about 140,000,000 kw.-hr. generated in the entire State in the calendar year 1939.

Activity at Friant Dam Approaches Peak

CONSTRUCTION ACTIVITY at Friant Dam, after a year of work, is approaching a peak with concrete pouring operations being expanded on a rapidly increasing scale at the base of the dam site in the old San Joaquin River gorge. Meanwhile at the top of the Fresno County abutment a 500-ft. section comprising the southerly end of the dam is virtually completed.

The maximum height of Friant Dam will be 320 ft., confirming the official estimate made prior to excavation. The exact height was determined by the final cut in the deepest portion of the foundation which was found to be in block 33 at the base of the south abutment. The lowest point of sound bedrock in the dam site is at El. 262. The crest of the dam is to be at El. 582.

The first "lift" of concrete at the lowest point was poured Nov. 27. Concrete placement in other blocks of the middle section of the dam was begun earlier. At block 41 in the trough where the river once rolled, the excavation went down to El. 266, about 25 ft. below the former streambed.

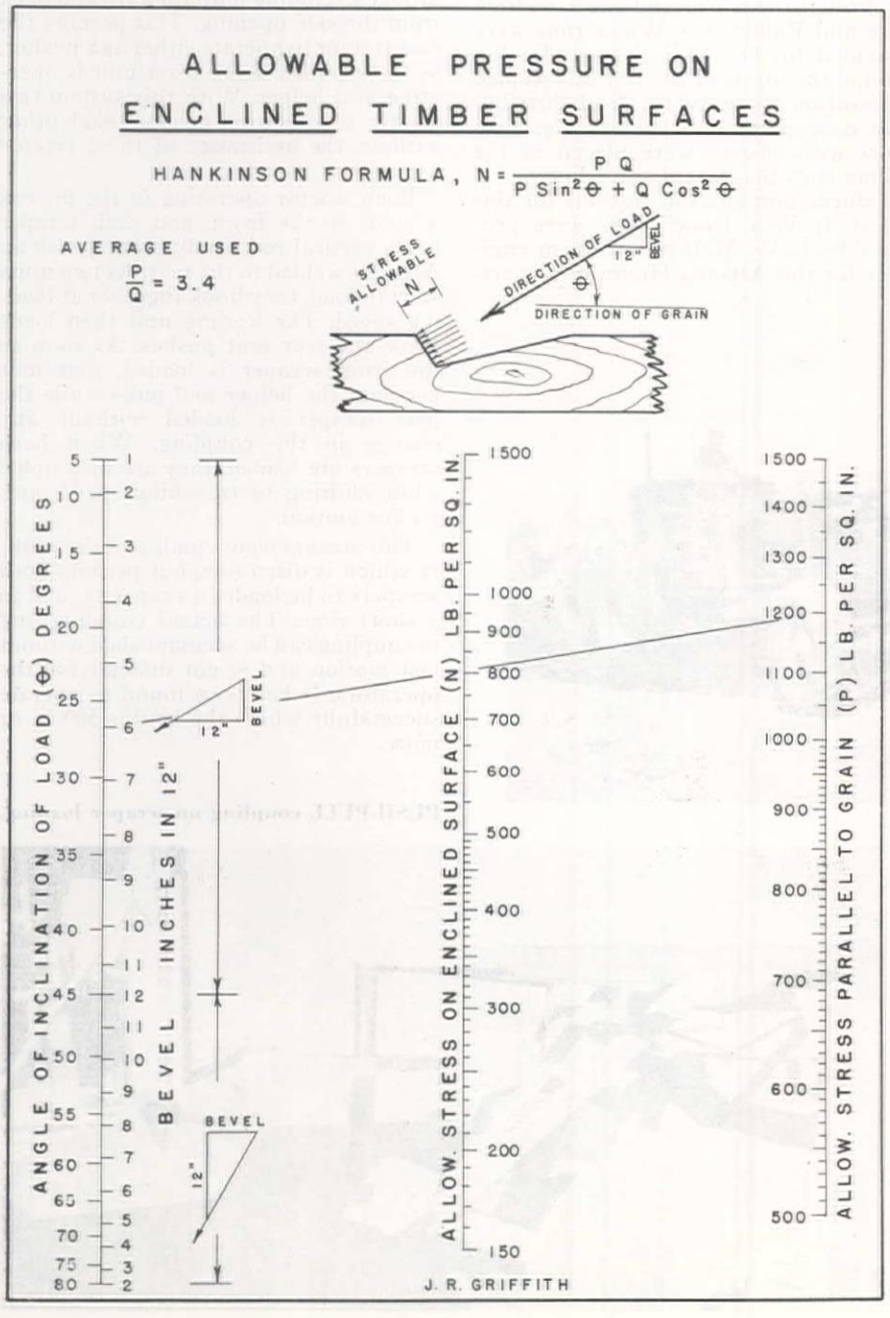
Construction Design Chart

LXI . . . Pressure on Enclined Timber Surfaces

By JAMES R. GRIFFITH
Lieut. Comdr. CEC-V(S), USNR.
Seattle, Wash.

WHILE much of the old type framing of heavy structural timbers has been eliminated by the use of modern connectors, there will probably always be a limited amount of it used. Due to the cellular nature of timber, the allowable working stresses in compression parallel and perpendicular to the grain, for any species, differ widely. Any number of handbooks list these allowable pressures for any species and grade. In the framing of heavy timbers for truss work, the cut is frequently at an angle with the grain. In such cases, the allowable bearing pressure cannot be picked out of the table. Except in the handbooks devoted to the use of timber, the designer may have trouble in finding the formula for the allowable working stress in terms of the two given ones. The Hankinson formula[1] is conventionally used to determine the allowable pressure when the load is applied at an angle to the grain. The formula, as developed by the Spruce Division of the U. S. Army for the use of timber in airplane construction, is as follows:

$$N = \frac{P\,Q}{P \sin^2 \theta + Q \cos^2 \theta}$$



N = Unit compressive stress in a direction at inclination (θ) with the direction of grain.

P = Unit stress in compression parallel to the grain.

Q = Unit stress in compression perpendicular to the grain.

In order to simplify the formula for purposes of chart construction, I have used an average value of the ratio $P/Q = 3.4$. The following table will illustrate the divergence from this average ratio by values taken from "Working Stresses for Structural Timber."[2].

	P	Q	P/Q
Douglas fir (Coast Region)			
Dense select structural	1300	380	3.42
Select structural	1200	345	3.48
No. 1 dimension	880	325	2.7
Douglas fir (Inland Empire)			
Select structural	1300	380	3.42
Structural	1200	325	3.70
Common structural	1100	315	3.40
Longleaf Southern pine			
Select structural	1400	380	3.42
Merchantable structural	1200	380	3.16
No. 1 structural	1000	380	2.63

The chart is solved by the use of a single straight line intersecting all scales. As will be noted, the angle (θ) of inclination of the load is given in both degrees and bevels.

In order to illustrate the use of this chart and to demonstrate its comparative accuracy, the following conditions will be assumed:

Douglas fir (Inland Empire)
Structural grade
$P = 1200$ p.s.i.
$Q = 325$ p.s.i.
Angle of inclination of load
Bevel 6 in. in 12 in.
$\theta = 26° - 33$ ft. $- 54$ in.
$\sin \theta = 0.4472$
$\cos \theta = 0.8944$

By substitution we then have

$$N = \frac{P\,Q}{P \sin^2\theta + Q \cos^2 \theta} = \frac{1200 \times 325}{(1200 \times 0.2) + (325 \times 0.8)}$$

$N = 782$ p.s.i.

A solution line has been drawn on the chart for the assumed values. On the central scale an allowable stress of $N = 810$ p.s.i. will be noted. The slight difference from that found by substitution, is due to the variation in the actual value of $P/Q = 3.7$ as compared to the average value of 3.4 used. So it will be seen that even with a relatively large variation in P/Q from the average used, the result by chart is still within a reasonable accuracy.

[1] Wood Handbook, page 57, U. S. Dept. of Agr.
[2] Supplement No. 1, Wood Structural Design Data, National Lumber Mfrs. Assoc.

Oversize Tires for Grader

WHILE constructing a highway grade of saturated silt taken from a drainage canal, the Arizona Highway Department was confronted with the problem of providing additional flotation for a motor grader which was spreading the material. Larger front tires, together with changes in the rims and steering equipment, finally proved to be the solution to the problem.

Construction of a 3½-mi. drainage canal near Buckeye, Ariz., undertaken to reclaim 1,200 ac. of farm land, required relocation of about 2 mi. of the highway.

LARGE TIRES float blade on wet muck.

The canal was excavated to a depth of 10 ft. by a 90-ton Bucyrus-Erie dragline equipped with a 3½-cu. yd. bucket and a 70-ft. boom. About 1,200 cu. yd. of the highly saturated Gila silt was cast from the ditch in every 100 ft.

The cast material was being spread by a Galion motor grader equipped with 7.00 tires in front and 12.75 tires on the rear. It was found that the front end was unable to ride over the highly saturated material since the small front tires which are standard equipment cut into the wet grade. The question then arose, If large tires are good on the rear of the machine, why wouldn't they serve equally well or better on the front, especially since the load is greater at the rear?

Changes in the equipment were made by Brown-Bevis Co. and the Goodrich Tire and Rubber Co. Wider rims were provided for the 12.75 tires, and a lug around the inside of the rim was welded in position to make the load distribution concentric with the spindle. Two bolts with sleeves were placed in the radius rods to prevent spreading.

Information and illustrations for this "How It Was Done" item were provided by E. W. McIntire, resident engineer for the Arizona Highway Department, and George A. Steisel, master mechanic. W. R. Hutchins is chief highway engineer for Arizona.

Scraper Coupling

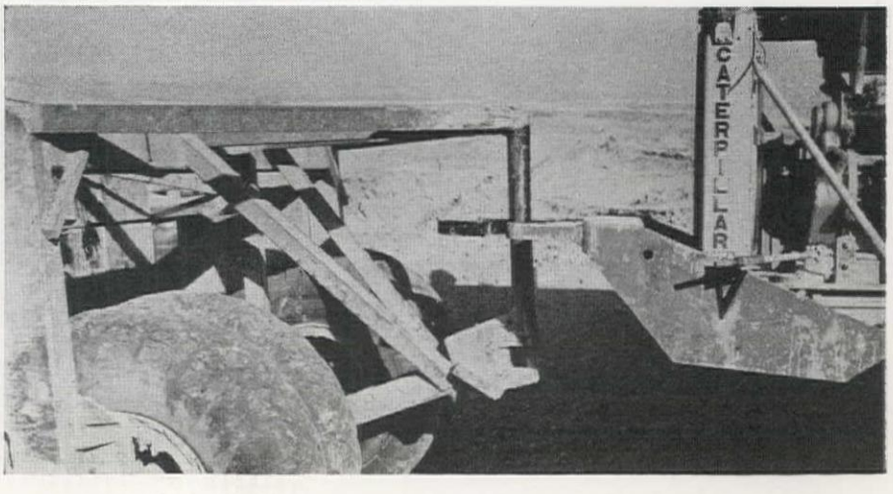
AT FRIANT DAM, J. V. Devine, master mechanic, and Paul Volpp, his assistant in the contractors' shop have developed a coupling for scrapers and pusher tractors that varies in principle and operation from any previously described on these pages. The coupling is used in the gravel pit where material is excavated by scraper and hauled to the aggregate plant for processing.

Principal unit of the device is a heavy steel hook cut from a plate and welded to a bumper-type support which is fastened to the pusher tractor frame. The hook is in a horizontal position with the groove extending both forward and back from the side opening. This permits the rear tractor to operate either as a pusher, or to be pulled if the front unit is operating as a helper. With this system two tractor-scraper units can load each other without the assistance of third tractor as pusher.

Each tractor operating in the pit has a hook on the front, and each scraper has a vertical rod firmly braced with an A-frame welded to the rear. As two units start to load, they hook together at loading speed. The leading unit then loads while the rear unit pushes. As soon as the front scraper is loaded, that unit becomes the helper and pulls while the rear scraper is loaded without any change in the coupling. When both scrapers are loaded, they are uncoupled while shifting to travelling speed with no lost motion.

This arrangement eliminates the pusher which is often idle, but permits both scrapers to be loaded to capacity, and in a short time. The actual coupling and uncoupling can be accomplished without lost motion and is not difficult for the operators. It has been found to operate successfully where the haul is 500 ft. or more.

PUSH-PULL coupling on scraper loading.



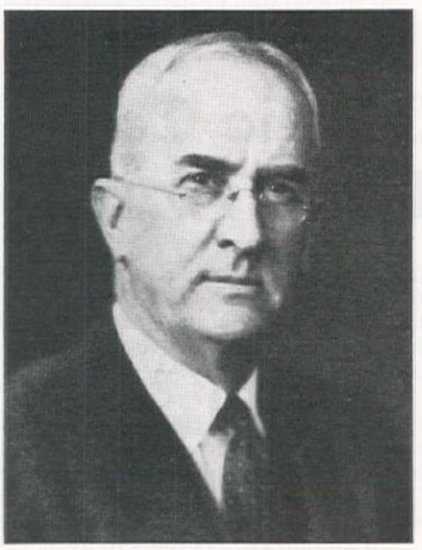
NEWS OF WESTERN CONSTRUCTION

JANUARY, 1941

Western Engineers Are Honored by American Society of Civil Engineers

F. H. Fowler Becomes President

FREDERICK H. FOWLER, consulting civil engineer of San Francisco, Calif., was inducted as president of the American Society of Civil Engineers at the Eighty-Eighth Annual Meeting of the Society, held in New York City, January 15-18. Mr. Fowler has been a member of the Society since 1906, when he was elected a Junior, becoming an Associate Member in 1911, and a Member in 1924. He served as a director from 1929 to 1930, and has been a member of the Special Committee on Effect of Earthquakes, of the Special Committee on Flood Protection Data, of the Committee on Masonry Dams, and of the Executive Committee of the Engineering Economics Division. He was president of the San Francisco Section in 1938.



F. H. FOWLER

Mr. Fowler was born at Fort Custer, Mont., and graduated from Stanford University in 1905. Following his graduation, he became engineer in charge of construction of the California section of Laguna Dam on the Colorado River, near Yuma, Ariz., and in 1906 and 1907 was engineer on surveys for the proposed American River water supply for San Francisco. For a year he was instructor in civil engineering at Stanford University. In 1909, Mr. Fowler served as engineer on topographic surveys in Michigan, and in 1910 returned to California as engineer on sewer construction. From 1910 to 1922, except for a period of war service, he was hydroelectric engineer and district engineer for the U. S. Forest Service at San Francisco, and for the last two years of this period also served as engineering representative in California and Nevada of the Federal Power Commission. During the World War, he served as Captain with the 211th Engineers at Camp Meade, Md. Since 1922, Mr. Fowler has maintained his engineering practice in San Francisco, where he has served as consultant to the Corps of Engineers; to the Federal Emergency Administration of Public Works; to the Flood Protection Planning Committee of Greater Kansas City; to the National Park Service; to the Los Angeles Department of Water and Power; and to other organizations. He was special consultant for the PWA on the Fort Peck, Grand Coulee and Bonneville Dams, and served on the Board of Review of the Atlantic-Gulf Ship Canal. He was also a director of the National Drainage Basin Study, and a member of the Governor's Commission to Investigate Causes Leading to the Failure of St. Francis Dam, and the California State Committee on Water Resources Investigation.

During the past few years, he has made extensive studies of flood volumes in the Mississippi tributaries. He is the author of various papers on power development, dam design, the Colorado River, and has published Hydroelectric Power Systems of California.

Two other western engineers to be honored at the Annual Meeting were John D. Galloway, consulting engineer of San Francisco, and Reginald H. Thomson, consulting engineer and formerly city engineer of Seattle, who were two of five members to be given Honorary Membership in the Society.

The San Francisco Section was represented at the Annual Meeting by J. I. Ballard, president of the San Francisco Section, and formerly editor of *Western Construction News*.

A.G.C. Chapter Meets in S. F.

CONSTRUCTION AND DEFENSE was the theme of the 22nd Annual Convention of the Northern California Chapter of Associated General Contractors of America held in San Francisco on December 20-21. Construction projects under the national defense program was the principal topic, with various types of construction presented by several different speakers. Other subjects which were discussed during the convention included labor problems, unemployment insurance, taxes and the WPA.

Following the address of welcome by Mayor Angelo J. Rossi, Col. Warren T. Hannum, division engineer of the South Pacific Division, U. S. Engineer Department, outlined the construction work of the Corps of Engineers. C. H. Purcell, state highway engineer of California, discussed the development of military highways in California. He pointed out that the improvements required for a strategic road system in California would require an expenditure of about $150,000,000. In addition to this amount, about $11,000,000 will be necessary for construction of access roads to the various cantonments and naval

Arizona Sanitary Meeting

THE ARIZONA Sewage and Water Works Association will hold its 16th annual meeting in Yuma, March 21-23. F. C. Roberts, Jr., state sanitary engineer of Arizona, is secretary-treasurer of the organization.

and military reservations which are being planned for the state.

Labor in defense work was discussed by Alexander Watchman, president of the San Francisco Building Trades Council, who stressed the progress which has been made in training labor, and the continuation of the training program.

During the afternoon session, Almon E. Roth, president of the Employers Council of San Francisco, spoke on the effect of the national emergency upon labor relations. He emphasized the point that if national regulation during the present emergency is to be avoided, the employers and the union must co-operate in speeding up production for defense. Hon. Gordon Garland, speaker of the Assembly, California Legislature, presented California's economic picture, and urged that the contractors take an active interest in the government of the state. Ralph M. Conner, project manager for Ford J. Twaits Co. and Morrison-Knudsen, Inc., outlined the organization and operations of the work at Fort Ord. He pointed out that the contractors had more than maintained the construction schedule, and that one building was being erected every fifty-four minutes.

T. D. Anderson, manager of the Merit Rating Bureau, urged the contractors to take an interest in revision of the unemployment insurance law, and recommended that the Merit Rating System be retained. The application of Federal and State taxes to new defense work was discussed by Robert L. Bridges, attorney-at-law. The sales tax became applicable to materials purchased for governmental projects on July 1, 1940, and the use tax will apply to those projects after Jan. 1, 1941. The franchise and income tax laws will apply to corporations working in California, but with headquarters in other states, on Jan. 1, 1941.

Discussions in open forum covered the subjects of general labor relations, prospective legislation, and plans for the coming year. Stanley A. Ball, president of the Northern California Chapter, presided over the convention sessions.

The annual dinner dance was held on Saturday evening.

Pacific Gas & Electric Co. To Build Four Hydro Plants

ABOUT $27,000,000 will be expended by the Pacific Gas & Electric Co., San Francisco, Calif., for its construction program for 1941. This amount is about $1,000,000 over the similar figure for 1940, and $2,000,000 more than was spent in 1939. Major construction to be started during the coming year will be four hydroelectric generating plants on the Bear and Feather Rivers, the first unit being the driving of a 5-mi. pressure tunnel which was started last December. The tunnel will serve the Dutch Flat power plant on the Bear River, on which construction will be started during the year. Installation at the plant will be a 27,000 kw. generator, and the estimated cost of the complete plant is $3,210,000. Another plant, similar to the Dutch Flat installation, and estimated at about the same cost, will be built at Colfax, downstream from the Dutch Flat plant on the Bear River.

Two plants on the Feather River are under consideration, and driving of a 4-mi. pressure tunnel for the first plant will probably be started in 1941. The Cresta plant will have an installed capacity of 75,000 kw., and is estimated to cost about $11,100,000. The proposed Pulga plant will have a similar installation at an estimated cost of slightly less.

Two large transmission line projects will be undertaken during the year, the first being a 110-kv. from Dutch Flat to Halsey Junction, at an estimated cost of $550,000. Another 110-kv. line will be constructed from the Oleum steam plant to the Claremont-Newark line. In addition to these two major construction projects, there will be several installations of second circuits on 60 kv. lines, and re-routing of several lines. A new 50,000-kva. substation will be built at East Nicolaus at an estimated cost of $660,000. A substation is now under construction at San Mateo, and a similar substation will be constructed at Soledad.

During the past year, the company's program of steam electric generating stations was carried out so effectively that it is rapidly nearing completion. Three 50,000-kva. steam electric generating stations have been under construction at oil refineries in the San Francisco Bay area. The plant at Avon was completed during the year; the plant at Martinez is scheduled for completion in March of this year, and the plant at Oleum will probably be finished during July. Originally a three-year program, practically all construction activity will be completed within two years. The total estimated cost of the program was $15,000,000.

Also completed during the year was the 4½-mi. Colgate tunnel at an estimated cost of $1,400,000. Three small hydroelectric generating plants were reconstructed, and various transmission lines and substations built during the year.

E. B. Euler is chief engineer of the Pacific Gas & Electric Co.

Arizona Canal Bid Call

AT YUMA, Ariz., the Bureau of Reclamation will open bids on Jan. 28, for construction of the first section of the Yuma Mesa Division canals, Gila project. Quantities include 790,000 cu. yd. of excavation, 37,155 cu. yd. of concrete in canal lining and 3,840 cu. yd. of concrete in structures.

Corps of Engineers Takes Over Army Airport Program

FUNDS APPROPRIATED for the War Department Air Corps construction program have been transferred from the Quartermaster Corps to the Corps of Engineers which will award and direct all contracts in connection with this program. The projects will be supervised by the various district offices already established. Selection of contractors for a given project will be made following an investigation of qualifications by the district engineer in charge of the territory where the project is to be constructed. Contractors desiring consideration of cost-plus-a-fixed-fee or negotiated lump sum contracts under the Air Corps program should file their applications with the Chief of Engineers, War Department, Washington, D. C., providing an extra copy for reference for the district office. Projects have been tentatively assigned to the U. S. Engineer Offices as follows:

Los Angeles, Calif.
Wendover Field, Ogden Air Depot, and Salt Lake City, Utah; Tucson, Ariz.; March Field, Mines, Field, and Muroc Lake, Calif.

San Francisco, Calif.
Hamilton Field, Moffett Field, and Salinas, Calif.

Sacramento, Calif.
Stockton, Fresno, and McClellan Field, Calif.

Omaha, Nebr.
Lowry Field, Colo.

Portland, Ore.
Portland, Ore.

Bonneville, Ore.
Boise, Ida.

Seattle, Wash.
Everett, Spokane, and McChord Field, Wash.; Elmendorf Field and Ladd Field, Alaska.

Honolulu, T. H.
Hickam Field, Morse Field, Wheeler Field, and Barking Sands.

Six Companies Takes Shipbuilding Contract

A GROUP OF CONTRACTORS, essentially the old Six Companies organization which built Boulder and Parker dams, has been awarded a contract of about $37,500,000 for the construction of 30 freighters of 9,300 tons each. The organization will be known as the Todd-California Shipbuilding Corp., with headquarters in the Latham Square Building, Oakland, Calif. Henry J. Kaiser is president of the organization, and vice-presidents include Joseph Haag and S. D. Bechtel. The ships are to be built for British interests.

The two members of the organization

are Todd Shipbuilding Corp. of New York City and Six Services, Inc., of Oakland. The latter organization includes the Henry J. Kaiser Co., W. A. Bechtel Co., Utah Construction Co., MacDonald & Kahn Co., Ltd., Morrison-Knudsen Co., Inc., Pacific Bridge Co., J. F. Shea Co., and General Construction Co.

Within the next few months, a shipyard, estimated to cost $8,000,000, will be constructed by the organization in Richmond, Calif., on the shore of San Francisco Bay. Edgar F. Kaiser, formerly project manager for Consolidated Builders, Inc., in charge of the work at Grand Coulee dam, will be in charge of the operations of the Todd-California Shipbuilding Corp.

Call Bids for Concrete Dam in Arkansas

BIDS WILL BE OPENED on February 20 by the U. S. Engineer Department at Little Rock, Ark., for the construction of Norfolk Dam on the North Fork River about 4½ mi. north of Norfolk, and 105 mi. north of Little Rock, Ark. The dam will be a concrete gravity type structure with an overflow section near the left abutment. Eleven conduits through the base of the spillway section will be controlled by slide gates. The dam will have a crest length of 2,600 ft., and a maximum height above streambed of about 220 ft. All labor, materials and supplies, except cement, will be supplied by the contractor. Some of the major items of work will include

550,000 cu. yd. common excavation
290,000 cu. yd. rock excavation
150,000 cu. yd. rolled fill
1,470,000 cu. yd. concrete

Plans and specifications will be available in the West at the Division Engineer office of the North Pacific Division, Portland, Ore.; at the South Pacific Division office at San Francisco; and at the U. S. Engineer Offices at Caddoa, Colo., and Seattle, Wash.

J. S. Moore to Head Soil Studies for Bur. of Rec.

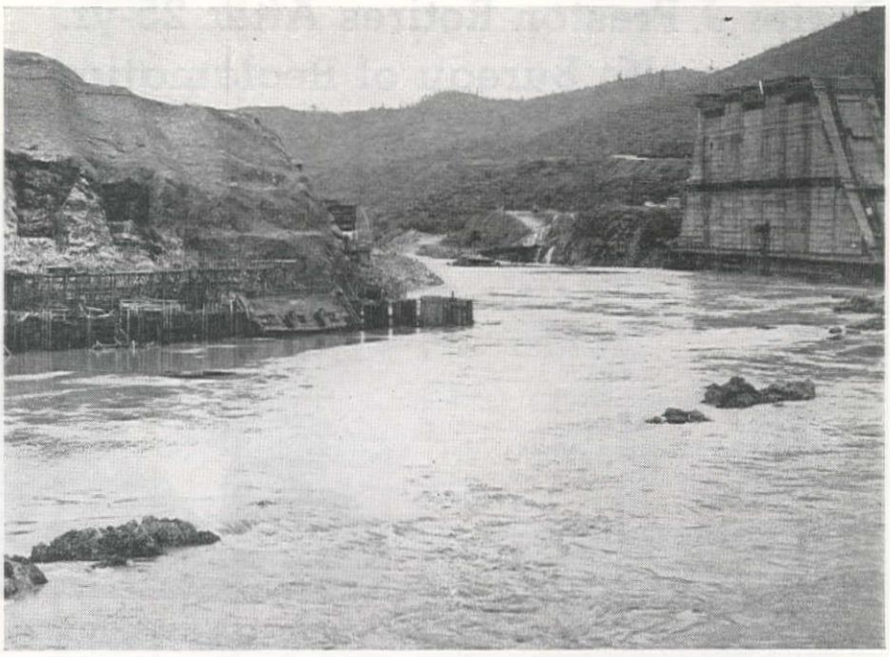
NEW WORK in soil and moisture conservation will be undertaken on Federal irrigation projects as a result of the establishment in the Bureau of Reclamation of a special division devoted to this program.

John S. Moore, now superintendent of the Yakima (Wash.) project and field supervisor of Operation and Maintenance District No. 2, is being assigned as field supervisor of Soil and Moisture Conservation Operations to have charge of the new work. Headquarters of the new division will be established in Denver, Colo.

A growing realization of the benefits which may be obtained from economical use of irrigation water, such as savings in storage and operating costs, prevention of water-logging, preservation of soil fertility, and even increased crop yields, influenced the establishment of the division of Soil and Moisture Conservation Operations, as did the knowledge that soil conservation and erosion prevention have been underemphasized in some irrigated areas.

The transfer to this Department by the President under his reorganization order No. 4 of soil conservation work on lands under the jurisdiction of the Department of the Interior has made possible the launching of the new work at this time.

Moore, a native of Charles Town, W. Va., has been employed by the Bureau of Reclamation for 32 years, at first at engineering and construction work, but since 1917 on responsible irrigation management and operating jobs. He has been superintendent of the Yakima Project since 1931 and field supervisor of District No. 2 since 1935. His home is in Yakima, Wash. He entered the employment of the Bureau in Idaho in 1908, within a year of his graduation as a civil engineer from Washington and Lee University.



SACRAMENTO FLOODS SHASTA POWERHOUSE CONSTRUCTION

HEAVY rains late in December flooded cofferdams in the Sacramento River and halted all work in the river bed and powerhouse. The channel, through which the river flowed from the middle of August when diversion was first accomplished, is completely under water. The river nearly reached flood stage.

Swindler Operating Among Contractors

HIGHWAY AND BUILDING contractors are being warned by Government agents to guard against the operation of swindlers who are obtaining large sums of money from contractors with ready cash. Three swindlers are involved, the first of whom is described as an Italian-American, age 44, height 5 ft. 6 in., weight 165 pounds, with a slight hair lip impediment and lisp. The second is age 70, 5 ft. 6 in. tall, weighs 175 pounds, and is lame. The Italian-American is reported to approach intended victim with large blueprints, not bearing an architect's name or other identification.

He is looking for bids on construction of a residence, outhouses and a cement wall on a 40-ac. estate in Montecito, a suburb of Santa Barbara, Calif., for the son of the Dole Development Co. He agrees to introduce the intended victim to a special representative of the Doles, and asks for a commission of 3% as finder.

Through a series of unexpected happenings, a sum of money is found, and a series of bets made upon horse races, until a considerable sum of winnings has accumulated. The intended victim is asked to provide additional money, which is finally lost with all winnings, and the three swindlers disappear.

Any contractor approached by the first swindler, who represents himself as the contractor's agent—usually the Italian-American—should get in touch with authorities at once, and attempt to stall the swindler.

* * *

CREWS OF the J. F. Shea Co. recently holed through the Hollywood tunnel, which forms a unit in the distribution system being constructed by the Metropolitan Water District.

Porter J. Preston Retires After 25-yr. Service with Bureau of Reclamation

PORTER J. PRESTON, after 25 years of continuous service with the Bureau of Reclamation as a civil engineer, retired from active duty on December 31, 1940.

Preston is one of the West's outstanding irrigation engineers and during the past three years had been connected with the Colorado-Big Thompson water diversion project in the capacity of supervising engineer. It was mainly through his efforts and investigations that this project has become a reality. He was appointed head of the project in September, 1938.

He was graduated from Colorado State College at Ft. Collins in 1892 with the degree of bachelor of science. On completion of his technical training he did survey work around Greeley, Colorado, and became a hydrographer in the State Engineer's office in Denver. For two years he was field engineer for the Great Plains Water Co. which constructed reservoirs and irrigation canals around Las Animas, Colo.

From 1897 till 1903 he was superintendent of the Ft. Lyons Canal Co. and the following two years served as deputy state engineer. During the next 6 years he was chief engineer of the Lewiston (Idaho) Sweetwater Land Co. and the Sterling, Colo., irrigation district. He started serving the Bureau of Reclamation in 1915 after four years as a consulting engineer. During his service with the Bureau he worked on the All-American Canal project, Uncompahgre project and the Yakima, Wash., project. From 1930 to 1935 he was in charge of the Colorado River investigations.

PORTER J. PRESTON

Preston is a member of the American Society of Civil Engineers and president of the Colorado Society of Engineers. He plans to open a consulting office in Denver after an extended vacation to the West Coast.

Steel Work Started on Pit River Bridge

ERECTION of the steel superstructure for the world's highest double deck bridge was begun on Jan. 2, when workmen of the American Bridge Co. swung into place a 24-ton section between abutment 2 and pier 1 at the south end of the bridge. All substructure work is completed except piers 3 and 4.

Colorado Project Cost Placed at $17,883,000

A LARGE multiple-purpose water project for the San Luis Valley in southern Colorado and to be sponsored by the Bureau of Reclamation would involve $17,884,000 in construction. This Reclamation project is intended to serve as both a flood prevention along the Rio Grande and the Conejos Rivers and as a system to provide supplemental water supply for 400,000 acres of land.

Principal features of the project are the construction of Wagon Wheel Gap reservoir on the Rio Grande River 32 mi. west of Del Norte, Colo., Weminuche Pass diversion from the San Juan basin to the Rio Grande basin, and the construction of two reservoirs on the Conejos River. Prior to construction on the Conejos unit, further investigations are contemplated to ascertain the desirability of substituting a single main stream reservoir. Included in the project authorization is $500,000 for the construction of a closed basin drain, its purpose being to develop waters not otherwise reaching the main stream to be credited to Colorado on its deliveries at the New Mexico state line, and reclamation of lands abandoned because of poor drainage in the closed basin.

American Road Builders Association Meets in New York, January 27-31

"ROADS FOR DEFENSE" will be the theme of the American Road Builders Association 38th Annual Convention to be held in New York City, January 27-31. Among the well known highway authorities on the speaking program will be John M. Carmody, administrator of the Federal Works Agency; Thomas H. MacDonald, commissioner of the Public Roads Administration; Senator Carl Hayden, Arizona, and Congressman Wilburn Cartwright, Oklahoma, co-authors of federal highway legislation; and Senator Sheridan Downey, California, member of the Senate Military Affairs Committee. Contractors' clinics have been planned to cover all subjects vital to the successful pursuit of the highway contracting business. Among the western engineers who will speak at the technical sessions are T. E. Stanton, materials engineer, California Division of Highways, on "Present Practices in Use of Moisture in Embankments and Stabilized Bases"; Bernard C. Hartung, director, Nevada traffic and safety division, on "Highway Safety in the National Defense"; R. H. Baldock, Oregon chief highway engineer, on "Skid-Resistant Qualities of Roadway Surfaces"; B. M. Doolin, manager, San Francisco Airport, on "Technical Airport Problems"; Harry Coffee, vice-president, Columbia Aircraft Corp., on "Value of National Defense Airport Development to Private Flying." Professor A. Diefendorf, head, department of civil engineering, University of Utah, and A. R. B. A. Educational Division President, will cover needs in highway education, and Paul B. Rynning, engineer, Jackson County, Oregon, will be a speaker at the county highway officials' clinic.

Colorado Highway Planned

CONSTRUCTION of a 40-mi. length of 4-lane highway from Colorado Springs to Franktown has been programmed in the preliminary budget of the Colorado state highway department for 1941. The project is considered as part of the national defense program, and would form part of a program to modernize the highway location between Denver and Pueblo, on which the state has already started improvements works.

New A.G.C. Board Members

FOUR NEW MEMBERS were appointed to the board of directors of the Southern California Chapter of the Associated General Contractors of America at the last meeting of the chapter held in Los Angeles on Dec. 3, 1940. F. K. Mittry, secretary-treasurer of Mittry Brothers, and Guy F. Atkinson, president of Guy F. Atkinson Company, are the new members from the engineering field. From the highway field, James H. Taylor, partner in Dimmitt & Taylor, has been added to the board, and from the building field, Emile Pozzo, president of the Pozzo Construction Co., is a new member.

Several members of the Los Angeles city council, and a group of water and power executives were guests of the chapter at the final meeting.

R. V. Edwards, retiring president, pointed out that the free play of private enterprise and private initiative is as productive in the construction field as in any other field in the country.

Preliminary Design of Idaho Dam Announced

PRELIMINARY FIGURES covering the design of the Anderson Ranch dam, which will be constructed on the south fork of the Boise River in Idaho, have recently been announced by the Bureau of Reclamation. Further applications filed with the Idaho State Commissioner of Reclamation for rights to the water involving the project have brought the $13,000,000 project another step toward reality. An appropriation was filed for 500,000 ac. ft. of water by R. J. Newell, representing the U. S. Bureau of Reclamation.

The present design indicates that the structure will be of earthfill type, about 400 ft. high and 1,400 ft. long on the crest. The project will also include a power plant of 20,000-kw. capacity.

Drilling at Santa Fe Dam

FIELD INVESTIGATIONS have been started by the Corps of Engineers at the site of the proposed $13,000,000 flood control dam near the mouth of San Antonio Canyon, which will form part of the general program of flood control in southern California. This work is being carried out under the direction of Col. E. C. Kelton, district engineer, Los Angeles. The present work consists of drilling test holes to determine the character of material at the dam site.

Obituaries . . .

Alexander Bell, 58, western vice-president of Wallace & Tiernan Co., with headquarters at San Francisco, Calif., died at his home in Woodside, Calif., on Dec. 10, following an illness of several months. For the past 21 years, Mr. Bell had been active in all phases of sanitary engineering on the Pacific Coast. He was a charter member of the California Section, American Water Works Association, and has been connected with the organization ever since. During 1938, he was president of the California Sewage Works Association. He was born in Milwaukee, Wis., and served overseas in the Destroyer Service of the U. S. Navy during the World War.

* * *

Kenneth C. Wright, 49, manager of the industrial equipment division of the Lang Company of Salt Lake City and former chief engineer of the Utah State Road Commission, died Dec. 21 of a cerebral hemorrhage. A member of the road commission for 22 years, he was a former secretary of the American Association of State Highway Officials.

* * *

Wilbert J. Austin, 64, president of The Austin Co. since 1924, was among the victims in the airliner which crashed at Chicago, Ill., on Dec. 4. The Austin Co. has designed and erected nearly six thousand industrial buildings in the United States and in 23 foreign countries, and has several offices in the western states. Among the buildings erected in the West by The Austin Co. is the National Broadcasting Company's new Radio City in Hollywood, Calif.

Washington News

. . . for the Construction West

By ARNOLD KRUCKMAN

Washington, D. C.—What will happen to appropriations required for West slope civil needs, and what the new defense organization will do about the location of defense industries, have been the chief questions in the minds of those who follow affairs in Washington with a Western slant. Some of the appropriation uncertainties will be partially clarified, it is hoped, when the President presents the regular budget to Congress. This should occur in the early middle of January; but the War issues may throw the schedule out of kelter. The Lend-Lease Budget for Britain may push everything else aside.

Reclamation fund decreasing

The hope is that the regular Reclamation needs will be maintained on a normal status. Responsible leaders here declare they have reason to think so. On the other hand, other equally responsible leaders say they have equally sound reasons for thinking all allocations not strictly defense will be eliminated; that no investigations will be continued, that no new jobs will be launched, that ordinary expansions will be arrested, and some going projects will be stopped. It is pointed out that Secretary Ickes, in his annual report to the President, says:

"Reclamation fund is decreasing. By the close of the 1941 fiscal year (June 30, 1941) the fund will be so depleted that the Bureau will be unable to carry on the construction of its projects. Either reclamation funds should be increased by an advance from the general fund of the Treasury, or certain of the more costly projects now being constructed should be financed by appropriations from the same source, or some other source of revenue should be found."

Obviously there is cold comfort in these suggestions. Everybody in the Government feels emphatically that the general fund should be tapped only when the tapping is justified by national defense needs. The White House is at the head of this phalanx. The idea covers every agency that serves the needs of the West slope. Aside from the Bureau of Reclamation it hits the Bureau of Mines, Biological Survey, Fisheries, Geological Survey, National Parks, Indian Bureau, General Land Office, Grazing Service, Forests, and every other normal peace-time activity of the Federal Government. You find, therefore, that the wise heads of the various regular civil agencies find innumerable reasons to give their jobs the color of defense.

The Bureau of Reclamation properly has shifted the emphasis from irrigation and reclamation to power. There are 100 potential investigations on the program, partially developed, that normally would emphasize land classification, reservoirs, canal surveys, economic aspects, and water supply. Many of them may undoubtedly be much needed in the interests of national defense. It is believed the 6-State basin-wide Colorado River study is a definite defense need. The Bureau has 27 projects in 13 states; 13 major storage reservoirs, and one diversion dam are almost complete and 9 are still incomplete.

There is urgent need for more powerhouses, for many other buildings, for tunnels, flumes, culverts, bridges, telephone lines and other structures. Bonneville, Grand Coulee, Boulder, Friant, and similar works obviously require funds. Parker is about ready to come in. Southern California is said to need more power urgently. Speaking about Bonneville and Grand Coulee, in the report to the President, Secretary Ickes said: "It can help to disperse heavy concentration of industry in the northeastern corner of the nation by making it possible for it to go elsewhere (with the development of power in the Northwest) thus helping to relieve a potentially dangerous military situation."

Definite figures not available

The normal budget as presented to FDR is said to run between $45,000,000 and $50,000,000 for Reclamation. Definite information about exact figures cannot be published before the President presents the budget to Congress. Correspondents who utter such data prematurely are called upon the carpet by Lowell Mellett, the White House assistant, who is slated to become Censor when and if we actually go into a state of war. Even if the budget comes out of the White House only normally shrunken, it is expected Congress will act cautiously.

The defense needs will be so stupendous that it is anticipated most ordinary needs will be ignored in the earlier months of the session, and the great works like Grand Coulee, Bonneville, Boulder, and so on, will receive their absolutely necessary appropriations at the last moment by the process known as

a deficiency appropriation. It also is considered probable that many normal items will slip into the defense budget. They tell you on the Hill that the defense budgets will cover a multitude of mysteries, that they will inevitably take under their wings some of the things that usually go into the pork barrel.

As intimated by Secretary Ickes, there was strong hope that the West slope would obtain a fair share of the new defense industrial plants that will be built in numbers this year. Defense Commissioner Chester Davis was the strong champion of taking the industries to the sources of raw materials, power and labor. He definitely had some untouched sections of the West slope in mind. Apparently he had sold the President. But the appointment of Knudsen as head of the Defense Commission is believed to have cancelled that plan. The coastal strip of Oregon, Washington and California, will continue to get the industrial plants identified with the region. The Ogden-Salt Lake section will get more industries. And new industrial units will expand business around Denver. But, unless the West slope does something dramatic about it, the rest of the area is not apt to get any more than it has already received.

Defense highways

They report here with satisfaction that Nevada and Idaho have adopted constitutional amendments checking the diversion of highway funds to other uses. Federal Public Works Administrator John M. Carmody again urges more money must come out of Federal highway funds, and out of State and local highway funds, to build the military defense highway, road, and street improvements. He continues to hold conferences with local and State agencies; but nothing has happened. There is a stalemate between the Army and the Federal Works people on one side, and the local people on the other. There appears to be a truce to wait to see whether Congress will appropriate special funds to pay the cost of military highway improvements.

FDR is vigorously opposed to more appropriations for highways. He insists the Federal highway funds should be used wholly for military purposes at this time. He says there are on the West slope 1,500 mi. of highways in the strategic system which must be widened to 18 ft.; that 5,000 mi. of highway must be repaved; that 600 bridges must be improved; and that 150 bridges must be rebuilt to meet the defense specifications of 18-ft. width and 12½-ft. clearance. And he tells us there are a thousand miles of military access roads, roads leading to camps and forts and arsenals and so forth, that must be improved in the West at a cost of $65,000,000. And he insists this work must be rushed, and that the States and localities must abandon their plans to improve general highways and put all their Federal-aid money on these highways.

Apparently bond issues for community improvements in some sections of the West slope should be investigated before they are bought, according to Secretary Ickes and his Division of Investigation. Working on defense jobs Mr. Ickes' people discovered that Rock Springs, Government Springs, Bumble Bee, and other towns in Arizona, Wyoming and elsewhere, were built on public lands, and that neither the communities as a whole, nor the business people nor home owners, had acquired clear title to their land, and they were told that they must proceed to clear title or vacate. Mr. Ickes, as usual, is inclined to proceed legalistically, but Congress undoubtedly will give the relief that is necessary by legislation. Certain property rights in Utah likewise were discovered invalid.

Personally speaking...

Ralph A. Tudor, principal engineer of the San Francisco-Oakland Bay Bridge, has been granted a military leave of absence, starting January 1, 1941. He will be stationed at San Luis Obispo, Calif., as assistant to the Chief of Staff in Charge of Military Intelligence of the General Staff of the Fortieth Division, with the rank of Lieutenant-Colonel. He is a graduate of West Point, and served six years in the regular army before coming to California, during five of which he was in the Corps of Engineers. He first joined the staff of the bridge department of the California Division of Highways in 1929, and was transferred to the San Francisco - Oakland Bay Bridge two years later.

* * *

Ralph W. Brown, formerly superintendent for Hemstreet & Bell, Marysville, Calif., has purchased the Mercer-Fraser Co. of Eureka, Calif., and will continue to operate the contracting firm under that name, which is one of the oldest in California. Brown is a graduate of Stanford University, and has had 26 years of construction experience on roads, bridges, and building industrial plants, wharves and docks. He was construction superintendent for the Shell Company during the construction of the refinery at Martinez, Calif., and for eight years was superintendent of convict camp work for the California Division of Highways.

* * *

W. W. Hurlbut, assistant chief engineer and general manager of the Water Bureau, Los Angeles Department of Water and Power, was nominated to receive the George W. Fuller award in 1941 by the California Section, American Water Works Association, at the annual convention in October. The Fuller award is conferred annually to the individual in each A.W.W.A. Section who has rendered the most distinguished service in the water supply field. Presentation of the award will be made at Toronto during the 1941 convention of the A.W.W.A.

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Fred Sharkey, office engineer for the Bureau of Reclamation at Grand Coulee Dam, was elected president of the Spokane Section of the American Society of Civil Engineers at the final meeting of the Section on December 13. **J. E. Buchanan,** dean of the school of engineering, University of Idaho, was elected first vice-president, and **R. Gladding,** of the soil conservation service at Spokane, Wash., was elected second vice-president. **W. S. Mortimer** of Spokane was reelected secretary of the Section.

* * *

James R. Griffith, professor of structural engineering at Oregon State College, has been assigned to active duty with the Thirteenth Naval District at Seattle, Wash. His rank is that of Lieutenant Commander in the Civil Engineering Corps, U. S. Naval Reserve. Commander Griffith is the author of the Construction Design Charts, which begin their sixth consecutive year of publication with this issue of *Western Construction News.*

* * *

H. F. Bahmeier, engineer with the Bureau of Reclamation, has been transferred from the position of resident engineer on Vallecito Dam, near Durango, Colo., to construction engineer of the San Luis Valley Project, with headquarters at Monte Vista, Colo. The San Luis Valley project will include construction of multiple purpose reservoirs on the Rio Grande and Conejos Rivers in southern Colorado.

* * *

George A. Sedgwick has resigned his position with the California Division of Architecture to accept a position as associate engineer with the Panama Canal Commission. He had served eleven years with the State prior to his resignation, joining the Harbor Board in San Francisco in 1929, the bridge department of the Division of Highways in 1933, and the Division of Architecture in 1937.

* * *

Claude L. Makeson, director of research for the American Bitumuls Co., San Francisco, was elected president of the Association of Paving Technologists during the Thirteenth National Asphalt Conference, held at Dallas, Texas, Dec. 9-13. **T. E. Stanton,** materials and research engineer of the California Division of Highways, was elected vice-president.

* * *

Howard C. Wood, senior bridge engineer with the California Division of Highways, will replace Ralph A. Tudor as principal bridge engineer for the San

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Francisco-Oakland Bay Bridge during Mr. Tudor's military service which started January 1. During the construction of the bridge, Wood served as senior design engineer.

* * *

S. G. Neff, formerly chief of operations at Denison Dam, Texas, for the Corps of Engineers, has been transferred to St. Johns, Newfoundland, Canada, where he is chief of engineering and operations on construction of the Newfoundland army posts and air bases. The work is being carried out by the U. S. Corps of Engineers.

* * *

Victor J. Englund, assistant engineer with the Bureau of Reclamation during the construction of Seminoe Dam in Wyoming from 1933 to 1939 and since that time in the spillway department of dam design in the Denver office, has been transferred to the Altus-Lugert project, Oklahoma, as associate engineer on construction.

* * *

Robert W. F. Schmidt, formerly airport engineer for the United Air Lines on several western projects, and more recently district airport engineer for the Civil Aeronautics Administration at Denver, has returned to the regional office of the CAA at Santa Monica, Calif., after ten months' duty in the Washington office.

* * *

Ben E. Nutter, formerly engineer of the Concrete Products Division of Graham Brothers, Ltd., Los Angeles, Calif., is now on Midway Island in the North Pacific Ocean as concrete technician on the Pacific Naval Air Base under construction there.

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Roy C. Fellows is now in Dutch Harbor, Alaska, as an engineering draftsman with the Siems-Drake-Puget Sound Co. in connection with the construction of a naval air base.

* * *

Fred C. Dunham, state highway department of Washington, has been named president of the Tacoma section of the Am. Soc. C. E. He succeeds Bert Thomas, inter-county engineer.

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J. G. Dodd, county engineer of Adams County, Washington, was granted a year's leave of absence to accept active duty with the U. S. Navy at Bremerton, Wash.

* * *

M. Norris, well known contractor of Burlington, Wash., was elected mayor of that city at the November elections.

* * *

Harris V. Crawshaw, with the Metropolitan Water District of Southern California for more than ten years, has accepted a position as office engineer with Ford J. Twaits Co. and Morrison-Knudsen Co., Inc., on the Naciento cantonment project near Paso Robles, Calif.

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R. M. Gilmore, senior draftsman with the Washington State Highway Department, has replaced **P. H. Winston** as secretary of the Washington Toll Bridge Authority. Winston resigned his position to accept duty with the Naval Reserve.

Supervising the Jobs...

A. B. Reither is supervising the construction of 185 miles of transmission lines in Phillips County, Colo. This project is practically one-half complete at the present time. E. A. Reiter of Aitken, Minn., secured the contract at $127,823. This contractor will carry out a similar project in the spring, involving 219 miles of transmission lines in Jefferson County., near Colorado Springs, Colo. This contract was awarded on a low bid of $181,000.

* * *

W. R. Rogers and **Charles McInroe** are job superintendents for the Rogers Construction Co., Dayton, Wash., in charge of 9 mi. of bituminous macadam surfacing on the Hug Point-Manzanita section of the Oregon Coast Highway in Clatsop and Tillamook Counties, Ore. **Manley Maloy** is road superintendent and **H. H. Hollenbery** is plant foreman on the job which will cost an estimated $110,107.

* * *

Victor Jacobson has been appointed general superintendent in charge of construction of eight warehouses, including utilities at Utah General Depot, Ogden, in Weber County, Utah. **H. H. Burgess** is field manager and **Stuart W. Leck** is general manager. The $1,705,000 contract was awarded jointly to the Al Johnson Construction Co. and the James Leck Co., both of Minneapolis, Minn.

* * *

J. P. Guerin, superintendent for Heafey-Moore Co., and Fredrickson & Watson Construction Co., Oakland, Calif., is in charge of the 2.6 mi. highway grading and plantmix surfacing job between Prunedale Junction and the Sargent overhead in Santa Clara County, Calif. **Earl Warren** is office manager on the job and **Jack Hurley** is grade foreman. Low bid for the work was $131,221. Guerin and Warren are also supervising work on a 1-mi. grade and roadmix surfacing job south of Davenport, Calif. On the Davenport job, **Ross Phillips** and **Ted Krieberg** are foremen. Low bid for the Davenport job was $52,995.

J. P. GUERIN (right) and Earl Warren are superintendent and office manager, respectively, in charge of two California highway jobs.

* * *

W. N. Evans, formerly assistant superintendent at the Upper Narrows Dam, northeast of Marysville, Calif., for L. E. Dixon Co. and Arundel Corp., has been appointed project manager by the L. E. Dixon Co., Los Angeles, to supervise construction of an army camp at San Luis Obispo and an airport at Paso Robles, Calif. The $3,880,341 contract was awarded on a cost-plus-a-fixed-fee basis.

* * *

D. E. Neukirch is general superintendent, **Arthur Lakey,** general foreman, and **Harold Owens,** carpenter foreman, on the $129,672 contract which includes construction of three reinforced concrete bridges on Primary State Highway No. 2, Preston-North Bend Section, in King County, Wash. Neukirch Brothers of Seattle, Wash., were awarded the contract.

* * *

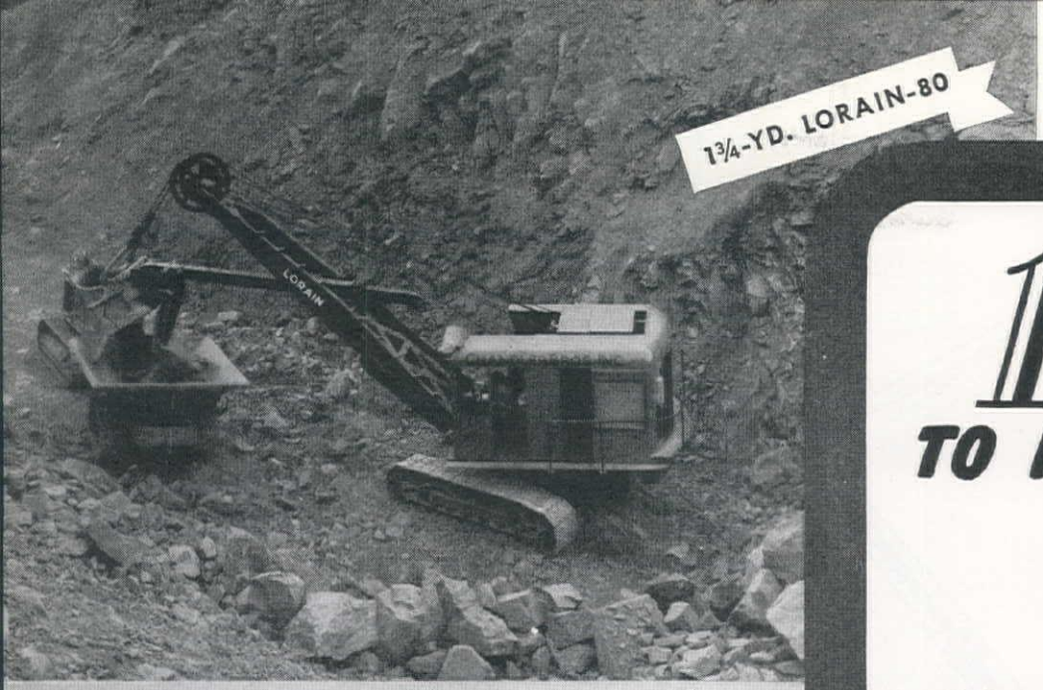
Cy Williams is supervising the construction of temporary buildings and utilities at Fort Douglas, in Salt Lake County, Utah. **John Williams** is foreman, and **W. A. Carson** is office manager. The R. D. Merrill Construction Co., of Helena, Mont., secured two separate contracts on this work, one for $125,370 and the other $151,906.

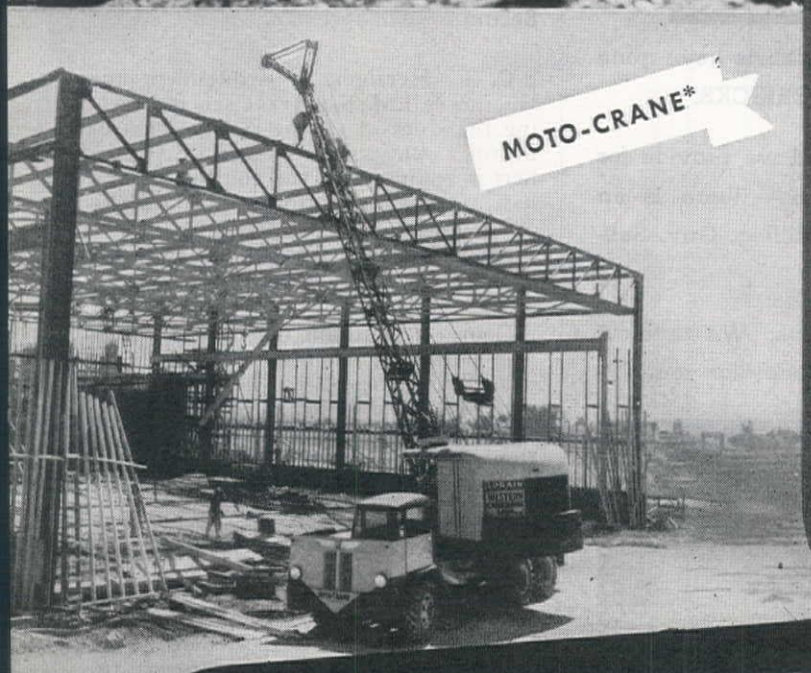
* * *

Roy Knapp, superintendent for Buttress & McClellan, contractors of Los Angeles, Calif., is in charge of the construction of a one-story building 125 x 320 ft., at Vernon in Los Angeles County, Calif. **J. E. McClellan** is in charge of field construction and **E. H. Davis** is handling the purchasing and accounting. The contract was awarded at $90,000.

* * *

R. H. Tinnin has been appointed superintendent by the Moore Electric Company, Los Angeles, Calif., for installation of the motor generator sets for the electric power system at the Navy Yard, Mare Island, in Solano County, Calif. The contract, including all materials and installation, amounted to $220,826.





19 WAYS TO MAKE MONEY IN '41

• Higher job costs and shorter time limits in '41 threaten profits unless specialized equipment is chosen and applied properly. That's why Lorain offers you a choice of 19 models—each and every one a specialist in its own field and designed to ***move more material, faster, at lower cost.***

Every unit in the Lorain line enjoys a top performance rating. Direct-to-the-point power transmission for handling tougher digging faster, increased capacities to handle more and heavier work, and a stronger, more simplified construction that insures continuous, low-cost operation—these three advantages are common to all Lorains because each is built to the proved principles of Center Drive design.

19 models, capacities from ⅜ to 2½ cu. yds.: crawler mounted units with interchangeable shovel, crane, dragline, clamshell, backdigger or skimmer booms; mechanized Moto-Cranes,* Moto-Shovels and Moto-Drags that travel and work on 10 rubber-tired wheels. Complete design and performance data on any or all of the machines making up the Lorain "Fleet" for '41 is yours for the price of a postal. Write today!

THE THEW SHOVEL COMPANY

LORAIN, OHIO

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*TRADE MARK

THEW CENTER DRIVE
REG. U.S. PAT. OFF.

LORAINS 19 MODELS 3/8 TO 2½ YDS.

HARRY ROTRUCK, superintendent for A. Teichert & Son, is in charge of the Rockaway Beach job in San Mateo County, California.

Harry Rotruck is in charge of the construction of 3.2 mi. of grade and plant-mix surfacing between Rockaway Beach and Edgemar, in San Mateo County, Calif. This contract was awarded to A. Teichert & Son, Inc., Sacramento, Calif., at $76,023. Mr. Rotruck is being assisted by **Adolph Bauer,** grading foreman; **Ace Collins,** carpenter foreman, and **August Hallberg,** plant foreman.

* * *

Carl Johnson is superintendent for Sam Bergesen of Tacoma, Wash., on the construction of a $130,100 reception center, including ten barracks, mess hall, infirmary, and officers' quarters at Fort Lewis, in Pierce County, Wash. **Nels Loberg** is carpenter foreman and **A. G. Seland** is labor foreman.

* * *

C. F. Herziger, superintendent for Engineers, Ltd., San Francisco, is directing the work of raising Alpine Dam in Marin County, California. C. E. Cuthbert is engineer for the contractor, and F. C. Harp is general foreman. The $469,397 contract being carried out for the Marin Municipal Water District was awarded last September.

* * *

George R. Putnam, recently construction superintendent on an earthfill dam near Toston, Mont., has been appointed general superintendent for the Utah Construction Co. to supervise construction of a dam, powerhouse and tunnels near Andrews, N. C., for the Nanthala Power and Light Co.

* * *

Isaac F. Lindsay, superintendent for A. Teichert & Son, Inc., Sacramento, Calif., is being assisted in the construction of two bridges north of Bakersfield, Calif., by **Fred Phillips,** carpenter foreman, and **Henry Teichert,** excavation foreman. Low bid for the job was $192,339.

W. H. Crawford is supervising the construction of a warehouse at Mines Field in Los Angeles County, Calif. Alco Construction Co. of Los Angeles was awarded the contract for the structure on a low bid of $121,385. **A. L. Clark** is president of the contracting firm.

* * *

R. E. Dayton, superintendent, and **Ed Kay,** job superintendent, are supervising construction of 141 mi. of transmission line in Big Horn County, Wyo., for the Big Horn Construction Co., Sheridan, Wyo. **Ed Temple** is timekeeper for the contractor on the $93,346 job.

* * *

Alva C. LaRue has been appointed general superintendent by M. M. Sundt Construction Co., of Tucson, Ariz., in charge of the construction of 30 housing units at Fort Huachuca in Cochise County, Arizona. The contract was awarded at a price of $100,000.

* * *

L. T. Jeckles is project manager and **C. Frandsen** is superintendent for the construction of a hospital at Santa Barbara, Calif. The project is a national defense unit, and the Baruch Corp. of Los Angeles secured the contract on a cost-plus-a-fixed-fee basis of $1,040,000.

* * *

M. A. "Pete" Pithoud is superintendent for Fritz Ziebarth, Long Beach, Calif., on the construction of the Bonneville - The Dalles transmission line which is being constructed for the Bonneville Administration. The line runs from Bonneville Dam on the Oregon side, along the Columbia River to The Dalles through Multnomah and Wasco Counties, Ore. **N. B. Cleghorn** is field superintendent, **R. J. Bloom** is office manager, and **E. W. Hastings** is material distributor. Contract for this project was awarded on a low bid of $248,989.

* * *

J. W. Askee is in charge of the construction of an office and laboratory building with concrete walls and tile roof at Boulder City, Clark County, Nevada. The contract was secured by Paul S. Webb of Boulder City at a price of $60,000.

* * *

M. J. Crewe is superintendent, and **Harry King,** assistant superintendent, on the construction of 100 housing units for the Municipal Airport at Albuquerque, New Mexico. The $285,000 contract was awarded to the Lembke Construction Co., Albuquerque, N. M.

* * *

Ralph O. Tooker, superintendent for Mead and Mount Construction Co., Denver, Colo., is supervising the construction of an engine test building at Hill Field, in Weber County, Utah. The contract was awarded on a low bid of $248,000.

* * *

E. C. Williams is supervising the driving of a tunnel between Tulelake sump and Lower Klamath Lake in Siskiyou County, Calif., for J. A. Terteling & Sons, Boise, Idaho. Low bid for the job was $172,096.

* * *

Jack Edwards is supervising the construction of a stabilized base and plant-mix surfacing at the U. S. Naval Net

CONSTRUCTION of the Bonneville-Dalles transmission line is under the direction of (left to right) Neil Cleghorn, field superintendent; M. A. Pithoud, general superintendent; and R. J. Springall, substation superintendent. Fourth man is Mr. Irwin, I.B.E.W. representative of Portland, Ore. Tractor and logging sulkey are used to haul poles over the rugged country over which the line passes.

Depot, Tiburon, Calif., for Lee J. Immel, San Pablo, Calif. The job includes grading and stabilizing and surfacing and miscellaneous work at an estimated cost of $32,200.

* * *

William Bullock is carpenter foreman for the Morrison-Knudsen Co., Inc., on the Glenville powerhouse and dam project at Sylva, N. C.

* * *

R. V. Frost, who was formerly in charge of the maintenance of shovels and tractors at Grand Coulee Dam for Consolidated Builders, Inc., has been transferred to the gravel plant and conveyor belt of Columbia Construction Co. of Redding, Calif., where he is doing similar work.

* * *

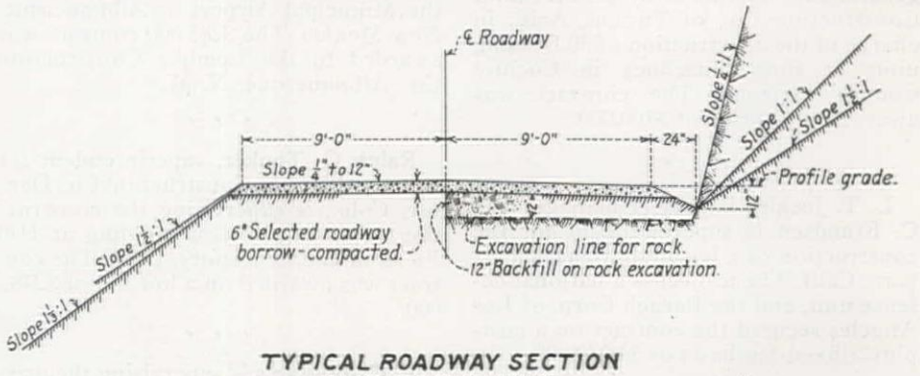
H. B. Shannon is foreman on the batch plant and trucks for the Sound Construction Co. and Peter Kiewit Sons Co. on the construction of 540 barracks at Fort Lewis, Wash. **Paul White** is project manager.

UNIT BID SUMMARY

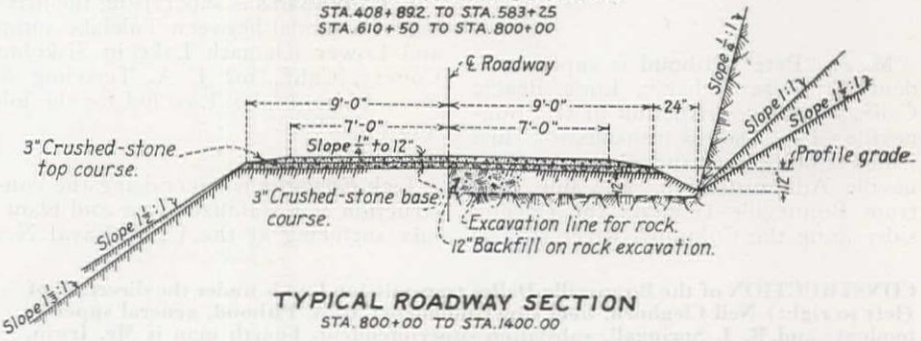
Highway and Street . . .

Washington—Ferry County—Bur. of Recl.—Earthwork, Structures & Surfacing

Erickson Paving Co., Seattle, Wash., $153,094 (Sch. 1 and 2), low to the Bureau of Reclamation, Coulee Dam, for construction of earthwork, structures, and surfacing for the relocation of the Ferry County Road between Mink Creek and Stranger Creek, Columbia River Reservoir, Columbia Basin project. The work is located near Inchelium. The Government will furnish cement for use in concrete, mortar, and grout; admixtures, if required, for use in concrete; reinforcement bars; corrugated metal pipe and connecting bands for culverts; metal pipe for pipe drains through retaining walls; lumber for permanent installation in structures, but not lumber for forms or other temporary construction; structural-steel bridge span, anchor bolts, anchor-bolt sleeves, rivets, pins, bearings, and red-lead paste for bearings for bridge; all posts, braces, wire, wire stays, staples, hardware, bolts, and washers for right-of-way fences and for right-of-way fence gates; all posts, cable, hook bolts, offset blocks, and anchor-rod assemblies for cable guardrails; all bolts, washers, separators, driftpins, lag screws, and spikes and nails twentypenny or larger in size to be used in the completed work; all paint and coating materials; and also all other materials not specifically



TYPICAL ROADWAY SECTION
STA.408+892. TO STA.583+25
STA.610+50 TO STA.800+00



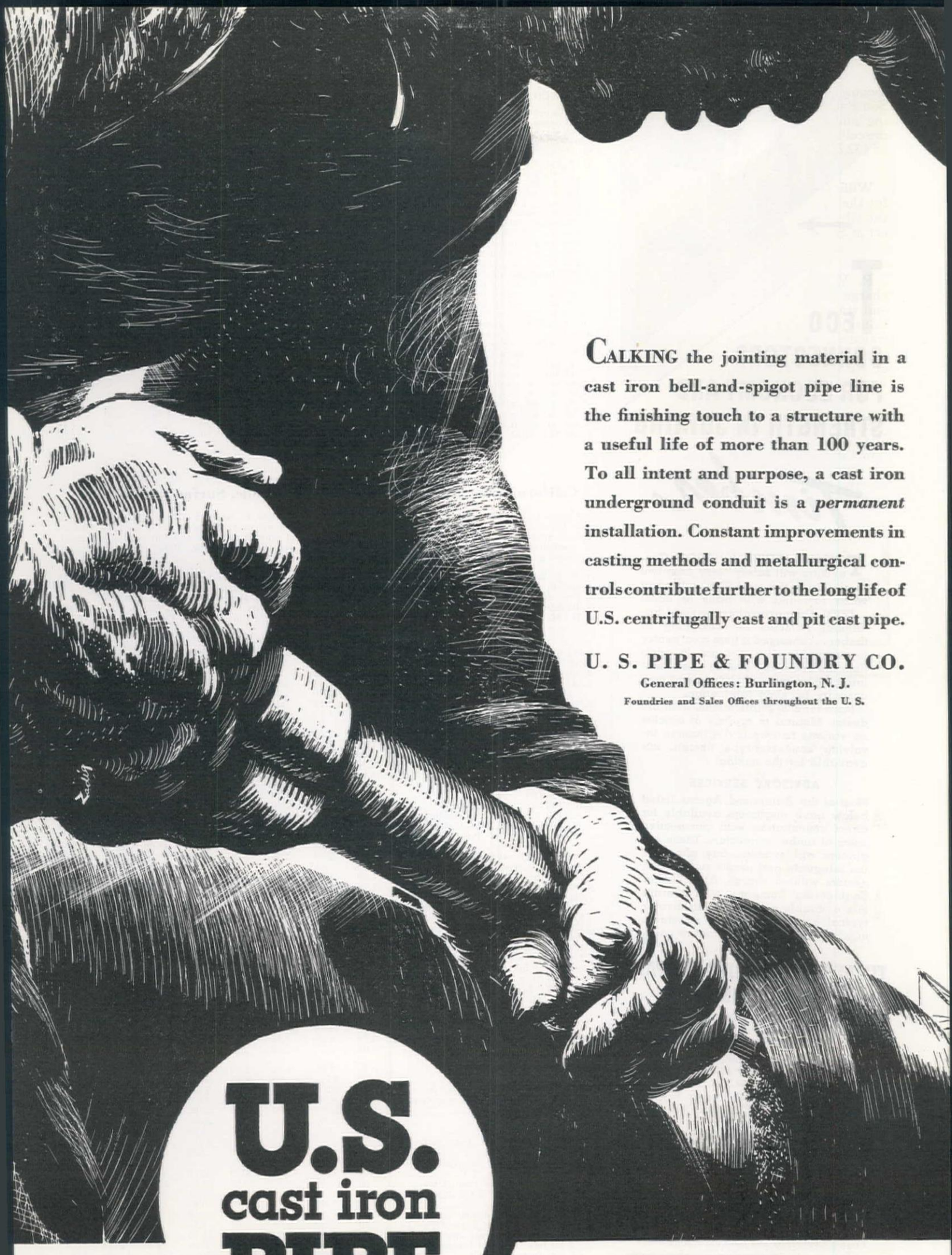
TYPICAL ROADWAY SECTION
STA.800+00 TO STA.1400.00

mentioned that will become a part of the completed construction work. The contractor will be required to furnish all sand and broken rock or gravel for concrete; all sand for mortar and grout; all backfill materials; selected roadway borrow materials and broken rock or gravel for surfacing; all binder material; all rock and rock spalls for riprap and rubble masonry; all form materials, including oil for oiling forms; all lumber required for strutting corrugated-metal-pipe culverts; all nails less than twentypenny in size to be used for the construction of structures and right-of-way fences; all wire, wire ties, or other appliances used for holding forms and for securing reinforcement bars; metal or other temporary supports, if used, for reinforcement bars, pipe, and other metalwork; all water used for mixing, cleaning, and curing concrete, mortar and grout and for moistening surfacing and backfill materials; and all other materials not a part of the completed construction work required for the completion of the contract. The contractor after date of receipt of notice to proceed, shall complete all of the work within 180 calendar days. Bids were received from the following:

	Sched. I	Sched. II
(1) Erickson Paving Co.	$59,495	$ 93,599
(2) Norris Bros.	62,411	103,350
(3) C. E. O'Neal	69,843	105,470
(4) Roy L. Bair	73,673	104,375
(5) L. Romano Engineering Co.	87,105	127,282

SCHEDULE I	(1)	(2)	(3)	(4)	(5)
34 acres clearing right-of-way	65.00	80.00	75.00	60.00	$100
23 acres grubbing right-of-way	50.00	80.00	60.00	60.00	$100
103,000 cu. yd. common excavation for roadway	.14	.16	.16	.145	.30
41,000 cu. yd. rock excavation for roadway	.60	.60	.70	.85	.65
72,600 sta. yd. overhaul	.01	.02	.01	.01	.02
50 cu. yd. common excavation, channel and dike	1.00	1.50	1.00	1.50	1.00
20 cu. yd. rock excav., channel and dike	1.00	1.50	2.00	2.00	3.00
300 cu. yd. common excavation for structures	.90	2.00	1.00	1.50	2.00
100 cu. yd. rock excavation for structures	.90	2.00	1.50	3.00	5.00
115 cu. yd. concrete in box culvert	23.00	20.00	17.00	22.00	25.00
23,200 lb. place reinforcement bars	.04	.025	.015	.04	.04
300 cu. yd. riprap	1.00	1.00	1.50	3.00	3.00
250 cu. yd. backfill	.30	1.50	.60	.30	.25
200 cu. yd. compacting backfill	.30	1.50	.20	1.00	.60
1,698 lin. ft. lay 18-in. corrugated metal pipe	.35	.20	.36	.60	.60
210 lin. ft. lay 24-in. corrugated metal pipe	.60	.25	.48	.70	1.25
104 lin. ft. lay 30-in. corrugated metal pipe	.70	.30	.60	.80	1.50
156 lin. ft. lay 48-in. corrugated metal pipe	1.00	.50	1.00	1.00	3.00
4.0 mi. construct right-of-way fences	$150	$135	$150	$200	$500
8 ea. construct right-of-way fence gates	20.00	12.00	10.00	25.00	25.00
4,610 lin. ft. construct cable guardrails	.20	.25	.40	.30	.30
15,000 cu. yd. selected roadway borrow	.50	.43	.75	.60	.60
364 sta. finish roadway	5.00	5.00	5.00	4.00	5.00

(Continued on next page)



CALKING the jointing material in a cast iron bell-and-spigot pipe line is the finishing touch to a structure with a useful life of more than 100 years. To all intent and purpose, a cast iron underground conduit is a *permanent* installation. Constant improvements in casting methods and metallurgical controls contribute further to the long life of U.S. centrifugally cast and pit cast pipe.

U. S. PIPE & FOUNDRY CO.

General Offices: Burlington, N. J.

Foundries and Sales Offices throughout the U. S.

U.S. cast iron PIPE

for water works, gas, sewerage, drainage and industrial services.

SCHEDULE II

44	acres clearing right-of-way	$110	80.00	75.00	60.00	$100
34	acres grubbing right-of-way	$100	80.00	50.00	60.00	$100
192,000	cu. yd. common excav. for roadway	.14	.15	.16	.14	.20
33,000	cu. yd. rock excav. for roadway	.60	.60	.70	.80	.60
105,000	sta. yd. overhaul	.01	.02	.01	.01	.02
100	cu. yd. common excav., channel and dike	1.00	1.50	1.00	1.00	.50
30	cu. yd. rock excav., channel and dike	1.00	1.50	2.00	2.00	2.00
530	cu. yd. common excav., for structures	.80	2.00	1.00	1.50	1.00
180	cu. yd. rock excav., for structures	2.00	2.00	1.50	3.00	2.00
150	cu. yd. concrete, bridge piers, abutments and pedestals	23.00	20.00	17.00	28.00	25.00
3,000	lb. place reinforcement bars	.04	.025	.015	.05	.04
150	cu. yd. rubble masonry walls	14.00	10.00	12.00	16.00	15.00
300	cu. yd. riprap	1.00	1.00	1.00	3.00	3.00
500	cu. yd. backfill	.30	1.50	.60	.30	.25
400	cu. yd. compacting backfill	.30	1.50	.25	1.00	.50
140	lin. ft. lay 12-in. corrugated metal pipe	.30	.10	.24	.40	.60
2,004	lin. ft. lay 18-in. corrugated metal pipe	.38	.20	.36	.60	1.00
470	lin. ft. lay 24-in. corrugated metal pipe	.60	.25	.48	.70	2.00
226	lin. ft. lay 36-in. corrugated metal pipe	.75	.35	.72	.90	3.00
60	lin. ft. lay 48-in. corrugated metal pipe	1.00	.50	.96	1.00	3.50
69.0	M.F.B.M. erect untreated timber in bridges	34.00	35.00	20.00	47.00	40.00
3.8	M.F.B.M. erect treated timber in bridges	48.00	40.00	20.00	47.00	40.00
Lump Sum	remove exist. struct. steel span of Colville River bridge and re-erect in Hall Creek bridge	$3,280	$10,500	$4,000	$3,600	$2,000
7.0	mi. construct right-of-way fences	$150	$100	$150	$200	$500
13	each construct right-of-way fence gates	20.00	12.00	10.00	25.00	25.00
2,915	lin. ft. construct cable guardrails	.25	.25	.40	.30	.30
10,600	cu. yd. crushed stone base course	.80	.90	1.25	.95	1.50
9,300	cu. yd. crushed stone top course	.80	.90	1.25	1.00	1.50
1,650	cu. yd. filler	.60	.50	.75	.30	1.00
340	M. gallons watering	1.25	2.00	1.50	2.50	3.00
1,160	cu. yd. stockpiling cr. st., top course	.80	.70	.75	.90	1.50
610	sta. finishing roadway	5.00	5.00	5.00	4.00	5.00

California—Stanislaus County—State—Grade, Surface and Bridge

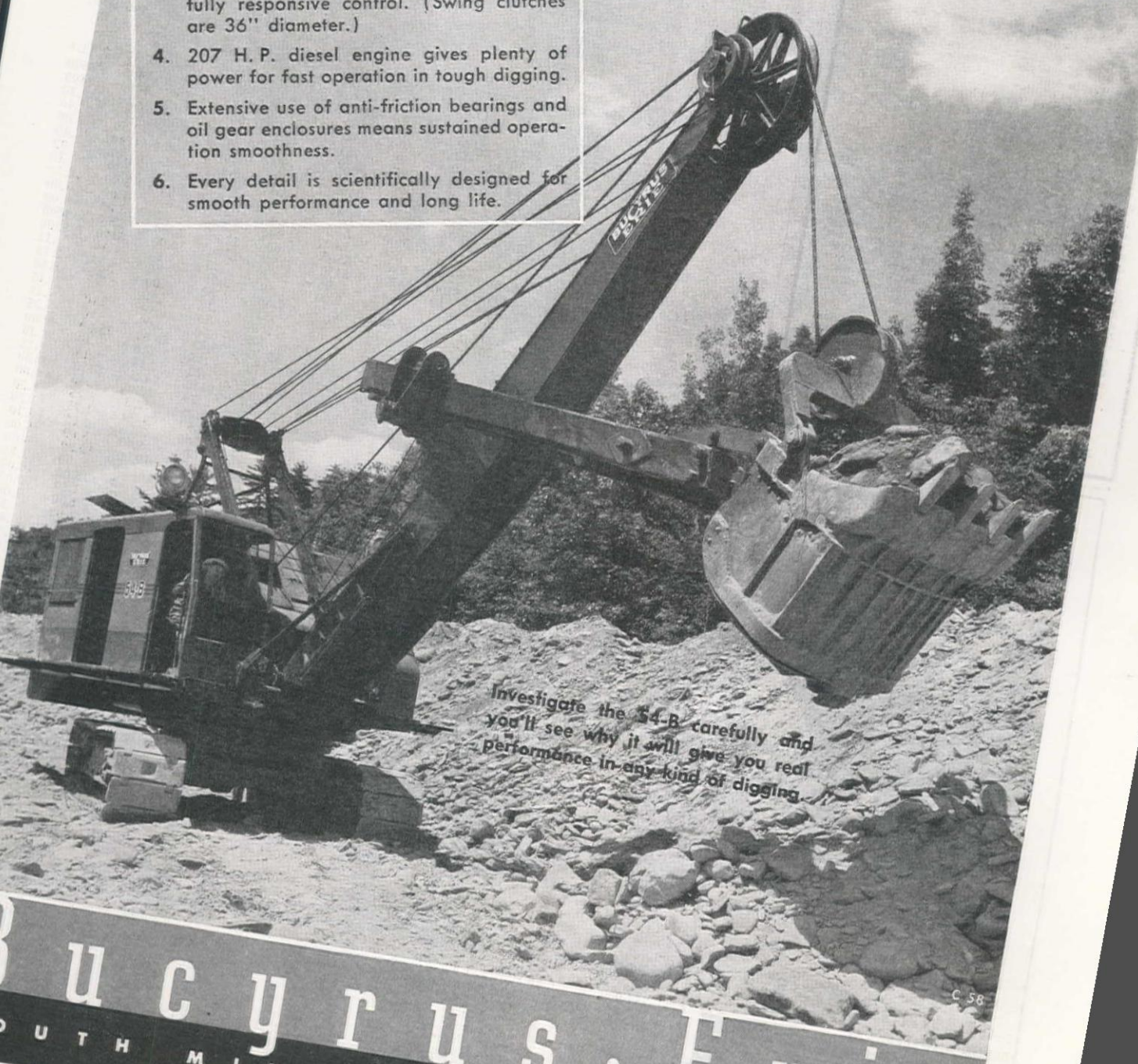
Contract awarded to M. J. B. Construction Co., Stockton, and F. Kaus, Stockton, $213,980, by California Division of Highways, Sacramento, for 5.5 mi. grade, portions to be paved with Portland Cement Concrete, plantmix surfacing on concrete base, construction of crusher run base adjacent to new pavement, and construction reinforced concrete bridge between Keyes and Hatch Crossing. Bids were received from the following:

(1)	M. J. B. Construction Co., and F. Kaus	$213,980	
(2)	Fredericksen and Westbrook	222,293	
(3)	Basich Bros.	224,102	
(4)	N. M. Ball Sons	229,152	
(5)	A. Teichert & Son, Inc.	$236,817	
(6)	Union Paving Co.	238,208	
(7)	Heafey-Moore Co. and Fredrickson & Watson Construction Co.	244,421	
(8)	United Concrete Pipe Corporation	249,273	

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
291	stas. clearing and grubbing	10.00	45.00	15.00	14.00	8.00	20.00	11.70	10.00
2,600	M. gal. water	.90	1.50	.75	1.10	.50	.50	1.00	1.20
34,000	cu. yd. rdwy. excav., w/o class	.23	.22	.16	.28	.15	.22	.20	.23
3,125	cu. yd. structure excavation	1.00	1.50	1.00	1.10	1.00	1.00	1.00	1.00
50	cu. yd. ditch and channel excav.	.80	1.50	1.00	1.00	1.00	1.00	.48	1.00
50,000	cu. yd. imported borrow	.35	.38	.38	.345	.35	.40	.31	.35
1,900	cu. yd. remov. exist. concrete	1.50	1.10	1.25	1.90	1.10	1.50	1.25	1.50
78,250	sq. yd. preparing subgrade	.08	.05	.10	.09	.08	.08	.08	.12
273	stas. finishing roadway	5.00	5.00	6.00	5.00	6.00	8.00	5.00	6.00
8,000	ton crusher run base & surf.	1.55	1.10	1.85	1.65	2.10	2.20	2.00	2.50
32,000	sq. yd. prep., mix., shap. (RMST)	.06	.05	.055	.06	.08	.07	.07	.07
200	ton liq. asph., SC-3 or 4 (RMST)	12.00	10.00	10.50	9.45	12.00	11.00	11.70	18.00
10	ton liq. asph., SC-2 (pr. ct., PMS)	16.00	10.00	12.00	15.00	17.00	15.00	15.00	20.00
287	ton liq. asph., ROMC-4 or 5 (PMS)	10.50	12.00	11.00	10.75	11.00	9.00	11.70	10.00
5,500	ton min. aggr. (PMS)	2.60	1.75	2.90	2.60	3.00	2.80	2.96	3.30
9.2	ton asph. emul. (paint binder)	25.00	25.00	40.00	25.00	30.00	30.00	35.00	40.00
285	cu. yd. cl. "A" P.C.C. (structures)	20.00	28.00	24.00	23.00	22.00	23.00	25.00	25.00
35	cu. yd. cl. "A" P.C.C. (curbs and gutters)	18.00	16.00	15.00	18.00	24.00	18.00	17.00	14.00
22	ea. ruby reflectors	2.50	2.00	2.00	5.00	2.00	4.00	1.70	10.00
66,000	lb. bar reinf. stl. (pav't & struc.)	.057	.055	.06	.07	.06	.06	.07	.045
108	lin. ft. 8-in. C.M.P.	1.00	1.00	1.05	1.00	1.00	1.00	1.00	1.00
2,380	lin. ft. 12-in. C.M.P.	1.20	1.20	1.35	1.25	1.20	1.25	1.42	1.30
1,026	lin. ft. 18-in. C.M.P.	1.75	1.75	1.70	1.85	1.80	2.00	1.96	1.70
92	lin. ft. 18-in. C.M.P. (siphons)	2.80	2.50	2.50	2.50	2.60	3.00	2.60	3.00
126	lin. ft. 24-in. C.M.P. (siphons)	3.60	3.30	3.80	3.50	3.50	4.00	3.70	5.00
176	lin. ft. 24-in. P.M.P. (sumps)	3.00	2.75	3.20	3.60	3.00	3.00	2.98	4.00
90	cu. yd. rock fill. matl. (sumps)	2.00	1.65	5.00	4.00	2.50	4.00	3.15	5.00
134	lin. ft. rem., clg. & salv. pipe culv.	.40	.50	.50	.40	.75	1.00	.60	1.00
134	lin. ft. relay. salvaged pipe	.40	.50	.40	.50	.60	.50	.72	1.00
3	ea. 18-in. conc. joints (siphons)	12.00	7.00	9.00	10.00	10.00	15.00	7.23	10.00
4	ea. 24-in. conc. joints (siphons)	15.00	9.00	12.00	14.00	12.00	20.00	8.84	12.00
23	ea. std. cast stl. frames & covers for D. I.'s	40.00	50.00	52.00	60.00	60.00	55.00	58.00	30.00
4	ea. spl. cast stl. frames & covers for D. I.'s	60.00	85.00	85.00	95.00	$100	$100	$100	30.00
6	ea. spillway assemblies	16.00	14.00	20.00	15.00	15.00	20.00	14.65	20.00
15	cu. yd. riprap	3.00	6.00	3.75	4.00	4.00	5.00	17.55	10.00
122	lin. ft. timber railing	2.00	1.25	2.40	2.50	1.25	2.00	1.75	1.50
210	ea. culv. mkrs., gde. posts and sta. markers	2.50	2.00	3.00	2.00	2.50	3.00	2.63	2.00
4	mi. new property fence	$500	$550	$550	$525	$500	$500	$431	$400
4.5	mi. rem. and salv. prop. fence	$100	$100	$150	$125	$300	$100	70.00	$250
0.5	mi. mov. and reset. prop. fence	$350	$550	$375	$400	$400	$400	$292	$400
15	ea. drive gates	18.00	20.00	20.00	20.00	25.00	20.00	22.00	20.00
4	ea. walk gates	12.00	12.00	15.00	9.00	20.00	10.00	10.40	10.00
120	ea. monuments	2.50	2.00	3.00	2.50	3.00	3.00	2.92	2.00
504	lin. ft. furn. conc. piles, incl. test piles	2.50	.50	3.20	2.00	2.20	2.50	2.34	3.00
12	ea. driv. conc. piles (precast or stl. shells) inc. T.P.	$100	$180	75.00	$100	$100	$100	$100	80.00
24	ea. remov. and reset. trees	25.00	40.00	90.00	50.00	35.00	25.00	65.00	20.00
14,790	cu. yd. cl. "B" P.C.C. (pav't and base)	7.00	7.25	7.05	7.40	8.20	7.85	8.43	8.10
12,900	ea. pavement dowels	.20	.18	.15	.17	.18	.15	.18	.14
510	ea. weak. plane joints (type 3)	2.50	2.50	2.70	3.00	2.50	2.25	3.00	4.00
30	sect's pave. cross. dev. (type C)	50.00	40.00	35.00	48.00	15.00	30.00	70.00	50.00
1	lot misc. items of bridge work	$350	$300	$1000	$750	$500	$100	$125	$1000
1	lot electrical work	$1210	$1000	$1000	$1500	$2000	$1000	$2200	$1000

Check these output-producing features against any 2½-yard excavator

1. Long upper boom section and big point sheaves give highly efficient digging angle.
2. Conical hook rollers eliminate center pintle, take both up and down loads.
3. Big direct-action clutches and brakes give fully responsive control. (Swing clutches are 36" diameter.)
4. 207 H. P. diesel engine gives plenty of power for fast operation in tough digging.
5. Extensive use of anti-friction bearings and oil gear enclosures means sustained operation smoothness.
6. Every detail is scientifically designed for smooth performance and long life.



Bucyrus·Erie

SOUTH MILWAUKEE, WISCONSIN

SAN FRANCISCO: BUCYRUS-ERIE CO., 390 Bayshore Blvd.; PORTLAND: CLYDE EQUIPMENT CO., 17th and Thurman Sts.; SEATTLE: CLYDE EQUIPMENT CO., 3410 First Ave. South; BOISE: INTER-MOUNTAIN EQUIPMENT CO., Broadway at Myrtle.

Wyoming—Yellowstone County—P. R. A.—Grade and Surface

Contract awarded to E. A. Studer & Sons Co., Billings, Mont., $78,704, by Public Roads Administration, Denver, Colo., for 0.5 mi. grade and surface W. Thumb Development of Grand Loop Highway within Yellowstone National Park. Bids were received from the following:

(A)	E. A. Studer & Sons Co.	$ 78,704
(B)	Taggart Construction Co.	89,745
(C)	Woodward Construction Co.	94,698
(D)	Northwestern Engineering Co.	97,000
(E)	Peter Kiewit Sons Co.	102,432
(F)	S. J. Groves & Sons Co.	106,764
(G)	Olof Nelson Construction Co.	$109,801
(H)	Inland Construction Co.	112,259
(I)	J. L. McLaughlin	119,000
(J)	Lowdermilk Bros.	119,523
(K)	McLaughlin Construction Co.	121,712
(L)	S. Birch & Sons Construction Co.	139,645

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
(1)	4 acres clearing	$100	312.50	$250	$275	$175	$300	$500	$300	$200	$250	$400	$500
(2)	2 acres grubbing	$150	312.50	$260	$275	$125	$300	$300	$300	$200	$250	$400	$500
(3)	1,500 cu. yd. stripping and storing topsoil	.30	.20	.75	.30	.50	.60	1.00	.47	.20	.50	.20	.30
(4)	8,100 cu. yd. unclassified excavation	.40	.29	.30	.40	.50	.60	.65	.47	.50	.80	.75	.40
(5)	5,000 cu. yd. unclass. excav. for struct.	.70	1.45	.75	2.80	2.00	1.50	2.50	1.60	2.00	2.50	2.50	3.00
(6)	11,600 cu. yd. unclass. excav. for borrow	.40	.31	.48	.40	.50	.60	.40	.47	.30	.50	.40	.40
(7)	116,000 sta. yd. special overhaul	.02	.01	.0025	.02	.015	.02	.03	.015	.02	.02	.01	.02
(8)	8,800 cu. yd. mi. special overhaul	.15	.15	.10	.15	.10	.25	.20	.24	.10	.20	.10	.30
(9)	6,200 ton 1½-in. heavy base course	1.30	1.20	1.40	1.25	1.35	1.50	1.75	1.65	2.00	2.00	3.00	2.50
(10)	200 units watering	2.00	1.25	1.00	1.35	1.00	3.00	2.00	1.60	1.50	2.00	1.00	3.00
(11)	100 hr. roller operation	3.00	5.00	3.00	2.75	3.00	4.00	3.00	5.00	3.50	5.00	3.00	4.00
(12)	1 ea. furnishing roller	$150	$100	$280	$200	$100	$500	$300	$300	$300	$300	$200	$500
(13)	Lump Sum water plant or plants for project	$100	$100	$100	$200	$100	$300	$150	$160	$100	50.00	$100	$500
(14)	12,000 gal. MC-1 cutback asph. for pr. ct.	.10	.10	.08	.10	.10	.12	.08	.13	.15	.10	.10	.15
(15)	2,200 ton cl. "C" new aggr., grade "A"	2.50	1.75	2.00	1.40	1.60	1.50	2.00	1.80	2.50	2.50	3.50	2.75
(16)	240 ton class "C" cover aggregate	2.50	5.00	3.75	4.00	5.00	4.50	3.50	3.50	5.00	6.00	5.00	8.00
(17)	27,000 gal. MC-3 ctbk. asph. for cl. C-1 roadmix	.12	.10	.08	.10	.08	.12	.08	.11	.12	.10	.09	.15
(18)	9,000 gal. RC-4 ctbk. asph. for cl. "C" seal	.15	.12	.08	.10	.12	.12	.08	.18	.15	.10	.10	.18
(19)	22,540 sq. yd. C-1 roadmix surf. laid	.10	.10	.10	.09	.10	.10	.10	.12	.20	.05	.10	.25
(20)	42 cu. yd. class "A" concrete	35.00	27.50	30.00	30.00	40.00	35.00	40.00	55.00	35.00	30.00	35.00	40.00
(21)	4,400 lb. reinforcing steel	.08	.085	.10	.08	.10	.15	.10	.12	.15	.10	.10	.15
(22)	11,200 lb. structural steel	.12	.13	.10	.20	.15	.20	.20	.24	.20	.14	.15	.15
(23)	6 MFBM tr. timber creosote preserv.	$140	$160	$220	$130	$200	$125	$150	$200	$150	$125	$150	$150
(24)	940 lin. ft. 6-in. vitrified clay pipe	.30	.42	1.40	.50	1.25	.75	.80	.63	.75	1.00	.50	1.00
(25)	850 lin. ft. 8-in. vitrified clay pipe	.45	.56	1.50	.75	1.75	.90	1.20	.80	1.25	1.25	.75	1.20
(26)	1,700 lin. ft. 12-in. vitrified clay pipe	.70	.90	2.25	1.15	2.00	1.30	1.60	1.00	1.50	1.90	1.25	1.70
(27)	750 lin. ft. 18-in. vitrified clay pipe	1.70	2.00	3.50	2.25	4.00	2.75	3.50	1.60	2.50	2.50	2.10	3.10
(28)	1,150 lin. ft. 24-in. vitrified clay pipe	3.10	4.00	6.00	4.00	5.00	5.00	5.00	3.00	4.00	3.60	3.60	5.00
(29)	25 cu. yd. hand-laid rock embankment	4.00	3.75	5.00	4.00	10.00	10.00	5.00	24.00	5.00	10.00	10.00	4.00
(30)	1,640 lin. ft. 6-in. clay sewer pipe underdr.	.60	1.00	1.00	.50	1.50	.75	1.00	1.60	.75	2.00	.50	1.25
(31)	5 sq. yd. grouted rubble gutter	15.00	5.00	10.00	5.00	15.00	10.00	5.00	8.00	5.00	7.50	15.00	10.00
(32)	8,300 lin. ft. concrete curb 20-in. depth	1.10	1.45	1.60	1.00	1.15	1.15	1.50	1.60	1.40	1.30	1.50	2.00
(33)	1,500 cu. yd. replacing topsoil	.30	.25	.70	.35	1.00	.60	.60	.55	1.50	.70	1.00	1.00
(34)	3,000 sta. yd. overhaul topsoil pile to pl.	.02	.25	.15	.30	.02	.025	.05	.015	.05	.02	.02	.50
(35)	3,300 sq. ft. cutting, lifting, and plac. sod	.10	.12	.10	.10	.15	.10	.30	.16	.20	.15	.25	.40
(36)	6,100 sq. yd. sidewalk, bituminous	.12	.93	.50	.85	1.25	1.00	.25	.87	1.25	1.75	.60	.50
(37)	600 lin. ft. native log barrier	.40	.85	1.00	1.15	.75	.85	1.00	1.60	2.00	1.00	1.50	2.00
(38)	250 lin. ft. rail fence	.40	2.00	.50	1.00	2.00	1.50	1.00	2.40	2.00	2.50	1.50	2.00
(39)	30 cu. yd. special rock fill	5.00	2.50	1.00	2.00	7.00	3.00	2.00	3.00	4.00	.75	12.00	4.00
(40)	630 lin. ft. 3-in. water line	.60	.75	1.00	.70	1.50	1.75	1.00	.95	1.50	1.50	2.00	2.00
(41)	1 ea. power and tele. vault, type "A"	$500	$630	$600	$350	$500	$790	$850	$900	$750	$600	$800	$500
(42)	3 ea. power and tele. vault, type "A-B"	$600	$780	$500	$490	$600	$940	$1000	$1050	$1000	$800	$1200	$350
(43)	2 ea. manhole, type I	$200	$140	$125	$150	$200	$175	$250	$190	$200	$200	$300	$300
(44)	3 ea. manhole, type II	$250	$160	$130	$160	$250	$200	$300	$234	$250	$300	$400	$300
(45)	Lump Sum furn. and install. elec. and telephone systems	$8500	$8500	$10000	$11608	$6400	$11000	$8000	$14500	$14309	$9500	$12500	$15635
(46)	Force Acct. misc. items	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000	$4000

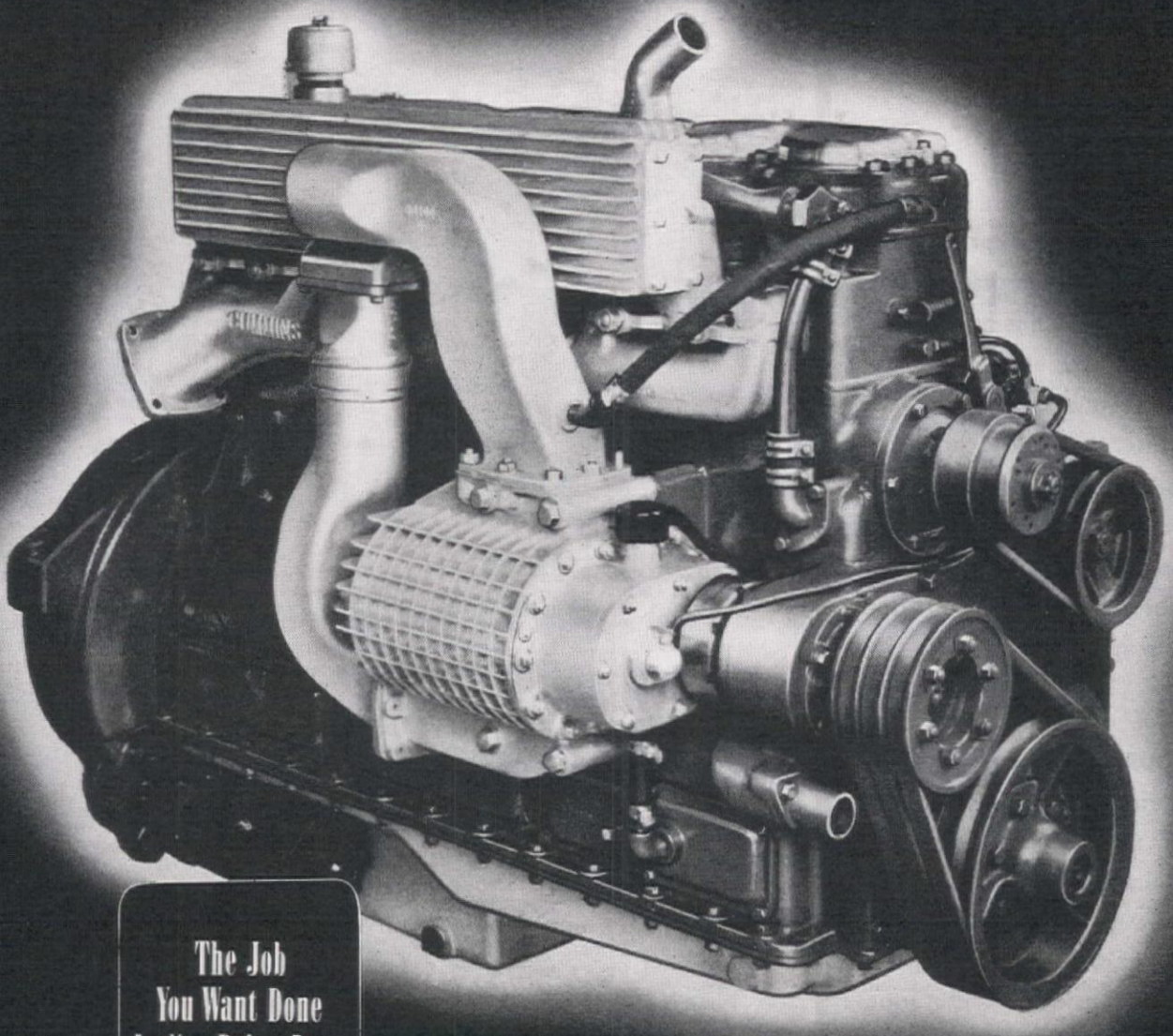
Idaho—Blaine County—P. R. A.—Grade

Award recommended to K. L. Goulter, Seattle, Wash., $116,360, by the Public Roads Administration, Ogden, Utah, for 3.3 mi. grade and surface, Ketchum-Clayton Forest Highway, Sawtooth National Park. Bids were received from the following:

(1)	K. L. Goulter	$116,360
(2)	Wheeler & England	129,808
(3)	Dan J. Cavanagh	134,277
(4)	Barnard-Curtiss Co.	$139,902
(5)	Tony Marrazo	158,643

		(1)	(2)	(3)	(4)	(5)
All	Required extra and misc. force account work	$600	$600	$600	$600	$600
36	acre clearing	50.00	70.00	$125	$125	$100
34	acre grubbing	50.00	70.00	$100	$125	$100
254,000	cu. yd. unclassified excavation	.35	.39	.41	.42	.50
700	cu. yd. unclassified excavation for structures	1.50	1.50	1.50	1.00	1.25
643,000	sta. yd. overhaul	.007	.015	.005	.01	.01
11,350	lin. ft. furrow ditches	.05	.07	.08	.01	.10
260	unit roadside cleanup	5.00	2.00	5.00	4.00	4.00
3.253	mile finishing earth graded road	$500	$300	$100	$500	$100
45	cu. yd. class "B" concrete	30.00	30.00	40.00	30.00	33.00
294	lb. reinforcing steel	.10	.10	.10	.10	.10
572	lin. ft. 18-in. C. G. S. M. pipe—16 gauge	2.25	1.85	2.50	2.50	2.00
1,048	lin. ft. 24-in. C. G. S. M. pipe—14 gauge	3.25	3.00	4.00	3.00	3.30
232	lin. ft. 24-in. C. G. S. M. pipe—12 gauge	4.50	4.00	5.00	3.50	4.20
156	lin. ft. 36-in. C. G. S. M. pipe—12 gauge	6.00	6.00	7.00	5.50	6.50
186	lin. ft. 36-in. C. G. S. M. pipe— 8 gauge	8.50	9.00	10.00	6.50	9.50
110	lin. ft. 12-in. perf. C. S. M. pipe underdrain	1.65	1.30	2.50	3.00	1.50
300	lin. ft. 6-ft. x 8-ft. exploratory tunnel	15.00	10.00	10.00	16.00	14.00

THE *Standout* IN AUTOMOTIVE, INDUSTRIAL & MARINE DIESEL POWER



The Job You Want Done Is *Now* Being Done with

CUMMINS *Dependable* **DIESELS**

SUPERCHARGED—one-third more power—less weight and lower fuel and lube oil consumption per horsepower—the same smooth running, quick acceleration, low maintenance and proved dependability that distinguish all Cummins Diesels . . . Write for the folder, "The Logic of Supercharging." Cummins Engine Company, 1916 Wilson Street, Columbus, Indiana.

Montana—Sweet Grass County—State—Grade and Bridges

Contracts awarded to Megarry Bros., Livingston, $95,231, for 6.6 mi. grade, surface with crushed gravel and construction of small drainage structures; and to W. P. Roscoe Co., Billings, by the Montana State Highway Commission for construction of 5 three-panel treated timber pile trestles over the South Fork of 10-Mile creek; over 10-Mile creek, over Wheeler creek and at survey station on Big Timber-Harlowton Road. Bids for the 6.6 mi. grade were received from the following:

(A)	Megarry Bros.	$ 95,231	
(B)	Standard Construction Co.	127,457	
(C)	S. J. Groves & Sons Co.	111,221	
(D)	Prahl & Sawtell, Inc.	117,981	
(E)	Leach Bros.	109,676	
(F)	Northwestern Engineering Co.	102,845	
(G)	J. L. McLaughlin	$117,855	
(H)	Collison and Dolven, Inc.	100,904	
(I)	S. Birch & Sons Construction Co.	110,821	
(J)	Inland Construction Co.	123,397	
(K)	Stanley H. Arkwright	97,832	
(L)	Union Construction Co.	97,969	

(1)	185,333	cu. yd.	unclass. excavation	
(2)	836	cu. yd.	culvert excavation	
(3)	114,700	sta. yd.	overhaul	
(4)	1,271	sq. yd.	grouted riprap	
(5)	33,475	ton	base course cr. grav.	
(6)	18,706	ton	grade A top course	
(7)	1,549	ton	stone chips	
(8)	2,500	cu. yd.	binder	
(9)	5,000	yd. mi.	overhaul on binder	
(10)	2,200	M. gal.	watering	
(11)	500	hr.	rolling	
(12)	106,556	gal.	app. SC-4 road oil	
(13)	6.639	mi.	processing	
(14)	246	sq. yd.	process road apps.	
(15)	3,862	gal.	tack oil should. SC-2	
(16)	28,652	gal.	seal coat oil 95+	
(17)	248	lin. ft.	15-in. rein. conc. pipe culv.	
(18)	52	lin. ft.	18-in. rein. conc. pipe culv.	
(19)	1,428	lin. ft.	24-in. rein. conc. pipe culv.	
(20)	56	lin. ft.	36-in. rein. conc. pipe culv.	
(21)	112	lin. ft.	48-in. rein. conc. pipe culv.	
(22)	164	lin. ft.	18-in. corr. met. syphon pipe	
(23)	204	lin. ft.	30-in. corr. met. syphon pipe	
(24)	3.92	lin. ft.	class B concrete	
(25)	9	each	wood guide posts	
(26)	1	each	conc. proj. marker	
(27)	36	each	wood station marker	
(28)	67	each	conc. r/w monument	
(29)	1,000	ton	stock piled gravel	

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
(1)	.14	.175	.20	.18	.18	.16	.21	.16	.19	.21	.15	.14
(2)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.50	1.00	1.00	1.00	1.00
(3)	.01	.01	.0075	.01	.01	.015	.01	.005	.01	.02	.005	.01
(4)	2.50	4.00	3.00	4.00	4.00	4.00	4.00	2.75	2.25	5.00	3.00	4.00
(5)	.40	.75	.50	.70	.55	.58	.60	.50	.60	.50	.50	.45
(6)	.70	1.20	.65	.80	.75	.68	.90	.78	.60	.90	.75	.75
(7)	3.00	5.00	3.00	2.50	3.00	3.00	3.00	2.80	2.50	4.00	3.50	3.00
(8)	.10	.25	.10	.30	.10	.25	.10	.02	.10	.15	.01	.10
(9)	.10	.10	.10	.15	.05	.10	.05	.01	.10	.15	.01	.05
(10)	1.50	1.50	3.00	2.00	1.50	1.50	1.00	1.50	1.25	2.00	1.00	1.25
(11)	4.00	3.50	3.00	3.00	4.00	3.50	3.50	3.00	4.00	4.00	3.00	4.00
(12)	.08	.08	.08	.087	.08	.065	.07	.09	.085	.075	.07	.07
(13)	$800	$750	$900	$800	$800	$600	$800	$700	$850	$800	$855	$750
(14)	.50	.15	.50	.50	.20	.20	.50	.30	.30	.30	.50	.25
(15)	.10	.07	.08	.09	.08	.067	.10	.15	.10	.08	.07	.10
(16)	.09	.085	.08	.10	.08	.08	.10	.10	.10	.095	.08	.12
(17)	1.75	2.00	1.70	1.80	2.00	1.70	2.00	1.50	2.50	2.00	1.65	1.50
(18)	2.50	2.70	2.25	2.50	3.00	2.20	3.00	2.10	3.00	3.00	3.00	2.50
(19)	3.50	3.50	3.20	3.50	3.50	3.30	3.25	2.90	4.50	4.00	3.00	3.25
(20)	7.00	7.00	6.35	6.90	6.00	6.00	7.00	6.00	8.00	7.50	6.00	7.00
(21)	11.00	12.00	10.70	11.35	10.00	10.00	11.00	10.00	12.50	13.00	10.50	12.00
(22)	3.00	2.25	2.15	2.40	3.00	2.30	3.00	2.20	3.00	2.75	2.35	3.00
(23)	5.00	4.00	4.00	4.75	5.00	4.20	5.00	4.00	6.00	5.00	4.50	5.00
(24)	40.00	30.00	50.00	35.00	40.00	35.00	40.00	30.00	30.00	30.00	50.00	30.00
(25)	10.00	5.00	3.00	2.00	3.00	2.50	4.00	2.50	5.00	3.50	5.00	3.00
(26)	15.00	10.00	15.00	10.00	15.00	15.00	25.00	10.00	15.00	15.00	25.00	10.00
(27)	3.00	3.00	3.00	2.00	3.00	2.50	3.00	2.50	5.00	5.00	4.00	4.00
(28)	3.00	3.00	3.00	5.00	3.00	3.00	3.00	2.50	5.00	5.00	3.00	3.00
(29)	.75	1.20	.65	.80	.75	.68	.75	.78	.60	.90	.75	.75

Bids for Unit No. 2, construction of 5 trestles, were received from the following:

(A)	W. P. Roscoe Co.	$14,915	
(B)	Standard Construction Co.	16,513	
(C)	H. E. Nesbitt	15,973	
(D)	L. V. Lockwood	16,244	
(E)	Walter Mackin	16,922	
(F)	Thomas Staunton	$16,987	
(G)	Prahl & Sawtell, Inc.	16,632	
(H)	Stanley H. Arkwright	17,065	
(I)	Midland Construction Co.	15,632	

(1)	107.53	MFBM	treated lumber	
(2)	6.62	MFBM	untreated lumber	
(3)	14	ea.	20-ft. treated timber piles	
(4)	53	ea.	25-ft. treated timber piles	
(5)	29	ea.	30-ft. treated timber piles	
(6)	24	ea.	35-ft. treated timber piles	
(7)	5	ea.	40-ft. treated timber piles	
(8)	47	cu. yd.	gravel ballast	
(9)	Lump Sum		rem. ex. str. & main. traffic	
(10)	Lump Sum		rem. ex. str. & main. traffic	

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	$104	$110	$107	$103	$110	$115	$115	$110	$105
(2)	$102	$110	$100	$100	$110	$110	$115	$100	$100
(3)	17.00	20.00	20.00	25.00	23.00	24.00	18.00	22.00	20.00
(4)	20.00	25.00	28.00	30.00	27.00	27.00	22.50	27.00	25.00
(5)	23.00	30.00	28.00	35.00	33.00	30.00	27.00	33.00	27.60
(6)	26.00	35.00	34.00	40.00	37.00	32.00	31.50	37.00	32.20
(7)	35.00	40.00	40.00	50.00	40.00	40.00	36.00	50.00	36.80
(8)	2.50	3.00	2.00	3.00	2.50	4.00	3.00	3.00	2.50
(9)	75.00	$150	60.00	$100	$300	50.00	$100	$200	$100
(10)	$100	$150	60.00	$100	$150	50.00	$100	$400	$100

Irrigation . . .

Arizona—Yuma County—Bur. of Recl.—Structure

Hansen & Izer, Ventura, Calif., $71,687, low to the Bureau of Reclamation, Yuma, for const. of the Wellton-Mohawk check and turnout, Sta. 790-90. 17, Gravel Main canal, Gila project. Bids were received from the following:

(1)	Hansen & Izer	$71,687	
(2)	Ralph A. Bell	95,281	
(3)	Vinson & Pringle	$98,824	
(4)	Charles J. Dorfman	99,100	

		(1)	(2)	(3)	(4)
15,000	cu. yd. excavation for structure	.50	1.00	.585	.46
400	cu. yd. compacted subbase	1.10	1.50	2.25	4.60
7,100	cu. yd. backfill	.30	.40	.52	.30
5,200	cu. yd. compacted backfill	1.00	.80	2.25	2.30
1,000	cu. yd. removing riprap from existing embankment	.40	1.00	1.04	1.67
900	cu. yd. riprap	.60	1.50	1.30	.50
130	cu. yd. constructing reverse filters	1.50	4.00	2.27	4.50
764	cu. yd. concrete in floor panels and slope paving	12.50	15.00	17.55	22.40
1,628	cu. yd. conc. in struct., except in floor panels and slope paving	18.50	23.00	24.18	23.00
362,000	lb. placing reinforcement bars	.013	.02	.0145	.0172
1,940	sq. ft. placing elastic joint-filler materials	.35	.20	.26	.46
1,390	lin. ft. placing rubber water stops	.35	1.50	.78	.69
3,100	lin. ft. driving steel sheet piling	.75	.75	1.30	1.47
9,700	lb. installing metal pipe and fittings, except pipe handrails	.05	.10	.0455	.045
5,650	lb. installing pipe handrails	.05	.14	.04	.06

(Continued on next page)

MARMON-HERRINGTON *All-Wheel-Drive*

"It has given us a smoother road surface, faster than any equipment we ever had. We use it to pull much larger trucks through when the going is bad."—A New England Town Board.

"Our Marmon-Herrington *All-Wheel-Drive* converted Ford was the only truck on the job that could reach the dump with a load. The rear axle was often completely buried in the sand," writes a well-known contractor.

"Outstanding IN MUD, SAND AND SNOW," Says Prominent Firm of General Contractors

Year after year Marmon-Herrington *All-Wheel-Drive* converted Fords have proven themselves veritable "little giants" in all sorts of general construction and road work. 1941 models are better yet, because they incorporate all the improvements in design and construction which have been developed through the years by The Ford Motor Company, and by Marmon-Herrington engineers. Truly, there are no other trucks, at any price, which can surpass these powerful, fleet and economical vehicles for performance when the "going" is really tough.

We convert all standard Ford trucks, passenger cars and commercial vehicles to *All-Wheel-Drive* in the same plant where Marmon-Herrington heavy duty *All-Wheel-Drive* trucks are built. Write for literature on any or all of these vehicles, and ask for a demonstration by our dealer in your territory. You will be amazed at what these vehicles will do, and agreeably surprised at the low prices. Cable address MARTON.

MARMON-HERRINGTON CO., INC. • INDIANAPOLIS, INDIANA, U. S. A.

Western Distributors: Western Traction Co., 355 Fremont St., San Francisco; The Crook Co., 2900 Santa Fe Ave., Los Angeles; Western Road Machinery CO., 83 S. E. Belmont St., Portland; The Sawtooth Co., 715 Grove St., Boise; Smoot Machinery Co., 2320 Neff's Lane, Salt Lake City; O. S. Stapley Co., 723 Grande Ave., Phoenix; Midland Implement Co., 2303 Montana Ave., Billings; Natrona Motor Co., 125 North Center St., Casper; Dean Gillespie & Co., 601 East 18th Ave., Denver; Morrow & Company, Inc., 1025 N. Fourth St., Albuquerque.

65,000 lb. installing radial gates and embedded metalwork	.04	.04	.04	.04
17,000 lb. installing radial gate hoists and operat. and contr. mech	.06	.06	.05	.045
12,000 lbs. installing miscellaneous metalwork	.07	.10	.10	.045
Lump Sum constructing engine house, except concrete	$950	$400	$390	$135
5 MFBM constructing timber railing	40.00	60.00	58.00	50.00
10 MFBM placing timber bulkheads	30.00	50.00	71.00	40.00
1,700 lin. ft. installing electrical metal conduits	.20	.25	.32	.25
280 lb. installing electrical conductors and ground wires	.25	.60	.52	.25
1,650 lb. installing electrical apparatus	.20	.30	.13	.25

Bridge and Grade Separation . . .

California—Kern County—State—Structures

Contract awarded to A. Teichert & Son, Incorporated, Sacramento, $192,339, by California Division of Highways, Sacramento, for construction of two bridges, one across the Kern River and the other across Beardsley Canal about 1 and 2 mi., respectively, north of Bakersfield. Bids were received from the following:

(A) A. Teichert & Son, Inc. $192,339
(B) R. R. Bishop 192,565
(C) Carlo Bongiovanni 192,878
(D) Griffith Co. 193,275
(E) A. Soda & Son 195,322
(F) Trewhitt-Shields & Fisher 199,969
(G) J. E. Haddock, Ltd. $210,488
(H) Ralph A. Bell 201,924
(I) Heafey-Moore and Fredrickson & Watson Construction Co. 207,620
(J) Harry J. Oser 214,030

(1) Detour bridge
(2) Remove exist. bridge
(3) 75 M. gal. water
(4) 200 cu. yd. roadway excav., w/o class
(5) 1,450 cu. yd. struct. excav.
(6) 1,700 cu. yd. imported borrow
(7) 1 ton liq. asph. SC-2 (pr. ct.)
(8) 6 tons liq. asph. SC-4 (RMST)
(9) 750 sq. yd. prep. mixing & shap. shldrs.
(10) 200 sq. yd. asph. paint binder
(11) 250 ton mineral aggregate (P.M.S.)
(12) 12 ton liq. asph. SC-6 (P.M.S.)
(13) 100 cu. yd. salvaged P.M.S.
(14) 592,000 lb. furn. bar reinf. steel
(15) 592,000 lb. placing bar reinf. steel
(16) 270 cu. yd. cl. "A" P.C.C. (foot. blocks)
(17) 2,425 cu. yd. cl. "A" P.C.C. (structs.)
(18) 677,000 lb. furn. struct. steel
(19) 677,000 lb. erect. struct. steel
(20) 8,520 lb. misc. iron and steel
(21) 7,560 lin. ft. furn. concrete piles
(22) 277 ea. drive conc. piles (pre-cast or stl. shls.)
(23) 2,756 lin. ft. steel railing
(24) 1,476 lin. ft. pipe railing
(25) 1 lot conduit and fittings
(26) 1 lot miscel. items of work

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	$2500	$3000	$2250	$2000	$7000	$3000	$3500	$2500	$1300	$4357
(2)	$250	$1500	$400	$420	$3750	$725	$1000	$1800	$250	$1500
(3)	1.50	2.00	1.00	2.50	2.00	2.00	2.50	1.20	1.20	1.00
(4)	.50	1.00	.50	.35	.50	.60	1.00	.60	.60	1.00
(5)	3.00	4.00	1.00	4.15	4.00	2.65	3.00	3.00	3.00	4.00
(6)	.80	1.00	.50	.64	.50	.50	.75	.75	.70	.75
(7)	20.00	30.00	15.00	24.00	30.00	12.00	30.00	25.00	10.00	50.00
(8)	10.00	25.00	15.00	10.00	20.00	6.50	15.00	12.00	10.00	40.00
(9)	.15	.30	.25	.12	.10	.10	.25	.12	.12	.20
(10)	.05	.10	.05	.06	.15	.20	.10	.06	.12	.15
(11)	2.50	3.00	4.00	3.10	3.00	4.00	4.50	3.00	3.60	4.00
(12)	10.00	12.00	10.00	7.70	10.00	8.00	10.00	18.00	10.00	25.00
(13)	1.00	1.50	1.00	.50	1.00	1.00	1.00	1.80	.60	1.00
(14)	.037	.04	.034	.035	.0315	.034	.032	.037	.04	.0325
(15)	.01	.004	.01	.009	.01	.01	.008	.01	.01	.0085
(16)	13.00	12.00	8.50	13.00	10.75	8.00	9.00	10.00	15.00	10.00
(17)	18.50	20.00	24.00	20.90	19.00	23.50	30.00	18.60	24.40	30.00
(18)	.065	.065	.063	.06	.07	.065	.058	.079	.07	.0525
(19)	.02	.01	.018	.021	.015	.022	.019	.02	.02	.0125
(20)	.18	.15	.15	.15	.20	.16	.15	.16	.17	.15
(21)	1.70	1.75	1.50	1.60	1.50	1.85	1.51	2.55	1.80	2.00
(22)	35.00	36.00	29.00	29.90	40.00	35.00	31.25	26.00	35.00	64.00
(23)	6.50	5.40	5.00	5.10	5.00	6.00	6.00	5.50	5.60	6.00
(24)	1.75	2.25	2.00	2.10	2.00	1.25	3.00	2.00	2.25	1.50
(25)	$2300	$1000	$1500	$1100	$2000	$1200	$500	$1200	$1100	$1155
(26)	$2000	$6500	$5967	$7400	$2500	$1200	$4500	$639	$700	$1195

Sewerage . . .

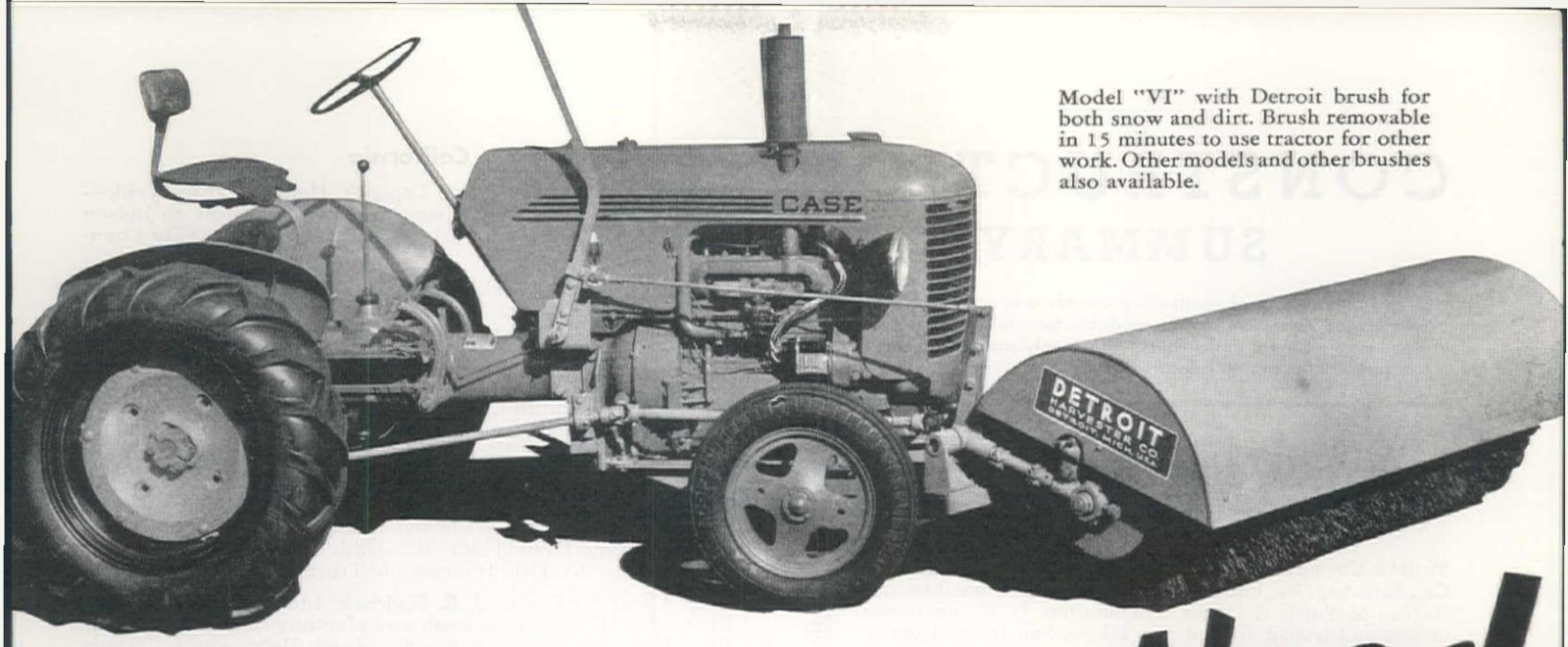
California—Los Angeles County—M. W. D.—Pipeline

M. C. Nottingham Co., Temple City, $10,496, low to Metropolitan Water District, Los Angeles, for construction of 0.6 mi. 8-in. vitrified clay pipe sewer and 0.9 mi. 10-in. concrete or vitrified clay pipe sludge disposal line at the District's treatment plant near La Verne. Bids were received from the following:

(A) M. C. Nottingham Co. $10,496
(B) Culjak & Zelko 11,158
(C) Edward Green 11,983
(D) G. E. Kerns 12,421
(E) Pete Chorak 12,936
(F) Sutalo & Ramljak $12,958
(G) Leko & Bosnyak 14,372
(H) Bebek & Brkich and VCK Constr. Co. 15,086
(I) J. L. Kruly Co. 15,337
(J) R. A. Wattson Co. 17,947

(1) 3,500 cu. yd. trench excavation
(2) 140 cu. yd. structure excavation
(3) 3,200 cu. yd. backfill
(4) 50 cu. yd. concrete structures
(5) 20 cu. yd. concrete cradle
(6) 3,100 lin. ft. furnish & install 8-in. vitrified clay pipe
(7) 4,470 lin. ft. furnish & install 10-in. concrete or vitrified pipe
(8) 60 lin. ft. incasement under railroad
(9) Lump Sum, valve structure
(10) 21 each steel pipe & coupling assemblies for manholes
(11) 1,600 lbs. reinforced steel
(12) 17,000 lbs. install plug valves & manhole covers
(13) 250 lin. ft. brick manhole shafts
(14) 1 each drop manhole connection
(15) 1 each drop manhole connection to existing sewer.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	.21	.30	.90	.65	.86	.22	1.00	.65	1.00	.90
(2)	.90	.75	1.00	1.00	1.15	.50	2.00	1.00	1.00	3.00
(3)	.15	.15	.15	.20	.24	.10	.20	.20	.50	.50
(4)	6.00	25.00	12.00	15.00	10.50	8.00	20.00	10.00	20.00	30.00
(5)	6.00	20.00	12.00	15.00	8.25	15.00	15.00	7.00	15.00	12.00
(6)	.50	.58	.48	.65	.50	.80	.50	.55	.60	.55
(7)	.67	.60	.50	.65	.70	.87	.55	.65	.75	.75
(8)	21.00	8.00	10.00	6.00	6.00	15.00	15.00	20.00	10.00	17.00
(9)	$307	$400	$300	$250	$410	$300	$275	$1000	$500	$450
(10)	42.25	20.00	50.00	50.00	52.00	50.00	54.00	40.00	25.00	38.00
(11)	.06	.08	.10	.06	.115	.05	.15	.06	.05	.07
(12)	.01	.01	.01	.02	.01	.05	.01	.08	.02	.06
(13)	5.60	7.00	5.00	5.00	5.50	6.00	7.50	9.00	6.00	10.00
(14)	25.00	20.00	10.00	25.00	12.00	25.00	25.00	10.00	20.00	40.00
(15)	45.00	25.00	10.00	25.00	25.00	25.00	25.00	25.00	20.00	40.00



Model "VI" with Detroit brush for both snow and dirt. Brush removable in 15 minutes to use tractor for other work. Other models and other brushes also available.

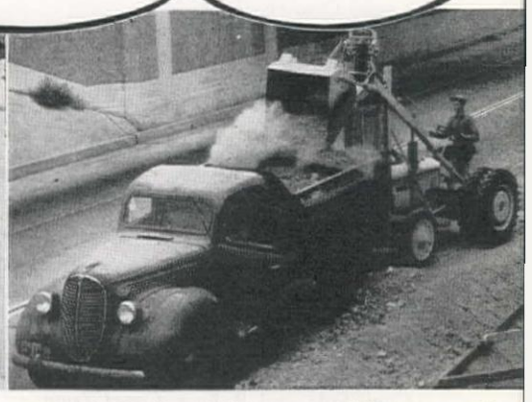
Four Models

Match Every Need

The Right Size for Every Job

Model "VI" has a weight range from 2400 to 3500 pounds, according to wheel, tire and other tractor equipment. With Case-Detroit mower is ideal for highway and similar work.

Model "RI" with varying equipment ranges from 3500 to 5000 pounds. As shown here with sidewalk plow it gets through narrow spaces, has power to handle heavy snowfalls.



Model "DI" available in a weight range of 5000 to 8500 pounds, is here shown working with a Hough loader making fast work of earth removal on a California culvert job.

When you choose a Case tractor you get gospel measure of weight, power, convenience, endurance, economy. What's more, you automatically get the choice of the finest equipment for putting power to work. It's only natural that makers of the better snow plows, brushes, loaders, etc., design them to work with tractors of top quality and working capacity.

Four sizes of tractor ranging from 2400 pounds weight to more than 11,000 pounds permit the operating economies of power closely proportioned to its job. There is no need for excess investment in too big a tractor, no compromise with capacity as with a tractor not quite big enough. For every size there is a long list of mounted machines. Whatever the nature or variety of work you have, find out what Case power and equipment offer you. Call your Case distributor or write the factory. J. I. CASE CO., Oakland and Los Angeles.

CASE

Model "LI" is the heaviest-duty wheel-type tractor made. It comes in a range of weights up to 11,000 pounds.

★

This tractor also is available with a Case-built solid-injection, spark ignition engine, and when thus powered it is called the "LIH." It burns a variety of low-cost fuels. Its operating and upkeep cost are surprisingly low in continuous service.

CONSTRUCTION SUMMARY

NOTE: This summary of construction awards and proposed projects has been changed to present a more readable form in which news of specific projects may be more easily found. The county name leading each item is that in which the project is located.

Large Western Projects...

CONTRACTS AWARDED

Mojave Corporation, Los Nietos, and **Person & Hollingsworth Co.,** Los Angeles, Calif., $1,530,000 (cost plus fixed fee basis), by Bureau of Yards & Docks, Washington, D. C., for construction of pier and transit shed at San Diego, San Diego County, Calif.

Henry J. Kaiser Co., Oakland, Calif., $3,300,300 (cost plus fixed fee basis), by Bureau of Yards & Docks, Washington, D. C., for construction of quay walls, piers, dredging and accessories at Navy Yard, Mare Island, Solano County, Calif.

Martin Wunderlich and Okes Construction Co., Jefferson City, Mo., $8,517,100, by General Purchasing Office, Panama Canal, Washington, D. C., for excavation of an approach channel and for a lock structure and grade of RR relocation at Gatun, Canal Zone.

Ford J. Twaits Co. and Morrison-Knudsen Co., Inc., Los Angeles, Calif., $1,351,642 (recommended), by Constructing Quartermaster, Presidio of Monterey, Calif., for construction of seven buildings at Camp Clayton, Monterey County, Calif.

Zoss Construction Co., Los Angeles, Calif., and **McNeil Construction Co.,** Los Angeles, Calif., $9,500,000 (cost plus fixed fee basis), by Federal Works Agency, Washington, D. C., for construction of 3,000 housing units and facilities at San Diego, San Diego County, Calif.

B. O. Larsen, San Diego, Calif., $6,500,000 (approximately), by Consolidated Aircraft Co., San Diego, Calif., for construction of an aircraft manufacturing plant in San Diego, San Diego County, Calif.

MacDonald & Kahn Co., Ltd., San Francisco, Calif., $1,550,000 (cost plus fixed fee basis), by Constructing Quartermaster, Washington, D. C., for construction of a cantonment at Fort Lewis, Pierce County, Wash.

Bechtel-McCone-Parsons Corporation, Los Angeles, Calif., $1,600,000, by War Dept., Washington, D. C., for construction of a central heating and power plant at Elmendorf Field, Anchorage, Alaska.

Leonard Construction Co., Chicago, Ill., $4,224,000 (cost plus fixed fee basis), by Constructing Quartermaster, Washington, D. C., for construction of 1400 housing units and facilities at Coco Solo and Balboa, Canal Zone.

N. P. Severin Co., Oakland, Calif., $1,128,200, by Constructing Quartermaster, Ft. Mason, San Francisco, Calif., for construction of Albrook Field reclamation building, steam distributing plant, photo laboratory, chemical storage, Ft. Gulick sales commissary building, and other various buildings at Albrook Field, Canal Zone.

N. P. Severin Co., Chicago, Ill., $1,450,799, by Constructing Quartermaster, Ft. Mason, San Francisco, Calif., for construction of AC operations hangar No. 1 and flight hangars Nos. 1, 2 and 3, at Howard Field, Canal Zone.

Highway and Street...

CONTRACTS AWARDED

Arizona

PINAL CO.—**W. E. Orr Construction Co.,** 302 W. Monte Vista Road, Phoenix—$216,863 for 7-mi. grade, drain, aggregate base coarse and roadmix bitum. surf., Superior-Miami Hwy.—by Arizona State Highway Commission, Phoenix.

PINAL CO.—**Tanner Construction Co.,** P. O. Box 1832, Phoenix—$57,443 for 4.3 mi. grade, drain, aggregate base coarse and plantmix bitum, surf., Mesa-Superior Hwy.—by Arizona State Highway Commission, Phoenix.

California

ALAMEDA CO.—**Ransome Co.,** 2030 Hollis St., Emeryville—$10,471 for const. of Shellmound St., from Powell St. to Judson Iron Works property on Park Ave., Emeryville—by City Council, Emeryville.

IMPERIAL CO.—**Basich Bros.,** 20530 South Normandie Ave., Torrance—$207,577 for 8.8 mi. grade and surf. with plantmix surf., pave with asphaltic conc., widen exist. bridges and const. bridge betw. Sandy Beach Rd. and Truckhaven—by California Division of Highways, Los Angeles.

KERN CO.—**Griffith Co.,** Los Angeles Railway Bldg., Los Angeles—$385,638 for 6.0 mi. widen roadbed and const. conc. flumes betw. Ft. Tejon and 1.4 mi. N. of Grapevine Station—by California Division of Highways, Sacramento.

LOS ANGELES CO.—**Harvey B. Adair,** 1201 E. Garvey Ave., El Monte—$11,307 for grade and 4-in. decomposed granite pave on Anza Ave., 117th, 118th Sts., 118th Place and Felton Ave., Los Angeles—by Title Insurance & Trust Co., Los Angeles.

LOS ANGELES CO.—**J. E. Haddock, Ltd.,** 3578 East Foothill Blvd.—$59,317 for 3.1 mi. grade and plantmix surf. on Bellflower Blvd. betw. Spring and South Sts., Long Beach—by California Division of Highways, Los Angeles.

SACRAMENTO CO.—**A. Teichert & Son,** 1846 37th St., Sacramento—$14,715 for grade, pave and sewers on "H" St. betw. 53rd and El Dorado Way, Sacramento—by City Council, Sacramento.

SACRAMENTO CO.—**J. R. Reeves,** P. O. Box 1072, Sacramento—$12,150 for resurf. roads from Mills to Mather Field, Sacramento—by Board of Supervisors, Sacramento.

SAN DIEGO CO.—**Daley Corporation,** 4430 Boundary St., San Diego—$11,875 for grade and pave., etc., on Monroe and Ohio Sts., San Diego—by City Council, San Diego.

SAN FRANCISCO CO.—**M. J. Lynch Co.,** Barneveld and Oakdale Aves., San Francisco—$41,513 for grade, surf., pave, etc., on Post St. from Taylor St. to Van Ness Ave., San Francisco—by Department of Public Works, San Francisco.

SAN FRANCISCO CO.—**Charles L. Harney,** Call Bldg., San Francisco—$18,000 for street improve. on Brookdale Ave. and Santos St., adj. to Sunnydale Housing Proj., San Francisco—by San Francisco Housing Authority, San Francisco.

SANTA CRUZ CO.—**N. M. Ball Sons,** Box 404, Berkeley—$251,087 for 6.2 mi. grade and sel. matl. surf. betw. Watsonville and Rob Roy Jct.—by California Division of Highways, Sacramento.

Idaho

BEAR LAKE CO.—**Carl E. Nelson,** Logan—$106,700 (official) for 14.2 mi. grade and surf., Montpelier-Geneva For. Hwy., Caribou Natl. For.—by Public Roads Administration, Ogden, Utah.

LATAH CO.—**Lobnitz Bros.,** Ashton—$121,760 for 2.7 mi. grade, drain and surf. on North and South Hwy., betw. Moscow and Viola—by Commissioner of Public Works, Boise.

Montana

DEER LODGE CO.—**C. & F. Trucking & Contracting Co.,** 1600 Chicago St., Butte—$57,112 for 2.2 mi. regrade, surf. with cr. grav., roadmix oil treat. of surf. crse. and const. small drain. structs., Sec. B, Deer Lodge-Butte Rd.—by Montana State Highway Commission, Helena.

LINCOLN CO.—**F. J. Haas,** Great Falls—$49,707 for 3.9 mi. grade, surf. with cr. grav. and const. small drain. struct., Sec. A & C, Libby-Jennings Rd.—by Montana State Highway Commission, Helena.

ROSEBUD CO.—**Wachter-O'Neil Construction Co.,** Havre—$23,235 for 5.5 mi. grade and const. small drain. struct., Sec. B, Colstrip-Lame Deer Rd.—by Montana State Highway Commission, Helena.

VALLEY CO.—**Union Construction Co.,** Great Falls—$16,622 for 0.8 mi. grade, surf. with cr. grav., roadmix oil treat. of surf. crse. and const. small drain structs., Sec. C, Nashua-Ft. Peck Rd. —by Montana State Highway Commission, Helena.

Nevada

PERSHING CO.—**Silver State Construction Co.,** Fallon—$139,633 for 6.5 mi. grade, surf., etc., about 1½ mi. W. of Woolsey to Lee Center, Rt. 1, Sec. C—by Nevada State Highway Dept., Carson City.

New Mexico

CATRON CO.—**Brown Bros.,** Albuquerque—$15,974 for 4 mi.

IT HAS THE DRAWBAR *Plus* THE HAULING

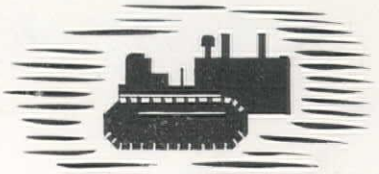
IN A FEW WORDS, that just about describes the new prime mover shown here. This unit has undergone the severest and most grueling of tests at Prado Dam and neighboring jobs in Southern California. In the opinion of construction men who have watched these tests, "it is among the most forward steps in earthmoving equipment since the advent of the track-laying tractor."

Versatility is perhaps the most outstanding practical feature of this unit; it can be used with any standard type of scraper or trailer for earthmoving work—*without making special changes.* No special equipment is necessary—it is built to go right to work with the equipment you have. It performs all of the functions of any prime mover and adds to this, the speed of a truck.

Let's look at some of the engineering features. In general, it resembles a truck-tractor as used with semi-trailers, but incorporates a number of important differences which fit it for construction work. Most revolutionary of these is a hydraulic coupler in the drive which absorbs shock and eliminates possible damage to the clutch and transmission. The final drive is through a special development of a walking beam with a reduction and chain drive which provides a triple reduction outside the drive shafts. The walking beam gives the *crawling* action in the wheels and enables the unit to pull out effortlessly—even when down over the hubs.

PULL OF A CAT

SPEED OF A TRUCK



Above: Just coming over the top at Prado Dam. This unit was pulling away from the pusher all the way up the grade—came over the top yards ahead. The CRAWLING action in the wheels accounts for the heretofore impossible pulling power in a truck-speed unit.

Right: Looking down on rear assembly. Shown here is the special development of a walking-beam with a reduction and chain drive which provides a triple reduction outside the drive shafts. Front tires are 13.50 x 24 and rear tires are 18.00 x 24 with duals available if extra flotation is required. The power control unit is mounted in the usual position back of the operator's seat—any standard type may be used.

For use with earthmoving scrapers, power to operate the power control unit is taken off the crankshaft and delivered to the PCU through a chain and sprocket arrangement at correct speeds. Any standard type may be used. Hauling speeds with a loaded scraper average 18 to 23 miles per hour and return speed averages about 24 miles per hour.

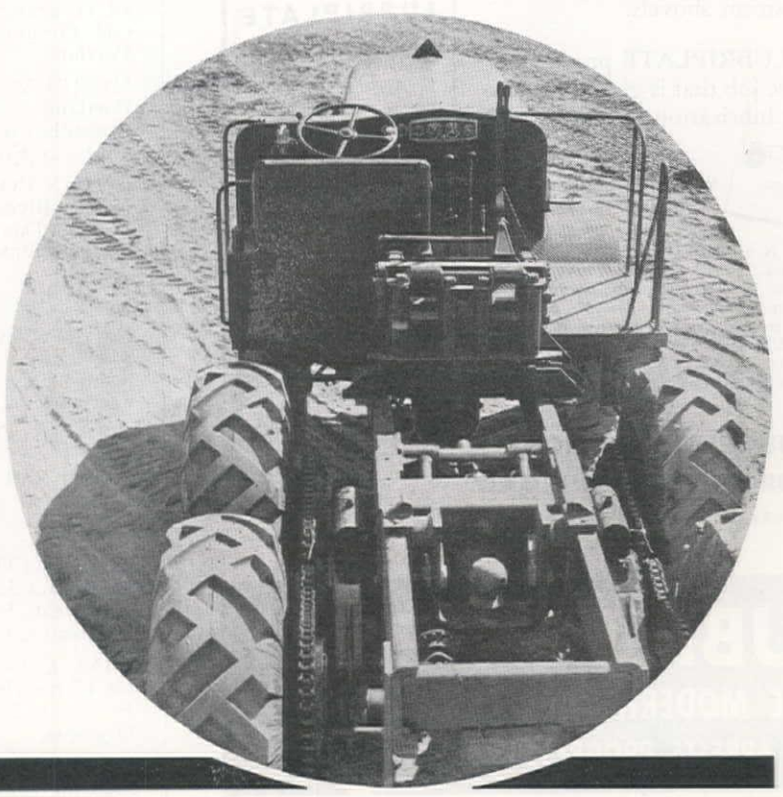
But if you operate dirtmoving equipment, you will want to see this unit in action before you bid your next job—it will make an important difference. Write us today, so that we can arrange a demonstration for you.

Address all inquiries to

G. A. COLLENDER,

Care of 6 Wheels, Inc.

1572 East 20th Street Los Angeles, Calif.



surf., etc., Alpine-Reserve Forest Hwy. Rt., Apache Natl. Forest —by Public Roads Administration, Santa Fe.

McKINLEY CO.—**Brown Bros.,** Albuquerque—$87,715 for 3.7 mi. grade, minor drain. structs. and misc. const., St. Hwy. Rte. No. 32 betw. Gallup and Zuni—by New Mexico State Highway Engineer, Santa Fe.

OTERO CO.—**Henry Thygesen & Co., Inc.,** Albuquerque—$60,603 for 9.5 mi. base crse. surf., U. S. Hwy. Rte. No. 70 betw. Hondo and Tularosa—by New Mexico State Highway Engineer, Santa Fe.

RIO ARRIBA CO.—**Davies & Sons,** Albuquerque—$41,262 for 9.4 mi. base crse. surf., U. S. Hwy. Rte. No. 285 betw. Abiquiu and Tierra Amarilla—by New Mexico State Highway Engineer, Santa Fe.

Oregon

CLACKAMAS & MARION COS.—**A. S. Wallace,** Roseburg—$12,245 for about 7,900 cu. yd. cr. rock or cr. grav. in stockpiles, Woodburn-Mollalla-Silverton Rock Prod. Proj.—by Oregon State Highway Commission, Portland.

CLATSOP & TILLAMOOK COS.—**Babler Bros.,** 2407 N.W. 28th Ave., Portland—$14,510 for about 10,300 cu. yd. cr. rock in stock pile, Seaside-Wheeler Rock Prod. Proj., Oregon Coast, Wolf Creek and Necanicum Hwys.—by Oregon State Highway Commission, Portland.

COLUMBIA CO.—**Roy L. Houck,** Salem—$87,492 for 3.1 mi. grade and pave, Scappoose-Multnomah Co. line, Columbia River Hwy.—by Oregon State Highway Commission, Portland.

DESCHUTES CO.—**A. S. Wallace,** Roseburg—$9,030 for furn. 7,000 cu. yd. cr. grav. in stockpile, Millican-Brothers Rock Prod. Proj.—by Oregon State Highway Commission, Portland.

GRANT CO.—**Fisher Bros.,** Oregon City—$117,479 for 5.3 mi. grade, surf. and oil, E. Unit, Dixie Summit-Austin Sec., John Day Hwy.—by Oregon State Highway Commission, Portland.

LAKE CO.—**Fisher Bros.,** Oregon City—$116,994 for 4.3 mi. grade, surf. and oil; const. 2-composite trestle bridges and 3 conc. culv., Forest Boundry-Cottonwood Creek Sec., Klamath Falls-Lakeview Hwy.—by Oregon State Highway Commission, Portland.

LANE CO.—**Clifford A. Dunn,** Box 431, Klamath Falls—$17,214 for 8,900 cu. yd. cr. rock or cr. grav. in stockpile, Deception Creek-Salt Creek Falls Rock Prod. Proj., Willamette Hwy.—by Oregon State Highway Commission, Portland.

MALHEUR CO.—**Norris Bros.,** Burlington, Wash.—$136,556 for 68.4 mi. surf. and oil, Owyhee River Sec.—by Oregon State Highway Commission, Portland.

MALHEUR CO.—**C. T. Lackey,** Ontario—$9,355 for 7,300 cu. yd. cr. grav. in stockpile, Cairo Jct.-Adrian Rock Prod. Proj. on Old Oregon Trail—by Oregon State Highway Commission, Portland.

MORROW CO.—**Frank Penepacker,** 400 N.E. Thompson St., Portland—$97,365 for 14.0 mi. grade and topping, Boardman-Umatilla Co. Line Sec. of Old Oregon Trail—by Oregon State Highway Commission, Portland.

UNION CO.—**R. O. Dail and Warren Brothers, Inc.,** 8219 S.E. Foster Blvd., Portland—$18,305 for 4.7 mi. surf. and oil, No. Powder-Davis Ranch Sec., No. Powder River County Road—by Oregon State Highway Commission, Portland.

Utah

EMERY CO.—**Reynolds-Ely Construction Co.,** Springville—$40,903 for 1.2 mi. road mixed bitum. surf. road and a conc. "T" beam bridge betw. Huntington and Price—by Utah State Road Commission, Salt Lake City.

GARFIELD CO.—**Carl E. Nelson,** Logan—$60,454 (official) for 7.1 mi. grade and surf., Panguitch-Tropic Forest Hwy., Powell Natl. Forest—by Public Roads Administration, Ogden.

Washington

FERRY CO.—**Elliott & Co., Inc.,** 2155 Northlake, Seattle—$74,995 for 5.1 mi. clear, grade, drain, surf. and const. light bitum. surf. treat., State Hwy. No. 3, Boyds to Barstow—by Director of Highways, Olympia.

KING CO.—**N. Fiorito, Inc.,** 844 W. 48th St., Seattle—$274,736 for 4.7 mi. clear, grade, drain and partial pave. State Hwy. No. 2, Preston to North Bend, Sec. 2, Unit 1—by Director of Highways, Olympia.

LEWIS CO.—**Lucich Co.,** 3001 21st Ave., South, Seattle—$129,437 (official) for 0.4 mi. const. or improve Randle-Yakima

WHITNEY CHAINS

Patented "MAXI" Super Heavy Duty Unit, showing Dual Axle, Spring and Dual Chain Drive. Designed and manufactured by SIX WHEELS, INC., Los Angeles.

designed into the special "DualDrive" of 6 WHEELS' Giant New Hauling Unit

HEADLINE NEWS in construction equipment is this new heavy-duty unit for off-the-road earthmoving . . . designed to speed the work and cut the cost of hauling tremendous loads.

Patented transmission includes Dual Drive by Whitney Roller Chains. Unlike any other 4-wheel drive, all rear wheels are driven from a single differential . . . assuring positive, trouble-free division of power to either side at all times . . . and action as free-rolling as any single-axis drive. Result: ALL 4 wheels have absolute tracking under all conditions.

Whitney Roller Chains were chosen for this unusual drive because they have the flexibility to fit into all design requirements . . . plus the *staying power* to "hold up their end" on the toughest kind of work. And *you* can build this same positive, trouble-free power transmission into *your* equipment . . . at no premium in price. Write, and ask to have a Whitney engineer call to talk it over.

The Whitney Chain & Manufacturing Co., Hartford, Conn.

Hwy., Natl. For. Rd. Proj., Columbia Natl. For.—by Public Roads Administration, Portland, Ore.

Wyoming

JOHNSON & WASHAKIE COS.—**Leach Bros.,** Buffalo—$117,642 (official) for 4 mi. grade, etc., on Buffalo-Tensleep Forest Hwy. Rt., Big Horn Natl. Forest—by Public Roads Administration, Denver, Colo.

SWEETWATER & SUBLETTE COS.—**John M. Keahey,** Buffalo—$327,114 for 24.4 mi. grade, drain, oil treat. by roadmix method, stone chip sealcoat, 4-treat. tbr. bridges and misc. work on Farson-Lander Rd.—by Wyoming State Highway Commission, Cheyenne.

Territories

HAWAII—**Hawaiian Contracting Co.,** Honolulu—$97,259 for pave and curbs at Hickam Field, Honolulu—by Constructing Quartermaster, Hickam Field.

PROPOSED PROJECTS

California

LOS ANGELES CO.—City Engineer, Los Angeles, has been authorized by the City Council to negotiate with the State of Calif. for approval of $49,000 for the improvement of Topanga Canyon Blvd. from Ventura Blvd. to south city boundary as part of State Hwy. No. 156, Los Angeles.

SAN MATEO CO.—Final plans and specifications will be completed March 1, 1941, by the Civil Engineer, San Mateo, for const. of roads and streets, sewer and water supply systs., etc., in Ray Park, 114 acres subdivision on the Mills Estate, adjoining Burlingame. Estimated cost of utilities construction is $250,000.

Montana

PARK CO.—All bids received by Montana State Highway Commission, Helena, for 0.5 mi. roadside planting of area adj. to wye at juct. nr. west city limits of Livingston, includ. grade, surf. with cr. grav. and roadmix oil treat. of surf. crse. in Livingston, have been rejected and will be readvertised for March letting.

Bridge & Grade Separation...

CONTRACTS AWARDED

Arizona

MOJAVE CO.—**H. L. Royden,** Box 3703, Phoenix—$37,107 for const. conc. bridge on steel H-column pile bents acr. Detrital Wash, Kingman-Boulder Dam Hwy., 36 mi. NW of Kingman—by Arizona State Highway Commission, Phoenix.

California

SAN BERNARDINO CO.—**J. S. Metzger & Son,** 408 South Spring St., Los Angeles—$21,334 for 0.3 mi. resurf. with plantmix and widen conc. bridge at Lytle Crk. at W. city limits of San Bernardino—by California Division of Highways, Los Angeles.

Montana

CARTER & FALLON COS.—**Union Construction Co.,** Great Falls—$59,695 for 5.4 mi. grade, surf. cr. grav., const. small drain structs. and standard treat. timber stockpass and 3-panel 57-ft. tr. timber bridge, Baker-Ekalaka Rd.—by Montana State Highway Commission, Helena.

DEER LODGE CO.—**F. J. Haas,** 512 9th St., NW, Great Falls—$14,186 for const. 4 conc. bridges, Sec. B, Deer Lodge-Butte Rd. 22-ft. to 36-ft. wide—by Montana State Highway Commission, Helena.

PETROLEUM CO.—**D. M. Manning,** Hysham—$10,181 for const. 5-panel 125-ft. treat. timber pile trestle bridge over McDonald Crk. and grade. of 0.3 mi. roadway, Sec. B, Winnett So. Rd., Winnett—by Montana State Highway Commission, Helena.

ROOSEVELT CO.—**Walter Mackin,** Billings—$11,385 for const. 3-panel 57-ft. timber bridge, 1 mi. E. of Wolf Point; and a 4-panel 76-ft. timber bridge, 3 mi. W. of Bainville, Glacier Park Trail Rd.—by Montana State Highway Commission, Helena.

ROSEBUD CO.—**D. M. Manning,** Hysham—$13,426 for const. timber bridges, Sec. B, Colstrip-Lame Deer Rd.—by Montana State Highway Commission, Helena.

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"300" SERIES
1½-2 CU. YD. CAPACITY
SHOVEL-DRAGLINE-CRANE

Close figuring on today's jobs demands greater output from man and machine, and low maintenance costs. The new speed, stamina, balance, stability and power built into Link-Belt Speeder "300" Series machines are enabling contractors to secure 25% greater output at lower operating costs. The exclusive feature that gives output the big boost is effortless, accurate Speed-o-Matic Hydraulic control. By eliminating operator fatigue, the greater speed and capacity for work built into the "300" Series machines are maintained throughout the entire shift. Speed-o-Matic control alone makes big slashes in maintenance costs because it eliminates 152 working parts that are essential to lever-operated controls. Link-Belt Speeder machines range in size from ⅜ to 3 yard . . . crawler, truck and tractor mounted. Get the facts from your nearest dealer.

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- ★ Interchangeable Crawler Side Frames with Patented Tread Design
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301 WEST PERSHING ROAD • CHICAGO, ILLINOIS

New Mexico

DONA ANA CO.—**Keliher Construction Co.,** Thomas Bldg., Dallas, Texas—$165,313 for const. nine bridges acr. the Rio Grande River in Dona Ana County, New Mex., and El Paso County, Texas—by International Boundary Commission, El Paso, Texas.

Oregon

GRANT CO.—**Averill & Corbin,** Portland—$42,840 for const. Gooserock bridge over John Day River, John Day Hwy.—by Oregon State Highway Commission, Portland.

MARION & LINN COS.—**J. F. Johnston,** 800 Sheridan St., Newberg—$15,988 for const. No. Santiam Riv. Bridge at Gates—by Oregon State Highway Commission, Portland.

MULTNOMAH CO.—**Frank Watt,** Portland—$25,670 for const. Hawthorne bridge appr., Portland—by Oregon State Highway Commission, Portland.

WASHINGTON CO.—**C. J. Eldon,** 2525 N.E. 15th St., Portland—$65,285 for Davis Grade Separation Proj. on Wolf Crk. Hwy.—by Oregon State Highway Commission, Portland.

Washington

ASOTIN CO.—**Henry Hagman,** Cashmere—$49,691 for const. steel bridge with reinf. conc. appr., State Hwy. No. 3, Grande Ronde River—by Director of Highways, Olympia.

KING CO.—**A. W. Stevens Construction Co.,** 711 2nd St., Mt. Vernon—$164,836 for const. 4 reinf. conc. bridges on Prim. St. Hwy. No. 2, Preston to North Bend, Sec. 2, Unit 2—by Director of Highways, Olympia.

PIERCE CO.—**J. H. Pomeroy Co.,** 333 Montgomery St., San Francisco—$75,000 for remov. struc. steel on roadbed of Tacoma Narrows bridge—by Director of Highways, Olympia.

Wyoming

TETON CO.—**Chas. M. Smith,** Thermopolis—$36,395 for repairs to bridge over Jackson Lake Dam at Moran—by Wyoming State Highway Commission, Cheyenne.

PROPOSED PROJECTS

California

KERN CO.—The City Engineer, Bakersfield, has been authorized to prepare plans and specifs. for const. an overpass carrying 26th St. over Golden Gate Ave. and the S. P. tracks, Bakersfield, estimated cost $300,000; an underpass carrying "H" St., Bakersfield, under the Santa Fe tracks, estimated cost $130,000.

ORANGE CO.—Application has been made to U. S. Engineer Office, Los Angeles, by City of Newport Beach, for War Dept. approval of plans and location of wooden foot bridge across The Rivo Alto Channel at 36th St., Newport Beach.

Water Supply . . .

CONTRACTS AWARDED

California

CONTRA COSTA CO.—**Manuel Smith,** 585 23rd St., Oakland—$2,300 for install 2,500 lin. ft. 6-in. asbestos cement water main in Cutting Blvd., Richmond—by East Bay Municipal Utilities District, Oakland.

IMPERIAL CO.—**William McCoullough,** 25 West 4th St., Calexico—$5,391 for strengthen and reconst. 1,000,000 gal. water tank, Calexico—by City Council, Calexico.

LOS ANGELES CO.—**Hood Construction Co.,** 3326 East Florence, Huntington Park—$2,946 for const. C.I. water main, Arcadia—by City Council, Arcadia.

LOS ANGELES CO.—**Clyde W. Wood,** 208 W. 8th St., Los Angeles—$28,575 for const. of improv. to east bank of San Fernando Reservoir, Los Angeles—by Department of Water & Power, Los Angeles.

LOS ANGELES CO.—**Case Construction Co.,** Box 6, San Pedro—$2,239 for place 20,000 sq. ft. 1½-in. gunite at reservoir at Wilson pumping plant, South Pasadena—by City Council, South Pasadena.

LOS ANGELES CO.—**Byron-Jackson Co.,** 2150 E. Slauson Ave., Huntington Park—$2,892 for furn. and install combination well pump and booster pump, Manhattan Beach—by City Council, Manhattan Beach.

LOS ANGELES CO.—**Consolidated Steel Corp.,** Slauson and

IT'S A LONG STORY — BUT IF YOU MOVE DIRT FOR A LIVING IT'S WORTH YOUR TIME-

Fulton's steamboat was called "Fulton's Folly"; Edison had to beg for the privilege of installing the first electric lights in New York City; in 1924 Buick announced 4-wheel brakes, and the cry of the industry was "Why use twice as many parts to stop the car when half as many will do the work?" Today all of these things enjoy universal acceptance—because they are obviously *logical, worthwhile* improvements.

In 1940 WOOLDRIDGE MANUFACTURING COMPANY announced its new line of scrapers, equipped with a 3-line two lever power control unit, a radical change from the long established 2-line control.

In the early days a 9-yard (struck measure) scraper was the largest size built. This scraper weighed approximately 8 tons. But scrapers got bigger fast. Today the most popular range between 15 and 18 tons in weight. Obviously, the size of the front apron and the load ejector has grown larger and heavier in direct proportion to the increased size of the unit. The whole purpose, or need, of the WOOLDRIDGE 3-line development swings around this point.

The 8-ton scrapers were equipped with a 2-line control—one line for the scraper hoist; one line for the load ejector or tailgate and the front apron. The manufacturer in those days recommended 1/2" or 9/16" cable. *The same size cable is still recommended today on 18-ton scrapers.* Is it logical to suppose that the same size cable can do twice the work with the same efficiency? Evidence to the contrary is the growing problem of steadily mounting cable maintenance costs.

*3-line control is the answer. WOOLDRIDGE front aprons and load ejectors are heavier and larger, to be sure, and we too recommend 1/2" or 9/16" cable—**but,** by using independent front apron control with one line and operating the load ejector with an independent line, the load formerly carried by one cable is divided between two cables. The savings in cable wear and maintenance are immediately apparent.*

But the best proving ground is not white paper—but a dirtmoving job. These 3-line WOOLDRIDGE scrapers and power control units are in action all over the United States. We urge you to observe one of them in action—or better yet—let us demonstrate on your own job.

WOOLDRIDGE MANUFACTURING COMPANY

SUNNYVALE CALIFORNIA

Eastern Aves., Los Angeles—$13,370 for const. 1,000,000 gal. cap. steel reservoir at Cucamonga Ave. and North Orange Ave., Pomona—by City Council, Pomona.

LOS ANGELES CO.—**Hood Construction Co.,** 3326 E. Florence Ave., Huntington Park—$13,463 for const. 6,615 lin. ft. 12-in. welded steel pipeline in Eucalyptus St. betw. Beach Ave. and Arbor Vitae St., and Arbor Vitae St. betw. Eucalyptus St. and Inglewood Ave., Inglewood—by City Council, Inglewood.

SAN FRANCISCO CO.—**Fred T. Fairey,** 1874 25th Ave., San Francisco—$5,350 for lay. 4-in., 6-in., and 8-in. C.I. mains in Naglee and Cayuga Aves., Arco Circle and Havelock St. and Alemany Blvd., San Francisco—Public Utilities Commission, San Francisco.

SAN FRANCISCO CO.—**San Francisco Water Dept.,** 425 Mason St., San Francisco—$3,337 for laying 6-in. and 8-in. C.I. mains in 38th and 44th Aves., Ulloa and Wawona and Potrero Heights Proj., San Francisco—by Public Utilities Commission, San Francisco.

Colorado

LARIMER CO.—**Lawrence Construction Co.,** 112 So. Elati St., Denver—($14,000 or $15,000 approx.) for trenching, laying of pipe and fittings, furn. by city, const. anchors and backfilling trench, Estes Park—by City Council, Estes Park.

Oregon

MULTNOMAH CO.—**Soule & Walters,** Elma, Wash.—$44,000 for water distrib. syst., Portland—by Russellville Water Dist., 850 NE 102nd Ave., Portland.

Utah

SALT LAKE CO.—**Ernest Stettler & Sons,** Logan—$48,751 for const. culinary water supply syst. at new Utah State Prison—by State Building Commission, Salt Lake City.

Washington

PIERCE CO.—**West Coast Construction Co.,** Lloyd Bldg., Seattle—$21,900 (Items 1, 2 and 3), for const. 12-in. water main for 41st Div. of Natl. Guard Cantonment, Ft. Lewis—by Constructing Quartermaster, Washington, D. C.

PROPOSED PROJECTS

California

SAN DIEGO CO.—The Constructing Quartermaster, Ft. Rosecrans, San Diego, is considering const. of 8,000 ft. 21-in. conc. pipeline acr. Torrey Mesa.

Washington

COWLITZ CO.—Bids for construction of a soft water filter plant at Longview, will be received until January 23, 1941, by City Clerk, City Hall, Longview. Estimated cost is $85,000.

Sewerage...

CONTRACTS AWARDED

California

ALAMEDA CO.—**E. J. Tobin,** 1132 Longridge Road, Oakland—$2,858 for const. sewers in Block 23, Oakmore Manor Tract, Oakland—by City Council, Oakland.

LOS ANGELES CO.—**Bukvich & Metkovich,** 230 East 76th Place, Los Angeles—$3,700 for const. sewer in Woodman Ave., Millbank St. to Ventura Ave., Los Angeles—by Board of Public Works, Los Angeles.

LOS ANGELES CO.—**M. C. Nottingham Co.,** 123 N. Cloverly, Temple City—$10,497 for const. 0.6 mi. 8-in. vitr. clay pipe sewer and 0.9 mi. 10-in. conc. or vitr. clay pipe sludge disposal line at the Dist. treat. plant nr. LaVerne—by Metropolitan Water District, Los Angeles.

LOS ANGELES CO.—**Bebek & Brkich and VCK Construction Co.,** 238 W. Florence Ave., Los Angeles—$3,368 for const. sewer in Madelia Ave. and Locota Place, Los Angeles—by Board of Public Works, Los Angeles.

LOS ANGELES CO.—**Sutalo & Ramljak,** 249 W. Mission Rd., San Gabriel—$3,356 for const. sewers in Montecito Dr., Menlo Dr., Harmon Pl. and Sparr Blvd., Glendale—by City Council, Glendale.

ORANGE CO.—**A. H. Famularo,** Rt. 1, Box 210, Santa Ana—$5,256 for const. storm drain in Paularina Ave. from County airport to Newport Ave., Santa Ana—by Orange County Supervisors, Santa Ana.

PROPOSED PROJECTS

California

FRESNO CO.—City of Kingsburg will vote Feb. 4, 1941, on a proposal to issue bonds in the amount of (1) $7,000 for extens. of Municipal sanitary sewer syst.; (2) $19,000 for extens. water works syst., and (3) $7,000 for extens. of storm sewer system.

KERN CO.—On January 21, 1941, an election will be held in the north of the River Sanitary Dist. No. 1 (embracing Oildale) for a $215,000 bond issue to provide funds for purchase of land and const. of a sewage treatment plant and outfall.

KERN CO.—The Consulting Engineer, Bakersfield, presented the Kern County Supervisors with a report on the proposed sewage treatment plant and collection syst. in the Mt. Vernon County Sanitation Dist., E. of the city limits of Bakersfield. The estimated cost is $228,000.

LOS ANGELES CO.—The City Manager has recommended to the City Directors that the City of Pasadena expend $440,000 to enlarge and modernize the sewage disposal plant at Pasadena.

LOS ANGELES CO.—A bond issue of about $500,000 will be voted on next spring to provide funds for improve. and additions at the Pasadena sewage disposal plant, according to an announcement by the City Manager.

Montana

YELLOWSTONE CO.—The cities of Laurel and Billings have been ordered by the Montana State Board of Health to provide proper sewage disposal facilities before Oct. 1, 1941.

Waterway Improvement...

CONTRACTS AWARDED

California

LOS ANGELES CO.—**United Concrete Pipe Corporation,** Box 1, Sta. "H," Los Angeles—$648,415 (official) for Los Angeles River improvement, Sec. VIII, Randolph St. to Stewart and Gray Road, Los Angeles—by U. S. Engineer Office, Los Angeles.

LOS ANGELES—**J. E. Burrell & Son,** 518 W. 17th St., Long Beach—$27,766 for repairs to wharf at Target Repair Base, San Pedro—by 11th Naval District, San Diego.

SAN DIEGO CO.—**Mojave Corp.,** 1074 W. Los Nietos Road, Los Nietos, and **Person & Hollingsworth Co.,** 507 S. Lorena, Los Angeles—$1,530,000 (cost plus fixed fee) for const. pier and transit shed at San Diego—by Bureau of Yards and Docks, Washington, D. C.

SOLANO CO.—**Henry J. Kaiser Co.,** Latham Square Bldg., Oakland—$3,300,300 (cost plus fixed fee) for const. quay wall, piers, dredge and accessories at Navy Yard, Mare Island—by Bureau of Yards and Docks, Washington, D. C.

SOLANO CO.—**Fredericksen & Westbrook,** 212 13th St., Sacramento—$11,935 for 6,050 ft. levee const. Cache Creek Settling Basin—by U. S. Engineer Office, Sacramento.

YOLO CO.—**Calowell Construction Co.,** Box 1096, Marysville—$7,500 for enlarg., etc., 2300 ft. levee along W. levee of Yolo By-Pass, N. of Knights Landing Ridge Cut—by U. S. Engineer Office, Sacramento.

YUBA CO.—**George E. France,** 1205 N. Court St., Visalia—$38,912 for enlarg., etc., 13,000 ft. exist. levee along E. levee of Recl. Dist. No. 10 adj. to W. P. RR., from Simmerly Slough N. 2.5 mi.—by U. S. Engineer Office, Sacramento.

YOLO CO.—**Fredericksen & Westbrook,** 212 13th St., Sacramento—$18,925 for enlarge, raise and strengthen 1850-ft. exist. levee along E. levee of Yolo By-Pass from Yolo causeway S. about 0.3 mi.—by U. S. Engineer Office, Washington, D. C.

Oregon

CLACKAMAS CO.—**Leonard & Slate,** Multnomah—$9,000 for remove brush, trees and other debris and 30,000 cu. yd. excav. sand and gravel from channel of Salmon River, betw. Tawneys and Arrah Wanna—by U. S. Engineer Office, Bonneville.

CLATSOP CO.—**Columbia Construction Co.,** 44 S.E. Salmon

St., Portland—$554,120 for repair south jetty at mouth of Columbia River—by U. S. Engineer Office, Portland.

COOS CO.—**Strong & MacDonald, Inc.,** 1011 East "F" St., Tacoma, Wash.—$342,250 for reconst. north jetty at entrance to Coquille River at Bandon—by U. S. Engineer Office, Portland.

DOUGLAS CO.—**Kern & Kibbe,** 42 S.E. Salmon, Portland—$723,320 for reconst. of north jetty at mouth of Umpqua River—by U. S. Engineer Office, Washington, D. C.

Washington

KING CO.—**Puget Sound Bridge & Dredging Co.,** 2929 16th Ave., S.W., Seattle—$16,150 for 100,000 cu. yd. suction dredge channel at mouth of Sammamish Riv. betw. Lake Washington and Kenmore bridge—by King County Commissioners, Seattle.

Territories

CANAL ZONE—**Martin Wunderlich & Okes Construction Co.,** 219 E. High St., Jefferson City, Missouri—$8,517,100 for excav. of an approach channel and for a lock struct. and for grade of RR. relocation at Gatun—by General Purchasing Office, Panama Canal, Washington, D. C.

PROPOSED PROJECTS

California

SAN DIEGO CO.—U. S. Engineer Office, Los Angeles, has received application by city of National City for War Dept. permit to dredge an area 500 ft. in width betw. the bulkhead and pierhead lines north of and adjacent to the mole type pier being const. in San Diego Bay.

Dam . . .

PROPOSED PROJECTS

California

SAN LUIS OBISPO CO.—The War Dept. will const. a $260,000 rock-faced earth fill dam with a conc. core wall to impound waters of Chorro Creek instead of the conc. dam originally planned.

Irrigation . . .

CONTRACTS AWARDED

Utah

WEBER CO.—**Enoch Smith,** Salt Lake City—$8,235 for const. pipe lines on laterals and South Ogden dist. syst., Ogden River Proj.—by Bureau of Reclamation, Washington, D. C.

PROPOSED PROJECTS

California

STANISLAUS CO.—Plans and specifications have been completed by District Engineer, Turlock and protests will be heard Jan. 13, 1941, by Board of Directors, Turlock Irrigation Dist., Turlock, for const. conc. canal lining and conc. piping in Dist. No. 221, Lucerne Ditch, and Dist. No. 259, Marriott Ditch.

Buildings . . .

CONTRACTS AWARDED

California

FRESNO CO.—**Trewhitt-Shields & Fisher,** Pacific Southwest Bldg., Fresno—$148,543 for const. reinf. conc. classroom bldg. at Alexander Hamilton Junior High School, Fresno—by Fresno Board of Education, Fresno.

LOS ANGELES CO.—**Aluminum Company of America,** 5151 Alcoa Ave., Vernon—$129,600 for const. of additions to various bldgs. at the company's plant, 5151 Magnolia Ave., Vernon. The above work is being done by the owner's const. forces.

LOS ANGELES CO.—**Theo. A. Beyer Corporation,** 533 Chamber of Commerce Bldg., Los Angeles—$135,213 for const. physical education bldg. at Abraham Lincoln High School, 3501 N. Broadway, Los Angeles—by Los Angeles Board of Education, Los Angeles.

LOS ANGELES CO.—**Fred E. Potts Co.,** 2516 12th Ave., Los Angeles—$120,000 for const. 1- and part 2-story store bldg. at the corner of San Fernando Road and Orange Grove Ave., Burbank—by F. W. Woolworth Co., San Francisco.

LOS ANGELES CO.—**Baruch Corp.,** 625 S. Olive St., Los Angeles—$250,000 for const. 4-story class "A" bldg. on the NE corner of Fountain Ave. and Catalina St., Los Angeles—by The Cedar of Lebanon Hospital, Los Angeles.

LOS ANGELES CO.—**Austin Co.,** 777 E. Washington Bldv., Los Angeles—$160,000 for const. a 2-story reinf. conc. bldg. at 3820 Union Pacific Ave., Los Angeles—by Continental Can Co., Chicago, Ill.

LOS ANGELES CO.—**Buttress & McClellan,** 1013 E. 8th St., Los Angeles—$125,000 for const. factory bldg. at 9801 Sepulveda Blvd., Venice District—by The Garrott Corporation, Los Angeles.

LOS ANGELES CO.—**E. S. McKittrick Co.,** 7839 Santa Fe Ave., Huntington Park—$450,000 for const. steel frame mfg. bldg. at 1001 E. Broadway, Hawthorne—by Northrop Aircraft Corporation.

LOS ANGELES CO.—**C. L. Peck,** 223 H. W. Hellman Bldg., Los Angeles—$500,000 (approx.) for const. of new 3-story and basement, class "A" bldg. at 725-27 S. Broadway, Los Angeles and remodeling exist. bldg. at 719 S. Broadway, Los Angeles—by F. W. Woolworth Co., San Francisco.

LOS ANGELES CO.—**Alco Construction Co.,** 5423 Flemish Village Lane, Los Angeles—$121,385 for const. warehouse at Mines Field—by Construction Quartermaster, March Field.

MONTEREY CO.—**Ford J. Twaits Co.** and **Morrison-Knudsen Co., Inc.,** 816 W. Fifth St., Los Angeles—$1,351,642 (recommended) for const. of seven bldgs. at Camp Clayton—by Constructing Quartermaster, Presidio of Monterey.

SAN BERNARDINO CO.—**C. T. and W. P. Stover,** 116 Alexander Ave., Ontario—$400,000 for const. ten addtl. barracks, two hangars, school bldg. and office bldg. and 1,000,000 sq. ft. pave. for runway extens. at Cal-Aero Aeronautical Training School, south of Ontario—by Cal-Aero Aeronautical Training School, Ontario.

RIVERSIDE CO.—**Harvey A. Nichols,** 936 E. Slauson, Los Angeles—$450,000 (cost plus fixed fee) for const. 150 housing units at March Field—by Federal Works Agency, Washington, D. C.

SACRAMENTO CO.—**Moore & Roberts,** 693 Mission St., San Francisco—$119,488 for const. temp. housing at McClellan Field—by Constructing Quartermaster, McClellan Field.

SAN DIEGO CO.—**Zoss Construction Co.,** 1015 E. 4th St., Los Angeles, and **McNeil Construction Co.,** 5860 Avalon Blvd., Los Angeles—$9,500,000 (cost plus fixed fee) for const. of 3,000 housing units and facilities at San Diego—by Federal Works Agency, Washington, D. C.

SAN DIEGO CO.—**B. O. Larsen,** 1340 "E" St., San Diego—$6,500,000 (approx.) for const. an aircraft mfg. plant in San Diego—by Consolidated Aircraft Co., San Diego.

SAN FRANCISCO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$660,900 for const. assembly shop at Naval Dry Docks, Hunters Point—by Bureau of Yards and Docks, Washington, D. C.

SAN FRANCISCO CO.—**Moore & Roberts,** 693 Mission St., San Francisco—$138,300 for const. temp. housing, includ. util. at Letterman General Hospital, Presidio of San Francisco, San Francisco—by Constructing Quartermaster, Ft. Mason, San Francisco.

SAN FRANCISCO CO.—**Carl N. Swenson Co.,** 355 Stockton Ave., San Jose—$324,872 for const. a 5-story reinf. conc. bldg. at State Psychiatric Hospital, San Francisco—by State Architect, Sacramento.

SANTA BARBARA CO.—**Baruch Corporation,** 625 S. Olive, Los Angeles—$1,040,000 (cost plus fixed fee) for const. hospital at Santa Barbara—by Constructing Quartermaster, Washington, D. C.

SANTA CLARA CO.—**Fred J. Early, Jr.,** 369 Pine St., San Francisco—$481,000 (cost plus fixed fee) for const. 150 housing units at Sunnyvale for civilian workers at Moffett Field—by Federal Works Agency, Washington, D. C.

SOLANO CO.—**Fred J. Early, Jr.,** 369 Pine St., San Francisco—$172,000 (cost plus fixed fee) for const. 50 housing units at Benicia Arsenal, Benicia—by Federal Works Agency, Washington, D. C.

SOLANO CO.—**Herrick Iron Works,** 18th and Campbell Sts., Oakland—$217,822 for furn. and install all struc. steel superstruc.

When an explosive shows an average saving of 15% over older types. **When its wide range of bulk strengths answers the need for good breakage** **at low cost in all kinds of rock. When millions and millions of pounds have been used with an outstanding safety record. When it continues to** **replace older types because of economy, performance, and safety. It's time** **to take a bow. That's why Hercomite has earned a place in the spotlight.**

EXPLOSIVES DEPARTMENT

HERCULES POWDER COMPANY

Incorporated

WILMINGTON • DELAWARE

D-12

for elec. shop, steam test plant and assembly facil. extens. to Bldg. 382 at U. S. Navy Yard, Mare Island—by Public Works Officer, Navy Yard, Mare Island.

Colorado

ARAPAHOE CO.—**F. J. Kirchoff Construction Co.,** 700 Lawrence St., Denver—$172,000 (cost plus fixed fee) for const. 50 housing units for civilian workers nr. Ft. Logan—by Federal Works Agency, Washington, D. C.

DENVER CO.—**Brown-Schrepferman & Co.,** 240 Washington St., Denver—$204,467 for const. one 6000-man mess hall at Lowry Field—by Constructing Quartermaster, Lowry Field.

Nevada

NYE CO.—**L. F. Dow Co.,** 245 No. Bundy, Los Angeles—$66,666 for const. post office at Tonopah—by Federal Works Agency, Washington, D. C.

WASHOE CO.—**Wine & Williams,** 1921 Plumas St., Reno—$110,000 for const. 2-story steel frame, brick and conc. store bldg. on NW cor. First and Sierra Sts., Reno—by Yori Land & Livestock Co., Reno.

Oregon

MARION CO.—**L. B. James,** Portland—$88,918 for const. 2-story reinf. conc. Materials Testing Laboratory Bldg., includ. heating plant and appurt. at Salem—by Oregon State Highway Commission, Portland.

Utah

SALT LAKE CO.—**R. D. Merrill Construction Co.,** Box 287, Helena, Mont.—$125,370 for const. 17 temp. bldgs. at Ft. Douglas—by Constructing Quartermaster, Hill Field.

WEBER CO.—**George A. Whitmeyer & Sons Co.,** 2759 Grant Ave., Salt Lake City—$208,990 for const. equip. repair bldg., at Hill Field—by Constructing Quartermaster, Hill Field.

WEBER CO.—**James I. Barnes Construction Co.,** 206 Bay Builders Exchange, P. O. Box 799, Santa Monica, Calif.—$751,000 for const. AC airplane repair shop covering an area of 752 x 310-ft., at Hill Field—by War Dept., Washington, D. C.

Washington

CLARK CO.—**L. H. Hoffman,** 715 S.W. Columbia, Portland, Ore.—$948,304 (cost plus fixed fee) for const. 65-bldg. cantonment type hospital unit at Vancouver Barracks, Vancouver—by U. S. Engineer Office, Washington, D. C.

KING CO.—**Sound Construction & Engineering Co.,** Northern Life Tower, Seattle—$160,000 for const. 2-story fireproof bldg. at corner of 12th Ave. NE., and E. 64th St., Seattle—by Pacific Telephone & Telegraph Co., Seattle.

KITSAP CO.—**S. S. Mullen, Inc.,** 1222 8th Ave., West, Seattle—$587,331 for const. four industrial bldgs. at the Naval Torpedo Station, Keyport—by Public Works Officer, Navy Yard, Bremerton.

KITSAP CO.—**Nels Mortenson & Co.,** 1021 Westlake Ave., North, Seattle—$245,413 for const. barracks bldg., officers' quarters, bag filling house, ign. filling and quilting house, Naval Ammunition Depot, Puget Sound—by Public Works Office, Puget Sound Navy Yard, Bremerton.

PIERCE CO.—**MacDonald & Kahn Co., Ltd.,** Financial Center Bldg., San Francisco—$1,550,000 (cost plus fixed fee) for const. cantonment at Fort Lewis—By Constructing Quartermaster, Washington, D. C.

PIERCE CO.—**Drake, Wyman & Voss, Inc.,** 310 S.W. 6th St., Portland, Ore.—$128,775 for const. temp. housing, includ, renovation, demolition, heating water, sewer and elec. systs. at Fts. Columbia and Canby—by Construction Quartermaster, McChord Field.

PIERCE CO.—**Charles Dahlgren,** 1362 30th Ave., South, Seattle—$249,000 for const. of a cold storage plant at Ft. Lewis—by Constructing Quartermaster, Ft. Lewis.

Territories

ALASKA—**Bechtel-McCone-Parsons Corporation,** 601 West 5th St., Los Angeles—$1,600,000 for const. of a central heating and power plant at Elmendorf Field, Anchorage—by War Dept., Washington, D. C.

CANAL ZONE—**Leonard Constructing Co.,** 37 S. Wabash Ave., Chicago, Ill.—$4,224,000 (cost plus fixed fee) for const. 1400 housing units and facil. at Coco Solo and Balboa—by Constructing Quartermaster, Washington, D. C.

CANAL ZONE—**N. P. Severin,** P. O. Box 208, Oakland, Calif.—$1,128,200 for const. Albrook Field reclam. bldg., steam dist. plant, photo. lab., chemical storage bldg., Ft. Gulick sales commissary bldg. and other various bldgs. at Albrook Field, Canal Zone—by Constructing Quartermaster, Ft. Mason, San Francisco, Calif.

CANAL ZONE—**N. P. Severin Co.,** 222 W. Adams St., Chicago, Ill.—$1,450,799 for const. A.C. operations hangar No. 1 and flight hangars No. 1, 2 and 3, at Howard Field—by Constructing Quartermaster, Fort Mason, San Francisco, Calif.

HAWAII—**Robert E. McKee,** 4700 San Fernando Road, West, Los Angeles, Calif.—$274,300 for const. AC engine test bldg. and spray pool at Hickam Field—by Constructing Quartermaster, Ft. Mason, San Francisco, Calif.

HAWAII—**Robert E. McKee,** 4700 San Fernando Road, West, Los Angeles—$258,200 for const. Quartermaster Barracks at Schofield Barracks—by Constructing Quartermaster, Ft. Mason, San Francisco, California.

Miscellaneous . . .

CONTRACTS AWARDED

California

ALAMEDA CO.—**Dinwiddie Construction Co.,** 210 Crocker Bldg., San Francisco—$700,000 (cost plus fixed fee) for const. hangar for Naval Reserve at Oakland Municipal Airport, Oakland—by Bureau of Yards & Docks, Navy Dept., Washington, D. C.

LOS ANGELES CO.—**Case Construction Co.,** P. O. Box 6, San Pedro, for recond. shipways and found. work includ. removal of exist. slips; excav.; piling.; conc. work, etc., at Los Angeles Shipbuilding & Drydock Co., San Pedro—by Los Angeles Shipbuilding & Drydock Co., San Pedro.

LOS ANGELES CO.—**Allis-Chalmers Manufacturing Co.,** 117 Rowan Bldg., Los Angeles—$262,620 for const. steam turbine electric geno. unit for the Municipal Power Plant, Burbank—by City Manager, Burbank.

SAN DIEGO CO.—**Oil Field Construction Co.,** 2650 Cherry Ave., Long Beach—$128,750 for const. power plant addns. at Destroyer Base, San Diego—by 11th Naval District, San Diego.

SOLANO CO.—**Moore Electric Co.,** 321 W. 3rd St., Los Angeles—$220,826 for furn. and instl. electric power syst. and instl. motor geno. sets furn. by Govt. in New Mach. Shop Bldg., Navy Yard, Mare Island—by Public Works Officer, Navy Yard, Mare Island.

Colorado

BOULDER, LARIMER & WELD COS.—**Snyder & Johnson Construction Co.,** Humboldt, Iowa—$246,413 for const. 387 mi.

Send for your copy *Now!*

STOP SLAMMING . . . *and you start saving!* Put in this check valve that closes quietly to a drop-tight seat . . . causes no vibration-damage to the line . . . cuts friction-loss as much as 75% . . . reduces replacements . . . increases pipeline capacity.

Once Chapman Non-Slam Check Valves are in . . . that's the last you or your maintenance men will hear from them. You can get these unique valves for all services . . . in iron, bronze, cast steel and alloys . . . for pressures from 150 to 1500 lbs.

Send today for the free book above . . . it gives full engineering details and specifications, shows actual installations, *gives you the full picture of what you can save.*

The **CHAPMAN VALVE & MFG. COMPANY,** *Indian Orchard, Mass.*

trans. line—by Poudre Valley Rural Electric Association, Severance.

EAGLE CO.—**A. R. Allison,** 205 Electric Bldg., Grand Junction—$88,225 for const. 118 mi. trans. line—by Holy Cross Electrical Association, Incorporated, Eagle.

PUEBLO CO.—**Hagen & McClintic,** P. O. Box 55, Rigby, Idaho—$78,390 for const. 104 mi. trans. line—by San Isabel Electrical Association, Incorporated, Beulah.

New Mexico

CURRY CO.—**Broome Electric Construction Co.,** Amarillo, Texas—$31,835 for const. 60 mi. trans. line—by Farmers' Electrical Cooperative, Incorporated, Clovis.

Oregon

CLATSOP CO.—**The Austin Co.,** 16,112 Euclid Ave., Cleveland, Ohio—$50,500 for quarters and equipt. for barracks at Naval Air Station, Tongue Point—by Bureau of Yards & Docks, Washington, D. C.

DOUGLAS CO.—**I. & E. Construction Co.,** Minneapolis, Minn. $148,821 for const. 186 mi. prim. trans. line—by North Douglas County Electrical Cooperative, Inc., Roseburg.

GRANT CO.—**American Bridge Co.,** Frick Bldg., Pittsburgh, Penn.—$713,950 for fabric. and deliver. 800 steel towers, for use in const. 183-mi. trans. line betw. Grand Coulee Dam and Covington—by Bonneville Power Administration, Portland, Ore.

WASCO CO.—**Newport Construction Co.,** 7031 N.E. Halsey St., Portland—$197,382 for const. 265 mi. trans. line—by Wasco Electric Cooperative, The Dalles.

Utah

SALT LAKE CO.—**Central California Construction Co.,** 115 Burrows St., San Francisco—$139,990 for const. AC gasoline fueling syst. at Salt Lake City Municipal Airport—by Constructing Quartermaster, Hill Field, Ogden.

Washington

BENTON CO.—**Yakima Electric Co.,** Yakima, Wash.—$60,240 for const. 82 mi. trans. lines—by Benton Rural Electrical Association, Prosser.

KITSAP CO.—**Dally & Quist,** Lloyd Bldg., Seattle—$179,397 for const. reinf. conc. pier, appr., a 1-story steel frame transit shed, a 5-T freight elev. and a 5-T hammerhead travel crane at Naval Ammun. Depot, Puget Sound—by Public Works Officer, Puget Sound Navy Yard, Bremerton.

YAKIMA CO.—**Fritz Ziebarth,** Box 469, Vancouver—$51,637 for const. 33.8 mi. of Midway-Yakima trans. line—by Bonneville Power Administration, Portland, Oregon.

PROPOSED PROJECTS

California

KERN CO.—Approval has been made by the CAA to the Bakersfield Airport, Bakersfield, for an expenditure of $307,729 to const. landing facilities. The CAA will receive bids and award contracts at 1508 4th St., Santa Monica.

LOS ANGELES CO.—City of Pasadena are considering five major projects for const. during the next five years. They follow: (1) Widen Colorado St., betw. Ave. 64 and Orange Grove Ave.; (2) Const. of bridge on Colorado St. acr. Arroyo Seco; (3) Const. bridge or widen roadway at Devil's Gate Dam; (4 and 5) Additions to sewage disposal plant and electric geno. plant.

SAN DIEGO CO.—The Defense Plant Corp., and Consolidated Aircraft Corp., 3302 Pacific Highway, San Diego, have been allotted $14,446,929 by War Dept., Washington, D. C., for acquisition and const. addtl. plant facil. and equipt. at Consolidated Aircraft Corp. plant at San Diego.

SANTA BARBARA CO.—With approval by the CAA, $533,400 will be spent for const. of landing facilities at the Santa Barbara Airport, Santa Barbara. Bids will be received and contracts awarded by the CAA, 1508 4th St., Santa Monica.

SUTTER CO.—The CAA has approved an expenditure of $238,000 for const. of landing facilities at the Sutter County Airport. Bids will be received and contracts awarded by the CAA, 1508 4th St., Santa Monica.

Colorado

PHILLIPS, YUMA & SEDGWICK COS.—The REA, Washington, D. C., has allotted $166,000 to the High Line Electric Assn., Holyoke for const. 190 mi. of trans. line to serve members of Phillips, Yuma and Sedgwick Cos., Colo., and members of Chase and Duel Cos., Nebr.

There's PROFIT in that Small Job, Too!

Make small jobs, as well as larger ones, pay dividends. Reduce non-productive travel time between locations with the mobile MICHIGAN'S 25 m.p.h. road speed. Let enthusiastic operators show you how MICHIGAN'S Air Controls increase productive time on the job. Here's fast-pace production without let-downs due to operator fatigue. Let the convertible MICHIGAN write a new story of economy and dependability into your cost records. Every MICHIGAN is built from the ground up for hard, tough going. You can handle Shovel, Crane, Clam, Dragline or Trench Hoe work with the same machine—and at a profit! Join the many MICHIGAN owners who are saying "NOW, there's PROFIT in my small jobs, too!"

Write for Bulletin W-11 Today

MICHIGAN *America's Mobile Shovel-Crane Specialists*

MICHIGAN POWER SHOVEL CO.

BENTON HARBOR MICHIGAN

News of Men Who Sell to the Construction West

Portland Caterpillar Distributor

HEADED by **Collis Johnson** as president and **James Lakin** as vice president, a new organization, known as the *Interstate Tractor and Equipment Co.*, has taken over the distribution of *Caterpillar* tractors and equipment in northern Oregon and southwestern Washington. Until new quarters have been completed, business is being conducted from temporary offices at 302 S.W. 4th Ave., Portland, Ore., with sales-display and service headquarters at 2860 N.W. Sherlock Ave., and the Parts Department at 240 S.E. Clay St.

Collis Johnson is a veteran of more than 25 years experience in the contracting, logging and farm machinery business. Since 1934, he has served as vice president and general manager of the *Willamette-Hyster Co.*, manufacturers of drums, arches, donkeys, and other logging equipment. **James Lakin** has been vice president of *Western Loggers Machinery Co.* since its inception in 1924, and prior to that time was connected with the *Willamette Iron & Steel Works.*

Interstate Tractor and Equipment Co. is handling the full line of Caterpillar products, including tractors, diesel engines, electric sets and road-building machinery, as well as the allied lines which include Hyster, LeTourneau and LaPlante-Choate equipment. Other lines include the Skagit logging machinery, American Brand wire rope, Young logging blocks and rigging, and Esco Bardon hooks.

COLLIS JOHNSON

JAMES LAKIN

* * * *

B. E. McDonell, formerly assistant branch manager for the *International Harvester Co.* at Seattle, Wash., has been transferred to Great Falls, Mont., in the same capacity, where he is specializing on motor trucks.

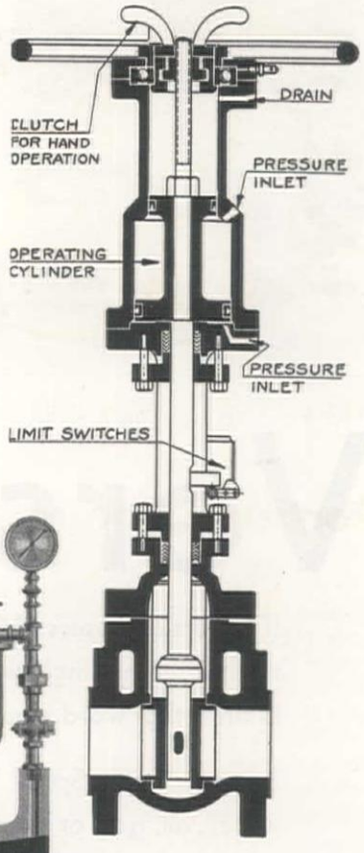
* * * *

Frank B. Connelly, 78, president of the *F. B. Connelly Co.* and the *Connelly Machinery Co.* of Billings, Mont., Seattle, Wash., and Portland, Ore., died in Seattle, on Dec. 6, following an extended illness. Mr. Connelly established his organization in Billings in 1904 as manufacturing agent for wagons and farm implements. The following year construction equipment was added, and in 1922, another organization was founded to handle tractors and construction equipment. In 1933, the F. B. Connelly Co. extended its operations to the Pacific Coast, and now has offices in Seattle and Portland, as well as Billings and Great Falls. Mr. Connelly was prominent in the civic

Look Inside...

for Proof of

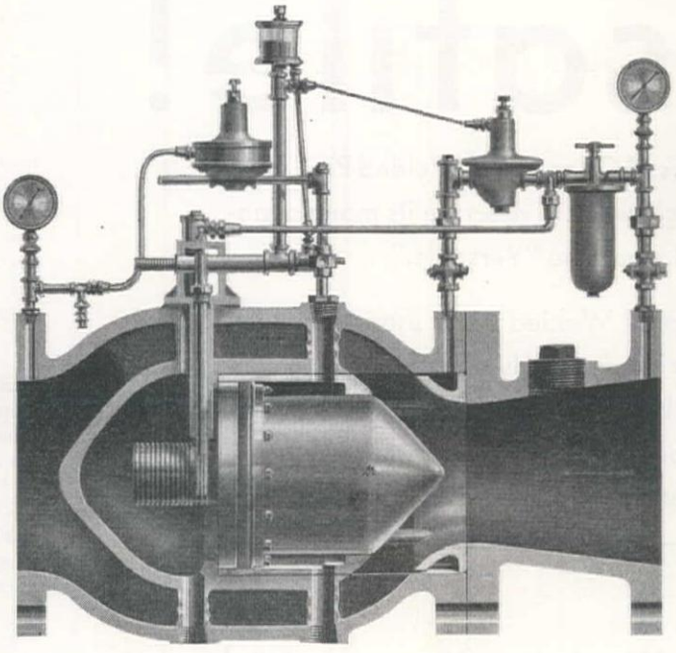
Superior Design

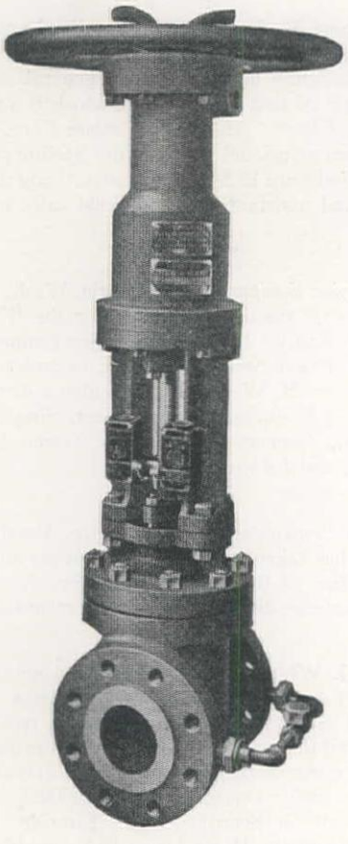


Above, diagrammatic section of Pelton automatic gate valve.

At the right, typical construction of Pelton automatic water works valve utilizing the balanced plunger principle.

Below, view of Pelton automatic gate valve, shown also in section at upper right.





The responsibility for selection of valve equipment for a water works system properly rests with the engineering personnel . . . the men who make it their business to understand every design feature. They look at the inside for detail construction as revealed by a sectional drawing and from it determine the adequacy of each valve design to fulfill its important function. This kind of information, coupled with performance records from actual service, is offered by Pelton engineers to the water works industry. Ask for a copy of bulletin No. 29.

The Pelton Water Wheel Company

Hydraulic Engineers

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EXCLUSIVE WESTERN REPRESENTATIVES for Baldwin-Southwark Division of Baldwin Locomotive Works, Baldwin De LaVergne Sales Corp., Woodward Governor Co., Cone Valve Division, Chapman Mfg. Co., and Carbondale Division, Worthington Pump & Machinery Corp.

BLW
THE BALDWIN GROUP

PELTON

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

affairs of Billings, and was a member of several lodges.

* * * *

Frank B. Hammerly, 53, vice president of the *Independent Pneumatic Tool Co.*, Chicago, Ill., died Nov. 27, while inspecting the coast plant at Los Angeles, Calif.

* * * *

R. O. Brosemer, a member of the *General Electric Company's* engineering department in the San Francisco office since 1929, has been appointed district industrial engineer. **O. A. Gustafson,** since 1928 a member of the Los Angeles staff, has been appointed district central station engineer. **W. C. Smith,** since 1932 engineer of the San Francisco office, and prior to that time transformer specialist in San Francisco, has been appointed district engineer of the Pacific district.

* * * *

L. C. Allenbrand, one time sales training representative for the western division of *Caterpillar Tractor Co.*, has been appointed manager of the sales development division for Caterpillar. He succeeds G. E. Spain, whose promotion to general sales manager was announced last month. Allenbrand first came to the West Coast in 1932, and in 1933 he joined the organization of the Doyle Tractor and Equipment Co. at Visalia, Calif.

* * * *

Robert L. Lerch, one time district sales manager for the *Haynes Stellite Co.* at Los Angeles, has been appointed general sales manager of that organization, which is a unit of the *Union Carbide and Carbon Corp.* He has been associated with Haynes Stellite since 1924, and since 1929 has been advertising manager and assistant to the general sales manager.

* * * *

Rainier Equipment Co., Seattle, Wash., has taken over the distributorship for the *Wooldridge Mfg. Co.* line of earthmoving equipment in the Puget Sound area. The organization, headed by **B. W. Harberg,** is also a distributor for Koehring Co. equipment, Simplicity screens, Gorman-Rupp pumps, Garco light plants, and Edwards wire rope.

* * * *

The Contractors' Equipment Co., Portland, Ore., has taken over the earthmoving equipment line of the *Wooldridge Mfg. Co.*, and will serve as distributor in the Portland area.

* * * *

F. J. White, formerly connected with the sales force of *General Motors Truck and Coach* in the Seattle factory branch, recently resigned that position to become sales manager of the commercial power and truck division of *S. L. Savidge, Inc.*, distributors for Dodge and Plymouth in Seattle. **"Bud" Linville,** formerly with the Hertz Drive-It-Yourself system, succeeds White with General Motors.

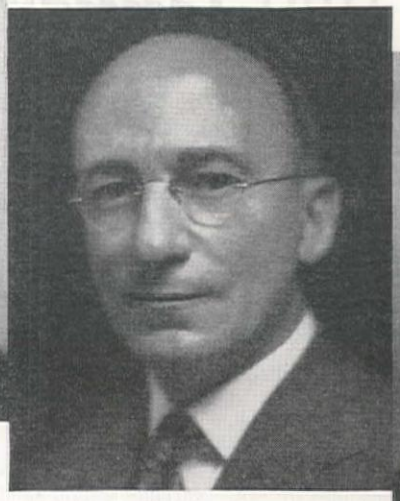
* * * *

The Howard-Cooper Corp., equipment distributor of Washington, Oregon and Idaho, held a sales meeting in Portland on Dec. 14-16 which was attended by between 40 and 50 employees. The attendance included branch managers, assistants, executives, and 22 salesmen working out of the Seattle, Portland, Spokane, and Boise offices.

These Men Have a Message for YOU!

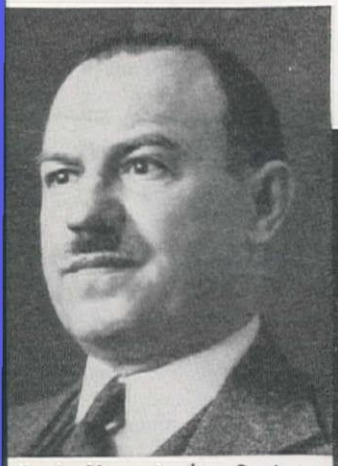
H. G. Sours, President, American Road Builders Association.

General Robt. Lee Bobbitt, of the Texas Highway Commission, will tell you how roads behave under military transport.



A. T. Goldbeck, Secretary of the Crushed Stone Association will discuss non-rigid pavements for airport service.

Prof. Walter Sadler of the University of Michigan brings you valuable data on the "Pitfalls of Bidding".

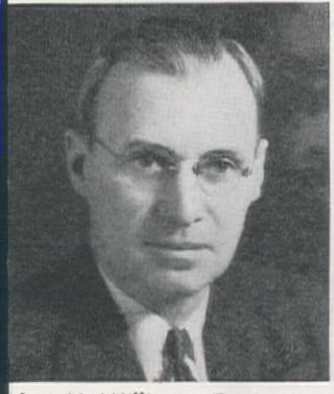


C. A. Hogentogler, Senior Highway Engineer of the Public Roads Administration, will tell you about engineering and construction control on highway embankments.

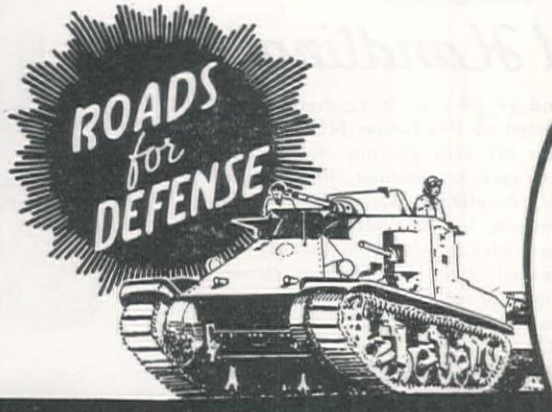
T. E. Stanton, materials Engineer, of the California Division of Highways, will discuss practices in the control of moisture in embankments and stabilized bases.

Capt. H. C. Whitehurst, Director of Highways for the District of Columbia, brings you a message on that coming new subject "City Street Maintenance by Contract".

Another new subject of heavy interest. H. H. Houk, Engineer of Washington National Airport, Civil Aeronautics Administration, will discuss airport engineering and the highway engineer.



Alan M. Williams, Engineer Manager of the Ionia County Road Commission, Ionia, Mich., will go into the important phase of legislation, finance and administration.



SPACE precludes our going into further details. These are but a few of the many topnotchers that are going to discuss many subjects pertinent to the problems of contractor and highway official alike. H. F. LaGuardia, Mayor of New York, Gen. Fugua, N.B.C. War Analyst, Frank Nikirk of the Caterpillar Tractor Co., E. E. Duffy, Francis J. Kelly, W. H. Seymour, H. F. Clemmer, are but a few of the many more that will discuss in detail the many things that affect your jobs. Don't miss it — there will be interesting inspection trips, motion pictures, open discussion — fun! Make your reservation now. . . .

38th ANNUAL CONVENTION
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JAN. 27-31, 1941

AMERICAN ROAD BUILDERS ASS'N.

International Building • Washington, D. C.

New Materials and *Equipment* . . .

Gearless Gyratory Crusher

Manufacturer: Kennedy-Van Saun Mfg. and Engineering Corp., New York, N. Y.

Equipment: Ball-bearing gearless type crusher.

Features claimed: The Kennedy ball bearing gearless short-shaft crusher eliminates gear or belt drives by a synchronous motor built in the pulley, which has a 250% starting torque and 300% pull out torque. This permits starting of the crusher when full of rock. The machine is also built driving by a standard motor through a drive belt. The crusher is built in a wide range of sizes from No. 66, with receiving openings of 66x235 in., to No. 3, with receiving openings of 3x8 in. Elimination of gears permits a higher gyrating speed of the main shaft and crushing mantle. Less power is consumed through the elimination of gear friction, and only one type of lubrication is required. An increased speed permits more vertical passage from feed to discharge, which increases the speed of flow and permits finer grinding without clogging. Short angles of the head and grinding ring, together with a perpendicular crushing blow, reduces flats and splinters to produce cubical products. The height from feed to end of discharge chute is less than that of any other fine crusher. The grinding ring is reversible, permitting it to be taken out and turned over when one side has become worn.

Tandem Roller

Manufacturer: Huber Manufacturing Co., Marion, Ohio.

Equipment: Streamlined variable weight tandem roller.

Features claimed: Among the important operating features of the new streamlined variable weight tandem roller are three forward speeds and reverse; dual controls which permit operation of machine from either side; automotive type of construction; ease in operation; high clearance of the frame; hydraulic steering; anti-friction bearings at all strategic points; full accessibility of all moving parts; full width seat to reduce operator fatigue; a large capacity well built water tank; and rust resisting sprinkling pipes. The roller is powered with a 6-cylinder Buda gasoline engine, although diesel power can be supplied on special order, if preferred.

Single Drum Paver

Manufacturer: Foote Company, Inc., Nunda, New York.

Equipment: 34-cu. ft. single drum paver.

Features claimed: The single drum 34-E paver is designed to supersede the 27-E on paving contracts which require speed and large output. The paver has a 34-cu. ft. capacity plus 10% on a 6% grade in accordance with A. G. C. standards. The machine has been in service during the past year on a wide range of jobs, and has averaged nearly 400 batches per 8-hr. day. Despite the increased capacity, the machine is easy to maneuver and transport. For transportation by trailer, the superstructure may be lowered by power after removing two pins. The machine is so designed that no water connections or other parts must be disassembled. It incorporates all the design principles of the latest model of the MultiFoote 27-E paver, including a double-cone drum, fully enclosed, travel gears running in oil, Timken bearings on all high-speed shafts, a power take-off of helical cut gears running in oil, and a water system unaffected by line pressure or a change in grade.

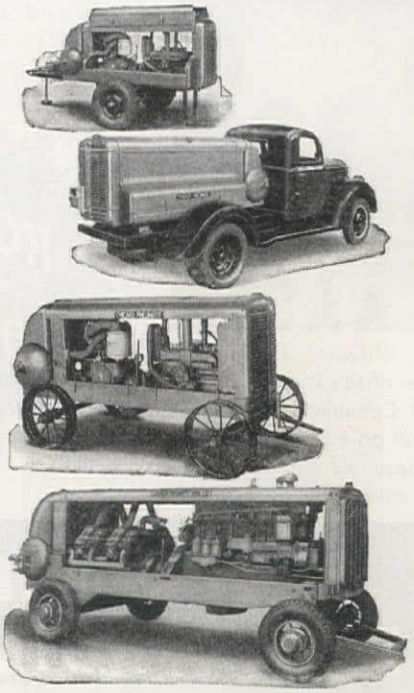
Portable Compressors

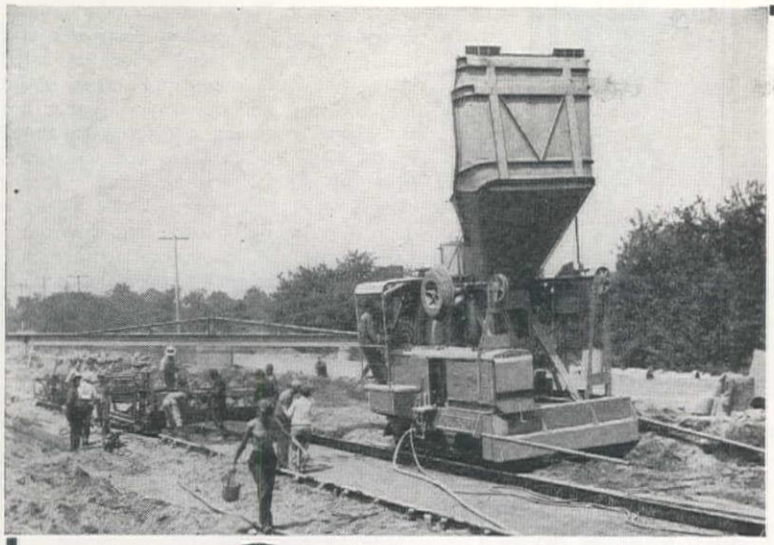
Manufacturer: Chicago Pneumatic Tool Company, New York, N. Y.

Equipment: Complete line of two-stage air-cooled portable compressors.

Features claimed: Including six models and sizes of 60 to 315 cu. ft. per min., and available in four different types of mountings, the 2-stage air-cooled portable compressors are now offered in a modern streamlined design which retains complete accessibility and incorporates many refinements of design and manufacture. Included in the construction features are a Hercules heavy-duty engine, a modern sectional radiator, auto-pneumatic throttle, modern all-steel deck, oil-bath en-

CP STREAMLINED COMPRESSORS





The Latest in Paving Economy

The Ransome 34-E "Single Drum" Paver

RANSOME offers the 34-E "Single Drum" Paver for average sized jobs where the capacity of the Ransome 34-E "Dual Drum" Paver is not required.

NOTE THESE FEATURES:

- Interchangeability of many parts with the 34-E "Dual Drum" Paver.
- Full Hydraulic "Finger Tip" controls for easier and smoother operation of boom swing, water valves, discharge chute.
- While a spreading reach of 32½ feet is retained, less counter weight is used than on standard 27-E due to better balance and longer crawlers.

WRITE FOR COMPLETE INFORMATION

RANSOME CONCRETE MACHINERY COMPANY

DUNELLEN, NEW JERSEY

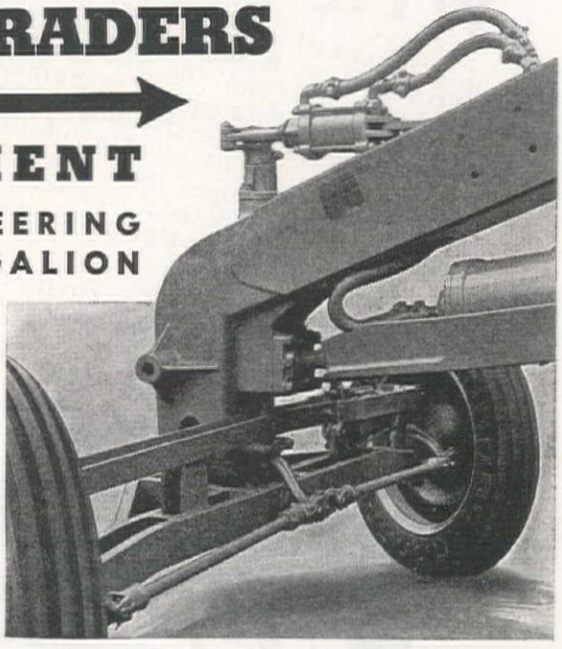
P-10

ON GALION MOTOR GRADERS

HYDRAULIC STEERING →

IS STANDARD EQUIPMENT

NO NEED TO BUY ADDITIONAL STEERING MECHANISM — WHEN YOU USE A GALION



OPERATORS PREFER HYDRAULIC STEERING — CAN DO AT LEAST 25% MORE WORK WITH LESS EFFORT—ASK THEM

Investigate Galion Motor Graders

Use a Galion IN 1941 - IT'S Easy to Steer and RUN

Galion Distributors:

Brown-Bevis Equipment Co., Phoenix, Arizona; F. Ronstadt Hdwe. Co., Tucson, Arizona; Brown-Bevis Equipment Co., Los Angeles, California; The Western Tractor Co., San Francisco, California; H. W. Moore Equipment Co., Denver, Colorado; Feenaughty Machinery Co., Boise, Idaho; Hall-Perry Machinery Co., Butte, Montana; Morrow & Co., Albuquerque, New Mexico; Feenaughty Machinery Co., Portland, Oregon; Feenaughty Machinery Co., Seattle, Spokane, Washington; Arnold Machinery Co., Salt Lake City, Utah

•

MOTOR GRADERS PULL GRADERS ROLLERS SPREADERS GRADER BLADES

gine air cleaner, spring-loaded multiple-disc clutch, automotive-type oil pan, oil-bath compressor air cleaner, simplate valves, accessible compressor bearings, straight line compressor, free-air unloader, lockable lead-lined fuel tank, and A. S. M. E. air receiver.

Screw-Holding Tray

Manufacturer: Independent Pneumatic Tool Co., Chicago, Ill.

Equipment: "Pix-Up" finder and Adjusto-Tray.

Features claimed: This new device which sorts, picks up and holds screws for driving increases the efficiency of power screw driving, and eliminates the time-wasted hand operations of picking up screws by the fingers and starting or holding the screw in tapped or drilled holes. The Adjusto-Tray is a screw-holding tray with a series of longitudinal slots in the bottom. A quantity of screws is spilled into the tray, and the tray is shaken a few times, which suspends the screws in the slots by their heads. Then a power screw driver, equipped with a "Pix-Up" finder is placed over a screw head, pressed, and as the tray depresses slightly on its spring mounting, the finder grips the screw head firmly, holding it ready for driving. The operation is entirely mechanical, and not magnetic. The finder is split to act as mechanical fingers in picking up, and holding, the screw.

PICK-UP FINDER AND ADJUSTO-TRAY

Welding Positioner

Manufacturer: Ransome Concrete Machinery Co., Dunellen, N. J.

Equipment: Heavy duty welding positioner.

Features claimed: With a capacity of 2,500 lb., this machine has been designed to facilitate the handling of material in welding shops. The all-welded table top, with T-slots for simplified clamping, revolves through a full circle and tilts 135 deg. from the horizontal. A worm and worm wheel arrangement makes the table self-locking when handling unbalanced loads. The positioner is available with hand wheels for manual operation or with tilting and revolving motors operated by remote control push buttons. The size of product handled is not limited to the size of the table. All working parts are covered and guarded by metal housing. For handling large jobs, the machine may be raised to any height by mounting on an elevated base which permits the welder to work in the position best suited. The machine occupies a floor space of 41½x31½ in., with the table top 37⅝ in. above the floor. The table top is 32 in. square.

Oiling Slide Rule

Manufacturer: E. D. Etnyre & Co., Oregon, Ill.

Equipment: Slide rule for computation of distributor control.

Features claimed: A new computing slide rule for operators of oil distributors simplifies control of the machine and removes guesswork, with a resulting increase in accuracy. The slide rule is printed on heavy toughened cardboard and is precision die-cut for accuracy. It is laminated with heavy cellophane, and is not only durable but resistant to finger smudges. As added protection, it is placed in a sturdy jacket for carrying in vest or overall pocket. For convenience of operation, and to reduce the size, the slide rule has tables on both sides. An accompanying instruction sheet aids the new user. By use of the specially designed slides, it is possible to determine the Bitumeter or Tachometer settings for spray bar lengths of from 3 ft. to 30 ft., the material required for application up to 3 gal., per square yard, and the solution of any multiplication, division or percentage problem.

Surface Concrete Vibrator

Manufacturer: Blaw-Knox Co., Pittsburgh, Pa.

Equipment: Surface type concrete paving vibrator.

Features claimed: This unit may be operated

in conjunction with a paving spreader or finishing machine and aids in preventing segregation, simplifying finishing operations, and facilitating the use of stiff mixes. The vibrator pan is made of abrasion resistant steel, assembled with high tensile alloy steel bolts and lock nuts. The pan has a sufficiently deep section to prevent dissipation by excess inertia and to transmit it to the concrete. The vibrators consist of unbalanced rotors mounted on the pan, with two used on the models for 12-ft. pavement width, and four on the full width machines. The center of gravity of the rotating member is readily adjustable to vary the amplitude of the vibration. The normal frequency of 4,200 per min. is also adjustable. A free floating action of the unit enables concrete to be fed beneath the vibrating pan and become incorporated in the slab. Tests have shown that the unit communicates the effect of vibration over a wide area of concrete mix—in some cases, as much as 8 to 10 ft. behind the vibrator.

Bronze Welding Rod

Manufacturer: Air Reduction, New York, N. Y.

Equipment: High-test flux-coated bronze welding rod.

Features claimed: Time formerly lost in removing a bar rod from the molten puddle, and dipping it into a flux can may be saved when the new high-test flux-coated bronze welding rods are used. The flux adheres well to the rod during shipment, and will not fall off even though the rod be bent. The eight outstanding advantages of the flux-coated rod are low fuming; faster application; denser deposit; increased tensile strength; greater bond strength; increased hardness of deposit; improved ductility; and saving in time. For those who prefer a bare welding rod, the same flux is available in a liquid paste form.

Literature...Catalogs

The following booklets may be obtained by sending your request directly to the manufacturer or to WESTERN CONSTRUCTION NEWS, 333 Kearny Street, San Francisco.

The Owen Bucket Co., Cleveland, Ohio —A new catalog on the Type RA Rock Grapple for handling all types of material, including rock, trees and debris. A table of dimensions and weights, as well as detail photograph of construction, is included.

Bucyrus-Erie Co., South Milwaukee, Wis.—Bulletin 2066, covering job uses for power shovels in the ½ to ¾-cu. yd. sizes. Illustrations include machines operating as shovels, dragshovels, skimmers, draglines, clamshells and cranes.

Sullivan Machinery Co., Michigan City, Ind.—Bulletin 87-G, covering improved detachable bits for rock drilling.

Screen Equipment Company, Inc., Buffalo, N. Y.—A folder describing Seco vibrating screens, built with one, two or three decks, and featuring an equalizer assembly.

Pioneer Engineering Works, Minneapolis, Minn.—Form No. 536 describes the new Pioneer traveling grizzly feeder, and Form No. 535 covers the Pioneer Trukbukit for handling quarry materials.

Koehring Co., Milwaukee, Wis.—Form K163 is a specification sheet on Models T-120 and TD-120 Trail-Dump for hauling excavated materials. Form K 166 covers the 14-S concrete mixer available with either end or side discharge. General specifications are included.

IT'S THE *Cost per Ton* THAT COUNTS!

IS YOUR present method of handling material eating into your profits? Then you'll find an answer to your problem in S-A Conveyors—they come any length and any size, as part of the large line of S-A Material Handling Equipment. S-A is staffed with capable engineers of long experience; men who cooperate with contractors and plant men in designing individual Conveyors, Elevators and allied lines, or complete plants. Write us for detailed recommendations without obligation.

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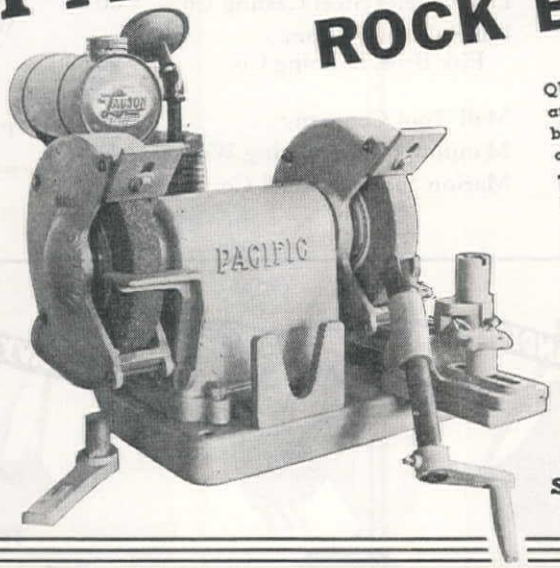
Catalog sent upon request

SOLVES THE PROBLEM OF BIT GRINDING AT ISOLATED OR SHORT JOBS

THE NEW G-8

PACIFIC *Gas-Driven* ROCK BIT GRINDER



QUICKLY restores proper cutting edge and gauge on 4-way detachable rock bits up to 3" diameter, anywhere and anytime.

The new Model G-8 unit includes double wheel, ball bearing, grinding head and two 8"x1¼" wheels, fully guarded; Powered with standard 4-cycle gasoline engine equipped with air cleaner and flyball type centrifugal governor; Right wheel equipped with PACIFIC attachments is for bit grinding; Left wheel for general utility grinding, sharpening pick points, etc. Attractively priced.

For further details concerning this and other low-cost PACIFIC bit grinding models write TODAY.

Sharp Bits Prolong Life of Drilling Equipment

With this new economy unit and a few bits you're set for handling small rock drilling jobs . . . PACIFIC G-8 rock bit grinder is gas-driven with plenty of power for the job . . . No special rigging needed to install this portable, self-contained outfit.

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