WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XX, No. 11

NOVEMBER • 1945

35 CENTS A COPY
$3.00 PER YEAR

IN THIS ISSUE

Flood Control Channel
Will Protect San Bernardino

Reclamation at Yakima
Project Features Siphons

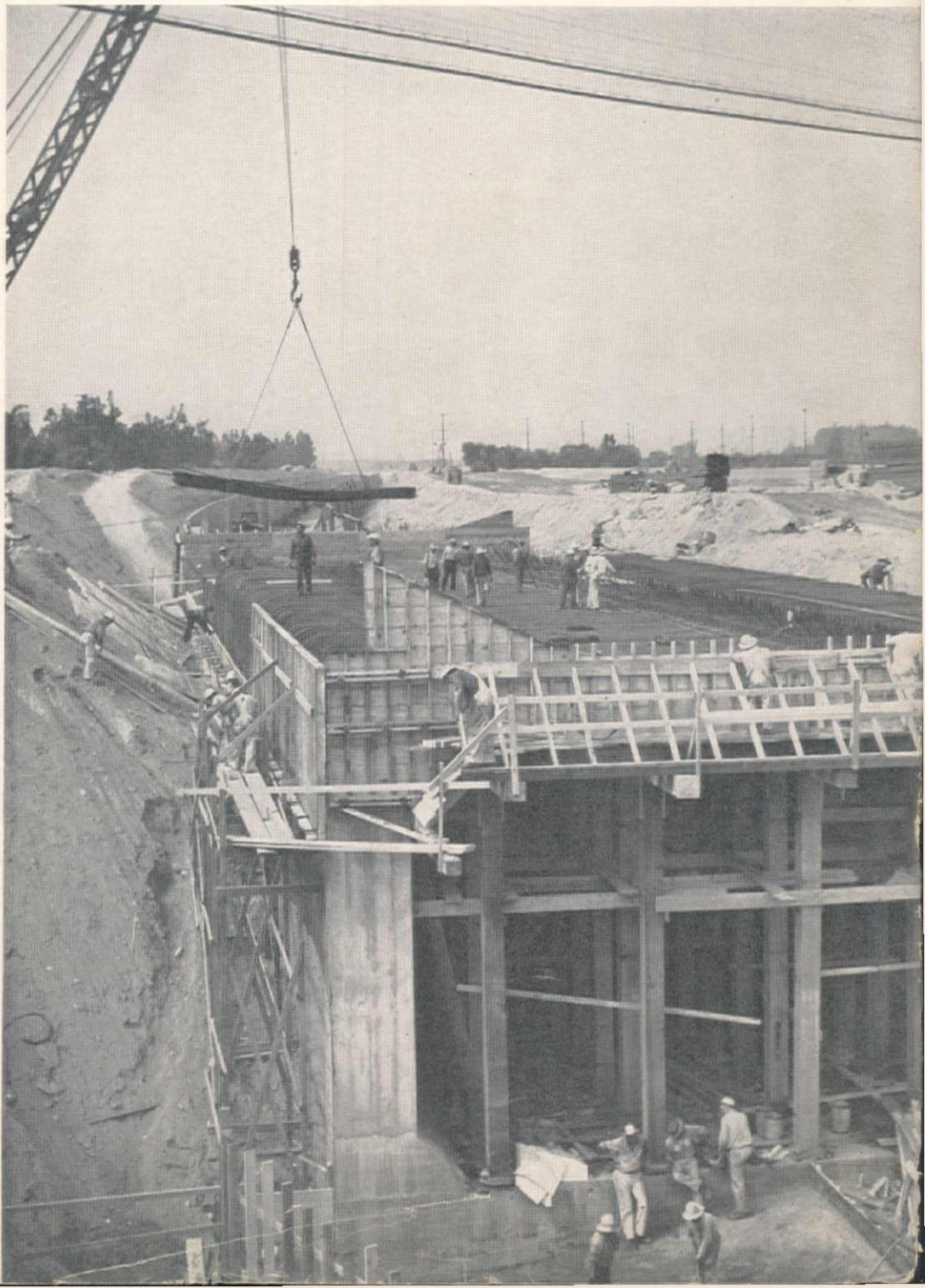
Sierra "Hump" Railway
Realignment Suggested

Atomic Bomb Plant
Construction Masterpiece

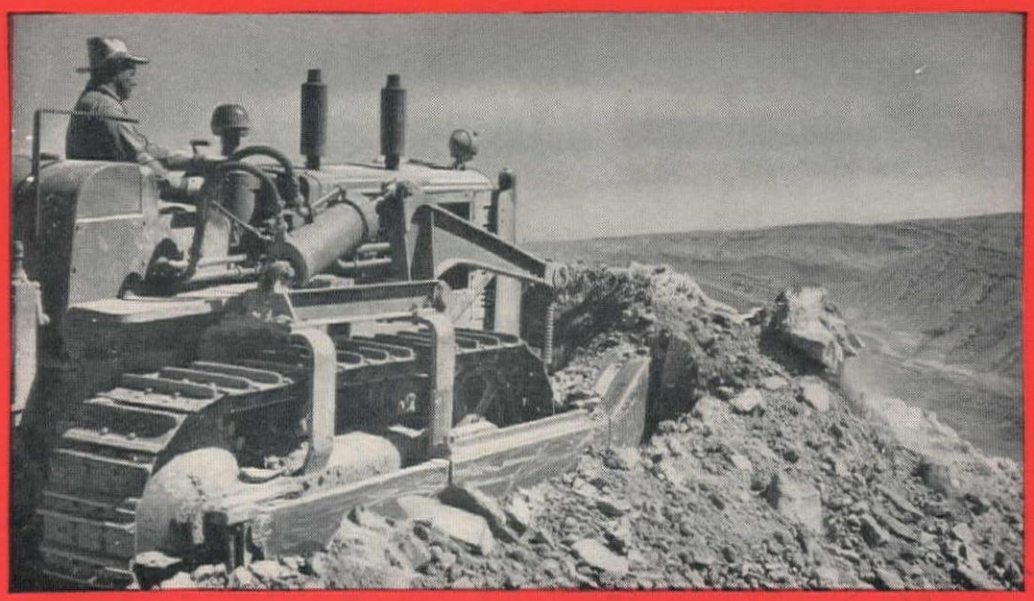
Oregon Sewerage Plans
Will Clear Willamette River

Salt Lake City Water
Aqueduct Approaching Completion

Temple at Idaho Falls
Erected by Mormon Church



DECK FORMS and reinforcing steel being placed in one of the overpasses crossing the Lytle creek flood control channel, a part of the San Bernardino, Calif. project now being constructed under the supervision of U. S. Engineer Corps. Photo by USEC.



FEWER APPLICATIONS NEEDED—

because protection lasts longer when you use the famous chassis lubricant that . . .

★ Resists squeeze-out
★ Seals out dirt and moisture
★ Stays in bearings under all temperatures

TRACTORS, graders, shovels, trucks and other construction equipment last longer, maintenance costs go down, when you lubricate them with long-lasting *Texaco Marfak.*

Marfak is one of the most famous of all Texaco lubricants. It is far more than a mere "grease". This unique product, designed especially for chassis lubrication, is both tough and adhesive. It cushions parts against road shock and clings tenaciously to bearing surfaces despite high speeds, heavy loads and extremes of temperature.

In addition, *Texaco Marfak* has the extraordinary characteristic of forming a fluid film inside a bearing while retaining its original consistency at the outer edges—thus sealing itself in, sealing out dirt and moisture. Its high resistance to squeeze-out means greater protection with fewer applications.

For wheel bearings, the right lubricant to use is *Texaco Marfak Heavy Duty.* It stays *in* the bearings, assuring safer braking. No seasonal change is required.

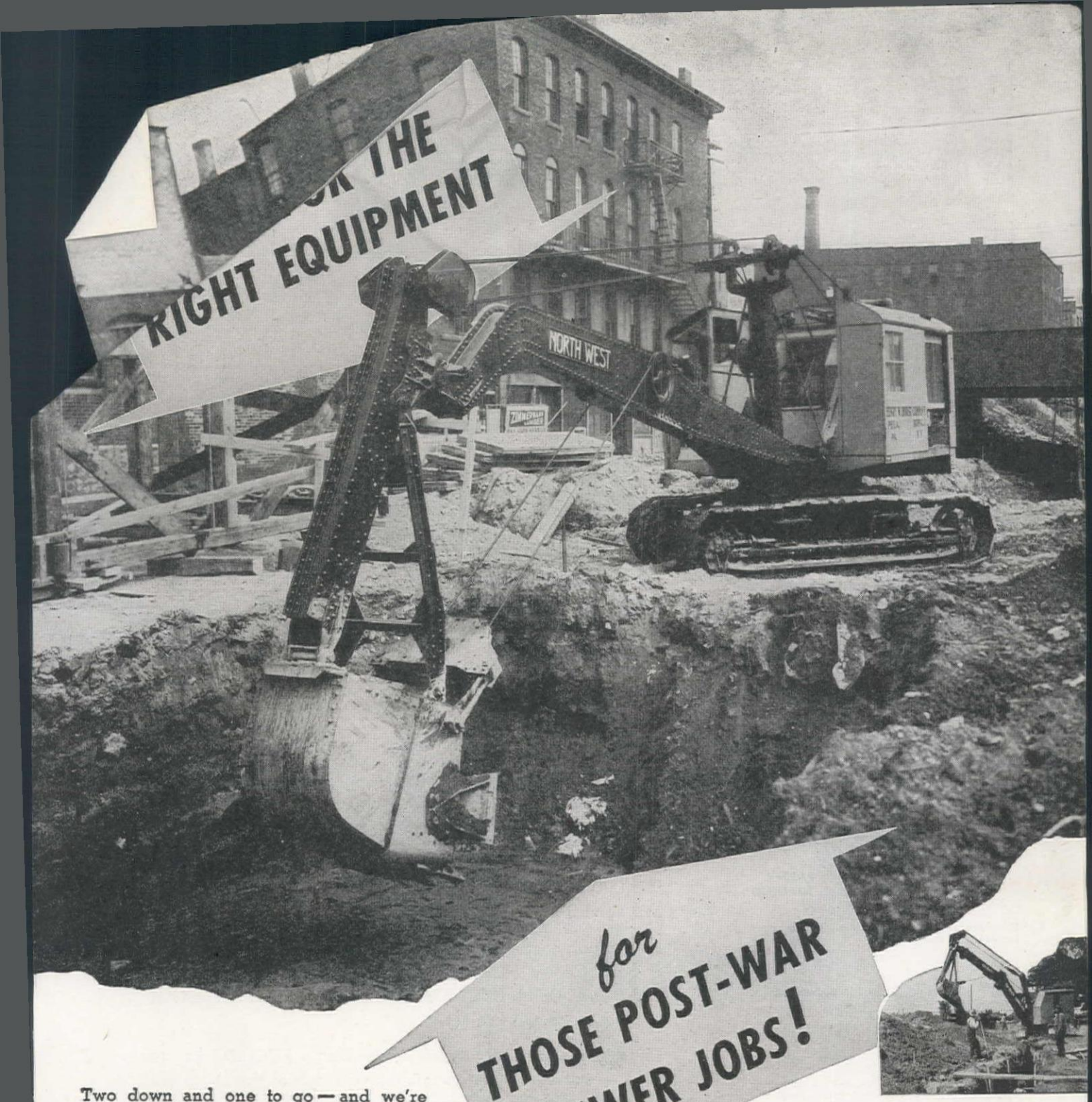
Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN THE TEXACO STAR THEATRE WITH JAMES MELTON EVERY SUNDAY NIGHT—CBS



...K THE RIGHT EQUIPMENT

for THOSE POST-WAR SEWER JOBS!

Two down and one to go—and we're getting closer to that postwar building boom that is going to mean 5,000,000 new homes and all the sewers, and water lines and basements they will require.

The Northwest Pullshovel gives you a trenching machine with a versatility equalled by no other type machine for this class of work. It handles any kind of ditch, large, small—dirt or rock. It loads trucks, or spoils to banks. It travels where large, less easily handled machines can't go. It sets pipe or backfills. It digs bell holes or basements. And it can be quickly converted to a Shovel, Crane or Dragline by simply changing booms—it's an all purpose unit that does what no other type trencher can do. Don't put your money in a one-purpose machine.

Plan to have a Northwest Pullshovel on your future sewer work.

NORTHWEST ENGINEERING CO., 1736 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Ill.

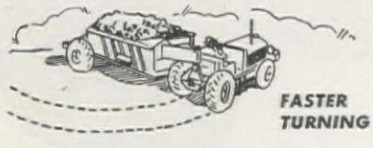
NORTHWEST

Northwest Sales Agents: ARNOLD MACHY. CO., INC., 149 W. 2nd South St., Salt Lake City, Utah; BALZER MACHY. CO., 2136 S.E. Eighth Ave., Portland, Oregon; WILSON EQUIPMENT SUPPLY CO., 902 West 22nd St., Cheyenne, Wyoming; *Branch Offices:* 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash.; 3707 Santa Fe Ave., Los Angeles, Calif.; 3015 Claremont, Denver, Colo.

Wait until you have seen the new NORTHWEST Rubber Tired Line of Truck Cranes, Truck Shovels or Wagon Cranes Before You Buy!

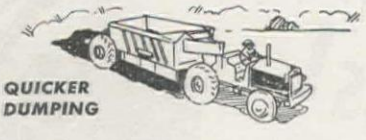
Ease in Handling EUCLIDS Means Lower Cost Operation

BOTTOM-DUMP EUCLID ADVANTAGES



FASTER TURNING

Sturdy, universal hitch and ample clearances for drawbar and doors.



QUICKER DUMPING

Unobstructed full-length-and-width door openings — steep, smooth, quick-shedding hopper sides — and finger-tip, air-operated dumping controls.

TRACTIVE POWER

Distribution of payload, large tires and double reduction planetary drive axle assure good flotation and traction for tough hauls.

• On this relocation of a Pennsylvania State Highway between Monaca and Aliquippa, Euclids moved approximately 900,000 cu. yds. of heavy clay and rock on long hauls which averaged 3 miles from shovel to dumping area.

In addition to 8 of their own Bottom-Dumps, S. J. Groves & Sons Co. of Minneapolis used 37 other Bottom-Dumps and 8 Rear-Dump EUCLIDS to haul a large part of the total excavation on this project.

Unusual maneuverability of Bottom-Dump EUCLIDS in the narrow working areas on this job was one of the important advantages of this equipment. Another was the rugged simplicity of the Euclids which enabled them to take this tough job in stride day in and day out.

These and other advantages have earned for Euclids their reputation for lower hauling costs. May we send you the proof?

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

THE EUCLID ROAD MACHINERY CO.

3710 SAN PABLO AVENUE — PIEDMONT 8046 — EMERYVILLE, CALIFORNIA

Brown, Fraser & Co., Ltd., Vancouver; Columbia Equipment Co., Portland; A. H. Cox & Co., Seattle; Hall-Perry Machinery Co., Butte; Intermountain Equipment Co., Boise; The Lang Co., Salt Lake City; Lively Equipment Co., Albuquerque; Constructors Equipment Co., Denver. District Representative: J. K. Greer, 2350 Jasmine, Denver, Colorado.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for November, 1945

Editorial Comment 85

Flood Control Channels at San Bernardino, Calif. . . . 87
By M. McMILLIN

Washington Irrigation Project to Open New Land . . 92
By C. E. TYLER

Willamette River Pollution to Be Cleaned Up . . . 96
By J. W. CUNNINGHAM

Atom Bomb Plant a Construction Masterpiece . . . 98

R. R. Realignment Planned for Sierra Nevada "Hump" 102

New Mormon Temple Completed in Idaho Falls . . . 106
By H. TIPPETTS

Partial Delivery Soon from Salt Lake City Aqueduct . 110
By O. N. MALMQUIST

How It Was Done 115

News of Western Construction 116

Unit Bid Summary 128

Construction Contracts Awarded During October . . 140

New Equipment and News of the Men Who Sell It . . 160

ABC

J. M. SERVER, JR.
Editor

SUBSCRIPTION RATES

The annual subscription rate is $3 in the United States and foreign countries where extra postage is not required. To Canada and to foreign countries where extra postage is necessary the annual rate is $4. Single copies, 35 cents.

Published by King Publications

OFFICE OF PUBLICATION
503 Market St., San Francisco 5, Calif. . . . . Telephone YUkon 1537

SOUTHWEST OFFICE
9327½ W. Olympic Blvd., Beverly Hills, Calif. . . . . .
J. E. BADGLEY, District Manager

MIDWEST OFFICE
5833 So. Spaulding Ave., Chicago 29, Ill. . . . . Telephone PRospect 1685
A. C. PETERSEN, District Manager

EASTERN OFFICE
115 Central Park West, New York, N. Y. . . . . .
R E. DORLAND, District Manager

WASHINGTON OFFICE
1120 Vermont Ave., NW., Washington 5, D. C. . . . . Telephone District 8822
ARNOLD KRUCKMAN, Associate Editor

Please address correspondence to the executive offices, 503 Market St., San Francisco 5, California

Entered as Second Class Matter at the Post Office at San Francisco, California, under the Act of March 3, 1879.

First OF A Great *New* "CATERPILLAR" Line!

"Caterpillar" Bulldozers are here—first in a mighty line of earthmoving equipment designed, built and backed by the same manufacturer that makes the tractors which power it; sold and serviced by a single dealer; developed to bring you still greater advantages in getting "lowest costs on earth."

Forty years of "Caterpillar" earthmoving experience has gone into these complete-package bulldozers built to give perfect balance between power, traction and blade capacity; to include every design feature learned on the toughest tasks of war and peace; to insure one high standard of material and workmanship and to provide the top performance and long life which are traditional with "Caterpillar" products.

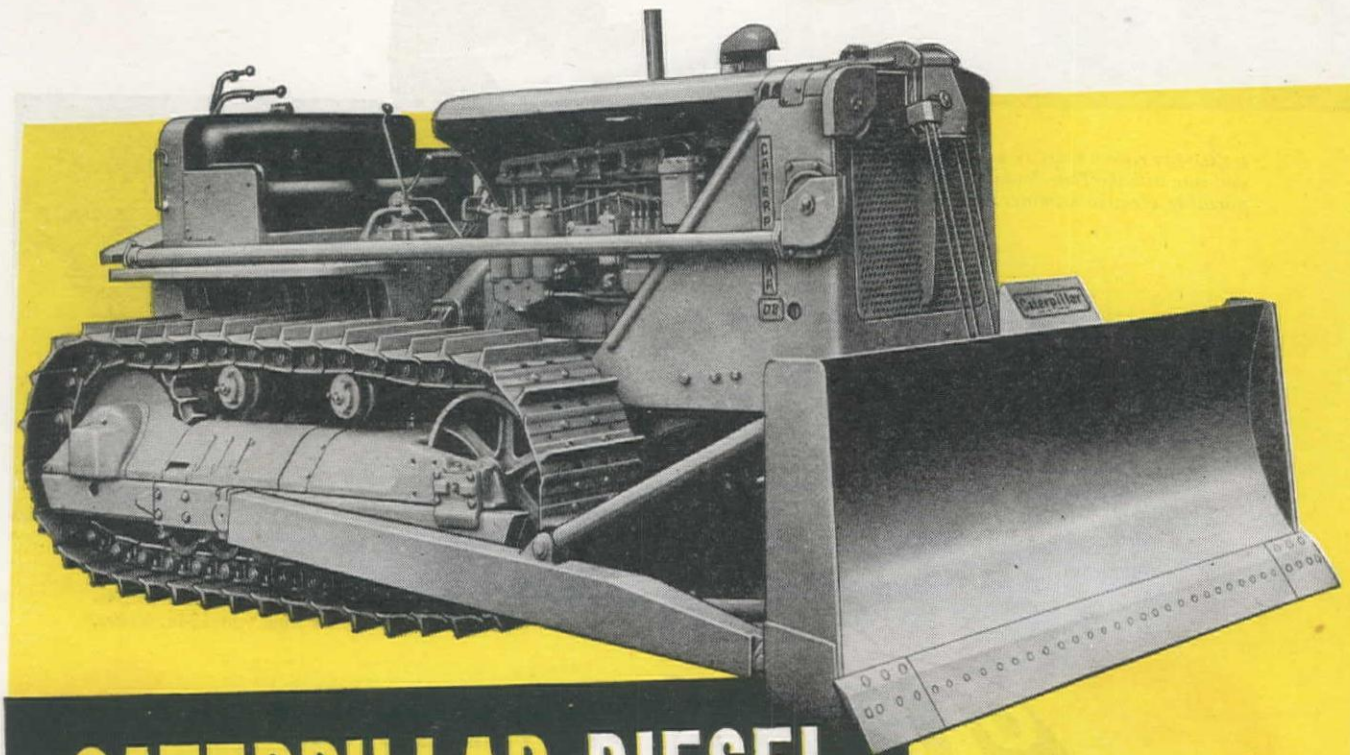
Proved in laboratory, on test field, and on the world's toughest jobs, "Caterpillar" Bulldozers are now ready to prove their advantages, stamina and long life on *your* jobs.

Your "Caterpillar" dealer will gladly give you full information on these rugged earthmovers. Better still, he will help you get them at the earliest possible date. Now, more than ever before, he is a good man to know. See him soon.

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

BULLDOZERS WITH THESE OUTSTANDING ADVANTAGES:

- BALANCED DESIGN
- GREAT CAPACITY
- RIGID CONSTRUCTION
- REINFORCED BLADE
- EASY DIGGING
- ENCLOSED OPERATING CABLES
- LONG-LIFE CUTTING EDGES
- EASY BLADE ADJUSTMENTS
- QUICK MOUNTING
- UNIT MANUFACTURE
- ONE SERVICE SOURCE
- CORRECTLY GROOVED SHEAVES
- LONG CABLE LIFE
- SAFE OPERATION
- FINE VISIBILITY
- HIGH LIFT
- LOW DROP
- STRAIGHT OR ANGLING CUT



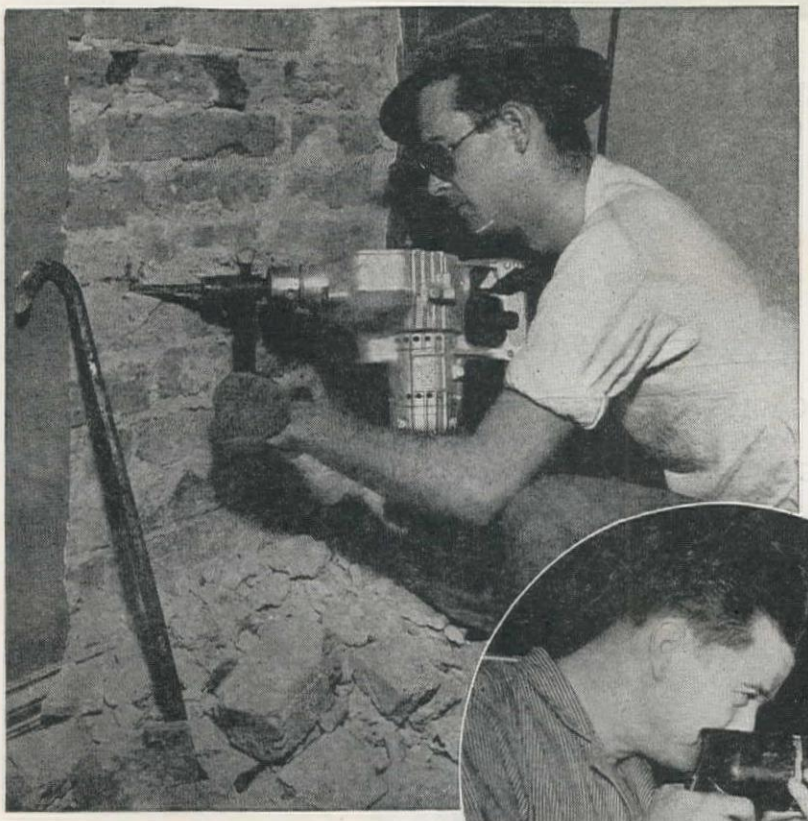
CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS
EARTHMOVING EQUIPMENT

SMALL TOOLS DO BIG JOBS

on Construction and Maintenance



Power-packed, yet light and easy to handle, Thor Portable Electric Tools save hours and dollars on construction, repair and renovation work. Check the many tasks they'll do for you *faster*. See or call your nearby Thor dealer or Thor branch office today.

INDEPENDENT PNEUMATIC TOOL COMPANY
600 W. Jackson Boulevard, Chicago 6, Illinois

BIRMINGHAM BOSTON BUFFALO CLEVELAND DETROIT LOS ANGELES
MILWAUKEE NEW YORK PHILADELPHIA PITTSBURGH SALT LAKE CITY
ST. LOUIS SAN FRANCISCO TORONTO, CANADA LONDON, ENGLAND

MAKE HOLES FASTER with Thor electric drills. Capacities from ¼" to 1¼". Speeds for any material.

DEMOLITION IS QUICK and sure with the Thor-Nado portable electric hammer.

SAWING IS SIMPLE . . . and safe with a Thor Electric Saw. 5 models with capacities from 6 to 12-in. blades.

Thor PORTABLE ELECTRIC TOOLS FOR EVERY CONSTRUCTION JOB

- *Drills* • *Saws* • *Hammers* • *Grinders*
- *Sanders* • *Polishers* • *Screw Drivers*
- *Nut Setters* • *Tappers* • *Nibblers*

Thor PORTABLE POWER TOOLS

PNEUMATIC TOOLS • UNIVERSAL AND HIGH FREQUENCY ELECTRIC TOOLS • MINING AND CONTRACTORS TOOLS

FWD TRUCK-POWER FOR *ALL* JOBS

Plus + SNOW-CLEARING!

When winter comes, the same FWDs that handle a wide range of heavy-duty work throughout spring, summer and fall, are ready for the toughest snow-fighting duty. Put them back of any good plow and you have snow-bank-busting power that has no equal in speed, snow-clearing effectiveness and economy.

They slug their way through deepest drifts... through hardest packed, crystallized "sugar snow" that defies less rugged power . . . because their true four-wheel-drive principle, with center differential, puts properly balanced weight, traction and maximum driving power on all four wheels. They do ALL jobs, in ALL seasons, at lower cost because they are engineered to provide the most in four-wheel-drive hauling power and stamina.

THE FOUR WHEEL DRIVE AUTO CO.
Clintonville, Wisconsin
Canadian Factory: Kitchener, Ontario

FWD TRUCKS
THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

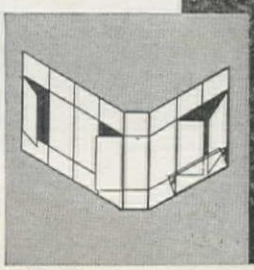
FWD Distributors: ARIZONA — Arizona-Cedar Rapids Co., 401 N. First St., Phoenix; CALIFORNIA—The Four Wheel Drive Auto Co., 1339 Santa Fe Ave., Los Angeles 21, and FWD Pacific Co., 469 Bryant St., San Francisco 7; COLORADO—Liberty Trucks & Parts Co., P. O. Box 1889, Denver 1; IDAHO—Intermountain Equipment Company, Broadway at Myrtle St., Boise; MONTANA—Steffeck Equipment Co., 11 E. Cutter St., Helena; NEVADA—Allied Equipment Co., Reno; NEW MEXICO—The Myers Company, Las Cruces; OKLAHOMA—Halliburton Oil Well Cementing Co., P. O. Drawer 471, Duncan; OREGON—Feenaughty Machinery Co., 112 S. E. Belmont St., Portland 14; UTAH—Cate Equipment Co., 49 E. 9th So., Salt Lake City; WASHINGTON—Feenaughty Machinery Co., 1028 6th Ave., So., Seattle 2, Glenn Carrington & Co., 91 Columbia St., Seattle, and Feenaughty Machinery Co., 715 N. Division St., Spokane; WYOMING—Wortham Machinery Co., 517 W. 17th St., Cheyenne; ALASKA—Glenn Carrington & Co., Nome, Fairbanks, Anchorage.

HATS OFF DEPARTMENT

HATS OFF TO...

Emery Roth, Architect
Henry Rudin, Builder
For "925 Central Park West" Building
New York, N. Y.

Here distinctive corner windows are formed by combining standard types of Ceco Apartment Windows through the use of vertical mullions. Prime purpose: maximum light and ventilation. Note also the use of inswing ventilators at the sills affording controlled ventilation for this modern apartment building.

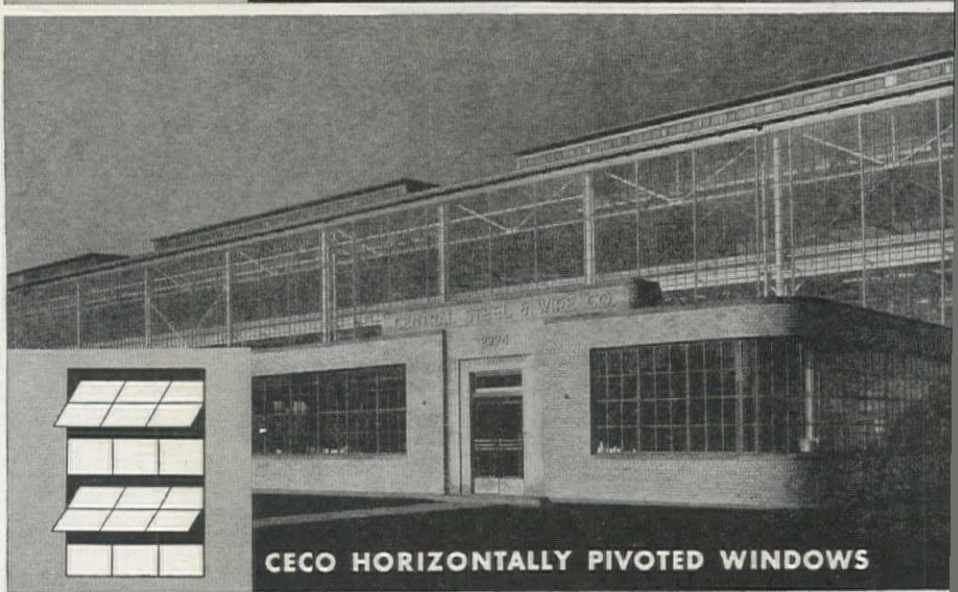


CECO APARTMENT WINDOWS

HATS OFF TO...

Alfred S. Alschuler and R. N. Friedman
Architects and Builders
For Central Steel & Wire Company Building
Chicago, Illinois

The architects were charged with obtaining maximum light for this modern factory. By using standard Ceco Horizontally Pivoted and Stationary Sash, continuous bands of windows were provided in the sidewalls and monitors. Result: Effective design and full use of outside light.

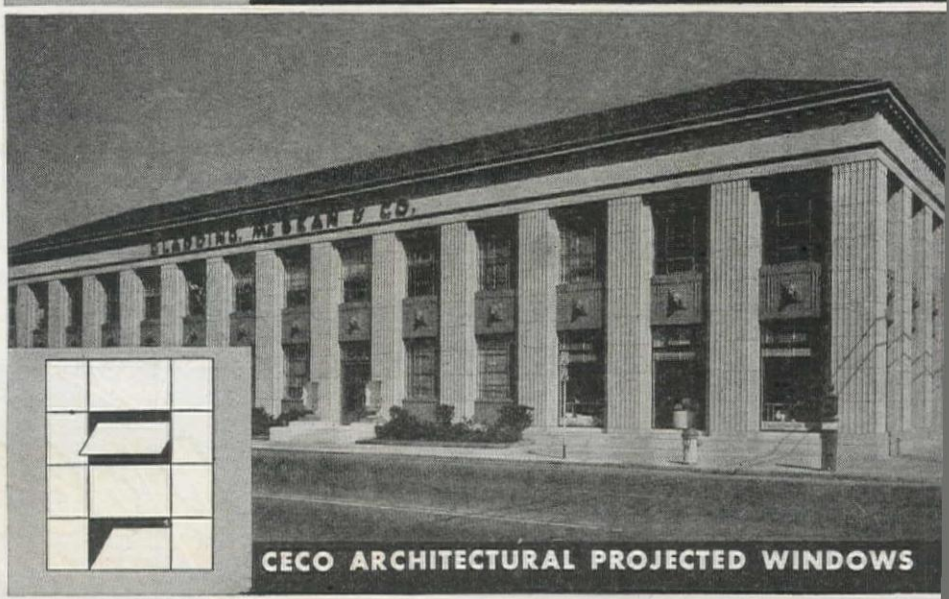


CECO HORIZONTALLY PIVOTED WINDOWS

HATS OFF TO...

Design Section of
Gladding McBean & Co.
Dinwiddie Construction Co.,
Contractor for Gladding McBean & Co.
San Francisco, Calif.

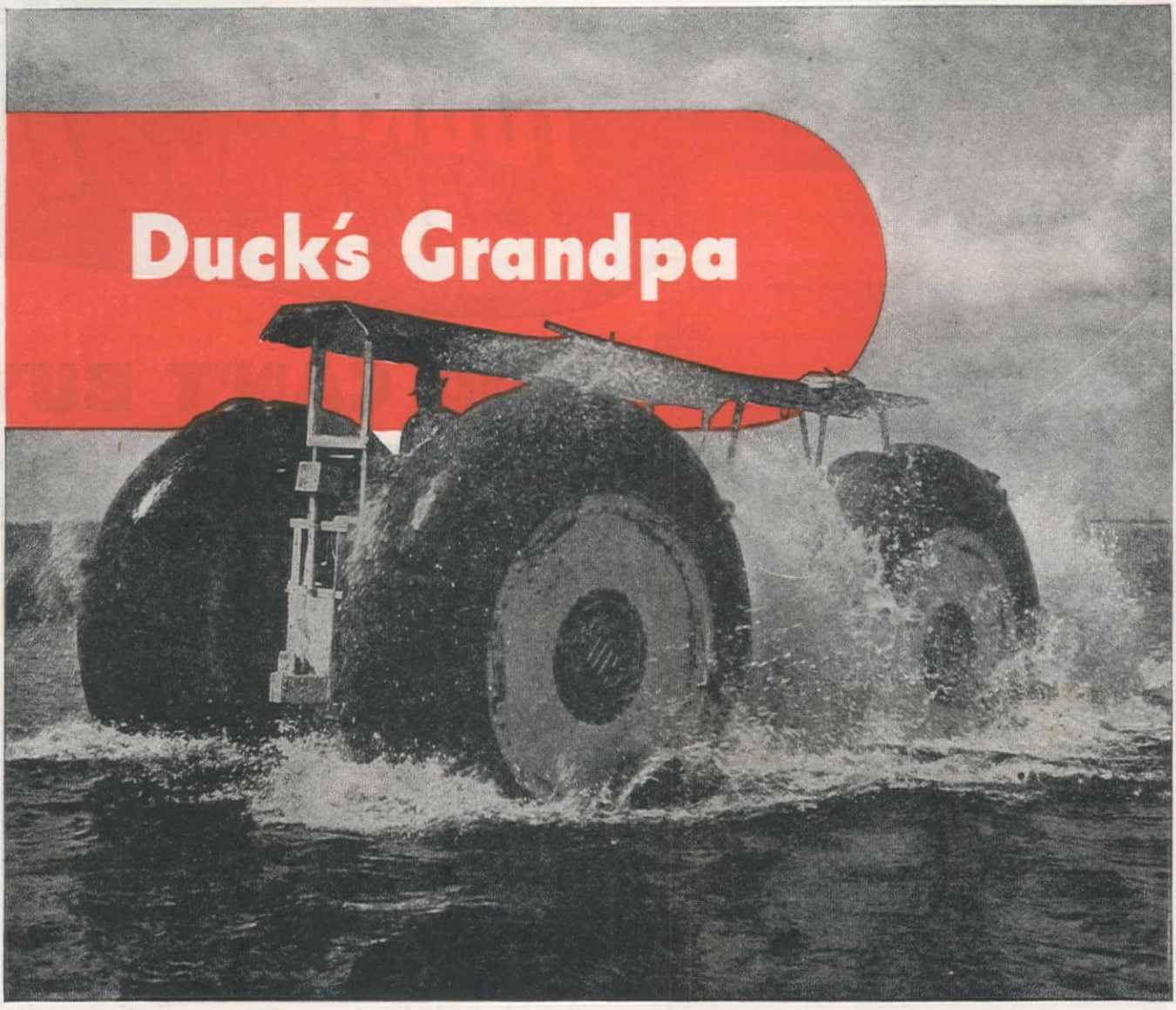
The use of Architectural Projected Windows in single unit openings provides effective symmetry and depth in this well-balanced and attractively designed office building. Inswinging ventilators at the sill and outswinging ventilators in the upper section give controlled ventilation with better light.



CECO ARCHITECTURAL PROJECTED WINDOWS

CECO STEEL PRODUCTS CORP.
MANUFACTURING DIVISION
5701 WEST 26th STREET, CHICAGO, ILL.
Concrete Engineering Division, Sheet Steel and Wire Division, Highway Products Division

ENGINEERING MAKES THE BIG DIFFERENCE IN CECO CONSTRUCTION PRODUCTS



MEET the grandfather of today's "Ducks," "Weasels" and other amphibious military vehicles—born 10 years ago when Gulf Oil Corporation geophysicists decided to search for oil deposits in Florida and Louisiana swamps.

To get men and test instruments into that soft, gooey marshland, Gulf engineers, with Goodyear development men assisting on the tire-and-wheel plans, designed the vehicle you see above — a self-powered "marsh buggy" shod with big Goodyear balloon tires cross-strapped with lengths of hose that act as traction chains in mud, as paddles in water.

These big Goodyears support and move full loads over dry land and marshland — keep the buggy from sinking into mud and ooze. Equally important, they're sized and calculated for full flotation. More than 3 times larger than car tires, but carrying only 1/10 the air pressure, these big babies are motive water wings, too—buoyant enough to float the buggy and its load when deep water is encountered.

This example of job-engineering adds further proof of Goodyear's ability to build the right tire for any job. For construction work, Goodyear off-the-road tires are designed and built to meet the needs of special operations — the great Sure-Grip for drive wheels, the super-tough Hard Rock Lug for rock work, and the time-proved All-Weather Earth-Mover for general purpose vehicles.

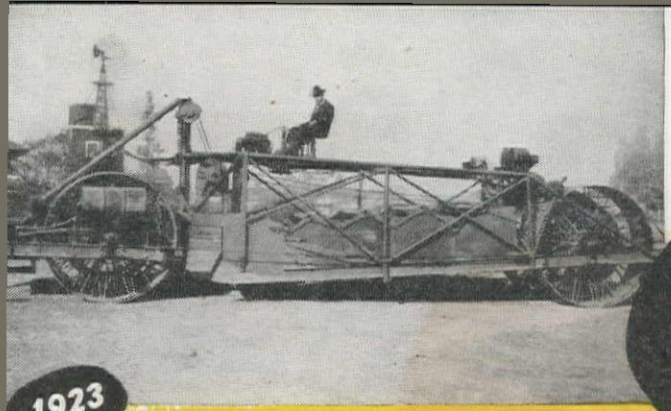
And because these 3 big Goodyears deliver top performance and lower costs-per-ton-mile, they're first choice with cost-wise contractors everywhere. Why not buy — and specify — Goodyears on *your* units?

GOODYEAR

MORE TONS ARE HAULED ON GOODYEAR TRUCK TIRES THAN ON ANY OTHER KIND

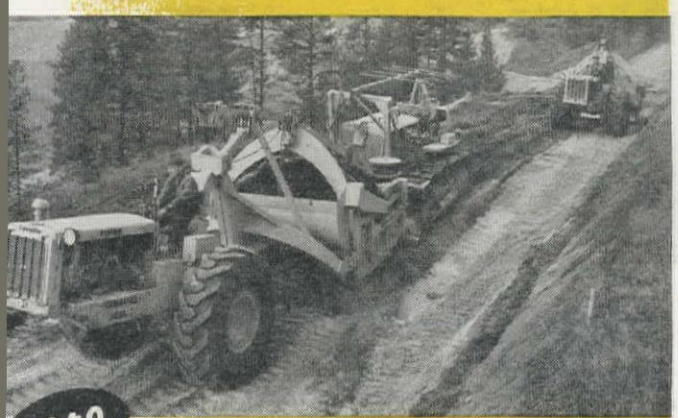
Sure-Grip, All-Weather—T. M.'s The Goodyear Tire & Rubber Company

TOURNAPULLS GIVE YOU



1923 First self-propelled, electrically-controlled Scraper, forerunner of today's Tournapull.

1938 Basic Tournapull design was proved on 13,000,000-yard Hansen Dam, Calif., where Guy F. Atkinson Co. used 13 of these 30-yard Tournapulls.



1940 Smaller 11-yard rig extended Tournapull profits to average-size construction jobs. On this 300,000-yard Washington Highway contract, Elliott & Co., Inc., moved dirt faster and at lower cost with 4 Tournapulls.

1945 The combined manufacturing and job experience of 3600 rigs is incorporated into today's 15-yard Tournapull — since 1941 delivering lowest-net-cost-per-yard. On this railroad contract, near Bensenville, Ill., Raemisch-Madden & McQueen, working on a 60-day time limit, used 12 Tournapulls, completed the 600,000-yard job in 48 working days, despite 18 days of rain in first month.

YOU CAN'T BUY IN ANY OTHER HIGH-SPEED SCRAPER UNITS

LeTourneau originated, pioneered and developed the modern high-speed rubber-tired prime movers and scrapers that have revolutionized the dirtmoving business. Through 8 years of on-the-job experience accompanied by continual improvement, over 3600 of these Tournapull units have been built and shipped, providing a background of field testing and performance records, plus basic and supplementary patents, shared by no other manufacturer. The Carryall Scraper and Power Control Unit used with the Tournapull have been perfected over 17 years and have been voted tops by dirtmovers who have bought 23,400 Carryalls and 67,300 LeTourneau Power Control Units.

TOURNAPULLS LEAD RUBBER-TIRED TREND

This unequalled world-wide experience under every test of climate, weather, application, materials

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED Over 3600 Built and Shipped

TOURNAPULLS

Trade Mark Reg. U.S. Pat. Off.

Job Experience

and abuse has led to a realistic evaluation of every detail of a basic idea which has proved so fundamentally right that it has now become accepted as the most economical method of moving scraper dirt. Its success has started other manufacturers in this field on the trend to rubber-tired prime movers.

You know this background and also the LeTourneau policy of continual development of dirtmoving equipment and release of improvements as soon as field tests have proved their ability to increase production or lower costs. When you buy Tournapulls you can be sure they will give you lowest unit costs and the biggest profit opportunity of any scraper units available.

GET THE FACTS

Look to LeTourneau now, as always, for leadership in development of dirtmoving equipment that will continue to give you lowest net cost per yard. Keep in touch with your LeTourneau distributor for advance information on Tournapull deliveries. Get his help in planning and estimating your jobs. He has experience and job-proved data that will help you. See him TODAY.

Job-Proved by over 3600 Tournapulls — job experience you can't buy in any other high-speed scraper unit. One typical record from T. M. Page, prominent West Coast contractor, shows his first Tournapulls have worked over 8300 hours . . . on Santa Monica, Victorville, March Field, Ontario and San Nichols Airports; on railroads at Del Mar, El Vira, Esperanza, Bakersfield, Stockton, Pittsburg and Needles-to-Topock; and on ammunition depots at Bellemont, Ariz., and Seal Beach, Calif. Job records like this prove Tournapulls' ability to: (1) deliver long-life economy, (2) lick tough jobs, (3) handle all types of dirtmoving, (4) increase owner profits.

2-WHEEL DESIGN of Tournapull eliminates extra traction-robbing steering wheels. You pull and steer with drive wheels . . . turn faster and sharper . . . "lever" loads up stiff grades or through toughest hauling. Full prime-mover weight, plus 40% of Scraper and load, is concentrated on drive wheels . . . gives you greater traction to pull through loose sand, over bumps, in and out of mud holes. These Tournapull advantages helped lick this tough emergency Illinois River flood-control levee job.

LESS WEIGHT PER H.P. enables you to carry pay load instead of equipment deadweight. The 150 h.p. Tournapull weighs only 31,000 lbs. That's 207 pounds of equipment per h.p. Compare this ratio with any other high-speed, rubber-tired scraper units. You'll find Tournapulls give you 30% more h.p. per pound of weight to move 15 heaped-yard loads on the level, up steeper grades and through tougher going. Successful contractors like A. I. Savin use Tournapulls to move extra pay yards each trip. On Rentschler Airport, E. Hartford, Conn., 5 of these rigs each averaged 55 heaping loads in 10 hours on 1.8-mile round trips.

HIGH AVERAGE SPEED is more important than high-rated m.p.h. A self-propelled scraper can seldom use extremely fast hauling speed. Its performance economy depends rather on a faster all-around cycle of load, haul, spread and return. Tournapulls' extra power with less weight . . . plus proper gear ratios . . . give you faster acceleration to get into high gear quicker . . . stay in high gear longer. Result — *higher average speed*, shorter cycle time, more yards per hour. Working in heavy, wet gravel at Bellows Falls, Vt., contractor Frank Whitcomb's Tournapull gets away from pusher faster, quickly hits 14.9 mph.

C33X

MOTOR GRADERS
ROLLERS

CHECK WITH
Your Nearest
Distributor:

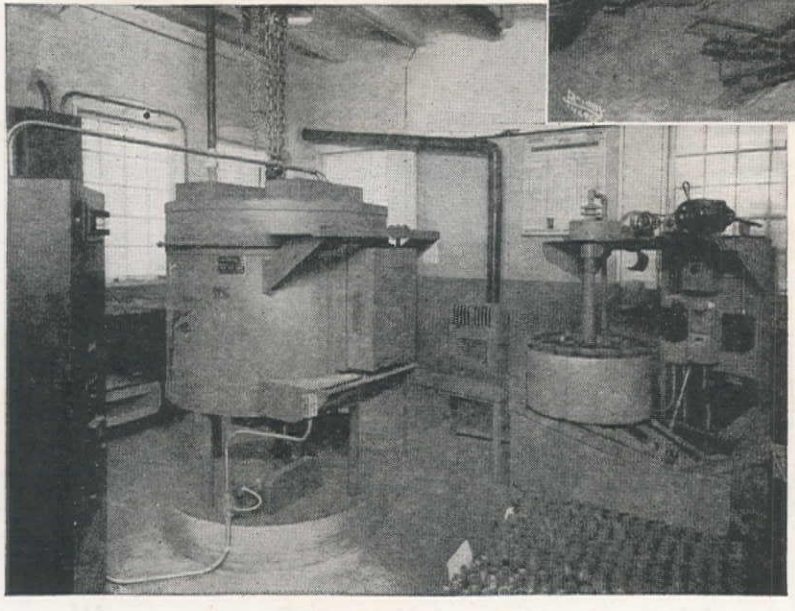
Western Distributors

BROWN-BEVIS EQUIPMENT CO.	Phoenix, Arizona
WESTERN TRACTION CO.	San Francisco, California
H. W. MOORE EQUIPMENT CO.	Denver, Colorado
HALL-PERRY MACHINERY CO.	Butte, Montana
NELSON EQUIPMENT CO.	Portland, Oregon
NELSON EQUIPMENT CO.	Seattle, Washington
F. RONSTADT HARDWARE CO.	Tucson, Arizona
BROWN-BEVIS EQUIPMENT CO.	Los Angeles, California
NELSON EQUIPMENT CO.	Twin Falls, Idaho
LAS VEGAS TRUCK & EQUIPMENT CO.	Las Vegas, New Mexico
GENERAL EQUIPMENT CO.	Reno, Nevada
NELSON EQUIPMENT CO.	Spokane, Washington
ARNOLD MACHINERY CO.	Salt Lake City, Utah

The Galion Iron Works & Mfg. Co.

Main Office and Works: **GALION, OHIO**

Near you there is a Service Shop for TIMKEN ROCK BITS



One of the important reasons for the widespread uses of Timken Rock Bits in the mining, quarrying and construction industries is the availability of prompt and economical service for converting hollow drill steels for use with Timken Rock Bits.

Located at 80 strategic centers throughout the country are modern well-equipped independently operated service shops, such as the one illustrated here. Most of these shops are also able to recondition used Timken Rock Bits for additional drilling—thus decreasing your drilling costs.

If your operations do not justify the maintenance of such a shop you may still enjoy the advantages of Timken Rock Bits by utilizing the services of the shop operator in your immediate locality. Write us for his name and address.

TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

Here it is

IMPROVED HD-10

A better performer than ever with extended track! More track on the ground means greater traction — more grip, more drawbar pull! Cuts scraper loading time, speeds bulldozing and hauling work . . . insures better footing on every type of soil. Operators will like its smoother, easier riding. Owners will welcome increased work capacity.

More good news . . . HD-10's are now more readily available to essential users. In case you have to wait temporarily . . . it will be well worth while waiting for the *improved* HD-10!

L·O·N·G·E·R T·R·A·C·K

Over ten per cent increase in ground contact is gained with longer track . . . ground pressure reduced. Addition of a truck roller on each track reduces wear and tear. More tractor weight — approximately 860 pounds — assures better all-'round performance.

— *Gives You*

IMPROVED TRACTION
IMPROVED BALANCE
IMPROVED RIDING . . .
IMPROVED PERFORMANCE!

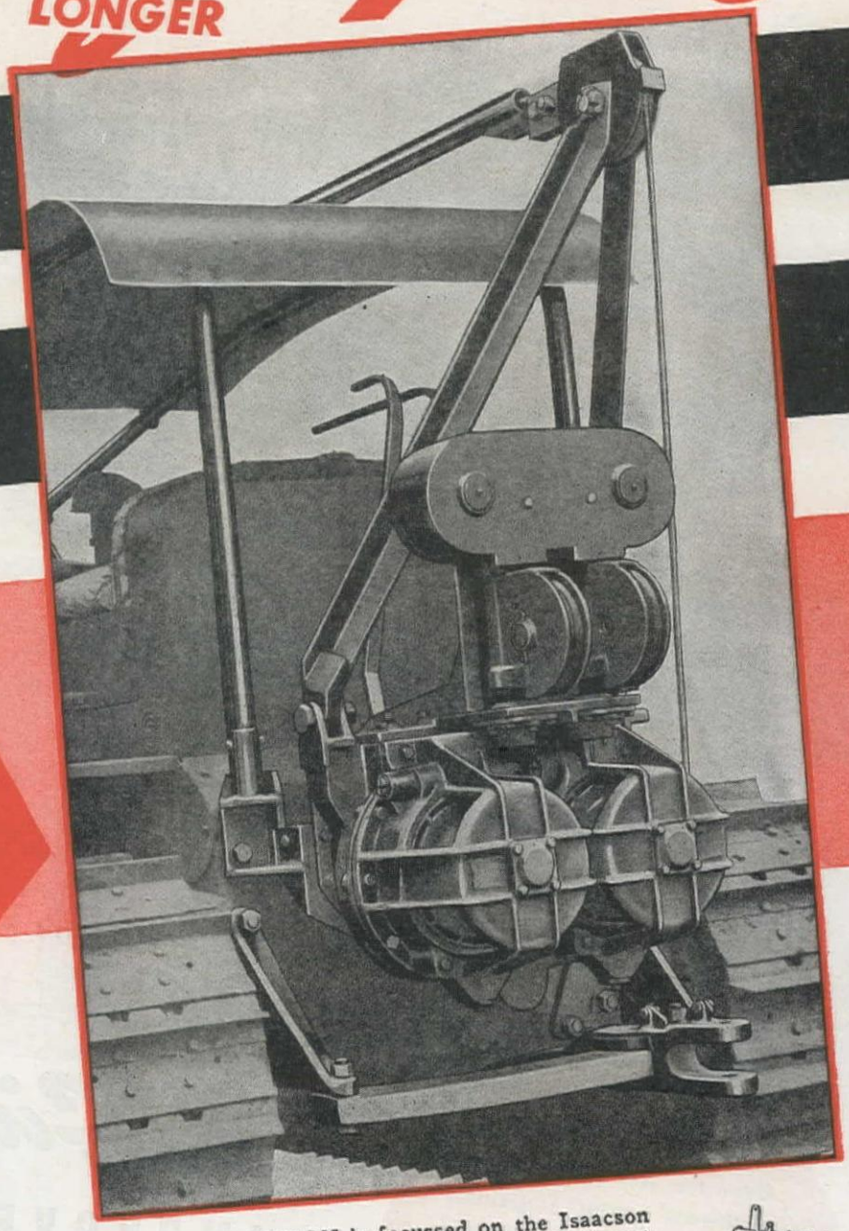
ALLIS-CHALMERS

TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

Stays "put" LONGER

ADJUSTMENTS
ARE SIMPLE
AND HOLD THEIR SETTING

TROUBLE-FREE
PERFORMANCE
SAVES OPERATOR'S TIME

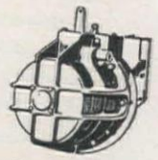


It's the Isaacson DOUBLE DRUM KABLE POWER UNIT

• Double drum model mounted on an Isaacson Kable Trac-Dozer.

NATIONAL ATTENTION is focussed on the Isaacson Kable Power Unit because of its ability to hold adjustment longer. It's *quick* and *easy* to adjust too—one-quarter turn moves friction adjustment *without removing guards*. It's built for *heavy duty* jobs where the going is tough and continuous . . . where "trouble-free" operation means the difference between profit and loss. Insure your profits with an Isaacson Kable Power Unit.

Write direct today for detailed information.

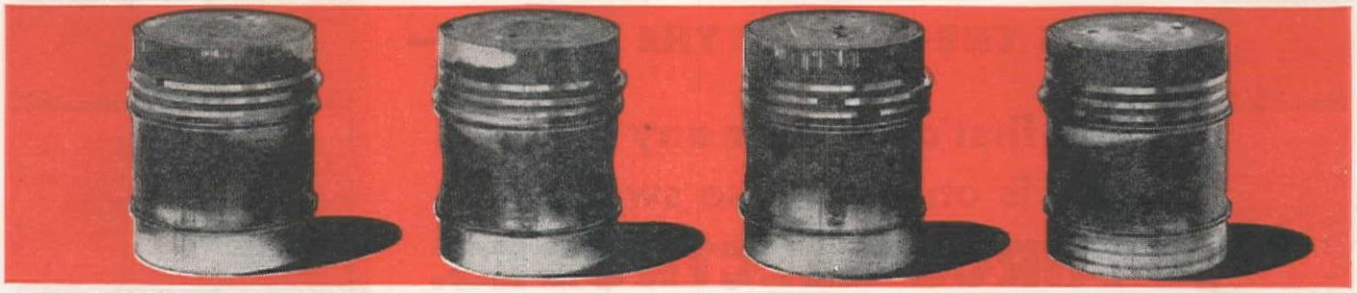


Front mounted single drum models also available.

ISAACSON
Tractor Equipment

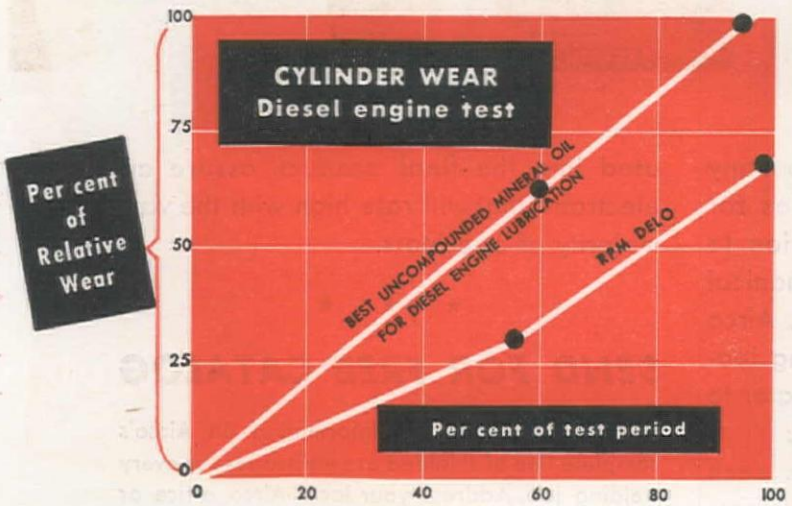
A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

How RPM DELO Oil keeps Diesel pistons clean

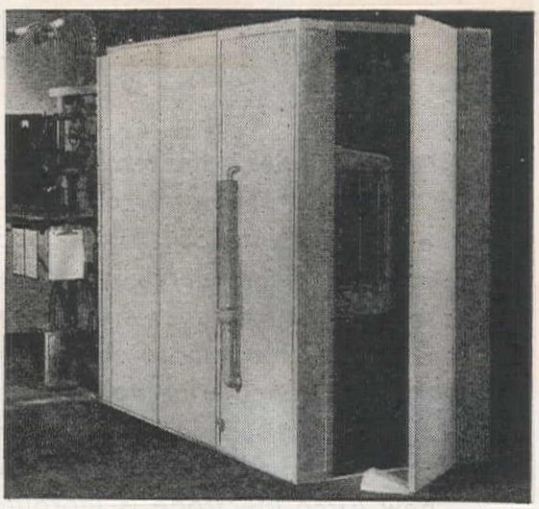


After only 265 hours of operation using the best *uncompounded mineral oil*, these Diesel test engine pistons were coated with a heavy, sticky gum-carbon deposit, as shown in this actual photo. The few bright areas were kept clean by rubbing cylinder walls. Oil ring slots were clogged, and blowby, resulting from stuck rings, caused a deposit of gum to form on cylinder liners. The engine was run on 80% load in a "Hot Box" where the air to the radiator was maintained at 125° F., simulating severe summer operation in high temperature areas.

Run five times longer under the same conditions, using RPM DELO Diesel Engine Lubricating Oil, the same engine's pistons were practically clean, as this photo shows. After 1200 hours, all the rings were free and unstuck. There was no appreciable amount of carbon formation in oil ring slots and the ring grooves were free from carbon deposits. Special, patented compounds in RPM DELO Oil give it this unusual ability to keep engines clean. They resist the formation of gum and varnish, remove deposits and keep contaminants in suspension.



How cylinder wear is reduced by minimizing gum-carbon and varnish formation on Diesel engine pistons through the use of RPM DELO Oil is shown by the above chart. For other charts, tests and a complete technical report on RPM DELO Oil, write for Booklet T-7, Standard of California, San Francisco 20, California.



This "Hot Box" cabinet is used in the laboratory to test Diesel lubricants in engines. It is the one mentioned above. In many devices, RPM DELO Oil is checked under conditions far more severe than are likely to be met in the field.

Detergent compound to clean engine.

Anti-oxidant to prevent gum and sludge.

Wear-reducing compound.

STANDARD OF CALIFORNIA

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help — make your maintenance job easier. Call your Standard Representative or write to Standard.

THAT in brief is the reason why so many welders prefer Airco Electrodes for every welding job. For, in addition to meeting the metallurgical and mechanical requirements of each specific job, Airco Electrodes have those easy-working features that enable the welding operator to meet output schedules consistently.

After exacting laboratory trials each new Airco electrode is thoroughly pretested for working ease and efficiency by welding operators of varying skill and experience. Their suggestions, incorporated into the final product, assure an electrode that will rate high with the vast majority of operators.

* * *

SEND FOR FREE CATALOG

—which gives detailed information on Airco's complete line of shielded arc electrodes for every welding job. Address your local Airco office or Dept. **WCN,** Air Reduction, General Offices: 60 East 42nd Street, New York 17, N. Y. In Texas: Magnolia Airco Gas Products Co., General Offices: Houston 1, Texas.

AIR REDUCTION AIRCO

OFFICES IN PRINCIPAL CITIES

Weld with

Western Offices: San Francisco, Calif.; Emeryville, Calif.; Portland, Ore.; Los Angeles, Calif.; and Seattle, Wash.

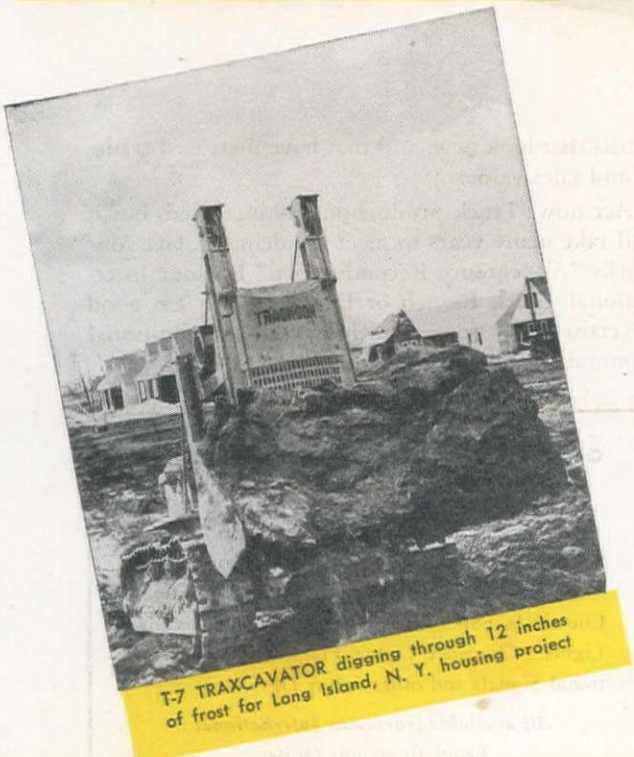
AIRCO ELECTRODES FOR BETTER WELDS AND EASIER WELDING

Plan NOW to TRAXCAVATE!

IT'S THE MODERN DIRT AND MATERIAL HANDLING METHOD

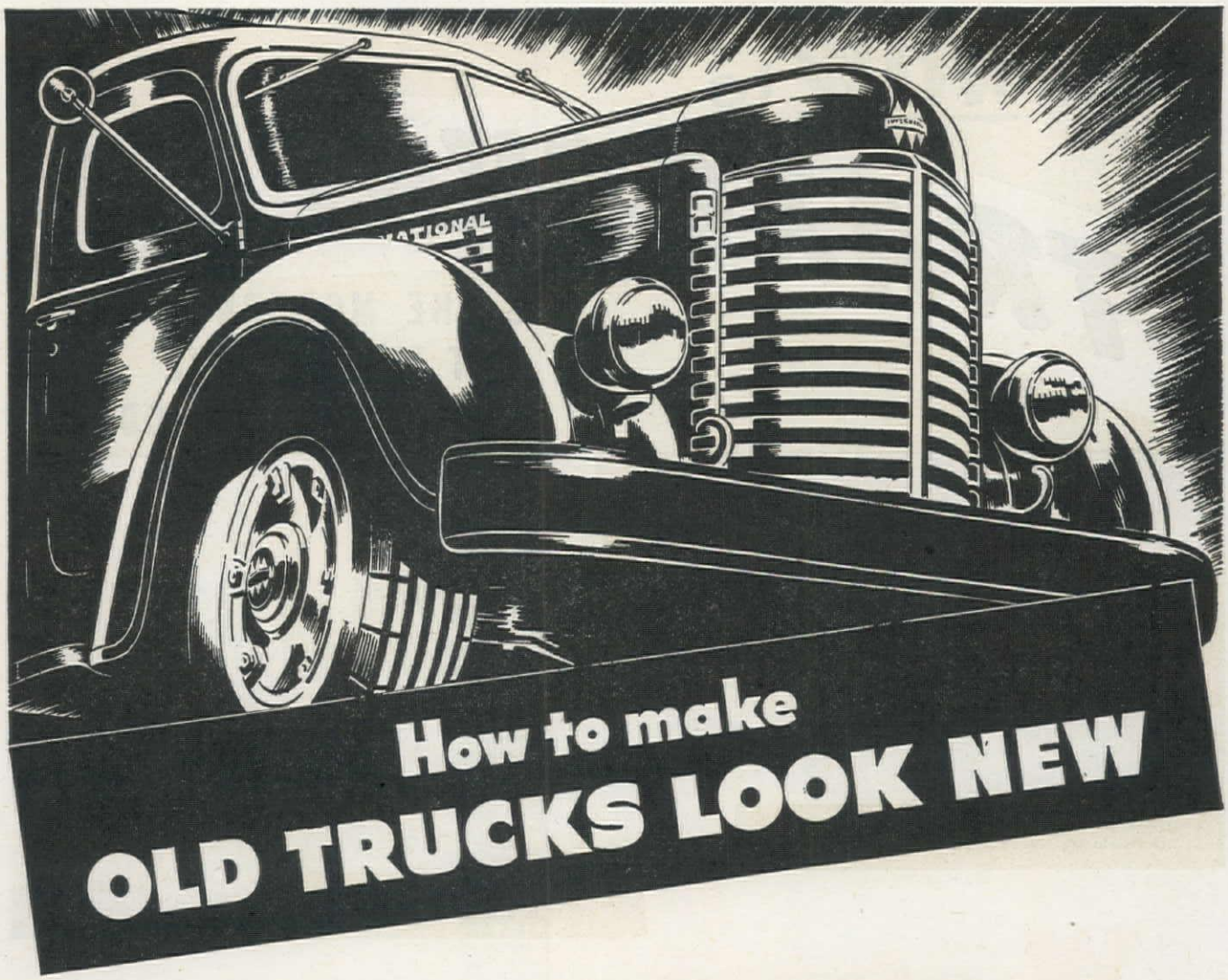
T-4 TRAXCAVATOR digging and loading material for road surfacing in Alabama at a rate of 60 yds. per hr.

Digging and loading old alley paving in a California city



T-7 TRAXCAVATOR digging through 12 inches of frost for Long Island, N. Y. housing project

Now that the "go-ahead" signal has been given, your well-planned construction and maintenance contracts will get off to a flying start if you have planned to "TRAXCAVATE" — for it's the modern earth-moving and material-handling method. TRAXCAVATORS, the dependable tractor excavators, combine in one machine the usefulness of a Shovel, Loader, Scraper, Bulldozer, Anglegrader, etc. There's a wide choice of models with bucket sizes from ½ to 2½ cubic yards. Your nearby TRACKSON-"Caterpillar" dealer will be glad to give you the complete story, or write for informative literature to TRACKSON COMPANY, Dept. WC-115, Milwaukee 1, Wisconsin.



How to make OLD TRUCKS LOOK NEW

● Here's a way to make old trucks look new—quick. Drive them to your International Truck Branch or Dealer and say, "I want an Appearance Reconditioning Job done on these fellows."

And you will get it, because sheet metal and other materials that were out because of the war, are back. You'll get perfect fitting new International fenders, radiator grilles, hood sheets, doors, glass, hardware, headlights, bumper guards and seat cushions—just what you want to put your trucks in shape and step-up trade-in value.

Next, paint jobs if the trucks need them—new paint to clean-up and brighten-up the whole trucks, and cause people to say, "There's one operator who certainly keeps his trucks looking swell."

The cost? Not great. The result? Marvelous—trucks that look new, and that have increased trade-in and sales value.

Act now. Truck production has increased, but it will take many years to meet the demand. Get your trucks "Appearance Reconditioned" by your International Truck Branch or Dealer. Make 'em good advertisements for you while you get additional economical miles from them.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue, Chicago 1, Illinois

International Truck Branches located at San Diego, Los Angeles, West Los Angeles, Glendale, Fresno, Sacramento, Oakland, San Francisco, Portland, Tacoma, Seattle, Spokane, Salt Lake City, Denver, Cheyenne, Billings and Great Falls.

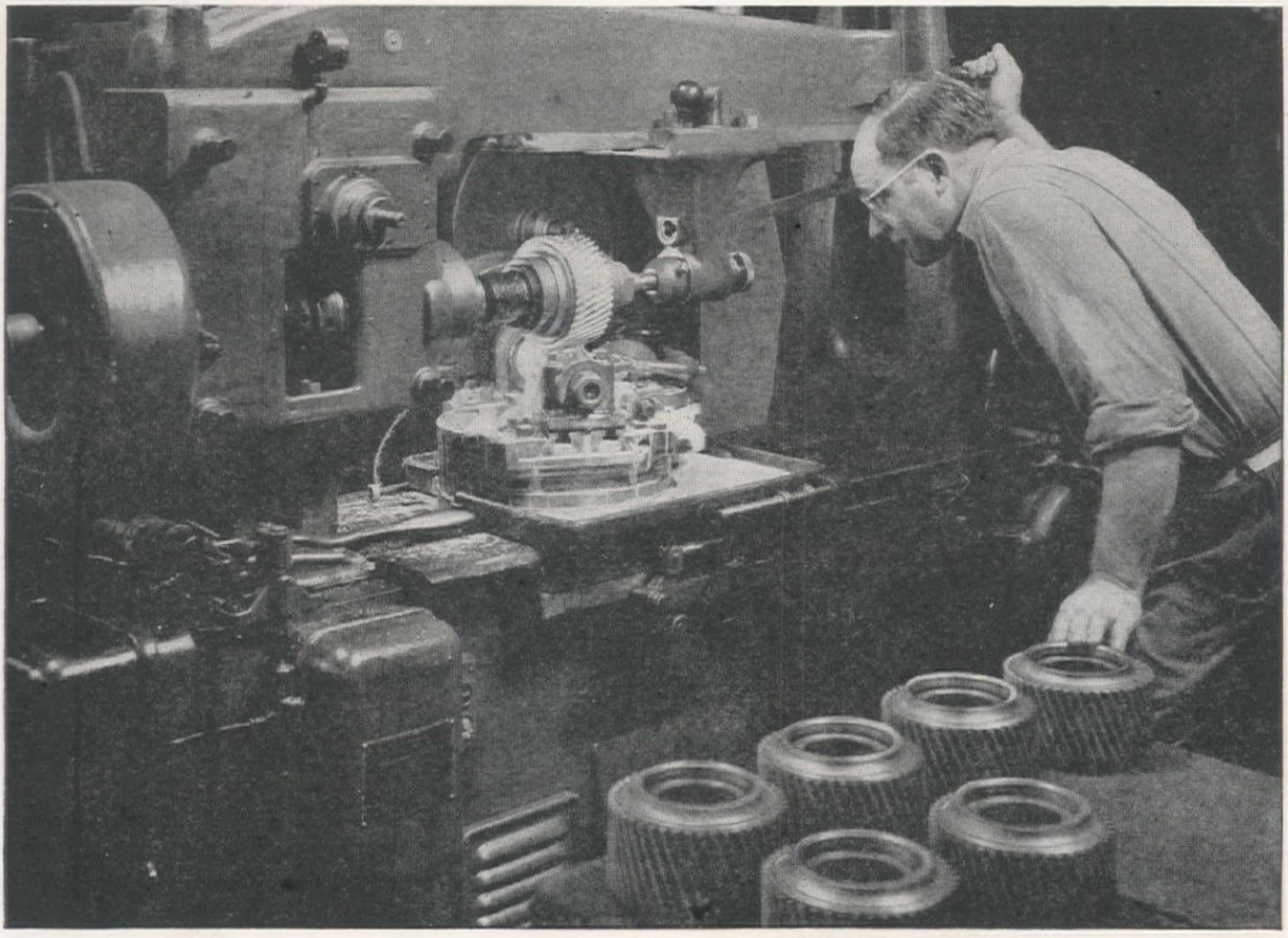
Get These Too When You Get Your Trucks
"APPEARANCE RECONDITIONED"

• Hot Water Heaters and Defrosters • Seat Covers • Elston Electric Road Sanders • Saf-T-Step • SOS Fire Guard • Whiz Automotive Chemicals • Spot Lights, Fog Lights and Driving Lights • Clearance Lights, Flags, Flares, Directional Signals and other Safety Devices.

All available from your International Truck Branch or Dealer

INTERNATIONAL

INTERNATIONAL Trucks



Cutting teeth for a helical gear in one of the precision hobbing machines.

We cut our teeth!

To bring you the finest in crawler tractors . . . to assure efficient, economical operation, all gears and spline shafts for Oliver "Cletrac" tractors are cut in our own plant. In this way, we can guarantee the close tolerances . . . the precision fits so necessary for smooth, quiet operation and freedom from excessive maintenance.

Cutting our own gears is but one extra step we take to assure the *extra* quality that is inherent in every Oliver "Cletrac" tractor part. Materials, workmanship and equipment are all based on one standard . . . the built-in quality that means added years of service.

Maintenance of that standard enables your Oliver "Cletrac" dealer to offer you the finest in crawler tractors . . . for your every need.

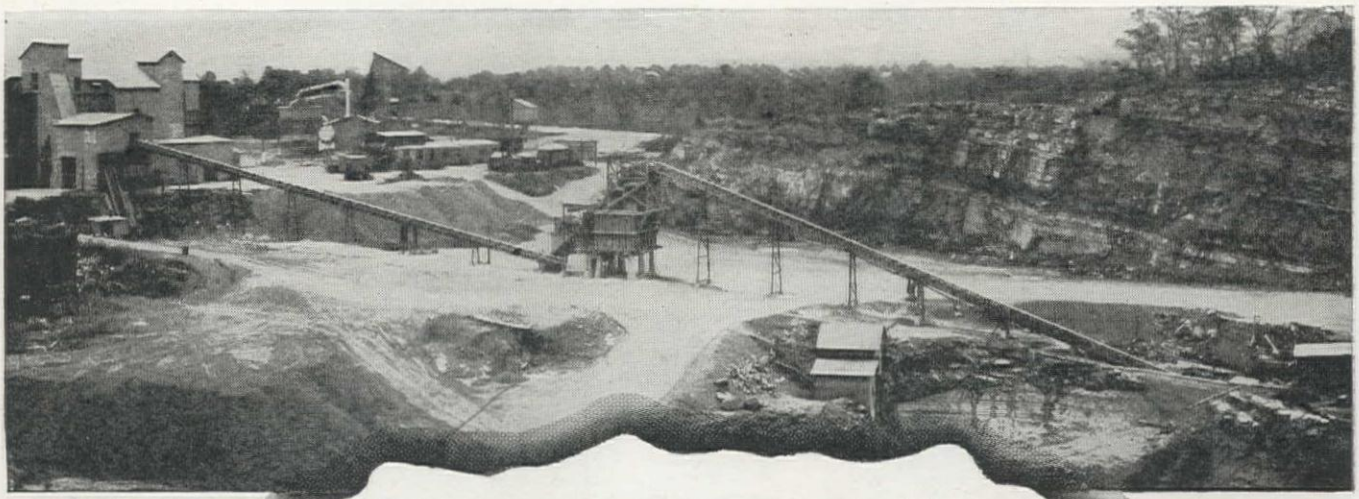
CLETRAC

THE OLIVER CORPORATION Cletrac

a product of

The OLIVER Corporation

State of Arizona: **Choguill Tractor Co., Phoenix.** ***State of California:*** **Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Comber & Mindach, Modesto; Nelson Equipment Co., Los Angeles; Tractor & Equipment Co., San Leandro; Flood Equipment Co., Sacramento; W. J. Yandle, Santa Rosa; Hamsher Tractor Co., Stockton.** ***State of Washington:*** **Burrows Motor Company, Yakima; Inland Truck & Diesel Company, Spokane; Pacific Hoist & Derrick Co., Seattle; Melcher-Ray Machinery Co., 202 East Alder Street, Walla Walla.** ***State of Oregon:*** **Loggers & Contractors Machinery Co., Portland and Eugene.** ***State of Idaho:*** **Idaho Cletrac Sales Co., Lewiston; The Sawtooth Company, Boise.** ***Western Montana:*** **Western Construction Equipment Company, Billings and Missoula.**



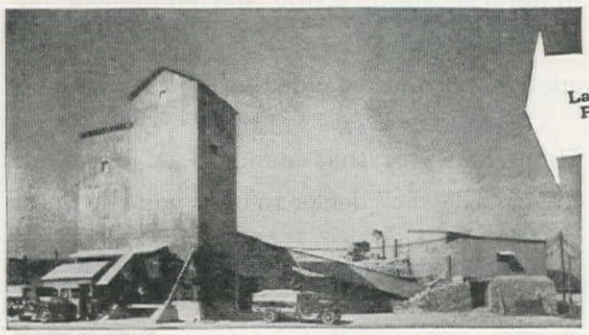
Berks Products Corp
Reading, Pa.
Rock Crushing Plant

MODERNIZED BY TELSMITH

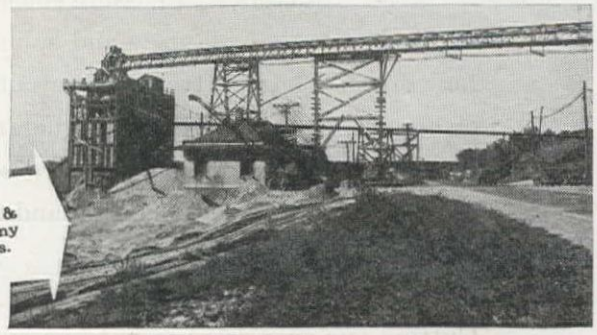
...these plants are ready for peacetime business

Callan Construction Company
Wickford Jct., R. I.

* Quarry plant owned by Ralph E. Mills Co. of Roanoke, Va.



LaMar Stone Co.
Princeville, Ill.



Hartland Sand & Gravel Company
Hartland, Wis.

● The operators of these plants were prepared for changed markets, new demands and keener competition. These plants are *Telsmith-modernized!* Re-arrangement, and the right Telsmith equipment for larger capacity and greater flexibility have cut costs and boosted output. Smaller sizes, in the right quantity and quality, to meet market demands, can now be produced *profitably!*

Plan *your* modernization, expansion, or new plant *now.* Telsmith's 40 years of engineering *know-how* in plant-designing and equipment-building is at your disposal. Consultation without obligation.

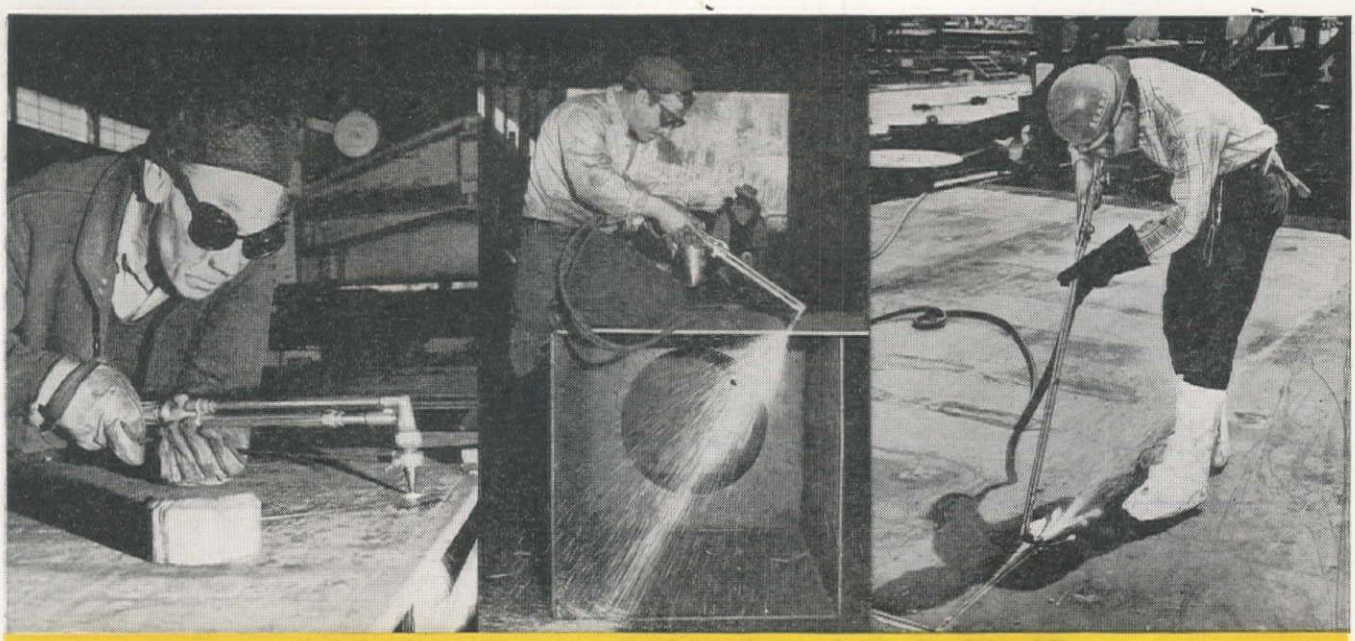
Get new equipment Bulletin E-30.

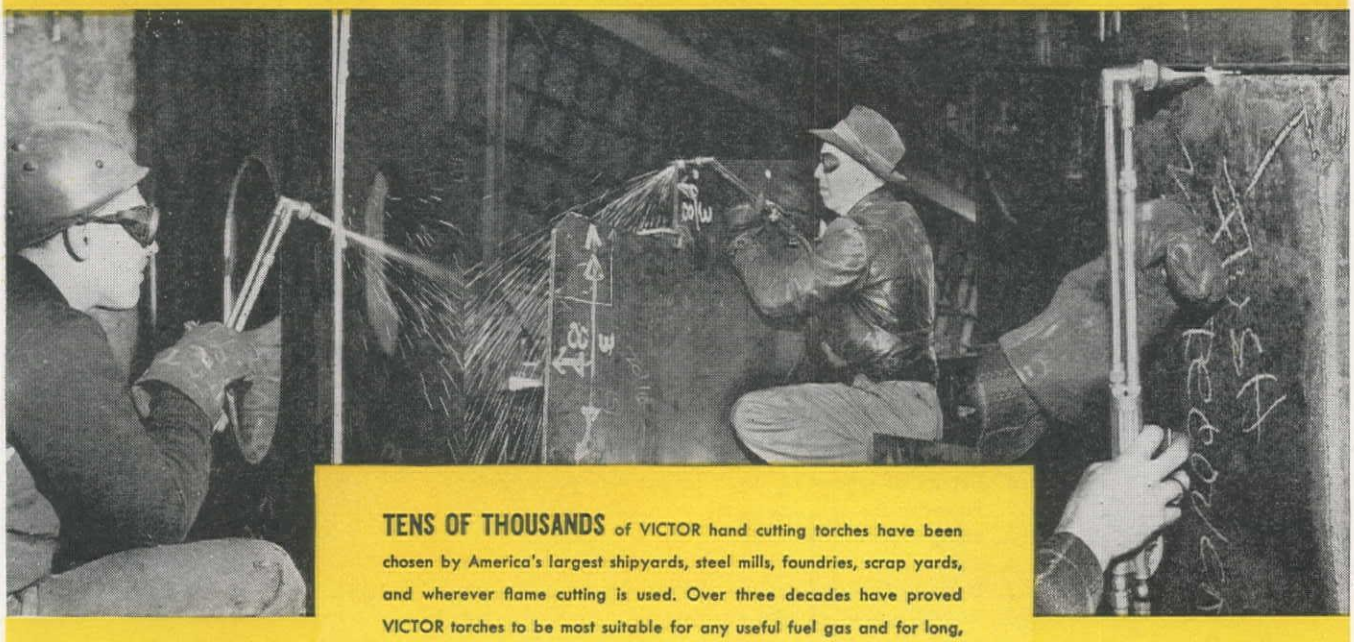
MP-5R

SMITH ENGINEERING WORKS, 4010 N. HOLTON STREET, MILWAUKEE 12, WISCONSIN

Mines Engineering & Equipment Company, 369 Pine St., San Francisco 4—811 W. 7th St., Los Angeles 14

Clyde Equipment Co. Portland 9, Ore.
Clyde Equipment Co. Seattle 4, Wash.
General Machinery Co. Spokane 1, Wash.
Gordon Russell, Ltd. Vancouver, B.C.
Contractors' Eqpt. & Supply Co. Albuquerque, N. M. — El Paso, Tex.



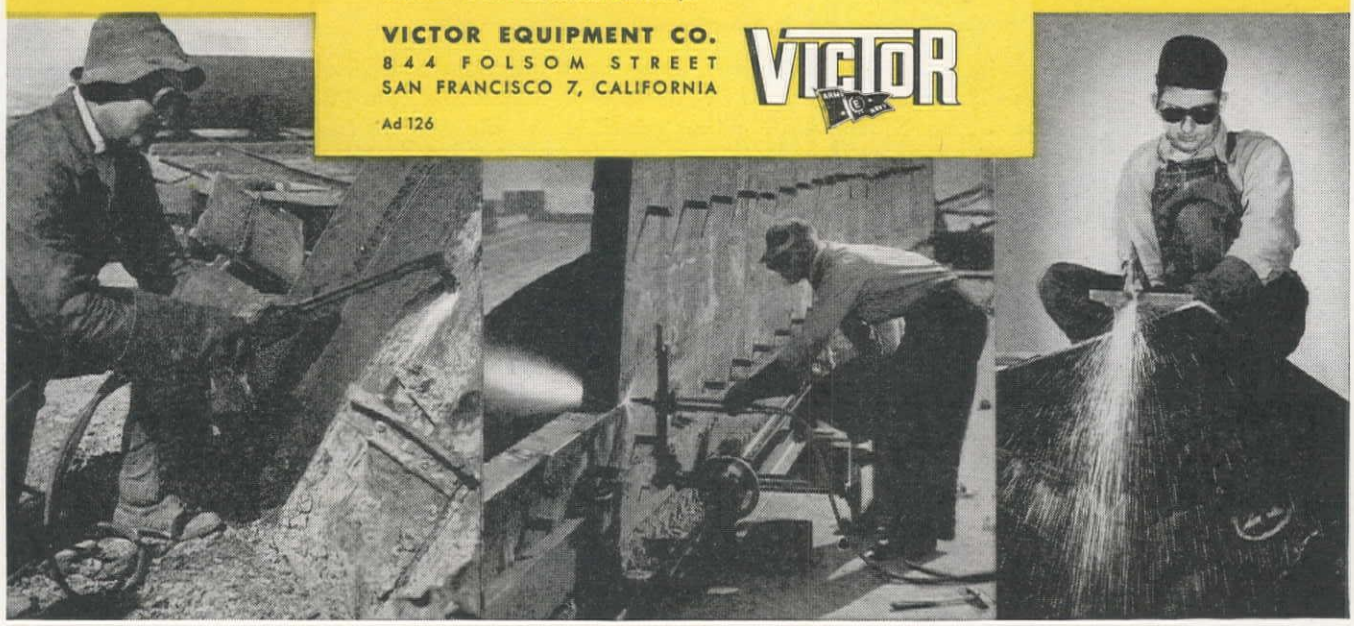


TENS OF THOUSANDS of VICTOR hand cutting torches have been chosen by America's largest shipyards, steel mills, foundries, scrap yards, and wherever flame cutting is used. Over three decades have proved VICTOR torches to be most suitable for any useful fuel gas and for long, trouble-free and economical ownership.

VICTOR EQUIPMENT CO.
844 FOLSOM STREET
SAN FRANCISCO 7, CALIFORNIA

VICTOR

Ad 126



THE 8 BASIC REQUIREMENTS
for low cost, all-weather roads

The science of soil stabilization has advanced swiftly during the past few years. Now, in building roads of native soils, strength can be definitely predetermined. Up to now, the tools used in soil stabilization have been borrowed largely from other fields. The process involved many trips over the same area, adding to time, adding to cost, and making the control factors difficult.

With years of experience in designing and building earth-handling machinery, P&H engineers saw the need for a machine built specifically for this purpose — to fulfill the 8 basic requirements for building stabilized roads:

1. Control of processing depth for accurate proportioning.
2. Pulverize the soil thoroughly.
3. Blend materials uniformly.
4. Create a true sub-grade.
5. Disperse the liquid through the entire volume in measured quantity.
6. Mix the coated material uniformly.
7. Lay the completely processed material in a fluffy, even depth, ready for compaction.
8. Do all these things in *one pass* — at a good rate of speed.

With its ability to combine all these basic functions in a single pass — to handle all types of commercial admixtures, the P&H *Single Pass STABILIZER* makes possible the building of base courses, light traffic roads, streets, airport runways, etc., at lower cost than ever before.

Highway Departments and contractors figuring on work of this kind in the near future should obtain complete information.

P&H

SINGLE PASS
STABILIZERS

4490 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER
CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS P&H HOISTS • WELDING ELECTRODES • MOTORS

"Torque-Tailored" MOTORS

PULLED THIS FLOOD-CONTROL JOB "OUT OF A HOLE"

SIX big flood pumps were needed to lift the waters of Cincinnati's Mill Creek over the barrier dam when the Ohio River was in flood. Two factors dictated the use of synchronous motors for driving these pumps—the large amount of power required, and the low pump speed.

But, the pumps were below the flood level of the Ohio—literally "in a hole." This resulted in a siphoning action which caused an unusual peak in the starting torque required by the pumps (see white arrow below). To get over this peak with synchronous motors of conventional design would have required oversized motors with high starting currents which would have resulted in excessive voltage disturbances. The solution lay in "tailoring" the torque characteristics of the synchronous motors to meet the pumps' individual needs.

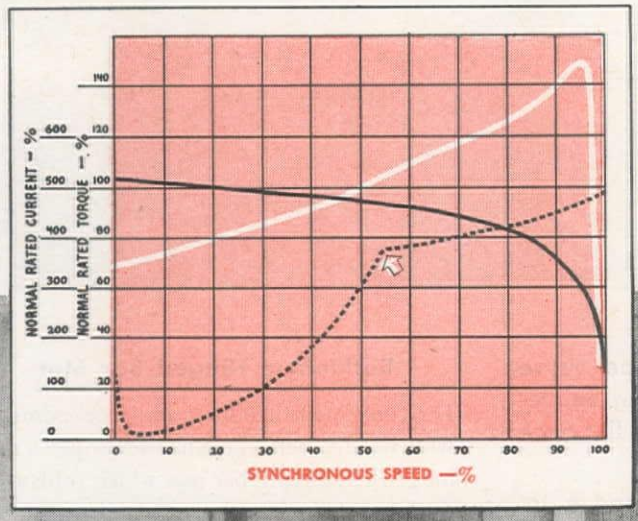
G.E. finds the answer

Our engineers prepared specifications for synchronous motors which convinced the flood-control engineers that these motors, as designed and built by General Electric, were right for the job *in advance* of installation. Our recommendation was for six specially built vertical synchronous motors, rated 6500 hp at 180 rpm, unity power factor.

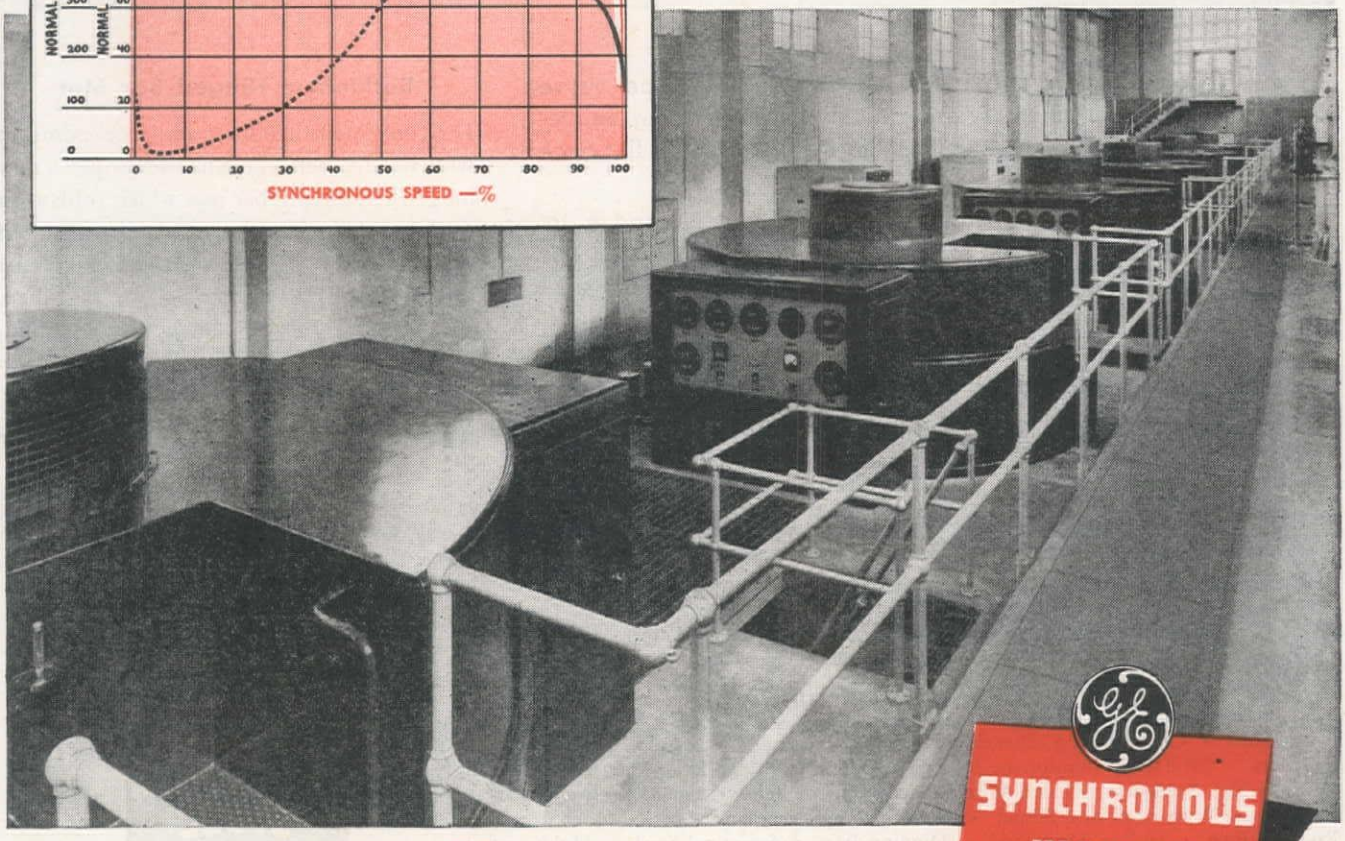
The white line on the chart shows how these G-E motors provide ample starting, accelerating, and pull-in and pull-out torques. Motor torque continuously exceeds pump requirements by a safe but never excessive margin. Starting current (thin black line) is kept well within the capacity of the power system. Recently the pumps were called into action to divert flood waters, and the motors proved the soundness of their design for the job.

For jobs of every size

Whether your synchronous motor needs call for special engineering or a standard design, you will find definite advantages in coming first to General Electric for help in writing specifications, or for a quotation on the most suitable and economical unit. G.E. has the widest range of motors available—in vertical and horizontal construction, and in ratings from 20 to 65,000 hp. They combine reliability and durability with the trim good looks that can add much to the prestige of your job. *Apparatus Dept., General Electric Co., Schenectady 5, N. Y.*



◀ ***TEST RESULTS,*** showing how motor-torque and -current characteristics matched pump requirements and the characteristics of the power supply. ***THE MODERN GOOD LOOKS*** of G-E synchronous motors match their outstanding electrical behavior. A feature of this installation is the use of built-in gage boards with instruments for recording bearing, winding, and cooling-water temperatures. ▼



SYNCHRONOUS MOTORS

GENERAL ELECTRIC

750-252-8030

BAR MATS that speed the job

As the big pavers and the squat finishing machines move along, the work goes smoothly and quickly if you're using Bethlehem Bar Mats. For they're rigid, easy to handle, and lie flat once they're in place.

In the stockpile and alongside the road, they'll stand a lot of rough treatment. No time wasted straightening out your bar mats—because these Bethlehem mats, made of new-billet steel bars clipped together, really *can* take it!

Bethlehem can supply not only bar mats but all the other steel products used in concrete highways and highway bridges. Buy the Bethlehem way, and you get coordinated service that will save you confusion, delay and extra paper work. Your order is handled as a unit, with shipments scheduled to reach the job as needed.

Write or phone the nearest Bethlehem district office today for full information about Bethlehem road steel service.

Bethlehem Hinged Bar Mat

For convenient handling and stockpiling in wide widths, Bethlehem has developed a new hinged reinforcing-bar mat which folds over double. Made like the regular bar mat, of deformed bars clipped together, it is easier to truck, and can be handled by two men. It is less likely to be damaged in handling, is readily installed, and lies flat.

BETHLEHEM STEEL COMPANY

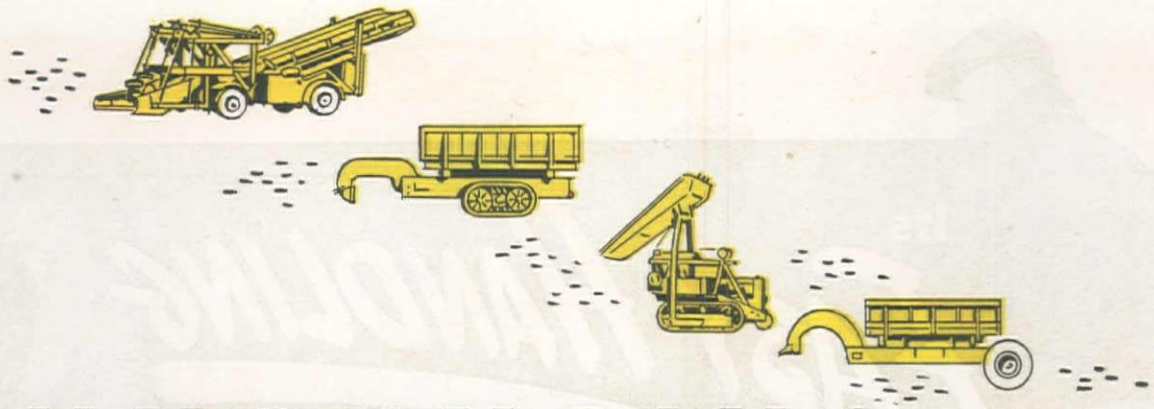
on the Pacific Coast

District Offices: San Francisco, Los Angeles, Portland, Seattle, Salt Lake City. *Steel Plants:* South San Francisco, Los Angeles, Seattle. *Fabricating Works:* South San Francisco, Alameda, Los Angeles. *Shipyards:* San Francisco, Alameda, San Pedro.

BETHLEHEM PRODUCTS FOR HIGHWAYS

Road Joints • Center Strip • Dowels • Dowel Bar Supports • Reinforcing Bars Bar Mats • Bar Ties • Reinforcing for Concrete Pipe • Bridge Floor Reinforcing Concrete Slab Spacers • Welded Wire Fabric • Guard Rails • Guard Posts and Brackets • Wire Rope and Strand • Right-of-Way Fence and Posts • Anchor Rods • Pipe • Hollow Drill Steel • Digging Bars • Structural Steel • Mold Boards • Corrugated Sheets • Turnbuckles • Tie Rods, Spikes, Bolts and Nuts Timber Bridge Hardware • Sheet and H-Bearing Piling

★ BETHLEHEM STEEL ★



ANNOUNCING..

a change in name

Effective at once

ATHEY TRUSS WHEEL COMPANY

has adopted the name

ATHEY PRODUCTS CORPORATION

5631 W. 65th ST. CHICAGO 38, ILLINOIS

And its Forged-Trak Wheels, MobiLoaders Force-Feed Loaders and Rubber-Tired Trailers will bear the Trade-Mark

"APCOR"

1. BIGGER TRUCK LOADS

Right from the start, easy-to-handle Transite Pipe begins to pay off. Its light weight means more footage carried per truck load . . . lower transportation costs.

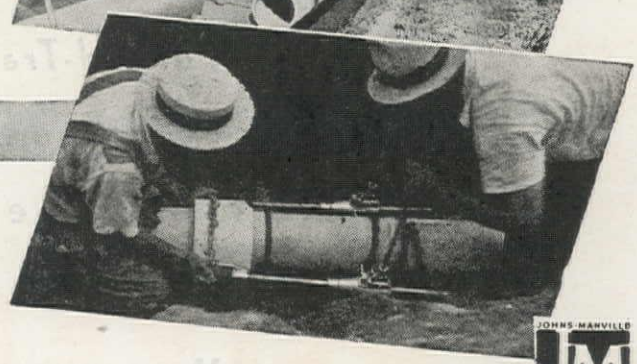
2. SMALLER CREWS

On the job, it takes fewer men to handle Transite Pipe, and smaller installation crews mean lower installation costs. Mechanical handling equipment is not necessary except for the larger sizes.

3. FASTER ASSEMBLY

In the trench, Transite Pipe is assembled easily, quickly, even by unskilled crews. Its exclusive Simplex Coupling assures tight joints, even when the line is deflected as much as 5° at each joint.

And in service, Transite Pipe pays off in efficient, dependable water transportation. Made of asbestos and cement, this non-metallic pipe is immune to tuberculation, highly resistant to soil corrosion. Its low maintenance has been proved in thousands of installations.



Johns-Manville

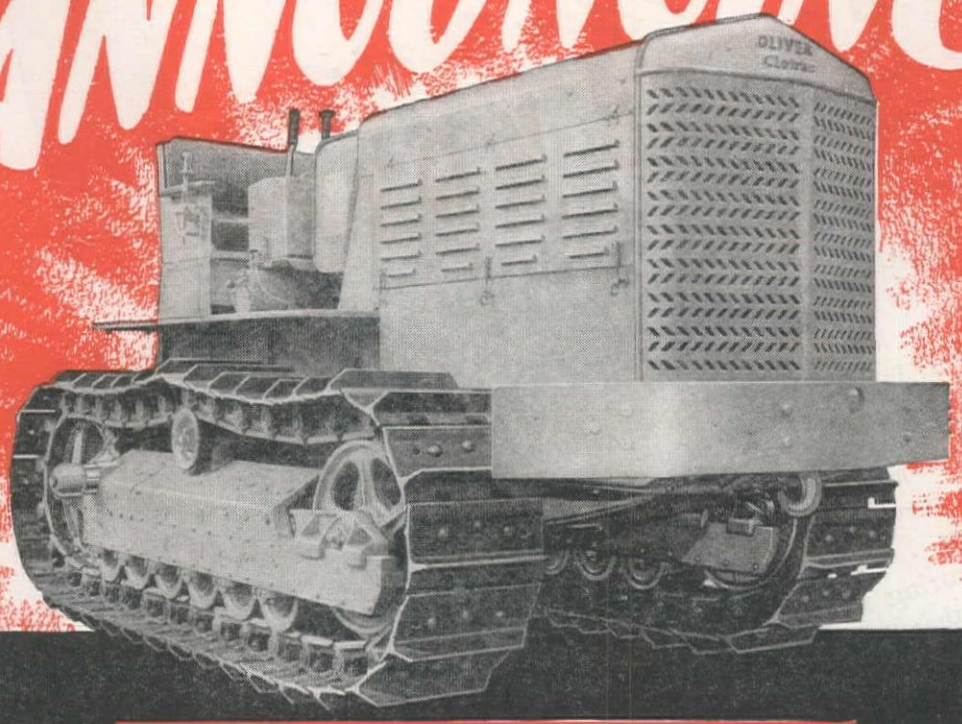
22 EAST 40TH STREET, NEW YORK 16, N. Y.

JOHNS-MANVILLE JM PRODUCTS

TRANSITE PIPE

FOR EFFICIENT, ECONOMICAL WATER TRANSPORTATION

ANNOUNCING



The Appointment of
CHOGUILL TRACTOR CO., INC.
as Distributors in the Phoenix Area for
OLIVER-Cletrac Equipment

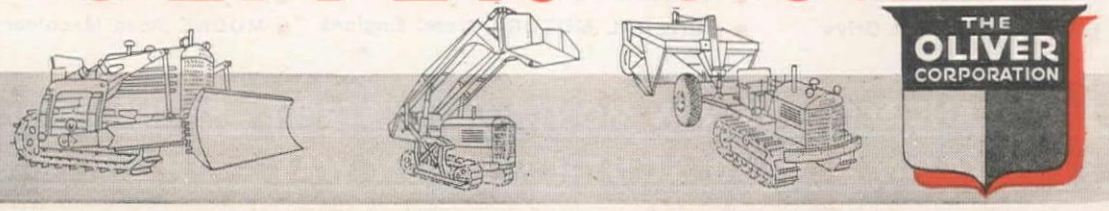
In the interest of bringing you better sales and service facilities, the Industrial Division of the Oliver Corporation is pleased to announce the appointment of Choguill Tractor Co., Inc., as distributors of Oliver "Cletrac" crawler tractors in the Phoenix area.

Choguill Tractor Co., Inc., with a background of years of experience in the construction machinery field, is well equipped to aid you in selecting new equipment and to repair and service your present machines. You'll find this courteous, experienced organization ready, willing and able to help you. Complete service and parts are now available.

• • •

CHOGUILL TRACTOR CO., INC.
1748-1750 Grand Avenue
PHOENIX, ARIZONA

OLIVER - Cletrac



THE OLIVER CORPORATION

MOORE EQUIPMENT COMPANY

Helping You With Your

SPADE WORK!

Contractors have much spade work ahead getting thoroughly organized to meet a widespread period of construction work.

MOORE EQUIPMENT COMPANY is geared TO-DAY to help you. Not only do we distribute some of the best known lines of heavy-duty equipment . . . but our large engineering department is at your disposal to aid in planning your work.

This, plus a personnel of experts . . our overhaul and standby service . . . rental and used equipment departments . . . and our own manufacturing facilities . . . give you that "Combination of Services" you'll find no where else.

Get in touch with us now. Have one of our trained representatives call.

MOORE EQUIPMENT COMPANY

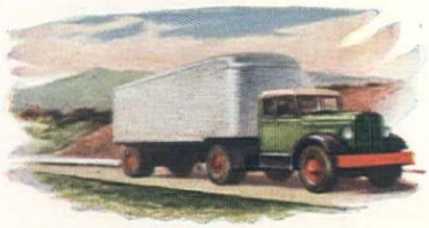
Distributors for

- GORMAN-RUPP Pumps
- PARSONS Trench Excavators
- GRICO—Two Axle Drive
- C. S. JOHNSON Clam Shell Buckets
- KWIK-MIX Cement Mixers
- GENERAL MOTORS Diesel Engines
- INGERSOLL-RAND Equipment
- KOEHRING Shovels and Cranes
- MOORE Road Machinery

★ SAN FRANCISCO – 55 NEW MONTGOMERY STREET – PHONE SUtter 0929

★ STOCKTON – 1250 SOUTH WILSON WAY – PHONE 8-8634

BUY AUTOCARS—BY AUTOCAR!



Heavy-duty Autocar Trucks are now in full commercial production, of course, but demand is still greater than supply. Order your Autocars, however, with the full assurance that Autocar Factory Branches and Distributors will do everything possible to meet your needs.

Fleets of fast, strong, heavy-duty Autocar Trucks and Tractors haul essential loads unceasingly over the highways of America . . . for highway transportation came of age when Autocar produced longer life by precision-building . . . bigger payloads by heavy-duty construction . . . and lower cost-per-mile performance by superb engineering. Autocars cost more because they're worth more! That's why leading highway haulers the nation over—like Shirks Motor Express Corporation, Lancaster, Pa. —own and operate these famous cost-wise and profit-sure trucks. . . . Buy Autocars—*by* Autocar. Follow the leaders, for they know the way.

THE AUTOCAR COMPANY

HEAVY-DUTY TRUCKS

Manufactured in Ardmore, Pa. • Serviced by Factory Branches and Distributors from Coast to Coast

HANDLING COSTS GO DOWN
with this versatile crane on the job!

THE NEW MODEL D
Full-Revolving HANDI-CRANE

- **Full-Revolving Boom**
  swings in a complete 360° circle... picks up or spots loads in any direction with ease.

- **High Mobility**
  Travels at speeds up to 15 m. p. h.; compact—works easily in narrow aisles, inside cars, etc.

- **Rugged Construction**
  Extra heavy frame transmits all crane load directly to axle... positively no strain placed on tractor housings.

- **Easier Steering**
  Automatic "booster" cylinder makes steering easy even when traveling with heavy loads.

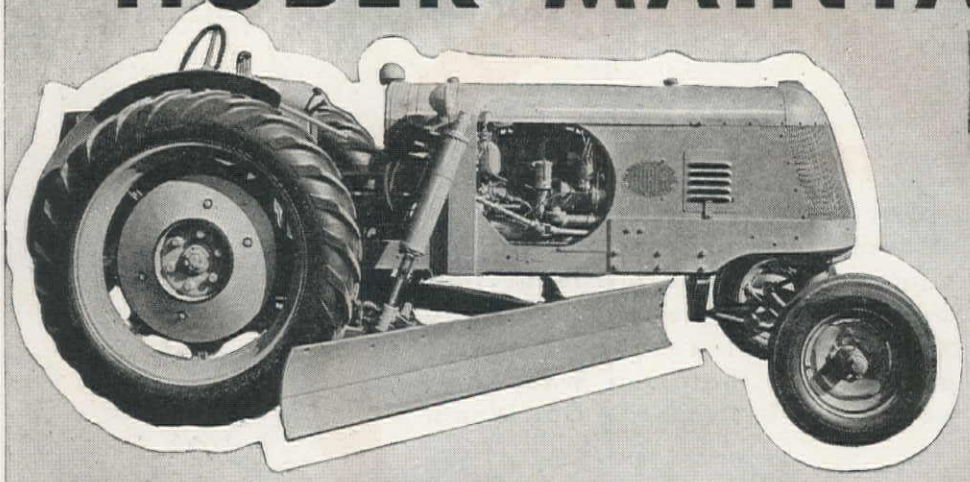
- **High Capacity**
  Handles loads from 1,500 to 5,000 lbs., depending on working radius.

New Model D Bulletin *gives complete information on this versatile load handler; write or wire for your free copy* now.

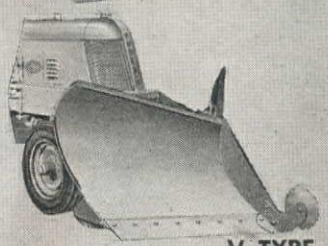
INDUSTRIAL EQUIPMENT COMPANY
10911 RUSSETT STREET, OAKLAND 3, CALIFORNIA • 4441 SANTA FE AVENUE, LOS ANGELES 11, CALIFORNIA

Other Products: • TANKS • HEATING EQUIPMENT • MOTOR BOATS

Versatile's THE WORD FOR THE HUBER MAINTAINER

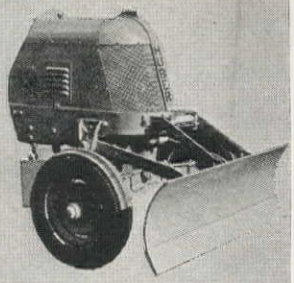


ONE WAY SNOW PLOW



V TYPE SNOW PLOW

Here's an all-purpose machine which makes short work of year 'round street, highway and airport maintenance jobs . . . jobs so varied it's hard to believe a single machine could handle them successfully. Equipped with a 9' scraper blade for light sub-grading, the Huber Maintainer can be converted speedily via practical attachments into a bulldozer, snow plow, mower, sweeper, lift loader or patch roller . . . has plenty of power at the drawbar for hauling, too. To get better acquainted with this one-man "maintenance crew," write today for a Huber Maintainer specification sheet.

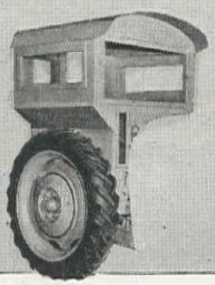


BULLDOZER

PATCH ROLLER

ROTARY BROOM

CAB



MOWER

LIFT LOADER

THE HUBER MFG. COMPANY • MARION, OHIO, U. S. A.

LEE & THATRO EQUIPMENT CO.
Los Angeles, Calif.

THE O. S. STAPLEY CO.
Phoenix, Arizona

EDWARD F. HALE CO.
Hayward, Calif.

THE MINE & SMELTER SUPPLY CO.
Denver, Colorado

CONTRACTORS' EQUIPMENT & SUPPLY CO.
Albuquerque, New Mexico

FEENAUGHTY MACHINERY CO.
Portland, Ore. • Boise, Idaho
Seattle, Wash. • Spokane, Wash.

THE C. H. JONES EQUIPMENT CO.
Salt Lake City, Utah

Our business is to PUT PIPE TO WORK

★ The basic ingredient of our business is pipe — or tubing. We do not make pipe, but what we *do* to pipe and the thousands of parts and devices which we make and *add* to it have made us a leading supplier of piping for power and processing, for plumbing, heating, cooling and humidifying, for fire protection and a host of other jobs involving piping.

Our five plants and nation-wide network of warehouses are equipped to handle every requirement from a ¼" tube fitting to a complete power piping system.

GRINNELL COMPANY, INC.
Executive Offices: Providence 1, R. I.

Plants:
Providence, R. I. Cranston, R. I. Columbia, Pa.
Atlanta, Ga. Warren, Ohio

Branch Warehouses

Atlanta 2, Ga.	Los Angeles 13, Cal.	Providence 1, R. I.
Charlotte 1, N. C.	Minneapolis 15, Minn.	St. Louis 10, Mo.
Chicago 9, Ill.	New York 17, N.Y.	St. Paul, Minn.
Cleveland 14, O.	Oakland 7, Cal.	San Francisco 7, Cal.
Houston 1, Tex.	Philadelphia 34, Pa.	Seattle 1, Wash.

GRINNELL

WHENEVER PIPING IS INVOLVED

This Power Clutch NEVER "Takes Over"

RETAINS "FEEL" OF THE LOAD

Unlike a booster clutch, which gives the operator no more than "on-or-off" control, the Koehring 605 Power Clutch never takes over. Simple linkage maintains constant control over the main clutch band. Complete control is maintained over the in-between stage, between full engagement and full disengagement. There is no continuous slipping booster, no complicated, sensitive network of air lines.

ONE-TENTH THE LEVER PULL

In all operations, a light lever pull sets this powerful 37-inch clutch—only 1/10 the pull required to set a manual clutch of comparative size.

AUTOMATIC HEAT ADJUSTMENT

Continuous, time-consuming adjustments for heat expansion are unnecessary on the Koehring Power Clutch. A large compensator spring automatically makes the required tension changes.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

KOEHRING
605

HARRON, RICKARD & McCONE CO., San Francisco-Los Angeles
PACIFIC HOIST & DERRICK CO. . . . Seattle, Washington
WESTERN CONSTRUCTION EQUIPMENT CO. . Billings, Mont.
WESTERN CONSTRUCTION EQUIPMENT CO., Missoula, Mont.
CONTRACTORS EQUIPMENT CORP. . . . . Portland, Ore.
LUND MACHINERY CO. . . . . Salt Lake City, Utah
NEIL B. McGINNIS CO. . . . . Phoenix, Arizona
HARRY CORNELIUS CO. . . . . Albuquerque, New Mexico
KOEHRING COMPANY WEST COAST PARTS WAREHOUSE . Sacramento, California

UNIT 357

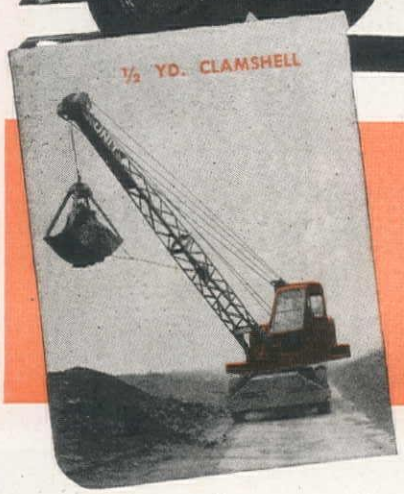
Self-Propelled MOBILE CRANE!

Here's a fast, mobile UNIT that rides on rubber . . . goes anywhere . . . over rough terrain or on paved highways . . . gets there in a hurry. Has the well-known UNIT power and stamina, plus motor truck speed and mobility. Operated by ONE man . . . powered by ONE engine . . . controlled from ONE position in cab. Ultra-modern in design, yet available at LOW COST. Ask for bulletin.

5-TONS
(7 tons with Outriggers)

New, Full Vision Cab—pioneered by UNIT—provides maximum visibility. Operator can see in ALL directions. Promotes safety. Increases efficiency.

FULL VISION CAB



UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN

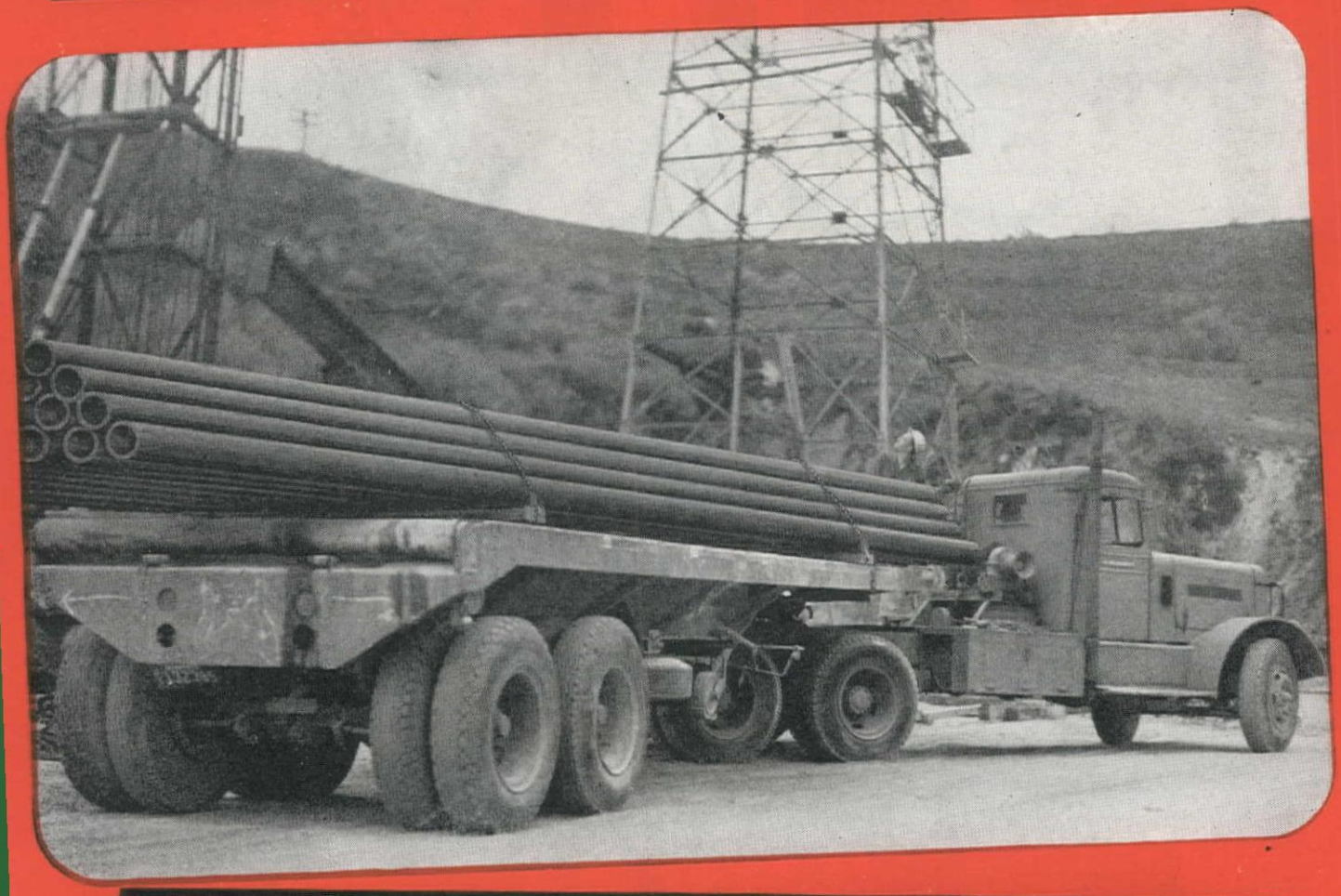
FULLY CONVERTIBLE TO ALL ATTACHMENTS

- SHOVEL
- DRAGLINE
- TRENCHOE
- MAGNET
- CLAMSHELL
- PILE DRIVER
- BACK FILLER

UNIT CRANE & SHOVEL CORP.
MILWAUKEE 14, WISCONSIN, U. S. A.

A 4813-1P-C

TOPS IN OIL!



Nature wasn't always considerate in placing her oil deposits in California. Some are right along paved highways. Others right on the waterfront. Much of the remaining is up in the mountains where transportation of materials is over rugged mountain terrain, with steep grades, dirt roads, hairpin turns. Just the kind of conditions which permit PETERBILT TRUCKS to make production models look like toys. Tide Water Associated Oil Company bought a couple of Diesel powered PETERBILTS for heavy hauling in their fields in the mountains back of Ventura and at Santa Fe Springs. Their performance was so eminently satisfactory that they followed with an order for two more PETERBILTS. If it's big stuff—machinery, drill pipe, casing, cement—it's put on the PETERBILTS. They can be depended upon to get it where it's intended to go.

Peterbilt Motors Company

107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORNIA

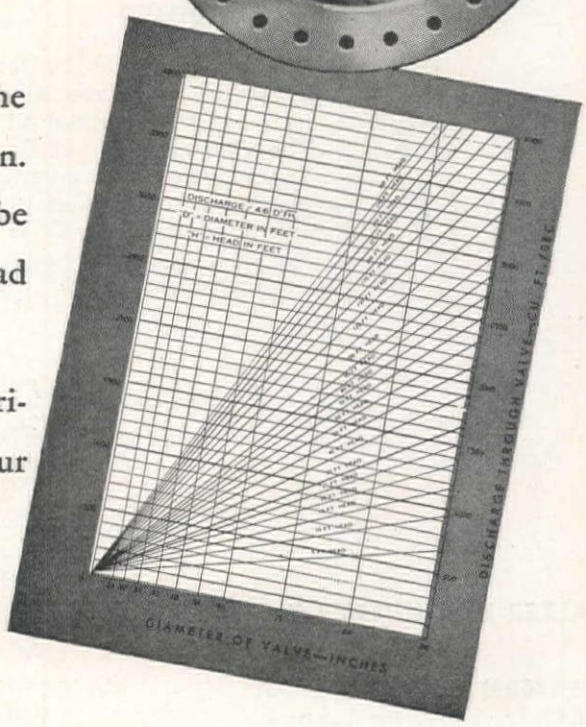
INVESTIGATE

Chapman's

DOW DISC-ARM PIVOT VALVE

For control, regulating, throttling, emergency shut-off and free discharge service

Photographs of 30" valve show position of the Disc in open, partly open and closed position. Chart at right shows approximate discharge to be anticipated thru a Pivot Valve under the head available at the valve inlet.



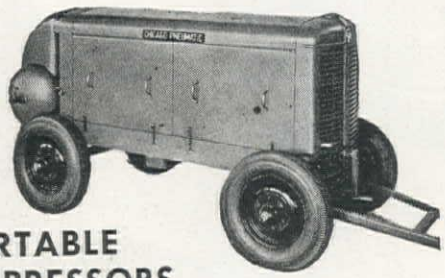
Complete engineering data, applications, experiences, and recommendations are contained in our Bulletin No. 40. Write today for your copy.

The CHAPMAN VALVE
Manufacturing Company
INDIAN ORCHARD, MASSACHUSETTS

CP service

No further away than your phone!

A telephone call, letter or wire will secure the immediate cooperation of your nearest CP Distributor. You will find him ready and able to assist you in obtaining maximum performance — and economy — with CP Air Compressors, Rock Drills, Demolition Tools, Pneumatic Tools and other contractors' equipment. Behind every Chicago Pneumatic Distributor are nearly fifty years of CP experience in design and production of time and labor-saving equipment for leading contractors in all parts of the country. Write today for a copy of Catalog 600.

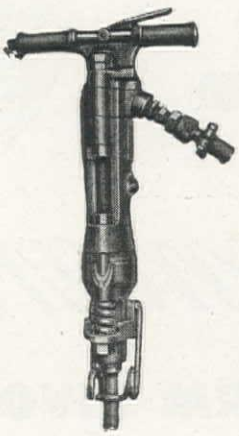


CP PORTABLE COMPRESSORS

15% to 35% more air per gallon of fuel is assured with CP Portable Compressors. Design features permit speed to vary with air demand — not by steps, but gradually — affording both fuel economy and wear reduction. CP Portables are available in gasoline-powered models of 60, 105, 160, 210, 315 c.f.m.; in Diesel-powered sizes of 105, 160, 210, 315, 500 c.f.m.

CP-116 SHEETING DRIVER

Essentially the CP-116 Demolition Tool with a special front head for driving sheet piling. The CP-116 Sheeting Driver has only one moving part, the piston, which strikes a fast and powerful blow. Does not "broom" — sheeting can be used over and over.



CP-117 DEMOLITION TOOL

Indispensable as a time and money-saver in tearing out dense concrete and similar medium-to-extremely-hard materials, the 80 lb. CP-117 Demolition Tool strikes a very powerful blow, but is comparatively easy to hold.

CP 365-RP PNEUMATIC WRENCH

(Impact Type)

To remove or apply nuts, bolts, lag screws, etc. in a fraction of the time it takes by hand, use the powerful CP 365-RP Pneumatic Wrench (Impact Type). Capacity: 1¼" bolt size. This is one of 6 fast low maintenance CP Pneumatic Wrenches — capacities from ⅜" to 1¾" bolt sizes.

CHICAGO PNEUMATIC TOOL COMPANY

General Offices: 8 East 44th Street, New York 17, N. Y.

Distributors

BALZER MACHINERY CO., Portland, Oregon

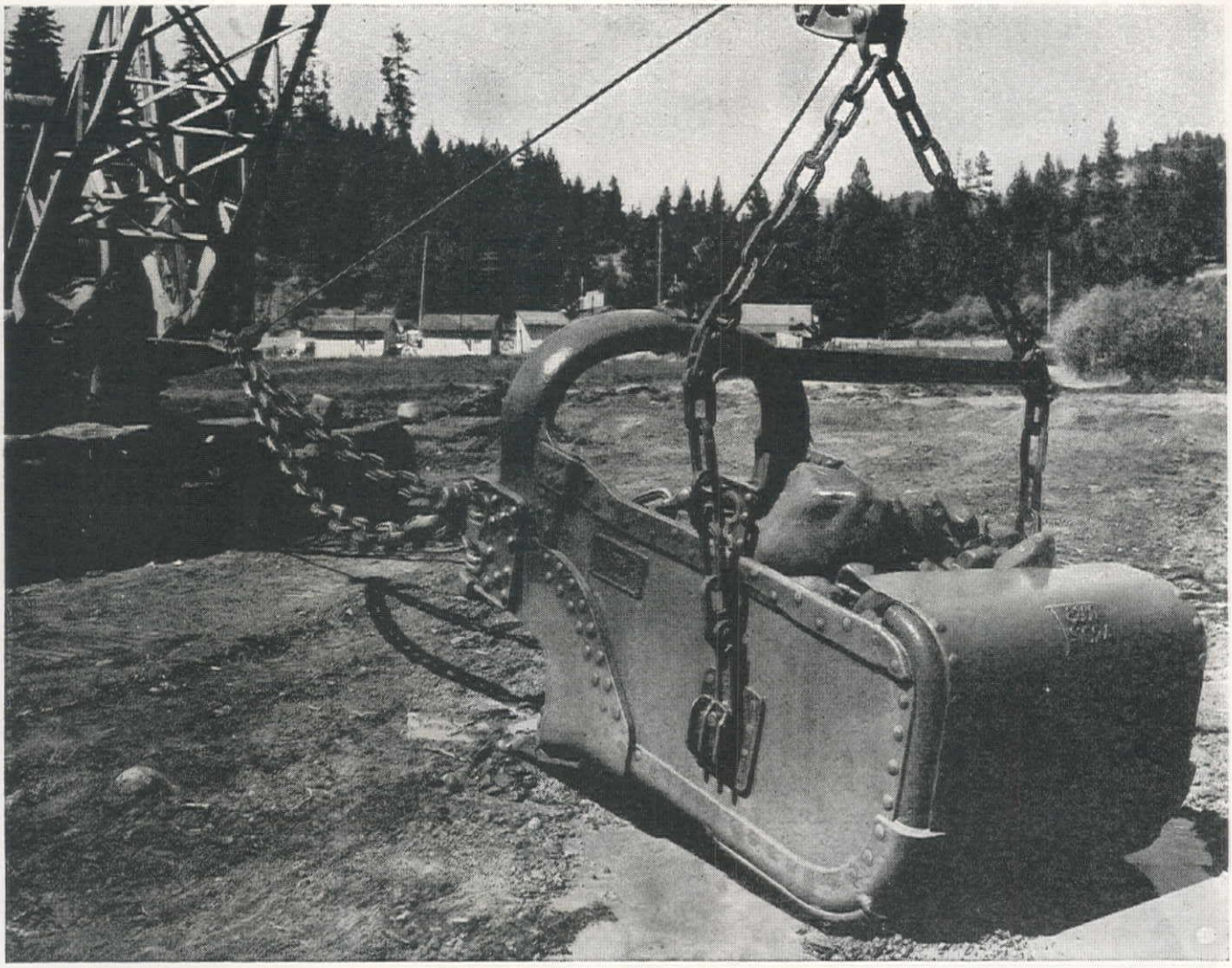
WESTERN MACHINERY CO., Spokane, Washington

HALL-PERRY MACHINERY CO., Butte, Montana

WESTERN MACHINERY CO.
3649 So. Santa Fe Avenue
Los Angeles 11, California

WESTERN MACHINERY CO.
760 Folsom Street
San Francisco 7, California

WESTERN MACHINERY CO.
500 North 16th Street
Sacramento 2, California



ESCO ... the strongest-per-pound buckets ever built - - -

That's a pretty strong statement — until you know all the facts about *ESCO's* Stripping and Mining Buckets. First off, *ESCO* Manganese Steel castings are used for all wearing parts, chains and connections. This tougher, shock-resisting, harder-wearing *ESCO* Manganese Steel is placed where needed; excess weight is thus eliminated.

Then, there's design. That's important, too. *ESCO* buckets are designed to *fill quickly*, use a *minimum of power* in loading and, because excess weight is eliminated in the basic design, a *maximum size bucket* can be used on the machine.

And don't overlook *ESCO's* specially designed teeth — that do the actual digging — that save the bucket lip. *ESCO* teeth and lip are correctly engineered for pitch to naturally and positively pull the bucket down into the material— for a maximum bite. May we send you more factual information on the strongest-per-pound buckets ever built? *ESCO* also offers a complete line of dipper buckets. Write for catalogs.

ELECTRIC STEEL FOUNDRY

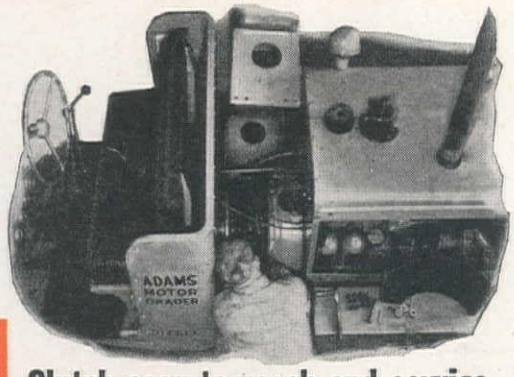
2141 N. W. 25th AVENUE, PORTLAND 10, OREGON

Offices and Warehouses

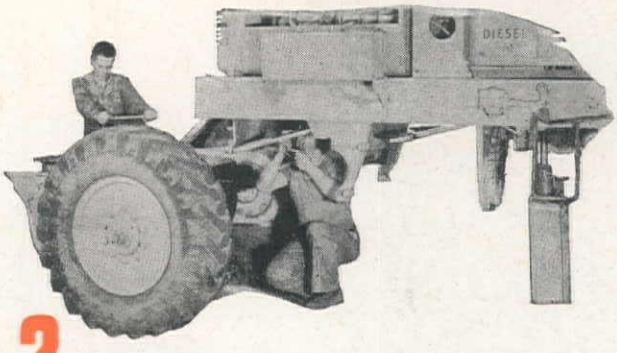
SEATTLE, 4 ★	HONOLULU, 5 ★	NEW YORK, 17 ★	SAN FRANCISCO, 7 ★	SPOKANE, 8 ★	LOS ANGELES, 11 ★	CHICAGO, 4
2724 First Ave. S.	814 Kapiolani Blvd.	Graybar Building	699 Second Street	121 S. Monroe St.	2700 Santa Fe Ave.	310 S. Michigan Ave.
Telephone	Telephone	Telephone	Telephone	Telephone	Telephone	Room 906
Elliott 4161	6486	Lexington 28958	Douglas 8346	Main 5530	Lucas 7251	Phone Harrison 5458

BARCO MANUFACTURING COMPANY, NOT INC., 1819 Winnemac Ave., Chicago 40, Ill. - In Canada: The Holden Co., Ltd., Montreal, Can.

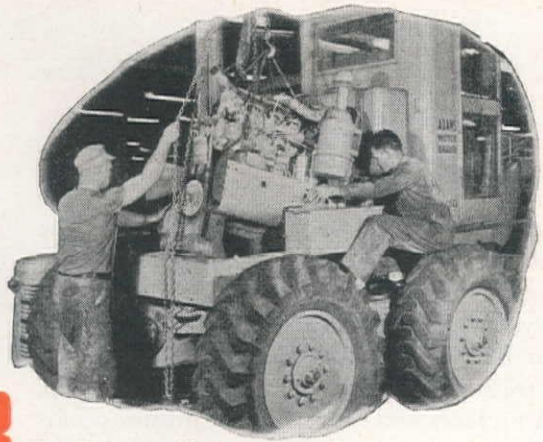
ADAMS MOTOR GRADERS EASY TO SERVICE



1 Clutch easy to reach and service



2 Transmission readily accessible



3 Engine easily removed

● From stem to stern Adams Motor Graders are engineered for fast, efficient, economical servicing. Note the examples pictured—observe how usually difficult-to-reach assemblies are easily accessible in Adams Graders:

1. Clutch is serviced without removing engine. A complete overhaul in about 4 hours.
2. Entire final drive disconnects and backs out easily for servicing transmission and lower half of engine.
3. If desirable, engine is quickly removable—much easier than on most motor graders.

These important time-saving, money-saving Adams features mean—*fewer repair-shop hours—more on-the-job working hours.* Ask your local Adams dealer for complete details. J. D. Adams Manufacturing Company, Indianapolis, Indiana.

LOCAL *Adams* DEALERS

ALASKA—Glenn Carrington & Co., Fairbanks
ARIZONA—O. S. Stapley Company, Phoenix
CALIFORNIA—Lee & Thatro Equip. Co., Los Angeles
Sutton-Morf Tractor Co., Sacramento
J. G. Bastain, Redding
Valley Equip. Co., San Jose, San Francisco
Brown Tractor Co., Fresno
Thompson-Sage, Inc., Stockton
CALIFORNIA (Cont.)—Farmers Mercantile Co., Salinas
Stevenson Farm Equip. Co., Santa Rosa
Stanislaus Impl. & Hdwe. Co., Modesto
Exeter Mercantile Co., Visalia
Gallagher Tractor & Impl. Co., Merced
COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equipment Co., Boise, Pocatello
MONTANA—Industrial Equip. Co., Billings, Missoula
NEVADA—Brown Motors, Reno
NEW MEXICO—Hardin & Coggins, Albuquerque
OREGON—Howard-Cooper Corp., Portland, Eugene
UTAH—The Lang Company, Salt Lake City
WASHINGTON—Howard-Cooper Corp., Seattle
Intermountain Equipment Co., Spokane
WYOMING—Industrial Equip. Co., Billings, Mont.
The Lang Company, Salt Lake City, Utah

MAKE WAY FOR THE BIG BOOM!

Get ready to go—go places with BAY CITY excavating and material handling equipment. The tremendous industrial and building booms are being thrown into high gear. For improved roads and new super-highways. For new homes and buildings. No matter how you serve the public, if your service includes the constant handling of heavy, bulky materials, you'll be time, money and profits ahead to let BAY CITY equipment do the heavy work for you. Like the Diesel-powered 17½ ton BAY CITY crane pictured here at reclamation work in a steel mill slag dump, with 45 ft. boom swinging a 55 in. magnet, BAY CITY cranes and shovels assure greater profits with their speed, their efficient, economical operation. Available in a wide range of models and sizes—both crawler and pneumatic-tire mounted—all of balanced design, heavy-duty construction, and expert workmanship. Call your nearest BAY CITY dealer today, or write direct to BAY CITY SHOVELS, INC., Bay City, Mich.

BAY CITY

SHOVELS • DRAGLINES
CRANES • HOES • CLAMSHELLS

SEE YOUR NEAREST DEALER for Bay City excavating and material handling equipment in sizes from ⅜ to 1¼ yards having crane rating up to 20 tons. Both crawler and pneumatic tire mounting.

Pierce Governed for ACCURATE REGULATION DEPENDABLE LONG LIFE UNFAILING PROTECTION

● The tremendous might of internal combustion engine power did much to win the war. Now it turns its versatile and efficient strength to a great new era of industrial and construction activity.

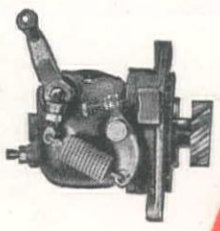
In this new job, engines and equipment are *not expendable* as they were in war. That's why they need governing—good governing—for accurate speed regulation, dependable, trouble-free long life—and unfailing protection.

Pierce Precision Flyball Governors give that kind of governing. They have built a reputation for it through more than a quarter-century. They have become accepted equipment on many of the world's finest and most widely used engines—gas, gasoline and diesel.

When you order new engines, specify Pierce Flyball Governors to pace and protect them. If your equipment is not Pierce governed, write for full information.

THE PIERCE GOVERNOR COMPANY, INC.
1645 OHIO AVENUE • ANDERSON, INDIANA

Manufacturers of Pierce Precision Governors and Sisson Automatic Chokes

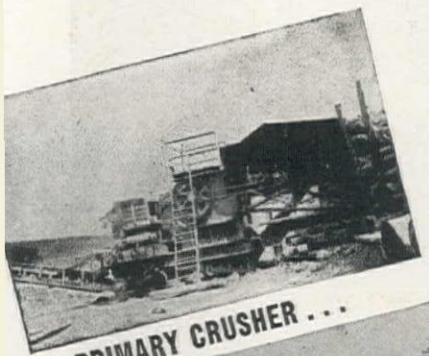


PIERCE GOVERNORS

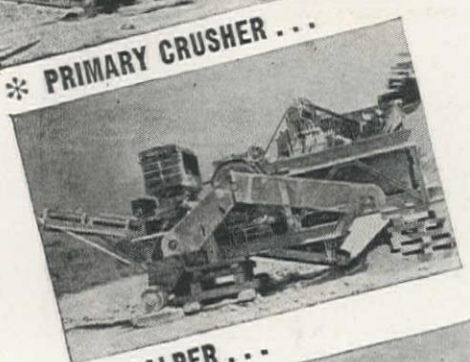
...a peek into the future—

Cedarapids Unitized Plant Economy
... for tomorrow's jobs

These 4 Units Make a
Dozen Complete Plant Combinations
for ANY Job Needs!



✻ PRIMARY CRUSHER . . .



✻ SCALPER . . .

✻ TANDEM STRAIGHTLINE PLANT . . .

✻ WASHING AND SIZING UNIT . . .

Each element of the Cedarapids Unitized Plant is a complete unit in itself, balanced for high capacity used alone or with other matched sizes to handle every range of production volume.

What a Unitized Plant Will Mean to You

The basic economy of standardized machines capable of instant adaptation to special job conditions needs no explanation to operating contractors. Savings begin in lower purchase costs, and extend straight down the line through maintenance, repairs, and labor-saving flexibility to the ultimate goal of profitable contracts. Working machines are the only money-making machines, and the Cedarapids Unitized Plant is designed to give you the equipment flexibility necessary to keep the good contracts coming in, the plant on the job. Be sure you find out all about Cedarapids Unitized Plants BEFORE you buy your plant requirements for the FUTURE—and what a future it is if you have the right portable plant equipment! See your Iowa Distributor for complete details.

IOWA MANUFACTURING COMPANY
CEDAR RAPIDS, IOWA

Cedarapids — Built by IOWA

THE IOWA LINE
of Material Handling Equipment is Distributed by

HOWARD-COOPER CORP.
Seattle, Washington, and Portland, Eugene, and Medford, Oregon

HALL-PERRY MACHINERY CORP.
Butte, Great Falls, Missoula, and Billings, Montana

INTERMOUNTAIN EQUIPMENT CO.
Boise and Pocatello, Idaho, and Spokane, Washington

WORTHAM MACHINERY CO.
Cheyenne, Wyoming

LUND MACHINERY CO.
Salt Lake City, Utah

BROWN-BEVIS EQUIPMENT CO.
Los Angeles, California

H. W. MOORE EQUIPMENT CO.
Denver, Colorado

EDWARD F. HALE CO.
Hayward, California

ARIZONA-CEDAR RAPIDS CO.
Phoenix, Arizona

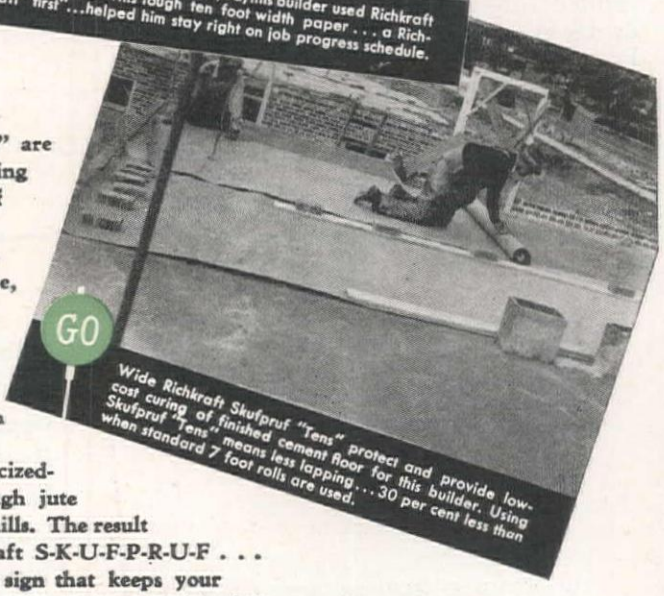
R. L. HARRISON CO., INC.
Albuquerque, New Mexico

SIERRA MACHINERY CO.
Reno, Nevada

Richkraft

SKUFPRUF GREEN

...The Go Sign to ...keep your jobs rolling



HERE'S a real building paper . . . designed by construction men for construction uses . . . Richkraft Skufpruf "Tens" are our 10 foot rolls—the perfect width for curing floors, protecting materials stored in the open, etc. This ten foot width of Skufpruf covers 30 per cent more floor area with fewer laps . . . less labor.

Fewer laps mean fewer chances for floor damage. Added up, it means less labor—less trouble—more profit per job. (Of course, Skufpruf is available in regular standard sizes too.)

All Skufpruf paper has been given our special Plasticizing Treatment . . . not the surface or "Puddle treatment" commonly offered . . . Skufpruf Plasticizing is done to the raw kraft pulp itself. This means Richkraft Plasticizing becomes an integral part of the paper . . . a part of the wood fibre itself.

Here's what Richkraft Skufpruf is: Two sheets of plasticized-treated kraft, EACH coated with asphalt and combined with tough jute reenforcing . . . all done in one of the world's most modern mills. The result is a waterproof, scuffproofed paper, second to none. Richkraft S-K-U-F-P-R-U-F . . . easily identified by its green tint . . . Skufpruf Green . . .The go sign that keeps your jobs rolling in all kinds of weather. Write for the booklet "The Mills Behind Richkraft."

The RICHKRAFT Company

General Offices: Builders Building, Chicago 1, Illinois

Eastern Office: Westport, Conn., Western Office: Pacific Building, Oakland 12, Calif.

and Progressive Dealers . . . Nationwide . . . With Stocks On Hand Waiting to Serve You.

***General Distributors:* PACIFIC COAST AGGREGATES, INC., 85 Second St., San Francisco, SUtter 8940**

Distributing Yards at San Francisco, Oakland, Emeryville, Berkeley, Daly City, San Jose, Stockton, Fresno, Sacramento

Road Distributors: Nelson Equipment Co., Portland, Spokane, Seattle, Boise, Idaho

22° LIFT

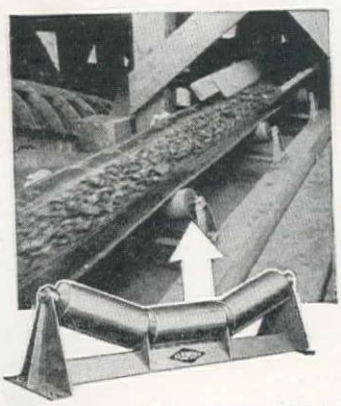
with this A-Frame
Heavy Duty, Mobile

DIAMOND CONVEYOR

LOADS ROCK, GRAVEL, SAND, ORE

For adaptability to location and type of material, and the ability to slug it out year after year on the heaviest runs—this DIAMOND A-Frame Conveyor is tops! It is electrically welded throughout. Frame and power unit are centered for proper balance. Self-locking raising and lowering gears; will raise to 22° angle. DIAMOND makes other standard conveyors as well as crushers, screens, plants, etc.

Ask for Conveyor Bulletin No. D45E



DIAMOND CONVEYOR ROLLS have rugged electric welded steel frames and greased-for-life ball bearings sealed against dirt. Ask your DIAMOND dealer or write us for details, prices, etc.

DIAMOND DEALERS

Oakland	SOULÈ EQUIP. CO.
Los Angeles	GARLINGHOUSE BROS.
Seattle	A. H. COX & CO.
Portland	LOGGERS & CONTRACT'S MACH. CO.
Boise and Spokane	WESTERN EQUIP. CO.
Salt Lake City	C. H. JONES EQUIP. CO.
Phoenix	O. S. STAPLEY CO.
Albuquerque	CONTRACTORS' EQUIP. & SUP. CO.

DIAMOND

DIAMOND IRON WORKS, INC.

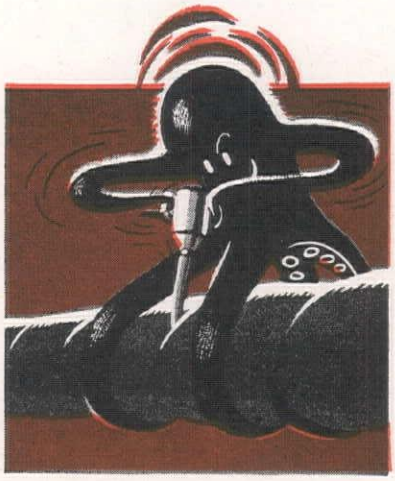
AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINNESOTA

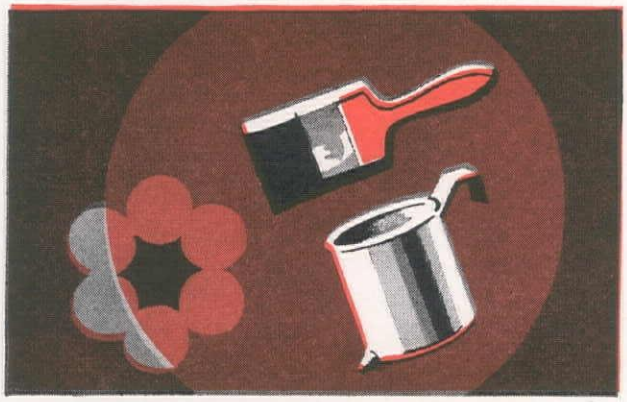
EASILY APPLIED COLD – STOPS WIRE ROPE WEAR

1. Your wire rope is a machine, composed of many working parts. It requires lubrication to reduce frictional wear. But the original factory lubrication will not last the life of the rope.

2. Field lubrication at regular intervals is essential. And the easiest, quickest, most dependable way to lubricate wire rope on the job is to use Unacal Cable Lubricant.



3. Unacal is a special blend of several ingredients carefully selected to give the utmost in lubrication, penetration, tenacity, and protection against rust and corrosion.



4. Because of a special solvent, it may be readily applied cold by paintbrush, drip can, or any other convenient method. Then Unacal quickly penetrates the rope, lubricating every strand.

5. After the solvent evaporates, the oil supply *inside* the rope continues to feed the strands for a long time–sharply reducing internal friction that causes wire rope wear.

Try a supply of Unacal Cable Lubricant. Your Union oilman or Union Oil Company, Los Angeles 14, California – will gladly furnish more information and deliver a supply.

UNACAL CABLE LUBRICANT

UNION 76

Another **UNION OIL** *Success-Tested Product*

Affiliate Member, Associated General Contractors of America

TEN REQUIREMENTS
FOR UNDERGROUND MAINS
under normal conditions

Long Life: In evaluating bids, the useful life of cast iron pipe is figured at 100 years minimum.

Carrying Capacity: The carrying capacity of standard tar-coated cast iron pipe remains practically unimpaired for centuries. For the certain areas where tuberculating water is encountered, cement-lined cast iron pipe is available. Under such conditions, no other material offers the combined long life and sustained carrying capacity of cement-lined cast iron pipe.

Tight Joints: For *ordinary* pressures, cast iron bell-and-spigot pipe—for *high* pressures, cast iron mechanical joint pipe—are known to be leak-proof.

Tensile Strength: When tested under hydrostatic pressure to destruction, the ultimate tensile strength of cast iron pipe is a minimum of 11,000 p.s.i. for pit cast pipe and a minimum of 18,000 p.s.i. for cast iron pipe made by other methods.

Beam Strength: Under beam stress tests, 10 ft. span, standard 6" cast iron pipe sustains a load of 15,000 pounds and bends approximately one inch before breaking.

Toughness: Under hydrostatic pressure and the impact of a 50 lb. hammer, standard 6" cast iron pipe does not crack until the hammer is dropped four feet.

Internal Pressure: An average of many internal hydrostatic pressure tests on standard 6" cast iron pipe shows this pipe withstands more than 2500 pounds pressure per square inch.

External Load: In regulation ring compression tests, standard 6" cast iron pipe withstands a crushing weight of more than 14,000 lbs. per foot.

Imperviousness: The walls of cast iron pipe are impervious to leakage, seepage, or sweating of water, gas or chemicals under internal pressure tests.

Tapping: Cast iron pipe can be tapped cleanly with strong, tough threads, losing little in structural strength.

Other pipe materials meet some of these requirements but only cast iron pipe meets them all.

Whether a pipe material is able to fulfill these requirements is a matter of experience rather than prediction. A page of history is worth a volume of sales claims. History proves that cast iron pipe has been meeting these ten requirements for generations.

Cast Iron Pipe Research Association, Thomas F. Wolfe, Research Engineer, Peoples Gas Building, Chicago 3.

CAST IRON PIPE
SERVES FOR CENTURIES

CAST IRON

High Speed EARTHMOVING

ON L-O-N-G AND SHORTER HAULS

Combines Power and Speed With Positive Steering Control

Powered by a heavy duty diesel with four speeds forward and a reverse gear, Wooldridge Terra-Cobras attain travel speeds up to 21 M.P.H. on either short or long stretches. Surplus rim pull permits fast acceleration in a short distance and provides ample power to pull up comparatively steep slopes—fully loaded without a "pusher." Regardless of whether it is loading, traveling, spreading or turning, the Terra-Cobra maintains a fixed direction of travel due to positive two-wheel hydraulic steering control. Full traction and power is constantly applied and maintained on BOTH drive wheels, at all times . . . even on sharp turns. As no fatiguing effort is required to handle the Terra-Cobra, full production and higher average yardages can be expected from each operator on every shift. To combine speed with safety on your earthmoving operations rely on Wooldridge Terra-Cobras. Investigate fully, today.

WOOLDRIDGE MANUFACTURING CO. SUNNYVALE, CALIFORNIA

No Danger of "JACKNIFING"

It is unnecessary to slacken speed when traveling, spreading or turning in order to maintain safe control of a Terra-Cobra, as there are no steering clutches to fight nor individual brakes to grab. Positive two wheel steering eliminates any possibility of "jacknifing."

WOOLDRIDGE

TERRA COBRA

SELF-PROPELLED EARTHMOVERS

WRITE TODAY

For your copy of new Bulletin giving full details on Wooldridge Terra-Cobras. Ask for Bulletin TA-425.

Achievement ...MEASURED IN TONS of Pay Material

3/8 to 30 CUBIC YARDS

- ★ 20% to 40% lighter than other buckets, type for type.
- ★ All welded construction for greater strength and durability.
- ★ Manganese Steel chains, fittings, and reversible tooth points.
- ★ Full Pay Load every trip, even in wet digging.
- ★ Perfect Balance; handles easier, fills faster, dumps quicker.
- ★ Three Types; light, medium, and heavy duty. With perforations or solid.

HENDRIX *Lightweight* DRAGLINE BUCKETS

WRITE FOR DESCRIPTIVE LITERATURE ... OR ASK YOUR DEALER

DESOTO FOUNDRY, INC. ★ MANSFIELD, LOUISIANA

Enthusiast

for INTERNATIONAL POWER

He sells more International TracTracTors than anybody we know! He runs them, handles the controls—knows, first hand, what International Crawler performance means.

And he's not backward about saying what he thinks about his power-packed prime mover, good or bad. Find him where the tough, grubby jobs are getting done—on highway, airport and construction projects—at mill yards or with municipal crews. And listen!

Hear him tell what *his* International can do, how it pays off in lower costs on every job, how he can beat the other fellow with it in climbing, turning, digging, carrying, and hauling.

And the outfit he works for backs him up with statements like this: *"It's a powerful tractor with all the speed and dependability we need. This is our first experience with International Power and we are thoroughly pleased with our choice." "Cheapest fuel cost and maintenance we have ever experienced."*

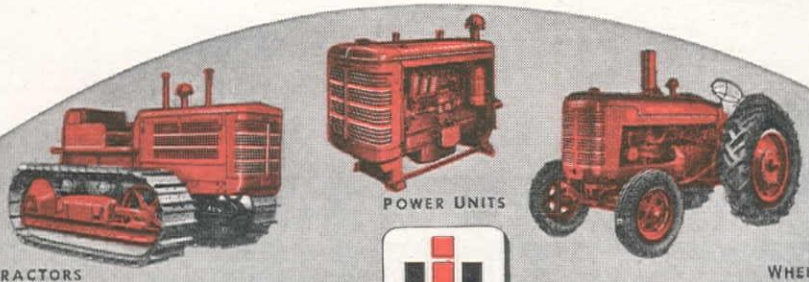
International Industrial Power Distributors have all information about International Diesel and carburetor-type TracTracTors, Wheel Tractors and Power Units. For help in selecting the size and type of power equipment that will serve you best, talk with the distributor near you:

Stanley J. Commerford, Eureka, Calif.; Valley Equipment Co., San Jose and San Francisco, Calif.; Farmers Mercantile Co., Salinas, Calif.; Brown Tractor Company, Fresno, Madera, Reedley, Calif.; Thompson-Sage, Inc., Stockton, Calif.; Sutton Tractor & Equip. Co., Sacramento, Calif.; J. G. Bastain, Redding, Calif.; Brown Motors Co., Reno, Nevada.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue Chicago 1, Illinois



INTERNATIONAL HARVESTER

INTERNATIONAL Industrial Power

THE Facts you need- on BETTER WATER SERVICE

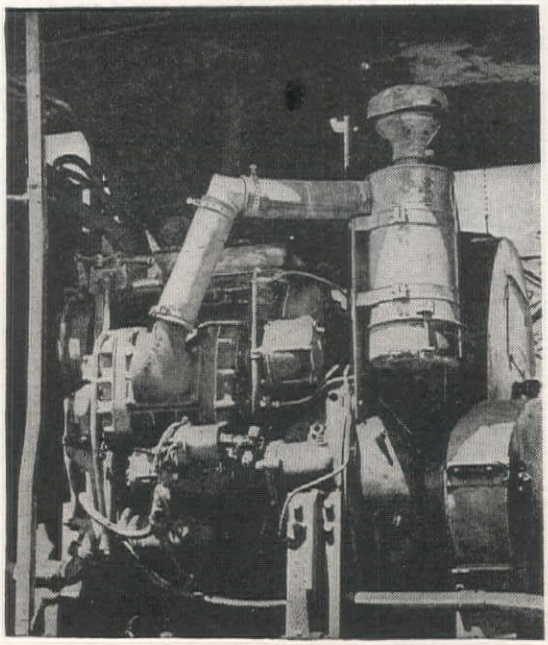
Write-

FOR YOUR COPY OF THIS NEW 28-PAGE BOOK—JUST OFF THE PRESS . . . . . COMPREHENSIVE, DETAILED, KEYED TO YOUR REQUIREMENTS!

PITTSBURGH • DES MOINES STEEL CO.

PITTSBURGH, PA., 3422 NEVILLE ISLAND—DES MOINES, IOWA, 923 TUTTLE STREET
NEW YORK, ROOM 920, 270 BROADWAY · CHICAGO, 1226 FIRST NATIONAL BANK BUILDING
DALLAS, 1227 PRAETORIAN BUILDING · SAN FRANCISCO, 629 RIALTO BUILDING
SEATTLE, 530 FIRST AVENUE, SOUTH

Over 15,000 hours —and repairs "too small to talk about"



"NEVER failed me once," says Mr. Rexroth, California contractor, speaking of the General Motors Diesel in his crane. "And it's nothing for that Diesel to lift 100 yards of dirt an hour, ten, fifteen and twenty hours a day."

That's because these high-powered two-cycle Diesels accelerate rapidly —they're quick on the trigger. Their higher horsepower per pound of weight delivers a powerful punch. The flexibility of these engines makes it possible to handle intermittent loads with ease. Until recently every GM Diesel we could make went into war work. *Now they are available again for peacetime work—available and ready to provide construction contractors with rugged power that is low in cost and high in reliability.*

GM
GENERAL MOTORS
DIESEL POWER

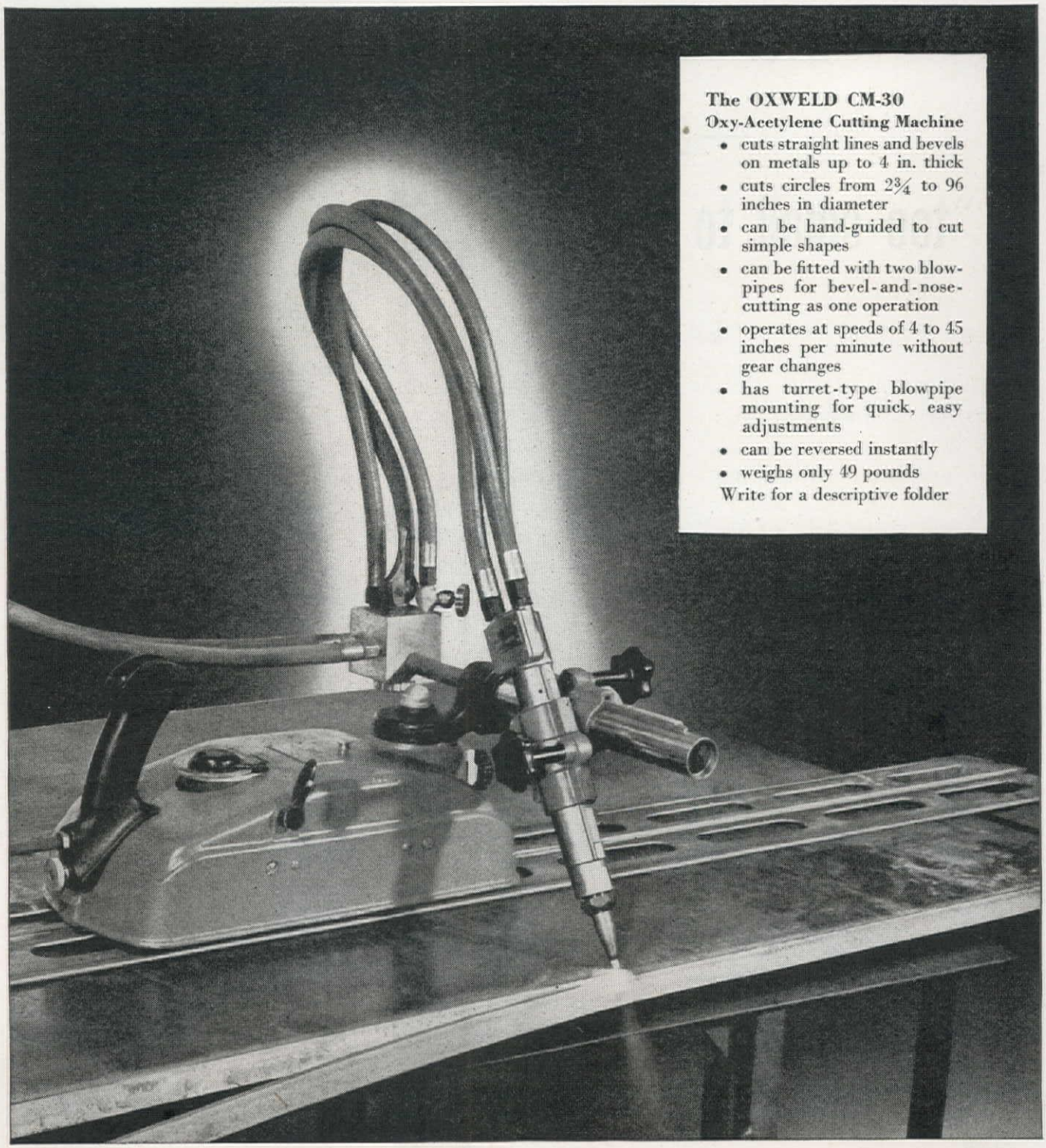
SINGLE ENGINES . . Up to 200 H.P.
MULTIPLE UNITS . . Up to 800 H.P.

DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

KEEP AMERICA STRONG
BUY VICTORY BONDS

Lima Crane powered by GM 3-Cylinder Series 71 Diesel Engine (shown above)

YOU CAN FLAME-CUT STEEL . . . FAST, PROFITABLY . . . WITH THIS LOW-PRICED PORTABLE MACHINE



The OXWELD CM-30
Oxy-Acetylene Cutting Machine

- cuts straight lines and bevels on metals up to 4 in. thick
- cuts circles from 2¾ to 96 inches in diameter
- can be hand-guided to cut simple shapes
- can be fitted with two blowpipes for bevel-and-nose-cutting as one operation
- operates at speeds of 4 to 45 inches per minute without gear changes
- has turret-type blowpipe mounting for quick, easy adjustments
- can be reversed instantly
- weighs only 49 pounds

Write for a descriptive folder

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

30 E. 42nd St., New York 17, N. Y. UCC **Offices in Other Principal Cities**

In Canada: Dominion Oxygen Company, Limited, Toronto

The word "Oxweld" is a registered trade-mark of Union Carbide and Carbon Corporation.

★ ***BUY AND HOLD UNITED STATES VICTORY BONDS AND STAMPS*** ★

"One Man Gang"

Here's efficiency! One man, one tractor, a Gar Wood Hydraulic Bulldozer in front and a 2-Wheel Scraper behind, handle practically any earth moving job, quickly and economically.

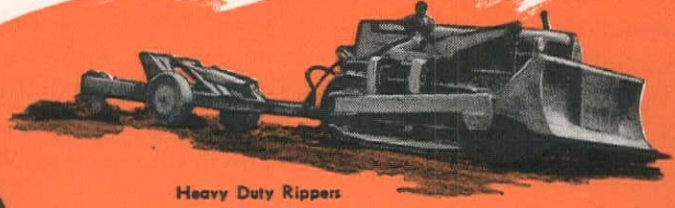
GAR WOOD ROAD MACHINERY
WITH ALLIS-CHALMERS DIESEL POWER

4-Wheel Hydraulic Scrapers

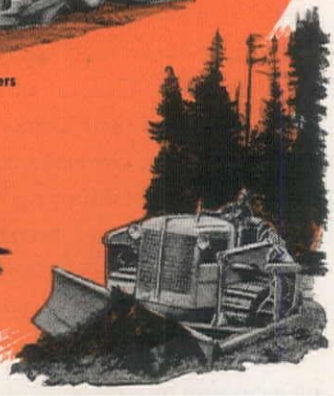
For Top Efficiency Use Gar Wood Road Machinery. That's a rule with many leading contractors and County Road Authorities. A large number of them began with a Gar Wood combination such as that shown above—found it superior on the job—ordered more units. As a result, the present volume of orders is the greatest in Gar Wood's history. Place your orders now with your Allis-Chalmers dealer.

4-Wheel Cable Scrapers

Cable Dozecasters



Heavy Duty Rippers



Hydraulic Dozecasters

GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN

OTHER PRODUCTS OF GAR WOOD INDUSTRIES INCLUDE HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

"WRAPS" ARE OFF

The Latest and Greatest Development of a 5-Year-Old INDUSTRY "FIRST"

"Fathered" by the World-Famous SUPERCRANE

. . The Amazingly New and Different

General Type 10 MODEL 105

ONE-MAN . . . ONE-ENGINE . . . ON RUBBER

Five years ago General "scooped" the industry with a great "first"—the one-engine, one-man operated, pneumatic-tired Supercrane. Carrying this development a great stride forward, General now takes the "wraps" off the *original* "Machine of Tomorrow." First announced more than a year ago, General's revolutionary Type 10, Model 105, is a profit-building rig that will go out and do more kinds of work—faster, better and cheaper—than you ever believed possible with a single machine . . . ½-yard shovel, crane, backhoe, dragline, clamshell, magnet and piledriver "rolled into one" and rolling with automotive smoothness on a cushion of air.

Here is mobility you must see in action to appreciate. Here is easy, positive, instant-response, metered air control you can "feel" and guide with your fingers at all times. Here is a design so practical that swing, travel and boom hoist may be performed independently or simultaneously.

Test-Proven Advancements

Fast highway travel (20 "plus" miles per hour); optional 4-wheel drive; air booster steering; independent, easily accessible assemblies; heavy-duty engine, transmission and clutches; self-counter-weighting machinery; 4 speeds forward and reverse; quick interchangeability of attachments . . . are only a few of the remarkable test-proven advancements. Write for the full story today!

FOR DETAILS, CONTACT

General Machinery Co., Spokane, Wash.; Wood Tractor Co., Portland, Ore.; M. M. McDowell & Sons, Seattle, Wash.; Morrow & Co., Albuquerque, N. Mex.; Power Equipment Co., Denver, Colo.; Smoot Machinery Co., Salt Lake City, Utah; Hyman-Michaels Co., Los Angeles-San Francisco.

GENERAL EXCAVATOR CO.

A GOOD DRIVER *Saves Gasoline*

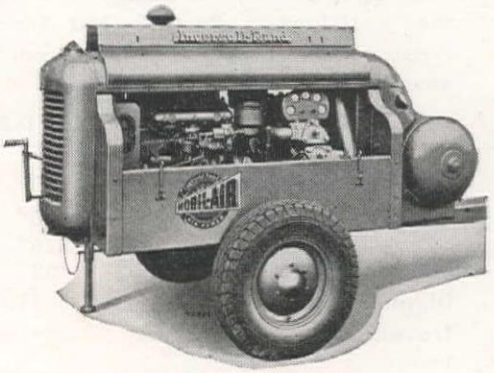
AND SO DOES THE DRILL-MORE REGULATOR

When driving through a "slow zone" regulated by traffic lights, you've seen the fellow who keeps passing everyone and then comes to screeching stops in front of red signals. There he sits, chafing at the bit and wasting gasoline. You and other steady drivers catch up as the lights turn green. Regulating your speed saved gasoline by eliminating idling and many accelerations, and by traveling at reduced speed.

In that same way, the DRILL-MORE Multi-Speed Regulator on MOBIL-AIR portable compressors saves up to 30% of the fuel required for an average job. It automatically regulates the compressor speed to suit your use of air, and eliminates wasteful idling. By slowing down, wherever full capacity is not needed, the average compressing speed is lower and more efficient ... wear is less and the machine lasts longer.

Let us tell you more about the Drill-More Regulator (standard on K-Series MOBIL-AIR compressors since 1939), the convertible engine, and other MOBIL-AIR features.

MOBIL-AIR ... the symbol of the portable equipped with the Drill-More Regulator.

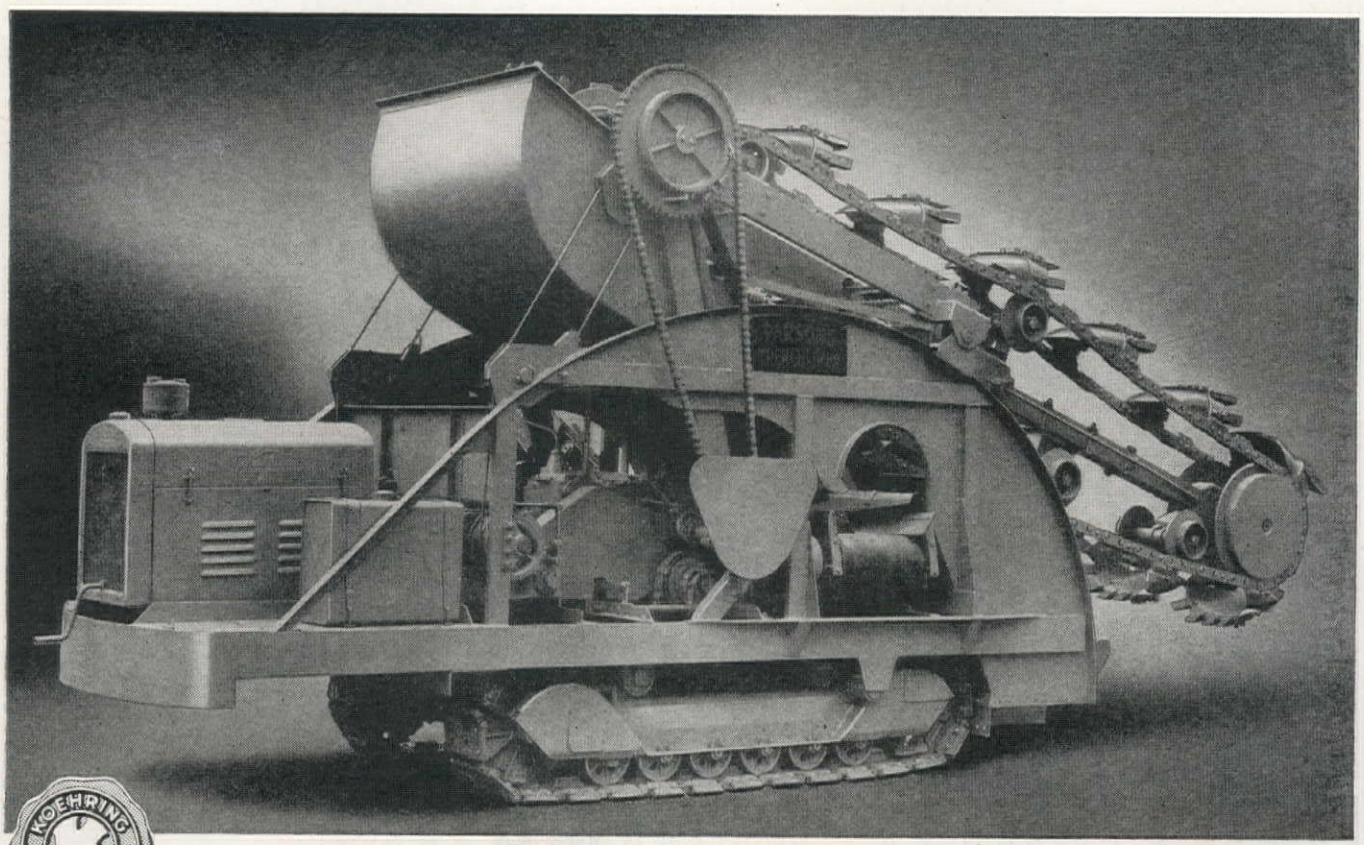


Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

2-728

COMPRESSORS · CONDENSERS · TURBO BLOWERS · CENTRIFUGAL PUMPS · ROCK DRILLS · AIR TOOLS · OIL AND GAS ENGINES



KOEHRING PRODUCT

221 *Announcing Parsons* TRENCHLINER

TO complete its peacetime line of Trenchliners, the Parsons Company presents the Model 221. Its fields of application: All types of utility trenching, particularly in close quarters, and railroad drainage. Similar in design and construction to the well-known Parsons 250 Trenchliner, the Parsons 221 Trenchliner cuts trenches fast and easy, at low cost.

221 PERFORMANCE DATA:

Depth of Trench: Up to 8'

Digging Widths:

Buckets Only	16"	20"	24"
Special Teeth	22"	26"	30"
With Sidecutters	28"	32"	36"

Digging Speeds: 25—From 2" to 113" per minute

Traveling Speeds: 5—From ½ to 2¾ miles per hour

Digging through an old Iowa road surface at the rate of 3 feet per minute, trenching 24 inches wide, 5 feet deep. That's the type of performance you can expect from the Parsons 221 Trenchliner.

Ask for your Parsons 221 Trenchliner Catalog today.

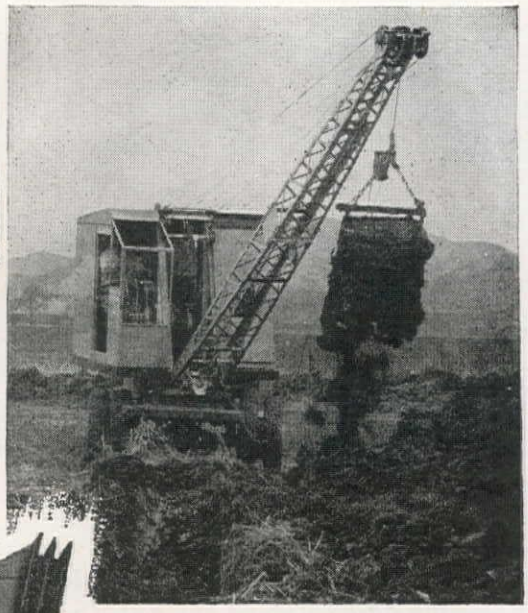
THE PARSONS COMPANY

NEWTON, IOWA

TRENCHING EQUIPMENT

PARSONS

Better Profits on Small Jobs



"QUICK-WAY" TO THE JOB

"QUICK-WAY" THRU THE JOB!

"Quick-Way" Model "J" Truck Shovel ¼ yd.—Mounts on any standard 1½-ton truck.

YOU get more profit from small jobs—doing a wide variety of work quickly and efficiently with a Model "J".

This rugged, compact ¼ yard shovel opened a whole new field of jobs to profitable operation with power equipment. Mounts on any standard 1½-ton truck, goes anywhere a truck will go *at truck speed and economy*. Attachments convert shovel into crane, dragline, orange peel, clamshell, pile driver and trench hoe right on the job in less than one hour. Equipment can be selected for each job; replacing slow, profit-eating methods on small jobs with efficiency and speed not possible with heavier power equipment.

This sturdy, dependable, fast working unit strides through small jobs with amazing speed and at low cost. Because of its versatility the Model "J" is ideal for excavating basements, digging ditches, telephone or power construction, cleaning irrigation ditches, material handling, landscaping, farm work, etc.

"Quick-Way" pioneered the truck mounted shovel. When you buy any "Quick-Way" you get equipment incorporating all the knowledge and skill gained from building *truck mounted excavating and construction equipment exclusively* for more than twenty-five years.

Write for Bulletin J-1.

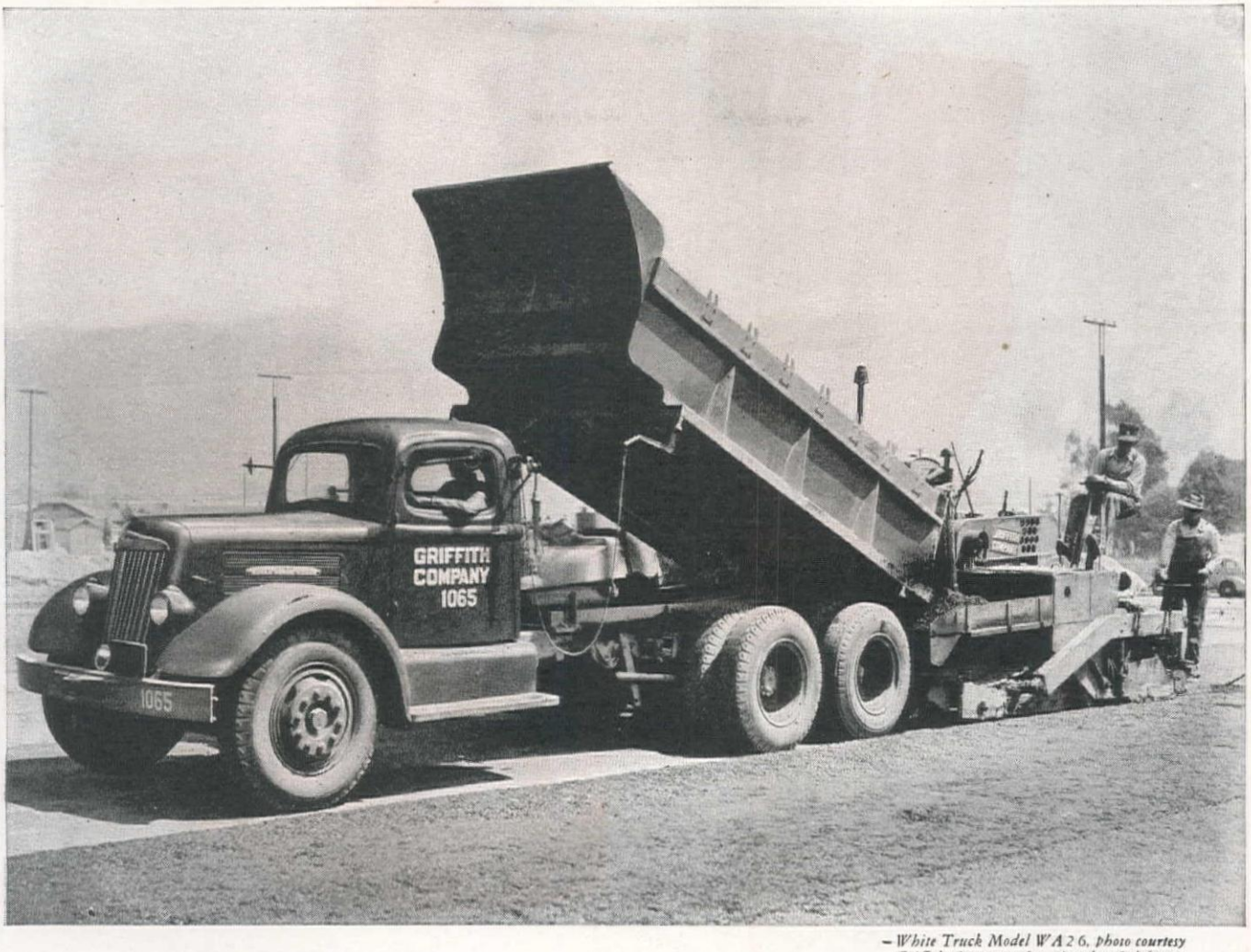
"QUICK-WAY" TRUCK SHOVEL CO.

GEO. L. MEFFLEY & CO., *Sales Representative*, 820 University Bldg., Denver 2, Colo.

ALBUQUERQUE, N. M.—Hardin and Coggins
BLUEFIELD, W. VA.—Rish Equipment Co.
CAMBRIDGE, OHIO—The Major Equip. Co.
CHARLESTON, W. VA.—Rish Equipment Co.
CHICAGO, ILL.—Arrow Contractors Equip. Co.
CINCINNATI, OHIO—Rish Equipment Co.
CLARKSBURG, W. VA—Rish Equipment Co.
COLUMBUS, OHIO—The W. W. Williams Co.
DENVER, COLO.—H. W. Moore Equip. Co.
DES MOINES, IA.—Herman M. Brown Co.

DISTRIBUTORS

EAU CLAIRE, WIS.—Miller, Bradford & Risberg Co.
FORT WAYNE, IND.—Korte Brothers, Inc.
LOUISVILLE, KY.—Brandets Mach. & Sup. Co.
LOS ANGELES, CALIF.—Murtaugh Eng. Co.
MILWAUKEE, WIS.—Central Engineering Co.
MINNEAPOLIS, MINN.—Rosholt Equip. Co.
OAKLAND, CALIF.—Buran Equipment Co.
OMAHA, NEBR.—T. S. McShane Co.
RENO, NEV.—Dennison Tractor & Supply Co.
RICHMOND, VA.—Rish Equipment Co.
ROANOKE, VA.—Rish Equipment Co.
ROCHESTER, IND.—Deeds Equipment Co.
SALT LAKE CITY—Arnold Mach. Co., Inc.
SAULT STE. MARIE, MICH.—Straits Eng. Co.
SEATTLE, WASH.—Nelson Equipment Co.
TROY, N. Y.—Howe Brothers
WILKINSBURG, PA.—Arrow Supply Co.



– White Truck Model WA 2 6, photo courtesy Griffith Company, Los Angeles, California

In Peacetime don't lose your Wartime Gains by neglecting Maintenance

The long awaited time will soon be here when you can freely buy the new White Trucks you've been wanting. Soon government restrictions will be off; soon the reconversion headaches will be licked—and an ever-increasing number of Whites will flow from the assembly line.

Until that day comes when you have your new Whites, rigid control of maintenance is very important. You should take full advantage of White's Personalized Service Plan—the plan which owners nation-wide have endorsed as the most effective method of keeping over-worked and over-aged equipment running.

If you are a White owner you know how richly White's conservation policy has paid. You know how this far-sighted policy of preventive maintenance, that was a wartime "must or else", promises to reward you with greater profits in the competitive days to come! White Personalized Service offers you the kind of tailored, proven protection that will enable you to make more money.

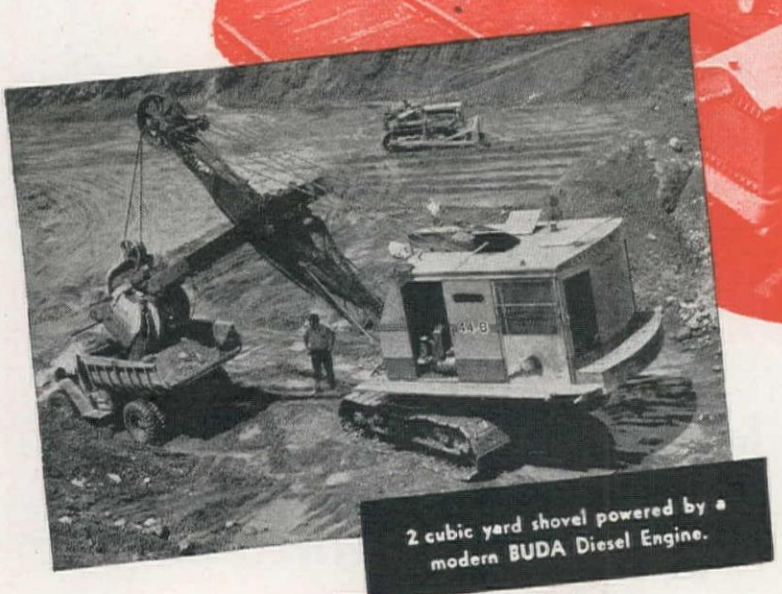
THE WHITE MOTOR COMPANY • CLEVELAND

Pacific Coast Branches and Dealers in all the important cities

White

FOR MORE THAN 45 YEARS THE GREATEST NAME IN TRUCKS

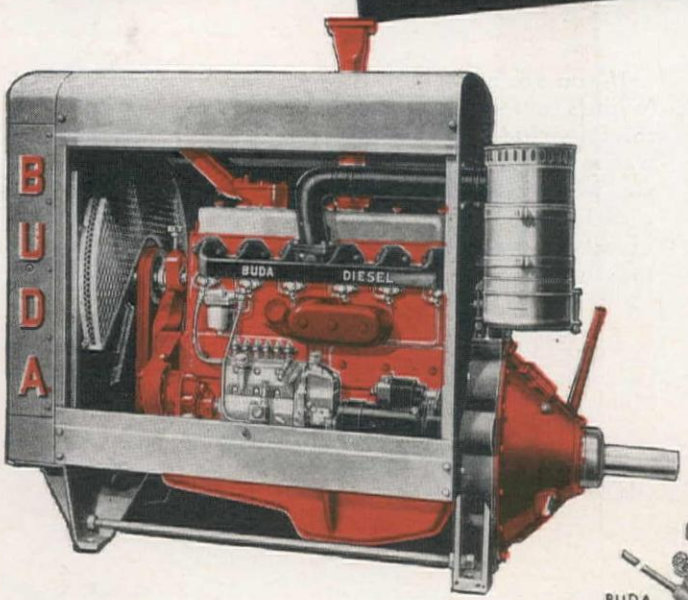
BUDA Experience...



2 cubic yard shovel powered by a modern BUDA Diesel Engine.

...pacing the Progress of Power

BUDA engines of the past were more than adequate for the jobs they had to perform. But time and power requirements move on. BUDA'S 64 years of manufacturing experience and 35 years of engine designing skill all add up to modern requirements. By keeping abreast of industrial needs BUDA has truly paced the progress of power — and will continue to build dependable and economical engines for the peacetime jobs ahead.



BUDA Nozzle Testers

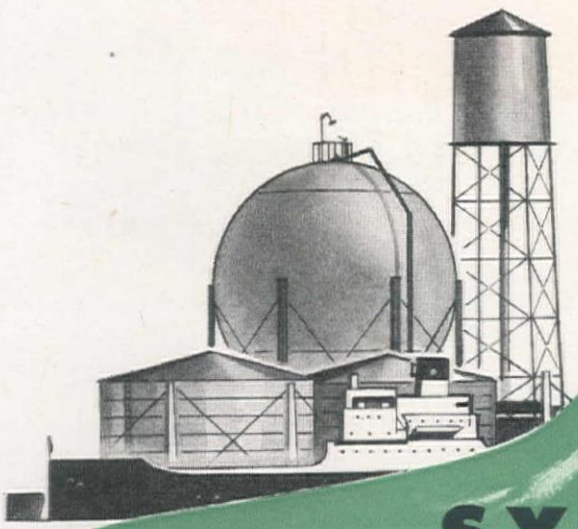
BUDA Jacks

BUDA

15424 Commercial Avenue
HARVEY (Chicago Suburb) **ILLINOIS**

NOW

the modern way to make metals last



THE U. S. NAVY AND MARITIME COMMISSION

changed from red lead to zinc chromate primer because of:

1. Much greater rust resistance.
2. A tougher, more adhesive film.
3. Quicker drying. Recoats in 5 hours.
4. No lead poisoning
5. Lower cost.

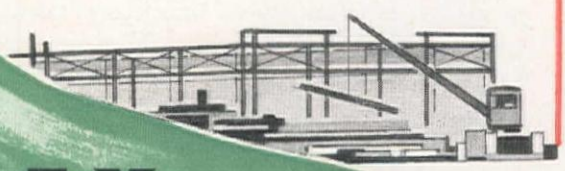
Syncro-Green is the outstanding Zinc Chromate primer *because*—

ZINC CHROMATE PIGMENT, the *only* known *active* rust inhibitive pigment . . .

+ SYNFLEX, quick dry, alkyd, water resistant resin, made exclusively by ourselves . . .

+ OUR EXPERIENCE through having manufactured over two million gallons of zinc chromate primer during the war . . .

= SYNCRO-GREEN METAL PRIMER, the primer that makes all metals last.



SYNFLEX SYNCRO-GREEN

METAL PRIMER

There is no law against spraying SYNCRO-GREEN, because it is non-toxic.

Manufactured by

ANDREW BROWN COMPANY

Write for Complete Details

5428 So. Riverside Drive • Los Angeles 22, Calif.
244 California Street • San Francisco 11, Calif.
1106 Twelfth Avenue • Seattle 22, Washington

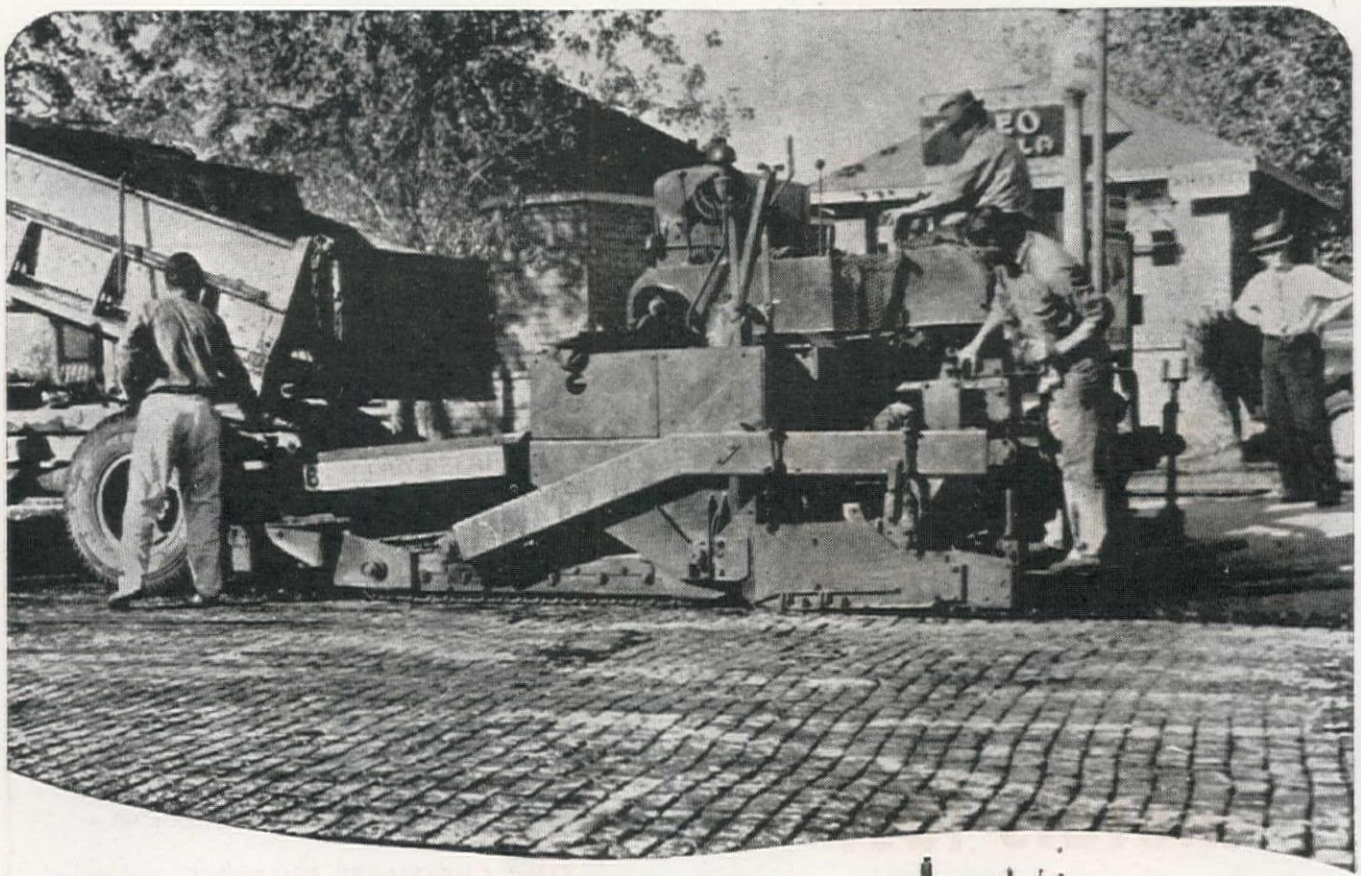
We are interested in learning more about Syncro-Green — the modern metal primer now released to industry.

Name_____

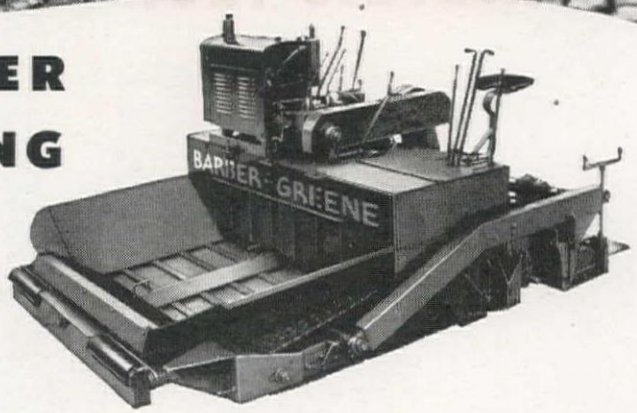
Company_____

Address_____

City_____ Zone_____ State_____



HOW A B-G FINISHER SOLVES RESURFACING PROBLEMS...



• When something must be done to rough, patched-up pavements, with their chuck holes and sinking spots, very often the best solution is complete blacktop resurfacing with a Barber-Greene *Tamping-Leveling* Finisher.

You can utilize the old base and save the cost of new construction . . . eliminate the need for special engineering and preparation —yet restore broken and traffic-worn roads and streets to smooth, safe surfaces that are as good as ever.

And whatever type of asphalt material you choose, your B-G Finisher will lay down a firm, level mat without the use of forms. Rolling can progress right up to the machine as it moves along steadily and speedily. Traffic interruption is practically avoided.

B-G finished surfaces *stay* level. An exclusive B-G mechanism tamps the material as it strikes it off, compacting the mix to uniform density. Two long, pivoted arms connect the crawler and screed units—abrupt changes in the thickness of mat are mechanically impossible.

Before you buy any bituminous finisher, learn about the many superior B-G features that years of engineering research have developed. Send for free catalog describing this versatile machine. Barber-Greene Company, Aurora, Illinois.

45-15

ARMY E NAVY

Barber B G Greene

Constant Flow Equipment

The SPECIFICATIONS *are Yours!*

Your requirements for profitable dredging determine the design of the Bucyrus-Erie hydraulic dredge you get. Our engineers work with yours to give you a truly job-tailored unit incorporating the features of design, construction, materials that will bring you the most in output and profits. In more than 60 years of building job-fitted dredges which have moved billions of yards, Bucyrus-Erie's unparalleled experience guarantees that your dredge will be "years ahead," the best obtainable for your work.

Your needs are our command — that's the policy which every Bucyrus-Erie machine, whether dredge or dry land excavator, reflects. That's why you'll profit most with Bucyrus-Eries.

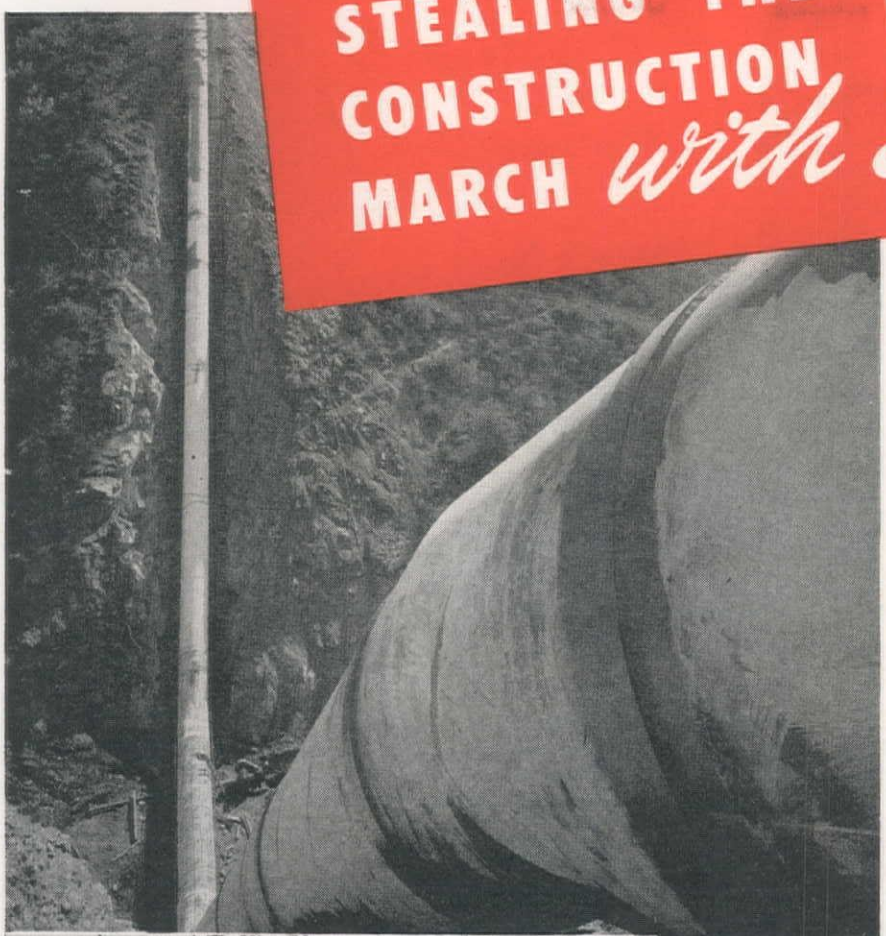
E-20

Dredges — Shovels — Draglines — Cranes — Drills — Tractor Equipment

Bucyrus-Erie

SOUTH MILWAUKEE, WISCONSIN, U. S. A.

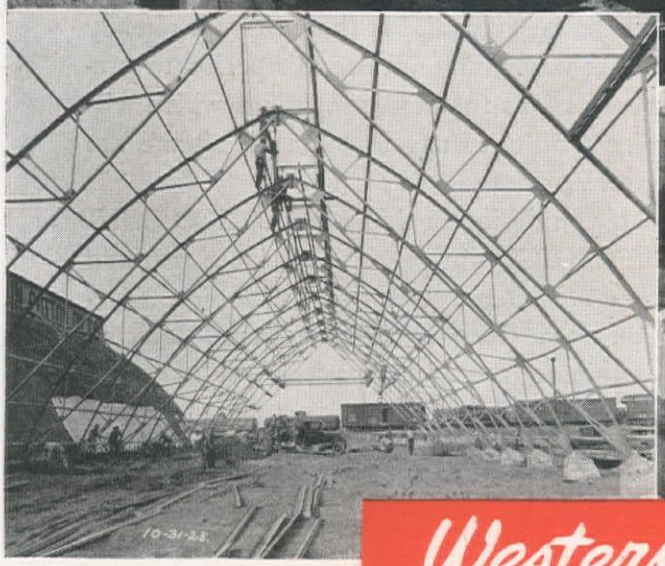
STEALING THE CONSTRUCTION MARCH *with steel!*

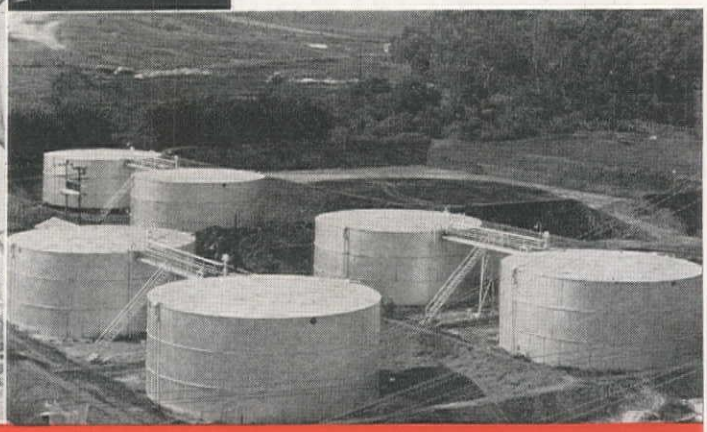


For endurance, potential strength in the building of pressure vessels, pipe lines, tanks, etc., steel has stolen the march in essential industry. Without it, much of the essential industrial growth of the past few years would have been impossible. Steel is a builder of industry.

Western Pipe & Steel for over 40 years has played a dominant part in the building of Western Industry. Municipal water facilities, penstocks, and modern refineries are only a few of the projects which we have fabricated and built.

When you plan steel construction, we will be glad to talk with you concerning your problems. Just write or call our nearest office





WESTERN BUILT PRODUCTS INCLUDE:

ABSORBERS
AGITATORS
BOILERS
CASINGS
OIL AND WATER
CULVERTS
GAS CLEANERS
GAS SEPARATORS
PIPE
- OIL
- GAS & WATER

PENSTOCKS, STEEL
REFINERY EQUIPMENT
TANKS
- BOLTED
- RIVETED
- WELDED
- GALVANIZED
- WALKWAYS
- STRUCTURAL

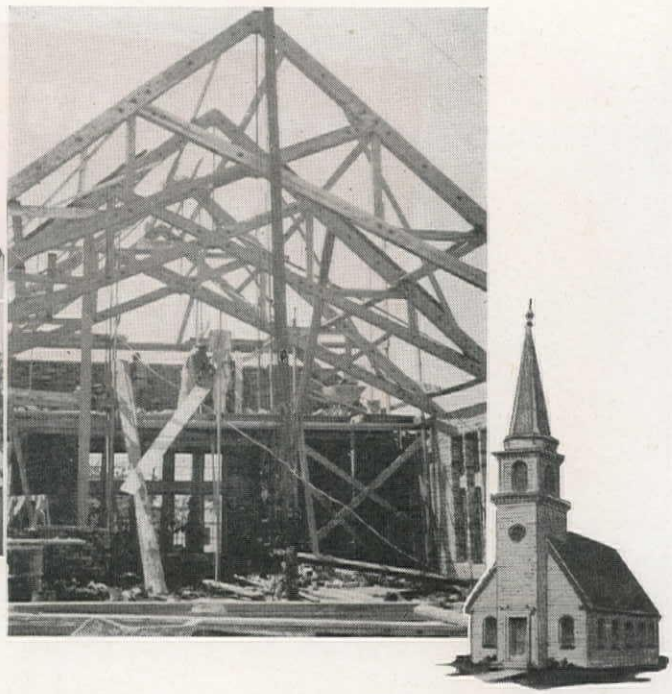
Western PIPE & STEEL COMPANY OF CALIFORNIA

Fabricators and Erectors

5717 Santa Fe Avenue
Box 2015, Terminal Annex
Los Angeles 54, California

200 Bush Street
San Francisco 6
California

Plants and Offices: FRESNO, BAKERSFIELD, TAFT, CALIFORNIA AND PHOENIX, ARIZONA



Needed...! SCORES OF NEW PUBLIC BUILDINGS

DESIGN THEM IN TIMBER . . . with TECO connectors

IN ALMOST every community America's pent-up construction requirements extend far beyond places for people to live . . .

Because of the vast number of the units involved, *residential* construction overshadows other types in discussions of post-War building . . . BUT ONLY IN DISCUSSIONS.

Practically every town needs a new place of *worship,* new places to *play,* and various other structures for public assembly . . . this is, or can be, BUSINESS FOR YOU.

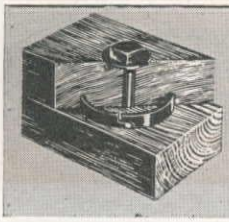
Relaxation of building controls will, of course, be gradual, but the process is already under way. Why not use this period to prepare designs for public buildings which will place you out in front when the signals are green?

If you design in timber with TECO CONNECTORS, your plans will have a *cost and time advantage.* Use this developing situation now. Get ahead of the "push" later by examining the local market and planning with the aid of TECO'S service.

HOW? . . . send for "Typical Lumber Designs". There is no obligation . . . use the coupon below.

Timber Engineering Co., Inc. of Washington, D.C.

Monadnock Building, 681 Market Street, San Francisco • Telephone Garfield 6296



SPECIFY TECO CONNECTORS
SPLIT RINGS • SHEAR PLATES
GROOVING TOOLS

USE THIS COUPON

Timber Engineering Company WCN
Monadnock Building, 681 Market Street, San Francisco

Please send me without obligation a copy of "Typical Lumber Designs."

Name.....

Company..... Title.....

Address.....

City..... State.....

Go after these jobs with a WOOD ROADMIXER

COUNTY ROADS
FARM-TO-MARKET ROADS
ACCESS ROADS
STATE HIGHWAYS
CAA AIRFIELDS
PRIVATE AIRFIELDS

SAVE AS MUCH AS TWO-THIRDS IN STABILIZED BASE AND PAVING COSTS

Every one of those jobs listed on the left are "naturals" for either road mix surfacing, mix-in-place asphalt base, soil-cement base, flexible base or some type of stabilized base. And a Wood Roadmixer is the *one* piece of equipment that can give you the highest production at the lowest cost per square yard or ton.

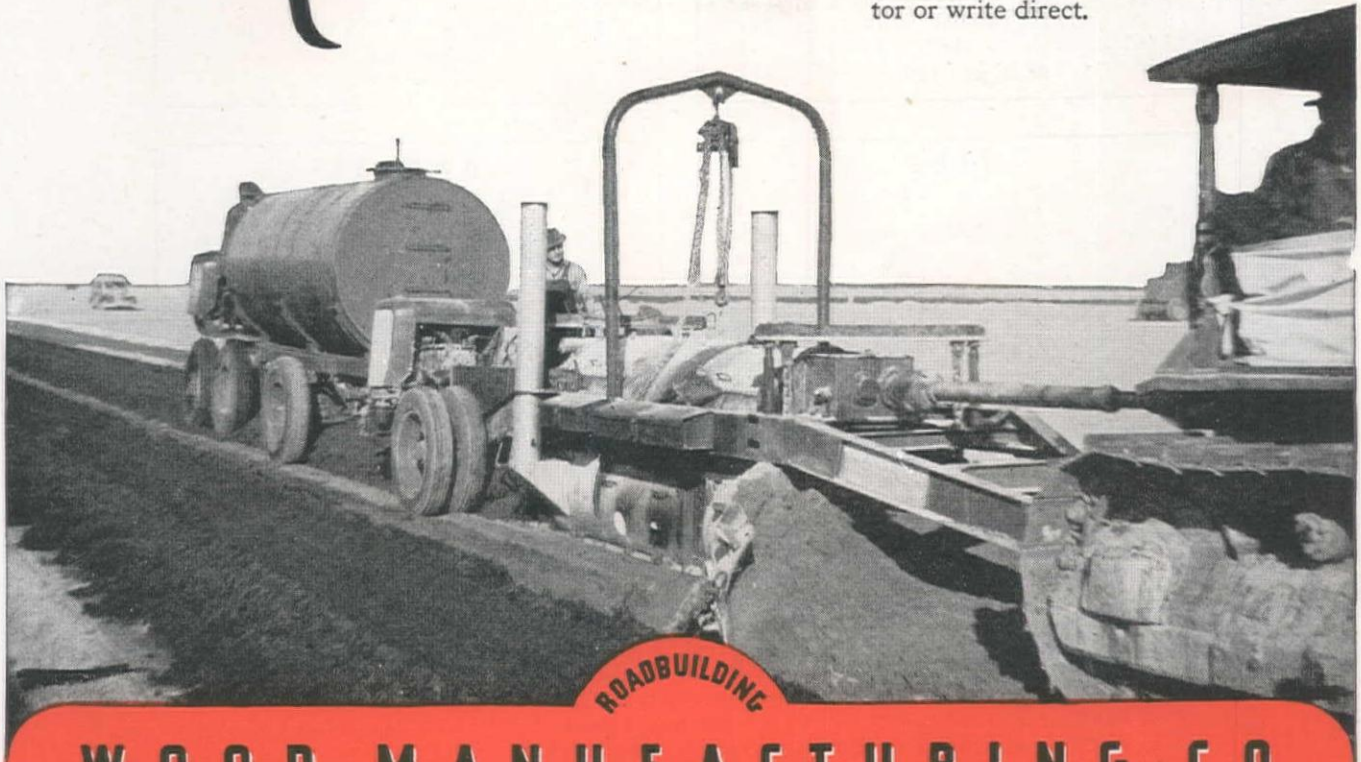
Here's why:

A Wood Roadmixer is a complete traveling mixing plant. It uses low-cost native or local materials and in *one pass* produces as much as 250 tons per hour of ready-to-spread mix. It handles emulsion, road oil or soil-cement mixes.

When you buy a Wood Roadmixer, you buy *one* piece of equipment. It is pulled and powered by a standard crawler tractor. A supply truck parallels or is towed behind the Roadmixer. Both tractor and supply truck are standard equipment with every contractor and can be used for other work when Roadmixer is not in use. Two men can handle the average Roadmixer unit.

Those are brief facts why Wood Roadmixers are paying off for contractors everywhere—why a Wood Roadmixer will give you higher production at less cost and more profit than any similar equipment on the market.

For complete specifications and costs see your nearest Wood Roadmixer distributor or write direct.



ROADBUILDING EQUIPMENT

WOOD MANUFACTURING CO.

816 WEST FIFTH ST. LOS ANGELES 13, CALIF.

SPECIAL LISTING
LARGE AMOUNTS
GOVERNMENT SURPLUS

STEEL

FOR IMMEDIATE DELIVERY

Reconstruction Finance Corporation has for sale in excess of 50,000 tons of steel plate, sheet, structural shapes and bars that have been declared surplus property. The partial list of items shown below is indicative of the large and varied stock on hand.
Immediate inquiry regarding your prospective needs is suggested, in view of constantly changing inventories.

WIDE FLANGE BEAMS

10″	77#	8′3″	to	33′ 2″	8″	35#	19′	to	38′
10″	112#	9′5″	to	37′10″	8″	31#	8′3″	to	25′ 3″
10″	89#	25′3″			6″	15.5#	17′	to	69′
10″	49#	16′6″	to	33′ 2″	6″	18#	8′6″	to	59′ 3″
8″	24#	8′6″			6″	20#	9′9″		
8″	27#	8′6″			6″	22.5#	6′4″	to	49′ 6″
8″	48#	8′3″	to	33′ 6″	6″	25#	8′1″	to	32′ 6″
8″	58#	9′6″	to	25′ 3″	5″	13.5#	8′1″	to	25′ 7″

$2.30 per 100#

PLATES

Gauge	Width			Length		
3/16	62″			363″		
5/16″	36″	to	62″	246″	to	483″
3/8″	12″	to	92″	123″	to	663″
7/16″	68″	to	86″	309″	to	363″
1/2″	32″	to	96″	132″	to	405″
9/16″	76″			339″	to	585″
5/8″	43″	to	98″	153″	to	345″
3/4″	74″	to	110″	147″	to	459″

$2.30 per 100#

MILD STEEL BARS — FLATS

Gauge	Width	Length		
1/4″	2″	27′		
1/4″	3″	20′	to	35′
3/8″	4″	21′		
3/8″	5″	20′		
3/8″	6″	10′	to	30′
1/2″	4″	21′		
1/2″	6″	22′	to	25′
1″	4″	15′		

$2.30 per 100#

TEES

12″	37#	30′	to	50′
12″	40#	30′		
10″	29.5#	26′3″	to	51′ 3″
9″	48#	36′	to	4′
9″	27.5#	20′	to	3′
9″	23.5#	30′		
9″	25#	9′3″	to	47′ 3″
7″	17#	14′	to	42′ 6″
6″	20#	9′3″	to	27′10″
5″	10.5#	11′9″	to	35′ 4″
5″	38.5#	9′3″		
5″	13.5#	10½′	to	27′
4″	8.5#	30′	to	33′
4″	15.5#	9′9″	to	39′ 6″

$1.75 per 100#

ANGLES

9″	x	4″	x	1/2″	30′			
7″	x	4″	x	1/2″	28′	to	30′	
6″	x	4″	x	1/2″	8′	to	49′	
6″	x	4″	x	7/16″	7′	to	30′	
6″	x	4″	x	3/8″	8′	to	50′	
6″	x	4″	x	5/8″	47′			
4″	x	3½″	x	3/8″	10′	to	41′	
3¼″	x	3½″	x	3/8″	49′	to	50′	

$2.30 per 100#

All prices quoted are F.O.B. Location—freight allowed to Pacific Coast Ports. All offerings are subject to prior sale and to other terms applicable to sales of government surplus property.

COMMUNICATE WITH

RECONSTRUCTION FINANCE CORPORATION

A Disposal Agency Designated By The Surplus Property Administration

San Francisco Agency • **200 Bush Street** • **San Francisco 4, California**
SURPLUS PROPERTY DIVISION • **EXbrook 6206** • **256 Montgomery Street**
or the Nearest RFC Office

WESTERN OFFICES ARE LOCATED AT Columbia Bldg., SPOKANE, Main 5111 • Dexter Horton Bldg., SEATTLE, Main 1080 • Pittock Block, PORTLAND, Atwater 6401 • Pacific Mutual Bldg., LOS ANGELES, Michigan 6321 Dooly Bldg., SALT LAKE CITY, 5-7503

DEPENDABILITY PROVED in a greater variety of applications than *any other diesel*

Proved

In heavy-duty trucks, both on-the-highway and off-the-highway.

Proved

In all types of heavy-duty earth moving, road building and material handling equipment for contractors and aggregates producers.

Proved

In every kind of mining power application . . . both above ground and below . . . stripping, loading, hauling, stationary and marine.

Proved

In tugs, ferry boats, commercial fishing boats, fire boats, as well as pleasure craft . . . for both propulsion and auxiliary service.

Proved

In yarders, loaders, trucks, tugs and sawmills . . . in all classes of portable and stationary service . . . on the show and in the mill.

Proved

In rotary rig, cable tool, pumping, generating and well service applications in all of the important petroleum producing areas.

Proved

In locomotives, motor trains, maintenance-of-way and other types of equipment operated by the nation's railroads.

Proved

In the widest range of stationary applications, such as flour and feed mills, ice and refrigeration plants, dairies, cotton gins and many more.

Read the Record

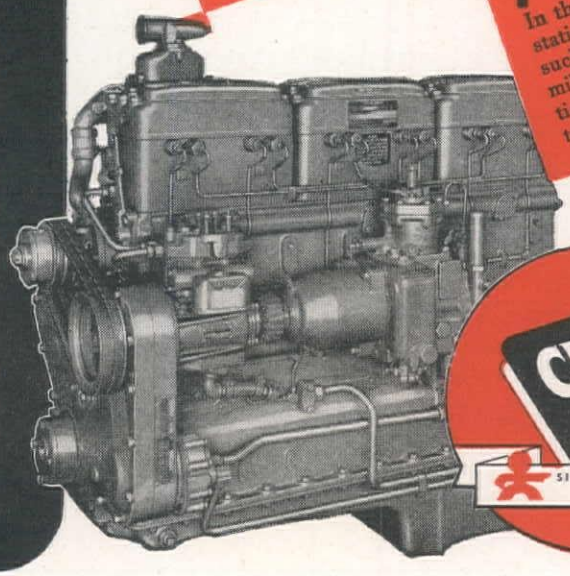
1. More than 90% of the long-line, franchise-operated, heavy-duty, diesel-driven trucks in the 11 Western States are Cummins Diesel-powered.

2. In the world's largest petroleum producing region—the Mid-Continent Area—Cummins Diesels power more rigs than any other diesel engine.

3. More yarders, loaders and trucks in the Northwest Woods are powered by Cummins Diesels than by any other single make of diesel engine.

4. On the Mesabi Iron Range—largest in the world—most of the rubber-tired earth and ore moving equipment is Cummins Diesel-powered.

CUMMINS ENGINE COMPANY, INC.
Columbus, Indiana



CUMMINS *Dependable* DIESELS

SINCE 1918...PIONEER OF PROFITABLE POWER THROUGH HIGH SPEED DIESELS

bust the RUST TRUST with new SHELL ENSIS RUST PREVENTIVES

HAVE YOU EVER tried to figure *your own* losses from rust? Ever added up the damage to equipment . . . materials . . . finished products . . . the cost of wasted time all along the line? Chances are, the total would stagger you.

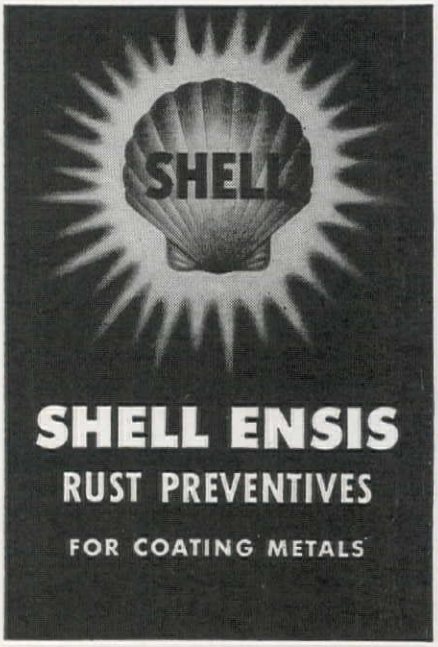
For years American industry has paid tribute to demon RUST — a Billion Dollars annually — putting up with rust as a necessary evil.

Now Shell offers a way to put this industrial racketeer out of business — out of *your* business. It's the new line of Shell Ensis Rust Preventives for coating metals.

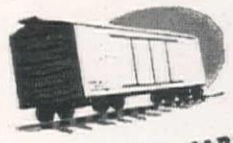
The new Ensis Oils are fortified with two new groups of additives. One group traps rust-provoking moisture in the air, emulsifies it, keeps it from reaching the metal. The other — suspended in the oil — gives it thicker film and *extra* mechanical rust-protection.

Ensis Rust Preventives come in several grades, designed to protect against exposures ranging from outdoor storage to mild humidity conditions encountered in the factory between machining operations.

No matter what your rust problem, there's a grade of Ensis that will help you. Call the Shell man now! Ask him to recommend the exact grade of Ensis Rust Preventive for your need. Shell Oil Company, *Incorporated.*



6 IDEAS IN STEEL

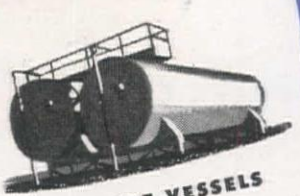


REFRIGERATOR CARS

STEEL BUILDINGS

SPECIAL STRUCTURES
Palomar Telescope Dome

DAM TRESTLES



PRESSURE VESSELS

DRUM GATES

Of the many and varied uses of steel, six are presented here to show the kind of jobs Consolidated Steel is prepared to help you plan and build now.

If your construction plans call for precision steel fabrication, Consolidated Steel is ready to offer you capable, immediate service. Address Consolidated Steel Corporation, Los Angeles 22, California; or Orange, Texas.

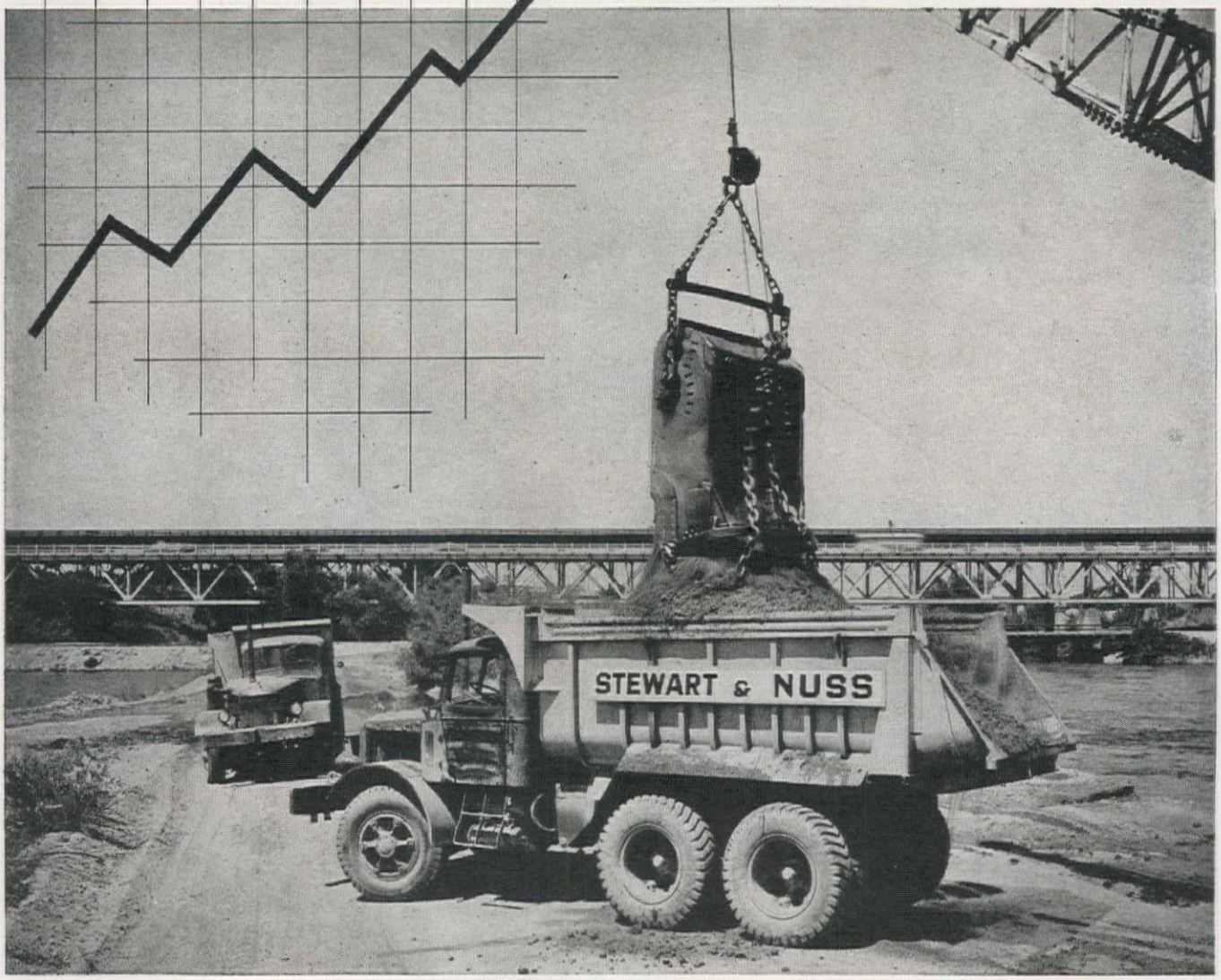
Consolidated Steel

FABRICATORS
ENGINEERS
CRAFTSMEN

LEADERS IN THE WEST AND SOUTH

Stepped-up production ...Thanks to Mack!

WITH so many orders to build air fields and defense highways, Stewart & Nuss, prominent California contractors, were faced with a supply problem. Limited area of operation restricted the number of trucks carrying paving material, thus slowed down production. How was this "bottleneck" broken? By the purchase of two diesel-powered, extra-large-capacity Macks! Operating full time, with their 15-ton loads, these Macks enabled the contractors to more than meet production demands. And so satisfied were Stewart & Nuss, that they are already planning additional purchases of Macks! . . . There is always a Mack to meet any particular problem!



* BUY THAT VICTORY BOND TODAY *

Mack-International Motor Corporation—Los Angeles, Sacramento, San Francisco, Seattle, Portland. Salt Lake City.

Mack
TRUCKS
FOR EVERY PURPOSE
ONE TON TO FORTY-FIVE TONS

Performance Counts

ELEVATED STORAGE TANKS for WASH WATER SERVICE

● IN ADDITION to furnishing water for fire protection and general service in industries, Horton elevated water tanks may be used to provide wash water for filtration plants.

The use of an elevated tank to provide water for filter washing has several distinct advantages. Filter washing usually requires water at a relatively high rate of flow for short periods. With an elevated tank, this high rate of flow can be supplied without disturbing the pressure in the supply system. Furthermore, the tank may be refilled from the mains at a low rate, or with a small pump. The capacity of such a pump is not nearly as great as it would have to be to supply wash water direct. Furthermore, a standby pumping unit is not required with an elevated tank.

The wash water tank shown at the left has a capacity of 40,000 gals. It is 40 ft. to bottom and is of welded construction. We also build welded elevated tanks with ellipsoidal bottoms and roofs and cylindrical columns.

In addition to designing, fabricating and erecting Horton elevated water storage tanks, we build standard capacity storage tanks for all types of liquids. Tanks for heavy liquids such as molasses are designed especially for these products. For quotations on installations of this type we invite you to write our nearest office outlining your requirements.

CHICAGO BRIDGE & IRON COMPANY

SAN FRANCISCO • ATLANTA • BIRMINGHAM
CHICAGO • HOUSTON • NEW YORK
Plants at BIRMINGHAM, CHICAGO,

PHILADELPHIA • HAVANA • WASHINGTON
CLEVELAND • TULSA • LOS ANGELES
and GREENVILLE, PENNSYLVANIA

November, 1945

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 20, No. 11

Cutting Railroad Time

CONSTRUCTION of the great Pacific Railroad was a notable event in American history, and linking up of the line at Promontory Point, Utah, marked the real beginning of western development. With that event, the Pacific Coast and the other western states ceased to be a colony and became in fact a part of the United States. Western development has never ceased since that day.

Unfortunately, railroad improvements have not kept pace with other phases of growth, with the result that the truck and auto, pipeline, steamship, and airplane have cut deeply into their operations. Railroad cars are a little bigger, engines a little stronger, and roadbeds a little safer than in those earlier days, but the essential bases of railroading have changed little.

On page 102 of this issue is presented a carefully considered plan for realignment of the "Pacific Railroad," now a part of the Southern Pacific System, over the Sierra Nevada, which was the toughest section to build originally, is still extremely costly to maintain, and the tortuous curves and grades of which slow up coast-to-coast traffic by two to five hours.

Maximum grade will be reduced from 2.55 to 1.9 per cent, curvature from 33,000 to 1,600 deg., summit elevation by 800 ft., time by several hours, and maintenance and operation cost by at least 50 per cent.

This project is an essential "must" if the railroads are to maintain their position in American life and hold their own against the various forms of competition. The plan is technically possible and appears to be financially sound. It is a plan which should command the interested attention of every engineer in the West. Although an outstanding example, it is but one of many similar improvements which should be undertaken.

A New Bridge Needed

THE RELEASE of unlimited gasoline to private automobiles has resulted in unprecedentedly high use of highways and bridges, as reported elsewhere in this magazine. In fact, in the West, highway traffic for September was 8 per cent higher than any pre-war September. This fact lends striking emphasis to the need for immediate prosecution of the highway construction program currently being delayed by lack of federal-aid money.

Of particular interest, however, is the concentration of automobile traffic on the San Francisco-Oakland Bay Bridge. A half million more vehicles used the structure in Sept. 1945 than crossed it in Sept. 1944, and the lowest traffic count in the month was on Sept. 2, when over 66,000 autos crossed the span. Inasmuch as it was originally designed for only 81,000 cars daily, it is obvious that the saturation point is nearly reached. This is evident to anyone obliged to drive over the structure.

Good news comes, however, from Sacramento, where the California Department of Public Works has been allotted $100,000 to initiate studies of another parallel bay crossing. Whether this would be another bridge or a tube will be considered, as will the exact location. No mean problem, too, is the matter of financing, for holders of bonds on the present structure must be protected, as well as those who would finance the new venture.

These are details, however, which one way or another it will be possible to solve. The important fact is that a new crossing is needed, and very soon. This publication urges particularly careful consideration of the tube proposal, suggesting the possibility that it will be cheaper and quicker to build, and much less vulnerable to attack by possible future hostile planes.

Costs Too High?

LABOR IS of course hurting its own cause more than any one else's by its present wave of riotous strikes and impossible demands. As one bit of evidence to support that statement, may we quote from Gov. Mons C. Wallgren, governor of Washington, himself an extremely liberal Democrat:

"The State of Washington is not in a position to compete with private industry in support of the present high prices of the building construction. I am not in favor of capital construction at present day costs. If prices continue to be prohibitive, then the State cannot undertake its building program for it must get a dollar's value for each dollar of cost and cannot waste its money."

Building may possibly be retarded in many other areas besides Washington, if prices become too high.

Government Waste Not New

THE CONTINUAL TUG of bureaucracy to control and direct every activity of the citizen's life is most strongly felt just now in the Regional Authority proposals. It is the contention of the opposition, who prefer traditional Americanism to foreign-made socialism, that government never does a job as well or as efficiently as private industry. Maybe in the "bright new tomorrow," which was supposed to have started on Aug. 15 last, America will find rulers who are wise, just, unselfish, and efficient.

History up to the start of that bright day, however, does not tend to lend particular confidence to many government undertakings. At least as far back as 1662 A.D. this was the case, for according to his diary, Samuel Pepys, himself a government employee, being Secretary to the Admiralty, went to watch the docking of one of the ships of His Majesty, King Charles II. In his diary for July 21, 1662 (called to our attention by Mark Tuttle, AGC manager in Salt Lake City), he wrote:

"Thence to the dock, where we walked in Mr. Shelden's garden, eating more fruit, and drinking, and eating figs, which are very good, and talking while the Royal James was bringing towards the docks, and then we went out and saw the manner and trouble of docking such a ship, which yet they could not do, but only brought her head into the dock, and so shored her up till next tide. But, ye Gods! what a deal of company was there from both yards to help do it, when half the company would have done it as well. But I see it is impossible for the King to have things done as cheap as other men."

BUILT to outperform

Exclusive features that save time and money by getting the job done better and quicker. "Plus values" built into every Austin-Western machine . . . values accumulated by engineering experience that has lived close to road building and earth moving problems and practices since the first crude Austin-Western tools of 1859.

Features of design and construction "job tested" before the war . . . that met the acid test of service on far-flung war fronts.

More than ever your post-war Austin-Western machine is "Built to Outperform".

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS, U. S. A.

MOTOR GRADERS—Exclusive All-Wheel Drive and All-Wheel Steer enables the "99-M" and "88-M" completely to outperform ordinary motor graders.

TANDEM ROLLERS—Made in 2 sizes—5 to 8-Ton and 8 to 10½-Ton. The variable weight feature enables one machine to handle a wide variety of jobs.

3-WHEELED ROLLERS—Made in sizes ranging from 6 to 12 tons. Gasoline or diesel engines. Hydraulic power steer. Hydraulic scarifier attachment.

PATROL SWEEPER—Compact, simplified, quick-dumping. Rear broom throws dirt directly into hopper. May be had with Leaf Broom attachment.

BADGER SHOVEL—Convertible to crane, dragline, piledriver, trench hoe, and skimmer. ¾-swing design has many operating advantages.

HYDRAULIC CRANE—Retractable-extensible boom provides ability to lift and carry maximum load under such handicaps as low doors and ceilings, inside box cars, etc.

CRUSHING EQUIPMENT—Roller bearing jaw crushers and roll crushers in a wide variety of sizes. Portable and semi-portable crushing and screening plants for all purposes.

TRAIL CARS—Hopper-bottom and side-dump types. Designed for heavy duty haulage behind powerful truck-tractors, in open pit mines, quarries, etc.

DUMP CARS—Side-dump models built in capacities up to 50 yds. (level full), and 90 tons; in standard, narrow and foreign track gauges. Also hopper type, bottom-dump cars.

ARIZONA—SMITH BOOTH USHER COMPANY	Phoenix
CALIFORNIA—EDWARD R. BACON COMPANY	San Francisco 10
SMITH BOOTH USHER COMPANY	Los Angeles 54
COLORADO—LIBERTY TRUCKS & PARTS CO.	Denver 1
MONTANA—WESTERN CONSTRUCTION EQUIPMENT COMPANY	Billings
WESTERN CONSTRUCTION EQUIPMENT COMPANY	Missoula
NEVADA—C. D. ROEDER EQUIPMENT CO.	Reno
NEW MEXICO—WESTERN STATES WELDING & PRESS CO.	Albuquerque
OREGON—COLUMBIA EQUIPMENT COMPANY	Portland 14
UTAH—WESTERN MACHINERY COMPANY	Salt Lake City 13
WASHINGTON—COLUMBIA EQUIPMENT COMPANY	Seattle
WYOMING—WILSON EQUIPMENT AND SUPPLY CO.	Cheyenne

Flood Control—Initiated in San Bernardino County

Warm rains following precipitation of snow in upper watersheds create an abnormal runoff and destructive floods which recur approximately every 12 years—Completion of the current $8,000,000 construction of levees, and channels will control future runoffs

By MARK McMILLIN
San Bernardino, Calif.

LYTLE AND CAJON Creeks, San Bernardino County, Calif., have been the source of some of the most destructive floods in the entire Santa Ana River basin. Enormous loss of property, and even of life, has resulted from two recent floods particularly—those of March, 1938, and January, 1943. Before this time, floods of 1914, 1916 and 1927 were also highly disastrous. Thus, within a period of thirty years, five floods have devastated the valley, causing loss of life, millions of dollars of damage to property of all kinds, and serious interruption to railway and highway traffic.

Realizing that a flood of even more disastrous consequences than any of those of the past might occur at any time, the residents of the stricken district in 1938 organized the San Bernardino County Flood Control District. At the earnest request of the Flood Control District, the United States Engineer Department, through the district office in Los Angeles, made surveys of the damage caused by both the 1938 and 1943 floods.

Flood history

In January, 1943, railroad trestles and fills were washed out, with the result that freight traffic was backed up as far east as Chicago, tracks and yards were covered with silt, and freight cars were overturned. Traffic was suspended for as much as thirty-six to forty-eight hours on the local Pacific Electric Lines and on the three main transcontinental rail lines into Southern California—the Union Pacific, the Southern Pacific, and the Atchison, Topeka & Santa Fe. In addition, one person was drowned in 1943, two in 1938, and one in 1914.

Moreover, competent engineers agreed that, the topography being what it is, not one of these three floods constituted the predictable maximum runoff, which might occur if a long period of warm rainfall were to come at a time when the nearby mountains were heavily blanketed with snow. The prospects called for immediate control measures.

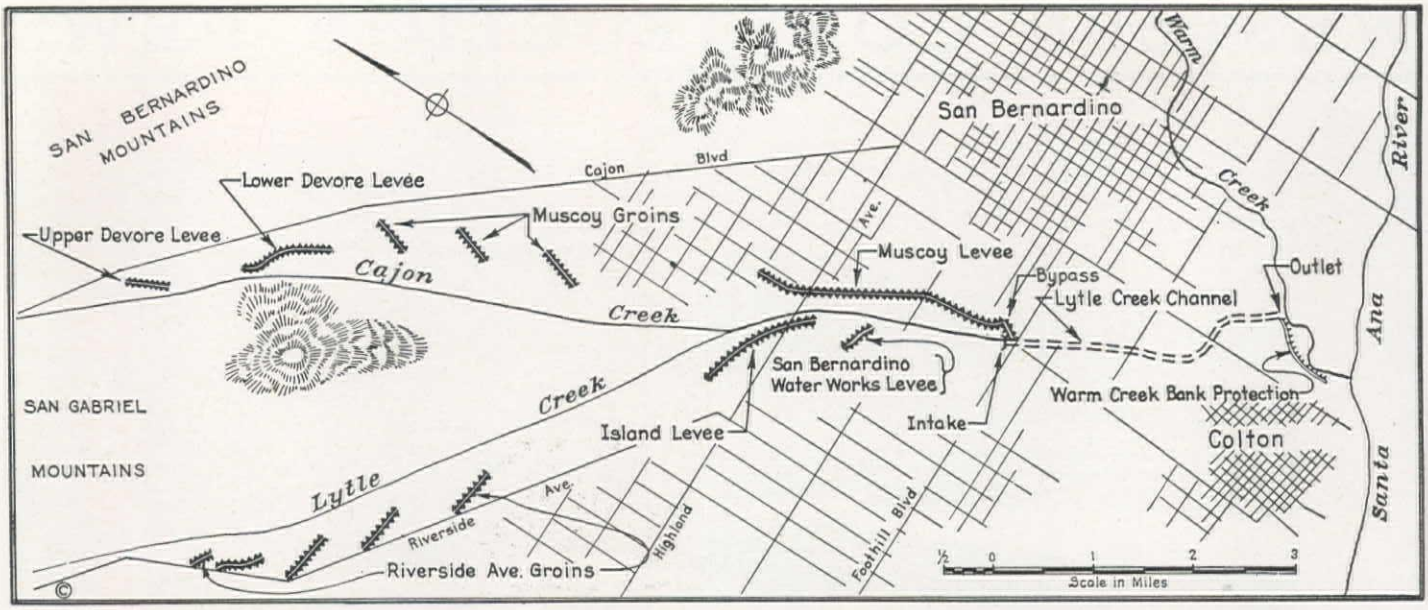
The report of the United States Engineers pointed out that the flood of 1943 resulted in serious delay to the vital war effort. As a result, a survey report of this particular drainage area was submitted prior to the completion of the comprehensive survey report on the entire Santa Ana River basin.

Project initiated

Based upon the survey report, a project for the control of floods on Lytle Creek was adopted by Congress in the Flood Control Act approved on Dec. 22, 1944. This project provides for a system of levees, groins, and a concrete channel to divert the flood flows from the developed area in the vicinity of the cities of Colton and San Bernardino, and carry them to Warm Creek, just above the latter's confluence with the Santa Ana River.

The main objective of the entire project was to prevent floods in this area, both to the end that war traffic not be impeded at a time when railroads were heavily burdened with the flow of military supplies being sent into the Pacific war zone, and for protection of the local population.

Plans and specifications were rushed, it being imperative that the work be so far along by flood season, 1946, that no



GENERAL PLAN of the San Bernardino flood control project in Cajon and Lytle creeks, showing the channel connecting them with Santa Ana river. Floods from this region are a strategic threat to the three transcontinental railways traversing the area, as well as menacing local traffic.

major disaster could occur which would interfere with railroad and highway traffic.

Plans were completed in May, 1945. Bids were invited immediately, contracts for construction of the lower section of the project were entered into soon afterward, and construction began within three days. Shortly thereafter, contracts were let for the upper section.

General plan

The plan of improvement provides for the following three phases: (1) a combination of groins and levees to confine flood waters to existing channels on the upper part of the alluvial cone above Foothill Boulevard; (2) a concrete channel having a capacity of 30,000 cu. ft. per sec., to carry most of the collected flood waters to Warm Creek; and (3) a concrete weir to bypass excess flow at Foothill Boulevard, into an existing channel—the east branch of Lytle Creek—which will carry the bypass flow through the lower part of the alluvial cone below Foothill Boulevard.

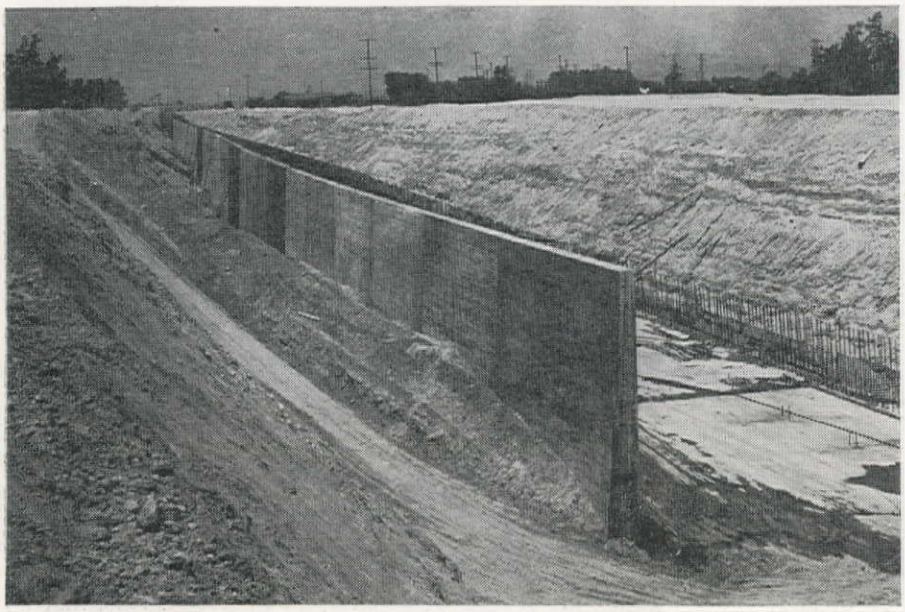
The work is already far advanced, and will be completed in time to safeguard the basin against any possible floods this year. Fifteen levees and groins are being constructed between the canyon mouths of Lytle Creek and Cajon Creek, and Foothill Boulevard. These levees and groins will collect and direct flows into the existing stream channel, and to the intake for the concrete channel.

The largest of these is the Muscoy levee, 3,165 ft. long, extending northerly along the left or east bank of Lytle Creek from Foothill Boulevard upstream to approximately the junction of that stream with Cajon Creek. At its southerly end the top of the levee will be 28 ft. above the toe, and about 16 ft. above the stream bed. At the upstream end the levee will be 20 ft. from toe to top and 8 ft. above stream bed.

Continuing up the east bank of Cajon Creek are six other shorter training structures known, in order, as the four Muscoy groins, and the lower and upper Devore levees. Beyond the last of these Cajon Creek is in canyon or in territory where no flood damage is possible.

On the right, or west, bank there are several shorter structures, named, upstream from Foothill Boulevard, the San Bernardino Waterworks Levee, Island levee, the longest on this bank, and the five Riverside Ave. groins, to direct the flow away from that thoroughfare.

CHANNEL RETAINING WALL on west bank of Lytle creek near La Cadena Ave. In place at toe of opposite slope is the footing and part of reinforcing steel for east wall.



Levee design

Levees and groins are composed mainly of material excavated from the wash areas, and are faced with grouted stone on the channel side. They are from 10 to 20 ft. high, have a crown width of 18 ft. and have side slopes of 1 on 2 on the land side, and 1 on 2.25 on the channel side.

The quarry-stone facing is 1.5 ft. thick at the top of the slope, and increases in thickness to 2.0 ft. at the toe of the slopes, and is completely grouted. The facing extends approximately 10 ft. below the elevation of the stream bed. To protect the toes of the levees and groins from scour, quarry-tone is placed over the grouted stone facing at the toes, and the voids are filled with stream-bed material.

Concrete channel

The concrete channel is being constructed from Foothill Boulevard generally along the west branch of Lytle Creek to Warm Creek at a point about one mile upstream from the confluence of Warm Creek with the Santa Ana. The east branch of Lytle Creek will serve as a bypass for flows in excess of the capacity of the concrete channel. These excess flows will be diverted to

the east branch over a 1,000 ft. long concrete spillway.

The concrete channel will be nearly 15,000 ft. long, the upper 7,000-ft. section following the present west branch of Lytle Creek from the Foothill Boulevard to the lower Atchison, Topeka & Santa Fe Railway crossing. The remaining portion of the channel follows a new course southeast, as far as Warm Creek.

The reinforced concrete channel below the intake structure is a rectangular section, 40 ft. wide, with walls from 20 to 25 ft. high. Each wall has been designed as an L-type retaining wall with a toe slab forming half of the channel. The walls have been designed to withstand loading conditions resulting from an equivalent fluid pressure of 62.5 lb. per cu. ft. acting on the outside of the wall when the channel is empty, and 62.5 lb. per cu. ft. acting on the inside, against 41.7 lb. per cu. ft. on the outside, with the channel full.

The design was made to conserve critical materials, and the use of reinforcing steel was limited to the lowest point consistent with safety. Working unit stresses for channel walls, inverts, and appurtenant structures, except bridges, are as follows:

a. f'_c = 3,000 lb. per sq. in. at 28 days
b. f_c = 900 lb. per sq. in.
c. n = 10
d. f_s = 24,000 lb. per sq. in. (intermediate grade steel)

For highway and railroad structures, working unit stresses are as follows:

a. f'_c = 3,000 lb. per sq. in. at 28 days
b. f_c = 1,050 lb. per sq. in.
c. n = 10
d. f_s = 20,000 lb. per sq. in. (intermediate grade steel)

Since a large amount of sand and gravel may be carried over the concrete channel invert slab by flood flows, a 4-in. wearing surface of concrete is used in addition to 2 in. of concrete provided to cover the steel reinforcing. A special concrete mix is being used in the top 4 to 5 in. of the invert slab, for the purpose of obtaining dense concrete with a low water-cement ratio.

When completed, the lined channel will have a safe capacity of 30,000 cu. ft. per sec., with freeboard allowance and allowance for super-elevation.

Additional items

Just above Foothill Blvd., a concrete intake structure 450 ft. long, tapering in width from 212 ft. to 40 ft., and dropping 22 ft. in elevation, is being built to accelerate the flow of water entering the concrete channel. The intake is provided with a 60 ft. wide by 25 ft. high steel Taintor gate to regulate the flow to the channel capacity, and to permit excess flows to be bypassed, by means of the spillway, into the east branch. Installation of the gate has been somewhat delayed as steel has not been available, but it is expected that work on the gate will begin in the very near future. The outlet at the downstream end of the concrete channel at Warm Creek will have a "bucket" section with a steel sheet pile cutoff and derrick stone scour protection.

The project includes, also, the reconstruction of one existing highway bridge and replacement of one railroad bridge with a covered section of channel, and new construction of four highway bridges and three covered sections for railroads. Highway bridges, except that at Colton Ave., are designed as reinforced concrete simple beam structures, using T-beam sections.

The railroad covered sections and the highway bridge at Colton Ave. are designed as reinforced concrete box sections.

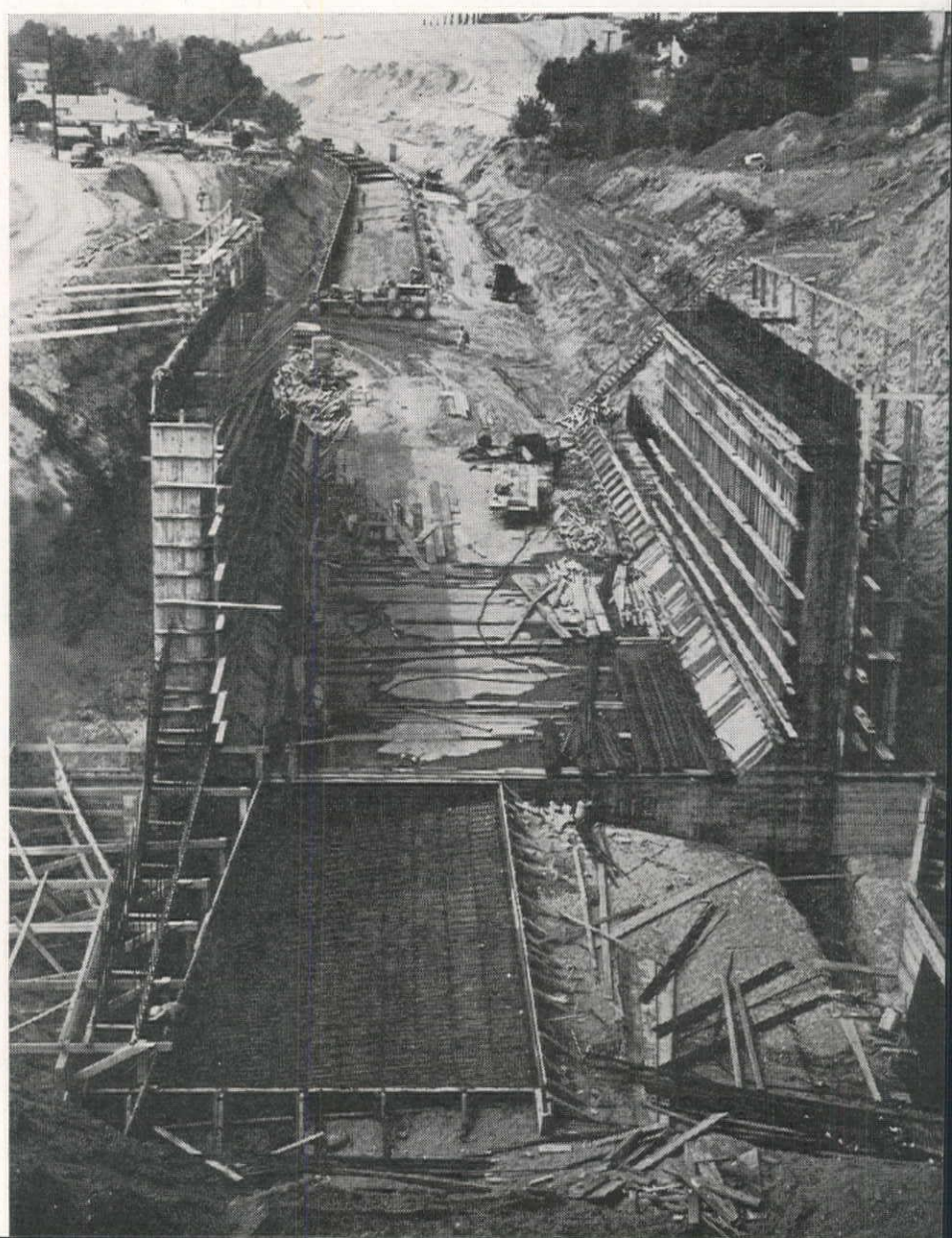
All water lines, irrigation canals, and other utilities which cross the protected channel are being relocated as is necessary to the expeditious completion of the project. The companies concerned are doing all this work, and it is not included in the contracts.

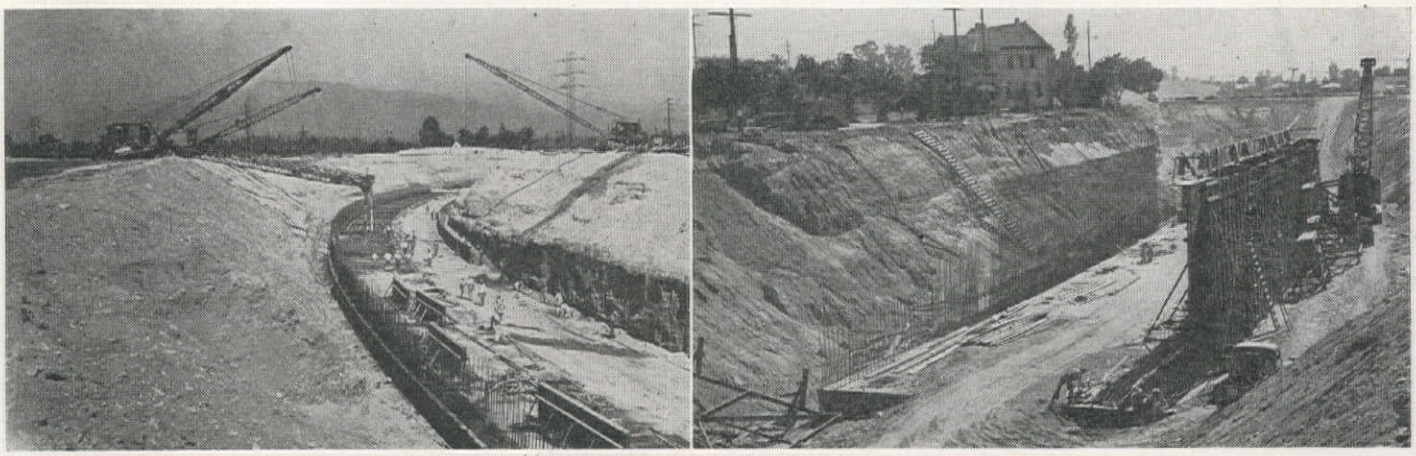
Contracts awarded

A total of $8,807,000 is being spent from public funds upon the entire project. Of this amount, the Federal Government has appropriated $8,055,000, and the State of California has appropriated the remaining $752,000. The state participation covers all of the costs involved in the Federal requirement for local cooperation in the project.

Two contracts cover all the work on the project. The first, for the construction of levees and bypass on Lytle and Cajon Creeks, was awarded to Winston Brothers Co., Minneapolis, Minn., Utah Construction Co., San Francisco, and the A. S. Vinnell Co., Alhambra, Calif., in the sum of $2,768,432, the three companies working together as a joint venture. The second contract, for the construction of the Lytle Creek channel, intake, and outlet structures, was awarded to the Bressi & Bevanda Constructors, Inc., Los Angeles, Calif., and Macco Construction Co., Clearwater, Calif., working together under the name of Bressi-Bevanda-Macco Company. This contract is in the sum of $2,528,350, and together with steel and supply contracts that approximate $3,090,983, runs into a first-magnitude project with an over-all working personnel, both engineer and contractor, of about 850 men.

BRIDGE ABUTMENTS for a highway crossing over the concrete flood control channel south of Foothill Blvd. This is a reinforced concrete box section, with invert thickened toward the sides, as shown by invert forms in foreground. Walls are thickened in order to conserve steel. Capacity of channel is 30,000 sec. ft.





POURING CONCRETE for 40-ft. Lytle creek channel near Rialto Ave., showing use of double "L" retaining wall section which forms the channel, left. The L-wall is designed to withstand loading conditions equivalent to a fluid pressure of 62.5 lb. per cu. ft. acting outside the wall when the channel is empty. Right, construction of forms for the abutments at La Cadena.

Under the first contract, the work to be done consists of furnishing all necessary plant, equipment, labor, and material, and constructing therewith 57,000 lin. ft. of levees and groins, bypass structure, and appurtenant work in accordance with specified drawings and specifications. Principal items of work include: (1) clearing site, (2) excavating, (3) levee fill, (4) back filling, (5) quarry-stone apron and blanket, (6) grouting, (7) derrick stone, (8) steel sheet piling, (9) reinforced concrete bypass, (10) tile and gravel drains, (11) highway grade changes, (12) fencing.

According to the terms of the contract, work began within three days after the contract date, and must be completed as follows:

Bypass structure by Nov. 1, 1945;
Intake and bypass levees by Dec. 1, 1945;
Muscoy levee and groin by Dec. 15, 1945;
Upper and lower Devore levees by Dec. 15, 1945.

All other features are to be completed by March 15, 1946, exclusive of final cleanup. However, it is confidently expected that the work will be completed well in advance of the scheduled time.

The contract for the second project—for the Lytle Creek Channel construction—calls for the following items of work: (1) clearing site and removing obstructions, (2) excavating and filling, (3) timber piling and trestle work, (4) constructing railroad shoo-fly embankment, (5) constructing highway detours, (6) constructing reinforced concrete channel invert and walls, covered sections, bridge abutments and superstructure, intake and outlet, (7) steel sheet piling, (8) quarry-stone facing and blanket, (9) derrick stone, (10) timber guardrail and wingwalls, (11) reinforced concrete pipe, (12) sewer lines, (13) water lines, (14) fencing, (15) miscellaneous work and job cleanup.

Work on this phase of the project began within three days after the signing of the contract. By Jan. 15, 1946, the essential features of the work—including the required fill and backfill—must be completed to the extent that the channel will function for the purpose intended. The entire project must be completed not later than May 15, 1946, sixty days additional being allowed for cleanup.

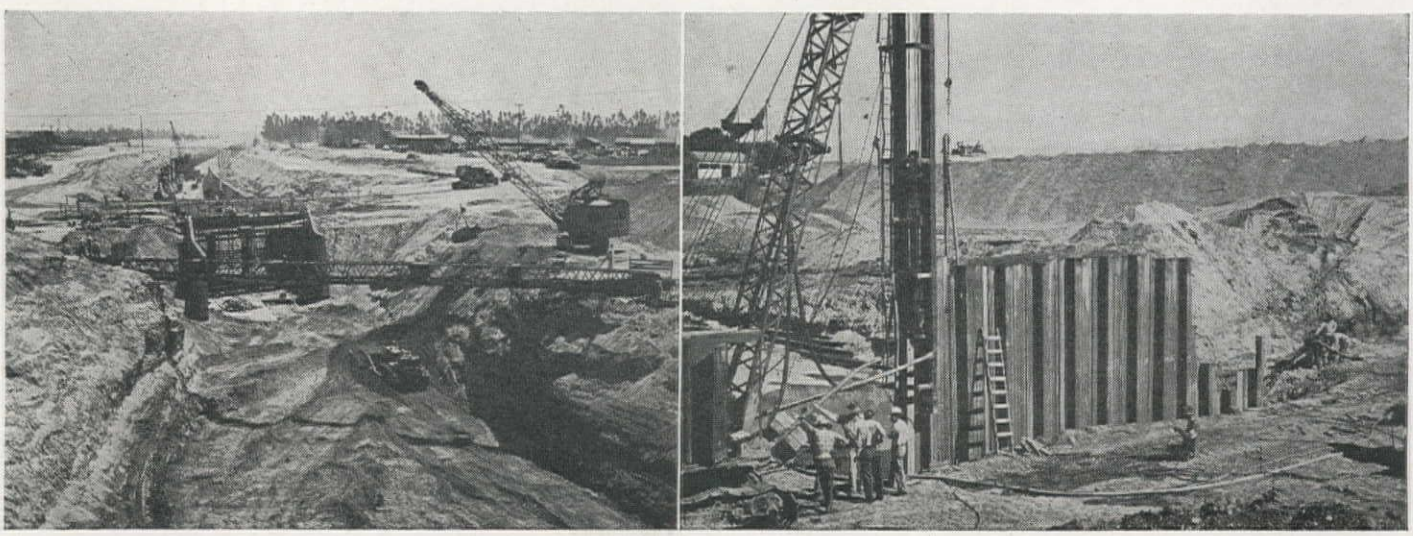
In order to speed construction of the concrete channel, the work was divided by the contractors into three approximately equal reaches. Each reach was provided with a complete crew with full equipment so that full-scale excavation and pouring operations could be carried on at all three places simultaneously. The construction of the four railroad and five highway crossings were the first order of work, and were completed in minimum time.

Organization

Colonel Rufus W. Putnam is District Engineer, Los Angeles District U. S. Engineer Department, and design was carried out under his supervision. Personnel for the Engineers on the project include the following: F. C. Bennett, resident engineer, and Loy G. Stover, assistant engineer in charge, both working on the whole job; J. G. Morgan, assistant resident engineer, and R. M. Rigney, assistant in charge of channel construction; Alvin L. Saunders, assistant resident engineer, and Beattie C. Hedrick, office engineer and in charge of the levees; J. S. Mankiewicz, administrative assistant, with clerical staff of seven, who handles the administrative work; and a technical force of more than fifty persons.

For the San Bernardino County Flood

ENTRANCE TO LYTLE creek channel, left. Training structures leading to this channel are faced with grouted stone and the toe of the wall covered with quarry stone to prevent undercutting or scouring action. Driving sheet piling at extreme edge of bucket section of spillway for excess flow which discharges into East Branch, right.



Control District, Howard L. Way, County Surveyor, is Chief Engineer, R. V. Ward is assistant engineer, and Ralph W. Motherspaw is superintendent of construction.

Supervising the operations of the contractors are: on the first contract, B. L. Richards, superintendent, assisted by Leonard Jones as excavating superintendent. O. T. Bekken is office manager. On the second contract, Roscoe P. Downs is project manager, Al Erickson, general superintendent, and Harry Porter, chief engineer.

FWA Advances Planning Funds To Develop Western Projects

THE FEDERAL WORKS AGENCY has approved additional loans for preparing complete construction plans in numerous Western cities. The cities and planning funds released to them, along with the projects, are as follows:

Alaska

Ketchikan has received two advances, $12,500 for planning a school to cost $425,000, and $2,000 for a library which will cost $58,000. Juneau also received two advances, $2,000 for planning a $60,000 library, and $3,000 for a $70,000 fire station; also $7,000 for a municipal airport building to cost $189,600.

The town of Wrangell, Alaska, has received an advance of $2,000 to plan a sewerage system estimated to cost $35,000, and also a further advance of $4,000 for design of a water supply dam estimated at $84,000.

Arizona

The city of Holbrook was allotted $800 to plan sewer facilities, which will cost $35,000; $800 for water facilities valued at $28,000; and $1,500 for a $49,000 town hall; Holbrook School District, $3,300 for a school to cost $88,000. Winslow, $3,000 for sewer facilities costing $91,000; Maricopa County Supervisors, $5,400 for juvenile delinquency facilities amounting to $153,500; Pima County School District, $1,960 for a $56,500 school; and Pinal County School District, $4,000 for a $107,000 school at Coolidge.

School District No. 1 of Pima County, Ariz., has received an advance of $20,000 to plan a new high school to cost $725,500.

California

The San Diego, Calif., Unified School District has received two advances totaling $21,500 to design school facilities estimated to cost $490,200. Other California communities to receive a share of the planning money are: Taft, $2,400 for a $77,000 city hall; Santa Ana, $2,500 for a sanitary sewer system to cost $280,000; San Luis Obispo, $4,000 for a city hall project to cost $102,000; Orland, $6,000 for high school facilities which will cost $121,000; San Luis Obispo County, $5,543 for sewer facilities at Morro Bay costing $152,907; Cayucos, $5,200 to plan sewer facilities valued at $152,000; Santa Paula, $4,500 for high school facilities which will cost $110,000; Martinez, $12,000 for a sewer program estimated at $300,000; Compton, $7,831 for high school buildings to cost $198,000; and Palos Verdes School District, three advances totaling $9,900 for various school facilities to cost a total of $221,840.

Additional advances for planning schools, and the estimated cost of the facilities follow: Oakdale High School District, $32,160 and $604,980; Napa High School District, $24,000 and $554,560; Burbank School District, $6,000 and $153,500; Pomona High School District, $15,540 and $434,237; Pomona School District, $8,400 and $204,640; Bellflower, $30,000 and $694,000; Trona $13,500 and $315,200; Escondido High School District, $7,250 and $174,500; Redondo Beach School District, $12,600 and $405,000; Orland School District, $1,750 and $58,600; Tulare High School District, $8,000 and $221,500; Oxnard School District, $9,300 and $249,140; Stockton School District, four advances totaling $36,720 and $1,282,650; Garden Grove High School District, $15,000 and $411,000. Montebello School District, $28,500 and $619,400; Walnut Creek School District, $11,040 and $200,000; Monterey School District, $2,660 and $52,270.

Colorado

Fort Collins, Colo., was given $8,500 to be used in planning a new municipal building estimated to cost $183,450.

Fort Collins also received two advances totaling $8,222 for sewer facilities valued at $279,630; Boulder was advanced $9,600 to plan a $262,000 city hall; Greeley, $7,000 for water facilities to cost $206,900, and school facilities as follows: Colorado A. & M. College, $12,000 for a dormitory building costing $212,000; Pueblo School District, $7,190 and $411,420; Denver School District, $30,743 and $1,180,380.

Montana

Fairfield, Mont., will use a $4,000 federal advance for planning sewers and a treatment plant estimated to cost $80,000, another advance of $1,800 for schools which will cost $49,400, and a third advance of $4,000 for street improvements projected at $88,500; Lewiston receives $6,000 for planning elementary schools which will cost $202,000, and Miles City has been allotted $11,000 for preparation of plans for a new county court house valued at $316,500.

Phillips County School District received $3,600 for planning a school at Saco, to cost $130,000. Hot Springs received $4,000 to plan a sewer system and treatment plant, costing $87,500.

Nevada

Two advances have been made to Sparks, Nev., totaling $3,502 for planning street improvements and construction of a city garage at a total cost of $145,138, and Washoe County has been allotted $35,000 for planning hospital facilities estimated to cost $876,500.

Sparks also received two other allotments, $2,610 for sewer facilities to cost $80,000 and $4,830 for irrigation ditch improvements to cost $260,000.

New Mexico

The Capital Buildings Improvement Commission was allotted $8,500 for planning buildings in Santa Fe, estimated to cost $1,500,000, and Roswell received two advances totaling $13,000 for planning streets which will cost $461,000.

Oregon

Clackamas County School District was awarded two advances totaling $11,520 for planning school facilities at Oregon City, estimated to cost $321,980.

Beaverton, Ore., was allotted $8,800 for high school additions estimated to cost $250,000, and Portland $21,730 for designing an elevated viaduct to cost $1,677,552.

Utah

Seven advances have been made to Salt Lake County, Utah. They are $4,332, $2,546, $8,702, and $3,918 for sewer facilities in various parts of the county, to cost, respectively, $121,340, $100,000, $273,000 and $143,000; $1,900 for a public building to cost $53,000; and $6,080 and $2,926 for two hospital additions which will cost, respectively, $169,600 and $81,620.

In addition, Salt Lake County was advanced $1,482 for fair ground improvements at Murray, to cost $43,340; American Fork received $1,140 to plan a water storage reservoir costing $31,800; Bountiful, $15,000 for a $633,000 sewer system; Orem, $3,900 for water facilities costing $146,200 and Ogden, $9,146 for sewers to cost $296,000.

Washington

Everett, Wash., received an allotment of $42,000 of federal funds for preparation of plans and specifications for a sewer system estimated to cost $1,072,500; Kirkland received $5,400 to plan a $150,000 sewer system; Tacoma, $6,000 for preparation of plans for five fire stations estimated to cost a total of $241,700, and two further advances totaling $10,800 for planning public safety and police buildings which will cost a total of $244,300; and King County, $2,000 to design a bridge near North Bend, estimated to cost $96,800.

Other advances and amounts in Washington are: Firecrest, sewers, $1,450, $40,000; Yelm, sewers, $3,500, $40,500; Monroe, sewers, $4,683, $107,276; Kirkland, street improvements, $20,000, $447,000; Burlington, sewers, $6,100, $168,000.

Wyoming

Laramie County was advanced $14,950 to plan a memorial hospital at Cheyenne, estimated to cost $487,450, and the State Game & Fish Commission received $2,500 to design a museum at Cheyenne costing $120,500.

Siphons Feature Yakima Canal

EXCAVATING MAIN YAKIMA Ridge Canal with 2-cu. yd. dragline. Two similar machines excavated over 185,000 cu. yd. of earth and rock on this project. Following the dragline is a three-man crew finishing the cut by hand sloping sides and bottom.

Roza Division of the Yakima, Washington, reclamation project was cleared early by WPB to increase food production from these rich lands—Construction of large reinforced concrete siphons will furnish irrigation water to otherwise inaccessible sagebrush desert bench lands

By CURTIS L. TYLER
Concrete Control Engineer
Bureau of Reclamation
Yakima, Wash.

ONE OF THE FIRST war food projects cleared for construction by the War Production Board in 1943 was the Roza Division of the Yakima Project in south central Washington. Here, irrigation is changing sagebrush-covered slopes into highly productive farms on which the average return per acre on 12,600 ac. cultivated in 1944 was $222. Principal crops grown are potatoes, alfalfa, peas, and onions. As the area becomes better developed it is expected that much of it will be placed in orchards of peaches, pears, and apples or in hops or other high-income crops.

The division occupies a strip of land roughly 3 mi. wide and 60 mi. long lying along the east side of the Yakima valley above lands already under irrigation from the older ditches. When completed the Roza division will include 72,000 ac., of which about two-thirds will be below the canal and will be served by gravity, and the remaining one-third will be above the canal and will require pumping.

Estimated total cost of the project is $18,500,000, which is to be repaid over a period of forty years. The cost per acre will be about $250.

Plan of the project

Construction of the project was begun in 1936 with the difficult section lying in the Yakima River canyon north of the city of Yakima. The water is diverted from the river by a diversion dam consisting of a concrete ogee gravity section, with two roller gates, each 110 ft. long and 14 ft. in diameter mounted on the crest for regulation. The canal headworks, with trashracks, electrically operated fish screens, and a 28 x 15-ft. radial gate, lies on the west side of the canyon.

From the diversion dam a canal bench flume section follows the west side of the river for a short distance, then enters a 17-ft. horseshoe-shaped tunnel 1.5 mi. long. Leaving the tunnel, the canal follows the west side of the canyon in lined canal and bench flume sections for 1.6 mi., then crosses under the river in a 15 ft. 4 in.-diameter concrete siphon 1,510 ft. long. After reaching the east side of the river, the canal follows through lined and unlined sections, and through another tunnel to a point on the southerly side of Yakima Ridge, north of the city of Yakima, where it is proposed to use 900 cu. ft. per sec. to develop 10,000 Kva. of electricity to be used primarily for pumping water to the 25,000 ac. of pump lands lying above the canal. Power available from Grand Coulee and Bonneville dams may defer construction of the power-house.

From this point on, the main canal and lateral system are complete to Mile 84 for the irrigation of 42,000 ac. of land lying below the canal. Notable features of this section of canal include 7 siphons from 13 ft. to 6 ft. 10 in. in diameter, with a total aggregate length of 5,025 ft., three horseshoe-shaped tunnels from 13 ft. 9 in. to 13 ft. 3 in. with a total length of 7,155 ft., 21.5 mi. of lined canal and three wasteways for returning excess waters to the Yakima River.

Principal work still to be done in order to complete the project is: completion of 10 mi. of main canal now under construction; construction of laterals to serve 5,000 ac. by gravity from Mile 84 to Mile 95 of the canal; construction of all of the 18 pumping units with their

lateral systems to serve 25,000 ac.; construction of the powerhouse; and enlarging the existing Sulphur Creek Wasteway which is used jointly by the Roza and the Sunnyside divisions.

Present construction

The portion of the main canal now under construction by N. Fiorito Co. of Seattle, Wash., extends from Mile 84 to Mile 95 of the canal and includes four siphons and two wasteways.

Construction was begun in March, 1945, with the excavation of Wasteway No. 6 and Siphon No. 9, which lie side by side down one side of a sharp draw, with the wasteway discharging in the bottom and the siphon extending on up the opposite side of the draw. Of particular interest in this operation was the contractor's use of a 2-cu. yd. power shovel working out two cuts, each 500 ft. long, in which the slope increased from 3 per cent to 67 per cent. The shovel, supported by cables from a winch anchored at the top of the hill, dug downhill through earth and broken rock which would have required shooting if any other method of excavation had been used.

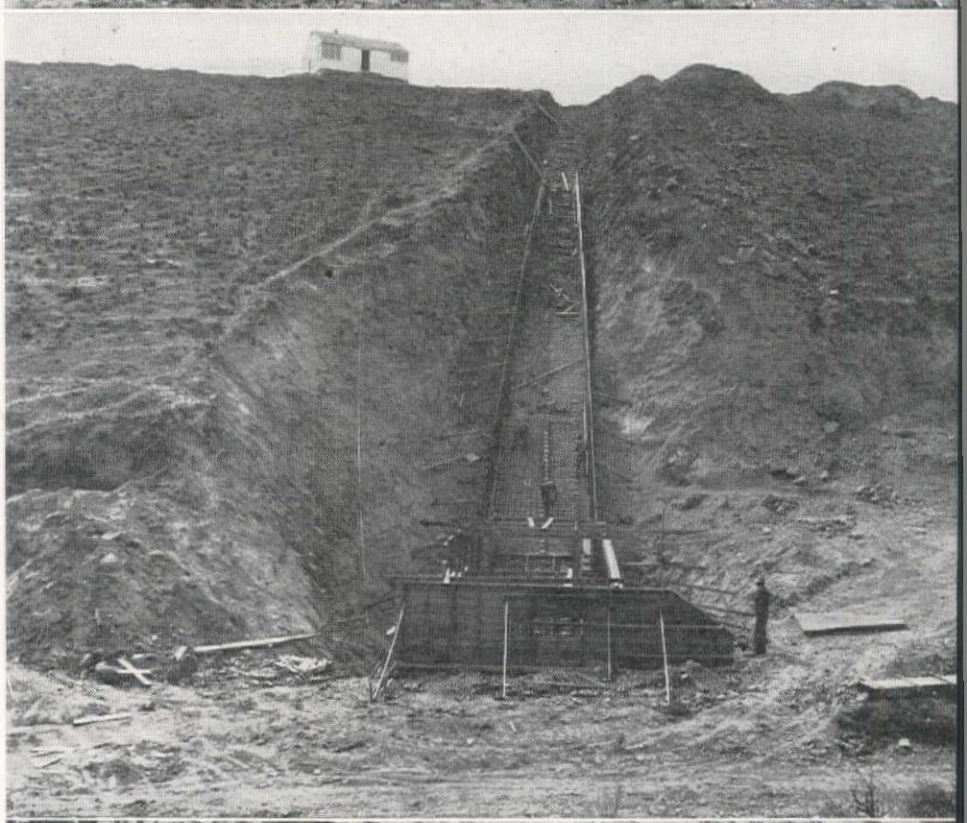
This shovel, later converted to a dragline, and another 2-cu. yd. dragline were used to excavate the open ditch section of the canal through earth and blasted rock. The small size of the ditch, it having only a 6-ft. bottom width and a depth of 6.6 ft., prohibited the use of power equipment for finishing, so a three-man crew worked behind the draglines trimming up slopes and bottom. A total of 153,000 cu. yd. of common excavation and 32,700 cu. yd. of rock were removed by the two machines.

Rock sections were stripped by D-8 tractors with bulldozers, after which the drilling was done by a 4 or 5-man crew with a 365-c.f.m. compressor and jackhammers. The rock is practically all basalt and generally breaks up well, offering little trouble to dragline excavation after shooting.

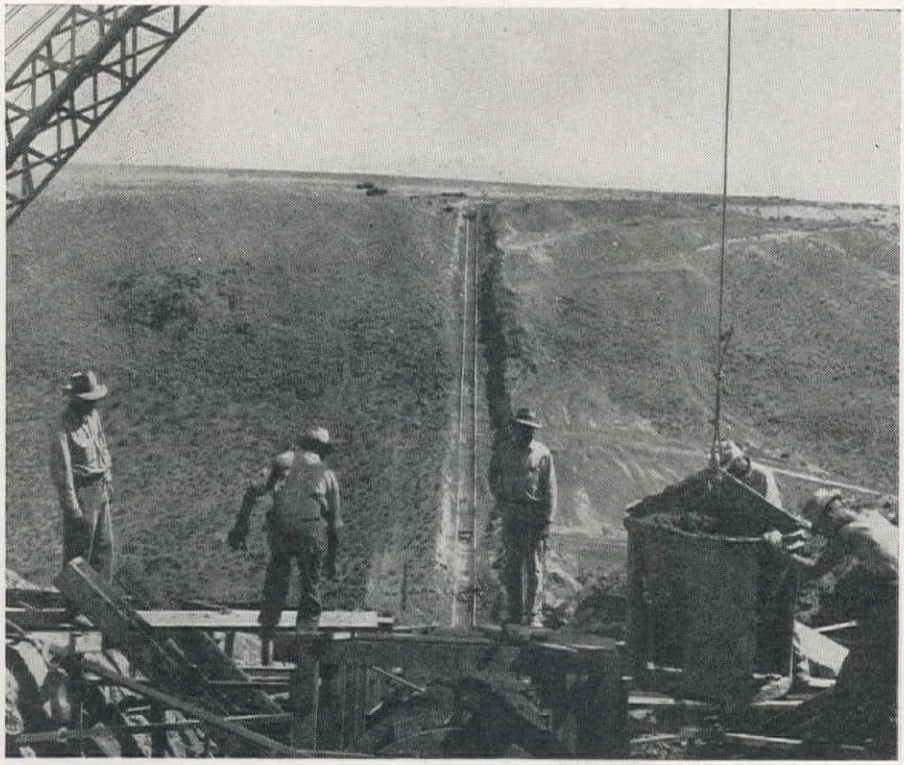
Concreting

As soon as the excavation for the wasteway was completed, work was begun on concreting this section to meet a specified completion time of 75 days. The concrete for the structures is mixed in two 3-cu. yd. truck-mounted high dump mixers, operating from a gravity feed batching plant set up in the bottom of the draw. Aggregates are trucked from government stockpiles a distance of 5 mi. and cement is hauled 4½ mi. from the railroad. At first water for mixing was hauled 3 mi., but later the canal was filled, making water available at the headworks of the wasteway.

Concrete from the mixers is dumped into the forms from a concrete bucket on a ⅜-cu. yd. dragline. Electric vibra-



SECURED BY WIRE ROPE this 2-cu. yd. shovel (top) excavated Wasteway No. 6 down a slope that increased from 3 per cent to over 60 per cent. Same wasteway showing stilling pool forms at canyon floor level, center. Siphon No. 9 forms in place in a rock cut near the bottom of the siphon.



POURING CONCRETE in Siphon No. 9 forms with a dragline equipped with a concrete bucket. Several ramps were cut at different levels on the canyon wall to aid trucks and the dragline in reaching construction areas along the siphon and wasteway, because steep slopes made transportation difficult.

tors are used to compact the concrete. Due to the steep slopes it was necessary to cut several ramps to different levels for the use of the mixer trucks and the dragline.

The open chute section of the wasteway was placed monolithically at first by hanging the inside forms from 2 x 6-in. cross-members supported on the outside forms. The walls were filled first and vibrated, with some of the concrete allowed to flow out the bottom of the form into the floor. When the walls were filled, more concrete was dumped to finish out the floor. Later, this system was abandoned in favor of placing the floor first with the fillet and 2 or 3 in. of the sidewalls, and later setting the inside forms for the walls and filling them. It was found that the latter method worked better on the steep slopes involved as there was less likelihood of stray rocks falling on newly-finished floor, and also the floor concrete could be run drier by placing it without the walls.

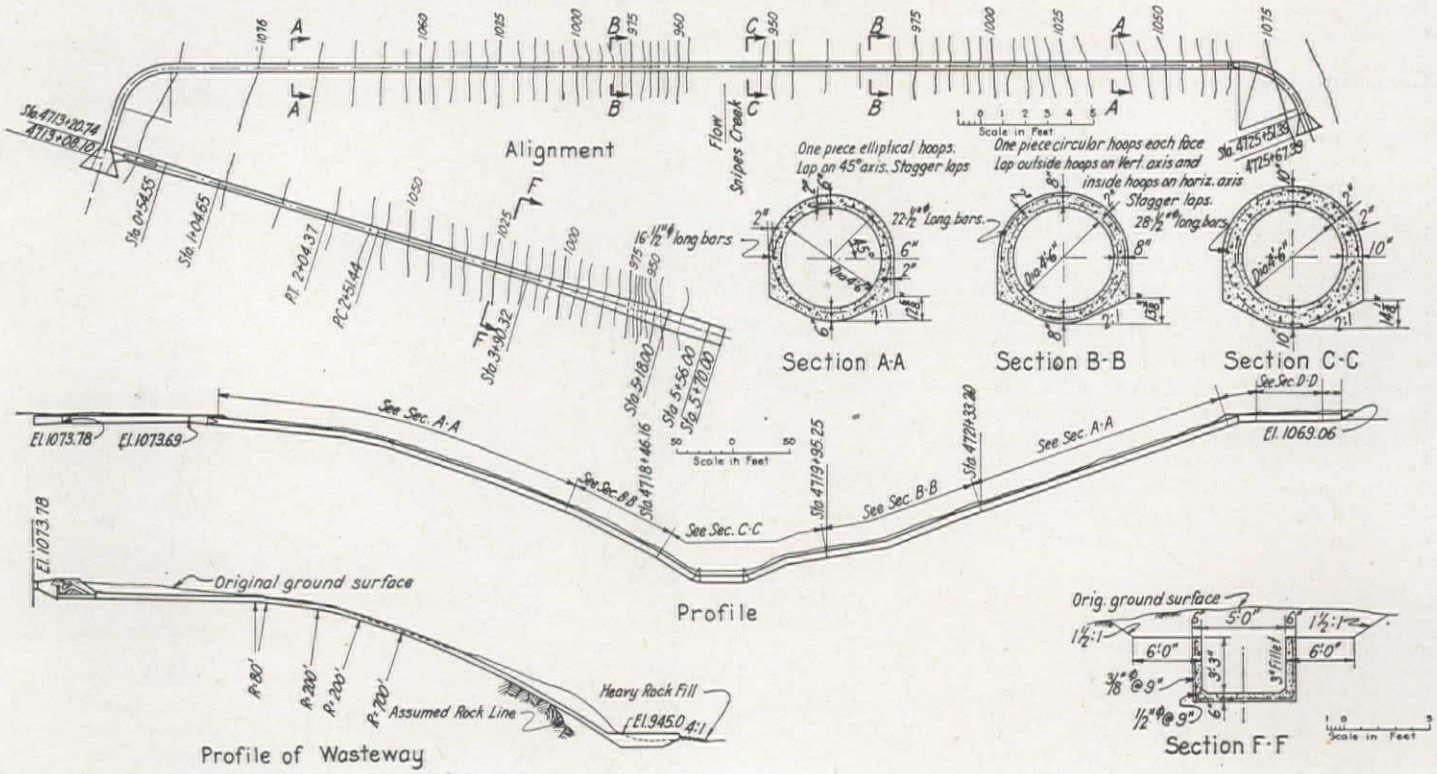
The headworks of the wasteway consists of two slide gates and a siphon spillway which required rather intricate form work. All work on the wasteway was completed in August and it was immediately placed in service.

Siphon construction

Siphon No. 9, which is 911 ft. long, with an inside diameter of 4 ft. 6 in., conveys the main canal across the draw above the outlet of Wasteway No. 6, and is constructed in approximately 25-ft. sections which are required to be placed monolithically. Metal water stops prevent leakage between the concrete sections. Forms for the inside of the siphon are quarter circles to the correct radius, and with a length of 12 ft. 6 in. Four quarter circles plus a 2 x 4 in. key are erected inside the steel mat, starting with one section on the bottom, then one on each side, then the top section with the key on one side. The two 12 ft. 6 in. sections composing a 25-ft. panel are bolted together in the center of the section, and are held down against the uplift of the concrete by three shee-bolts grouted into the rock foundation. The flooring used for sheeting on the inside forms was run through a wood pipe stave machine which planed a slight curve on the outside face, and beveled the edges to make a very tight joint.

The outside set of forms are placed on 4 x 8-in. ribbons set solidly to line and grade. The lower part of the outside

PLAN AND PROFILE of No. 9 Siphon and No. 6 Wasteway of the Yakima Ridge Canal. Overlapping one-piece elliptical hoops were used to reinforce the circular sections.



form is brought up vertically from the haunch for 22 in., with inspection doors to assist in placing the concrete which must be run under the inside form. When this lower set of forms is filled, a concave section which is 1/6 of a circle, is added to it to bring the concrete up high enough so that the remainder of the top of the barrel can be placed without outside forms. These concave forms are cut 6 ft. 3 in. long for easier handling on the steep slopes, and to make it possible to keep the surface of the concrete fairly level without spilling over the lower end. The outside forms are suspended above their proper places while placing progresses on the lower part of the barrel, and are lowered into place as needed, braced to the supporting bents and held out from the inside forms by 2 x 4-in. spreaders until filled with concrete.

Because of the small size of the barrel the contractor has placed alternate sections to facilitate form setting and removal. The bulkheads at the ends of each of the initial sections are bolted to the inside forms and carry the 8-in. wide hoops of 3/16-in. wrought-iron water stop, half of which is embedded in the concrete on each side of the joint.

Additional items

Three other siphons, all smaller than Siphon No. 9, are still to be built, as is Wasteway No. 7, a chute similar to Wasteway No. 6, but smaller and with less elaborate headworks. Construction of four timber bridges over the canal and Wasteway No. 6 is included in the present specifications, along with the building of turnouts from the canal to admit water to the laterals which will be built under a subsequent contract.

Nine precast concrete pipe culverts, 24 and 36 in. in diameter, were placed ahead of the excavation of the canal to care for drainage. Compacted fills over the culverts were placed by bulldozers and sheepsfoot rollers. Heavy sprinkling of borrow pits and fills was necessary to secure adequate moisture for compaction.

Design work for the pumping units is under way, and it is expected that if funds are made available, four pumping units can be completed in 1946. In general the pumping units will be developed with a high lift of about 200 ft. and a low lift of 100 ft. above the main canal.

Data necessary to issue specifications for the construction of laterals on the 5,000-ac. gravity unit from Mile 84 to Mile 95 have been collected, and it is hoped that this area will have water available for the 1946 irrigation season.

Personnel

For the Bureau of Reclamation Harold T. Nelson is the Construction Engineer, E. W. Woodard is chief of party, and Ray Moorhead and Harry White are the inspectors. The work is under the general supervision of Frank A. Banks, Regional Director, Walker Young, Chief Engineer, and Harry Bashore, Commissioner, Bureau of Reclamation. For N. Fiorito Co., Dan Fiorito is the superintendent and Walt Duvall is the carpenter foreman. E. Peck was in charge of earthwork.

West Coast Embarkation Ports Transfer Large Tonnage to War

IN THE FIRST report of the movement of troops and supplies into the Pacific, the War Department announced that nearly two and one-half million troops and more than 44 million ship tons of cargo were sent from the Army's West Coast ports of embarkation during the 45 months from Dec., 1941, through Aug., 1945.

This transportation feat was equivalent to transporting the entire population of the State of Louisiana over some 5,000 to 6,000 mi. of ocean to foreign bases scattered all the way from New Zealand to Japan, and then carrying to it not only supplies necessary for feeding, clothing and medical care, but also the firepower necessary to defeat the fanatical Japanese enemy.

America's mighty battle strength funneled to fighting fronts half a world away through three major ports and two sub-ports operated by the Army Transportation Corps. The San Francisco Port of Embarkation handled the bulk of the load, with 1,655,000 troops embarked and 22,751,000 ship tons of cargo outloaded. Troops passing through the Golden Gate were processed at Camp Stoneman, Pittsburg, Calif., and Fort McDowell, Angel Island, Calif., the port staging areas.

Khaki-clad Americans to the total of 524,000, and supplies in the amount of 10,219,000 ship tons moved to the Pacific through the Seattle Port of Embarkation. Fort Lawton, Wash., was the staging area for the great Northwest port.

The Portland sub-port, administered under the Seattle Port's control, handled 53,000 troops through the Vancouver Barracks staging area, and 1,731,000 ship tons of cargo.

Another Seattle sub-port, Prince Rupert, British Columbia, embarked 31,000 troops and shipped 940,000 ship tons of supplies. There, troops were processed through a staging area located at Fort Edward, B. C.

The Los Angeles Port of Embarkation at Wilmington, Calif., handled 188,000 troops and 8,645,000 ship tons of cargo. Troops passing through this port were staged at Camp Anza, Calif.

The rapidly increasing build-up of American power in the Pacific is best shown by the sharp annual gains in embarkations and exports. The year 1942 saw 368,000 troops and 5,764,000 ship tons of cargo going to the Pacific through the Pacific ports. The record for the next year was 566,000 troops embarked and 10,076,000 ship tons of supplies outloaded. In 1944, 780,000 American soldiers and 14,555,000 ship tons of cargo left West Coast gateways. And, in the first eight months of 1945, some 700,000 troops and 13,737,000 ship tons of supplies headed out.

Construction of New Transmission Line Links Idaho Power Co. Stations

MORRISON-KNUDSEN CO., INC., has been awarded the contract to build a new power plant at Hagerman Valley, Idaho, for the Idaho Power Company. Included in the contract is 120 mi. of 138,000-volt transmission line to connect the new plant with other distribution lines at Boise and Emmett. The new plant will have a capacity of 16,500 kw. Completion of the project was scheduled for Oct. 15, 1946. H. H. Obermiller is project manager for Morrison-Knudsen in charge of the construction of the power house and transmission lines. Lou Steelman is general superintendent of the power house work and Tom O'Mara general supervisor of transmission line construction.

C. J. Strike, president of Idaho Power, said of the construction project, "it is part of our over-all plan to furnish adequate electrical power facilities to the mining, lumbering and agricultural interests of the Snake river valley." Strike further commented that the Idaho Power and its staff are actively participating jointly with other industries to develop the natural resources of the area. During the war the company built several transmission lines to critical industries such as the 106-mi. line to the recently-discovered deposit of tungsten ore in the Yellow Pine district. The rapid development of this deposit and another at Stibnite made Idaho the largest producer of tungsten and antimony at a time when both metals were critically needed for the war effort.

Idaho Power estimates it has a 90 per cent coverage of the farms in southern Idaho and eastern Oregon as a result of thirty years in farm electrification work. In view of the current expansion the company hopes to increase its farm coverage to nearly 100 per cent.

Oregon Cities Plan Sewer Programs

Waters of the Willamette River, which have been badly polluted in recent years by sewage from cities along its course, will be cleaned up by treatment plants and collection systems in each community—Portland plans largest system of interceptors and treatment plant at a total cost of about $12,000,000

By JOHN W. CUNNINGHAM
Consulting Engineer
Portland, Ore.

CONTAMINATION OF THE WATERS of the Willamette River in Oregon by the raw sewage of the cities along its course has reached such an alarming proportion that the Oregon Sanitary Commission has urged all of these cities to undertake sewage treatment and disposal projects at an early date. Included in the postwar program of practically every city in the river's basin is a major item dealing with this problem. The largest proposed project is naturally that planned for the city of Portland.

Portland is built on both banks of the Willamette, just above its confluence with the Columbia. It utilizes a combined sanitary and storm sewer system, and at the present time has 62 separate outlets, 51 into the Willamette and 11 into sluggish backwater, known as Columbia Slough, tributary to the Columbia River.

The Willamette River has a low water flow, coming in the late summer, of only about 4,000 cu. ft. per sec., which has been heavily polluted by up-river cities and industries before reaching Portland. With the addition of the Portland sewage, very serious conditions result, and the remaining oxygen in the water is entirely consumed. This lack of oxygen has created a barrier to the movement of fish and the one-time heavy fall run of salmon in the river has been entirely destroyed. In Columbia Slough, with very little flow, the conditions are offensive to the extreme.

History of Portland project

Plans for intercepting and treating the Portland sewage have been discussed for many years, and have gone through many phases. They have gradually crystallized into the basic idea of collecting all of the flow at a single point, treating it, and discharging the effluent into the Columbia. This stream is much larger than the Willamette, and with regulatory dams upstream will seldom, if ever, carry a flow of less than 75,000 cu. ft. per sec. Moreover, the low water season comes in the late fall and early winter months, and in the period when pollution is at the present the most objectionable, the flow of the Columbia is from 125,000 to 150,000 cu. ft. per sec., affording a high dilution for a population greater than can ever be expected in Portland. Under these conditions, the residual oxygen of the river can never be seriously depleted, and the extent of the treatment required is only that necessary to remove floating and unsightly materials.

Present planning for the Portland sewerage improvement is based on a $12,000,000 bond issue authorized by the voters in May, 1944. A contract for the engineering on the project was awarded to two firms of consulting engineers, Stevens & Koon and John W. Cunningham & Associates, operating as a joint venture. The work is being done under the direction of an engineering board consisting of Ray E. Koon and John W. Cunningham of these firms, and Ben S. Morrow, City Engineer. A. M. Rawn of Los Angeles has acted as a consultant on special phases of the work. A very thorough study of the economics of construction and operation has been carried out. At present, studies have progressed to such an extent that the general plan, routing of sewers and construction features can be discussed. First construction will probably begin next spring.

The original conception of the project was to build intercepting sewers paralleling both sides of the Willamette and Columbia Slough, below and close to the outlets of all sewers. Such a plan would necessitate deep construction in bad ground along the river, where the original surface has been altered by fills of sawdust, slab wood and miscellaneous materials. Early plans included a number of rather large pumping plants along the main sewers, and three expensive under-water crossings of the Willamette. A portion of the outfall sewer traversed low bottom land, with uncertain foundation conditions. The treatment plant site was on low ground, below high water level, which would require filling before it could be utilized.

Outline of plan

Present plans are similar in extent and objectives, but the route of the intercepting sewers has been generally fixed farther from the river bank and at much higher elevations. Foundation conditions are believed to be generally very good, excavation will be decreased, and construction difficulties due to water will be minimized. Moving the sewers back from the river has made necessary local interceptor systems and in some places pumping stations to pick up the sewage flow from areas near the river and lift it into the main sewer. These pumping stations, however, are generally small, with low horse-power requirements. The new plan reduces the number of main pumping stations to two only and will very greatly cut down the cost of pumping sewage. The plan also eliminates two of the original crossings of the Willamette, all of the flow from the west side being taken across the river at a single point, the pumping station for this crossing will utilize the existing structure of the Front Avenue system near the end of the Burnside bridge.

The maximum designed capacity of the main outfall sewer will be 155 million gallons per day or 240 cu. ft. per sec. From this size the various intercepting sewers will be reduced as they extend upstream in proportion to the amount of flow picked up at different diversions. The outfall sewer will have an arched form, 8½ ft. wide and 8½ ft. high, while the Peninsula tunnel will be a horseshoe section, 8 ft. by 8 ft. in cross-section.

A feature of the present plans is the long tunnel through what is commonly called the "Peninsula" between the Willamette and Columbia rivers. This tunnel will be about 17,000 ft. in total length, but intermediate shafts and adits will permit its excavation from several faces simultaneously. There will be another 7,000-ft. tunnel along Grand Avenue and several shorter tunnels. These bores are not considered a difficult or especially expensive item of the work. Ground through which they will be excavated is believed to be generally firm and free from water, and they are preferable to deep trenches. An important advantage is the elimination of the traffic interference that is bound to occur where large sewers are constructed by the trench method through city streets.

Accessory plants

The main pumping station, at Sullivan's gulch, will lift the sewage about 32 ft., to an elevation from which it will flow to the Columbia River by gravity. The total installed capacity of pumps at this station will exceed 1,000 hp., though these pumps will never be operated all at the same time. Other stations will be very much smaller, some requiring only 10 to 15 hp. These stations will be controlled automatically, and will require only occasional inspection and attention. Other automatic features of the system will be the devices which regulate and control the flow of sewage from the existing sewers into the intercepting system. The objective of the entire design is to minimize the cost of maintenance, operation, and manpower.

The sewage treatment plant is, from the standpoint of cost, one of the minor

features of the project, but is of particular importance in the entire program. It will be built on a site on Columbia Blvd., already owned by the city. The plant will accomplish what is ordinarily termed "primary treatment" of the sewage. The first operation will be to pass the flow through coarse screens and channels at a velocity which will permit settling out the heavy sand and gravel. Then the sewage will enter larger tanks, where the unsightly and objectionable solids will be removed by sedimentation. These will be collected mechanically and transferred to heated digestion tanks where the solids will be converted to a thick, liquid, earthy material that can be wasted without objection, or if desired can be drained and dried. In its dried form it has some value as a fertilizer.

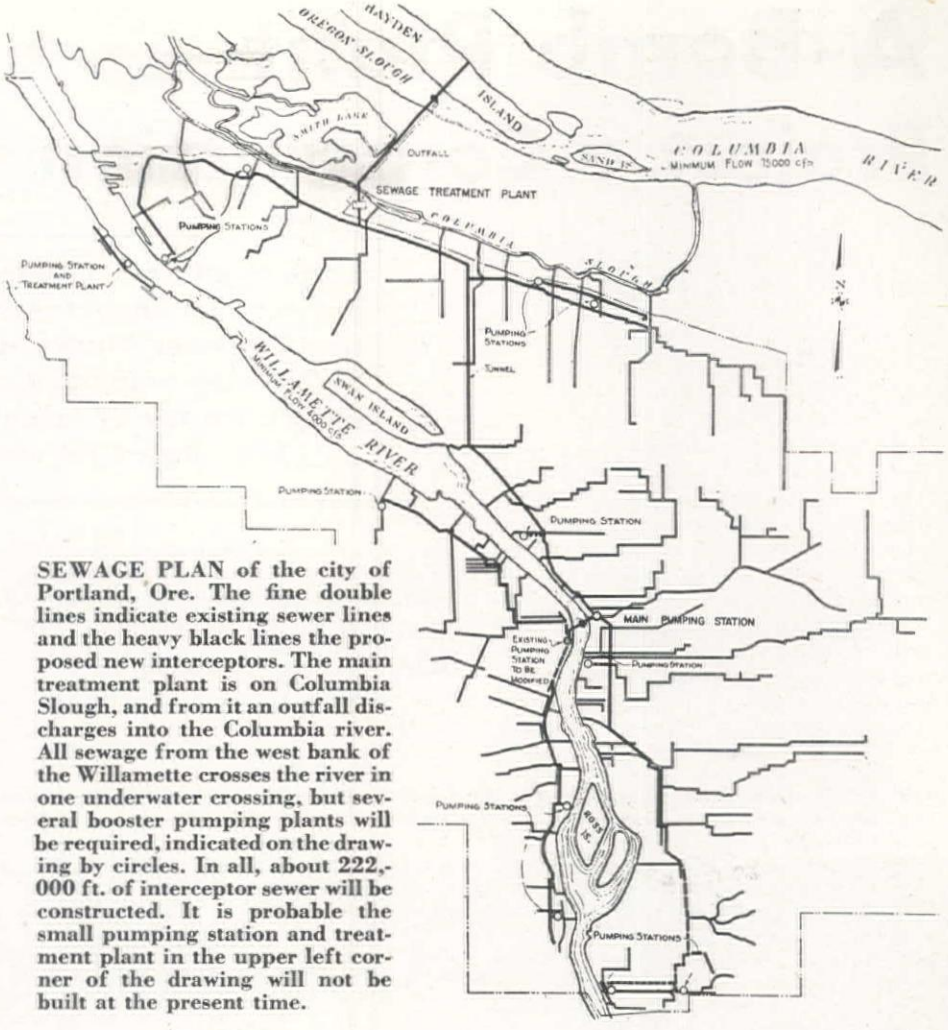
The sewage treatment plant structures will be attractive in design and the grounds will be planted and landscaped. No appreciable odor will come from the plant, and with the single objection coming from association with sewage, the plant will be very interesting to visitors.

The preliminary estimate of the length of different types of sewer in the interceptor project is as follows:

Size	Type	Lin. Ft.
8′ 6″	Circular	15,960
8′ 6″ x 6′ 0″	Box	2,205
8′ 0″	Circular	5,723
6′ 6″	Circular	475
5′ 6″	Circular	2,128
5′ 0″	Circular	1,012
4′ 6″	Circular	1,235
4′ 3″	Circular	4,760
3′ 2″ x 5′ 6″	Tunnel	1,973
8′ 0″ x 8′ 3″	Tunnel	19,060
6′ 6″ x 7′ 0″	Tunnel	2,179
6′ 0″ x 6′ 6″	Tunnel	530
5′ 6″ x 5′ 9″	Tunnel	5,912
2′ 10″ x 5′ 0″	Tunnel	2,400
2′ 10″ x 5′ 0″	Tunnel for 27″ pipe	2,700
48″	Circular	4,647
42″	Circular	12,920
36″	Circular	19,059
33″	Circular	3,427
30″	Circular	7,400
27″	Circular	4,815
24″	Circular	7,236
21″	Circular	3,300
18″	Circular	1,285
15″	Circular	2,410
12″	Circular	40,772
10″	Circular	2,100
8″	Circular	45,030
TOTAL		222,653

Plans of up-river cities

The various up-river cities have voted bonds or are levying special taxes to finance similar sewage treatment plants. When these are completed, the water of the Willamette will be distinctly improved in quality, and objectionable odors, accumulation of sludge beneath piers and in points of stagnation, and unsightly detritus in the channel will be eliminated. It is of course useless to hope that the river will ever be as pure as in the days before man came into the area, but the condition of 0 oxygen content in the water will be a thing of the past.



SEWAGE PLAN of the city of Portland, Ore. The fine double lines indicate existing sewer lines and the heavy black lines the proposed new interceptors. The main treatment plant is on Columbia Slough, and from it an outfall discharges into the Columbia river. All sewage from the west bank of the Willamette crosses the river in one underwater crossing, but several booster pumping plants will be required, indicated on the drawing by circles. In all, about 222,000 ft. of interceptor sewer will be constructed. It is probable the small pumping station and treatment plant in the upper left corner of the drawing will not be built at the present time.

The proposed projects of other Willamette valley cities are as follows:

ALBANY—Sewers and disposal plant, plans under way, cost estimate $150,000.

BEAVERTON — Sewer program of $50,000, no disposal plant.

CORVALLIS—Total sewer program of $281,000, of which $177,000 is for disposal plant, water use tax in effect and bonds to be voted.

COTTAGE GROVE—Sewers and disposal plant, cost estimate $150,000, portion of cash on hand.

DALLAS—Sewers and disposal plant, plans complete, site acquired, cost estimate $164,000, financed by bonds.

EUGENE—Disposal plant, plans complete and funds available, cost $156,000; sewers being planned, cost $300,000.

INDEPENDENCE — Disposal plant, plans under way, cost estimate $50,000.

LEBANON — Sewer program to cost $225,000, of which disposal plant is $75,000, no plans started.

McMINNVILLE—Disposal plant, portion of money on hand, but plans not made, cost estimate $200,000.

MT. ANGEL — Disposal plant plans complete and financing in hand, cost $32,225.

NEWBERG — Disposal plant desired, but no steps yet taken.

OREGON CITY — Interceptor sewers and treatment plant plans nearly complete, funds available, cost $210,000; sewers similar situation, cost $50,000.

OSWEGO—Disposal plant, plans complete, money in hand, cost $7,000.

SALEM—Interceptor sewers and treatment plant, plans practically complete, cost $500,000, of which $200,000 is in hand.

SPRINGFIELD—Disposal plant, plans complete, financing by bond issue, $85,000.

SWEET HOME—Sewers and disposal plant, plans complete, cost estimate $225,000, $75,000 bonds already voted.

WEST SALEM—Disposal plant, plans not started, cost estimated $20,000.

A COMMERCIAL STANDARD for tank-mounted air compressors has been adopted by the trade and is recorded as voluntary code CS126-45, which is for sale by the Supt. of Documents, Government Printing Office, Washington.

The new specifications for motor-driven compressors require that they conform to a simplified A. S. M. E. low-pressure orifice test and shall have as standard equipment the following items: Pressure gage, shut-off line valve, A. S. M. E. safety valve, automatic unloader, V-belt drive if belt driven, intake muffler and air filter, automatic pressure switch and tank must conform to A. S. M. E. Code.

A-Bomb Plant—
Project a Construction Masterpiece

Largest and most expensive single construction project ever undertaken in the West was the Hanford Engineer Works, near Pasco, Wash.— Over 45,000 men employed at height of construction, and entire towns taken over to house workers— Site chosen for security and electricity

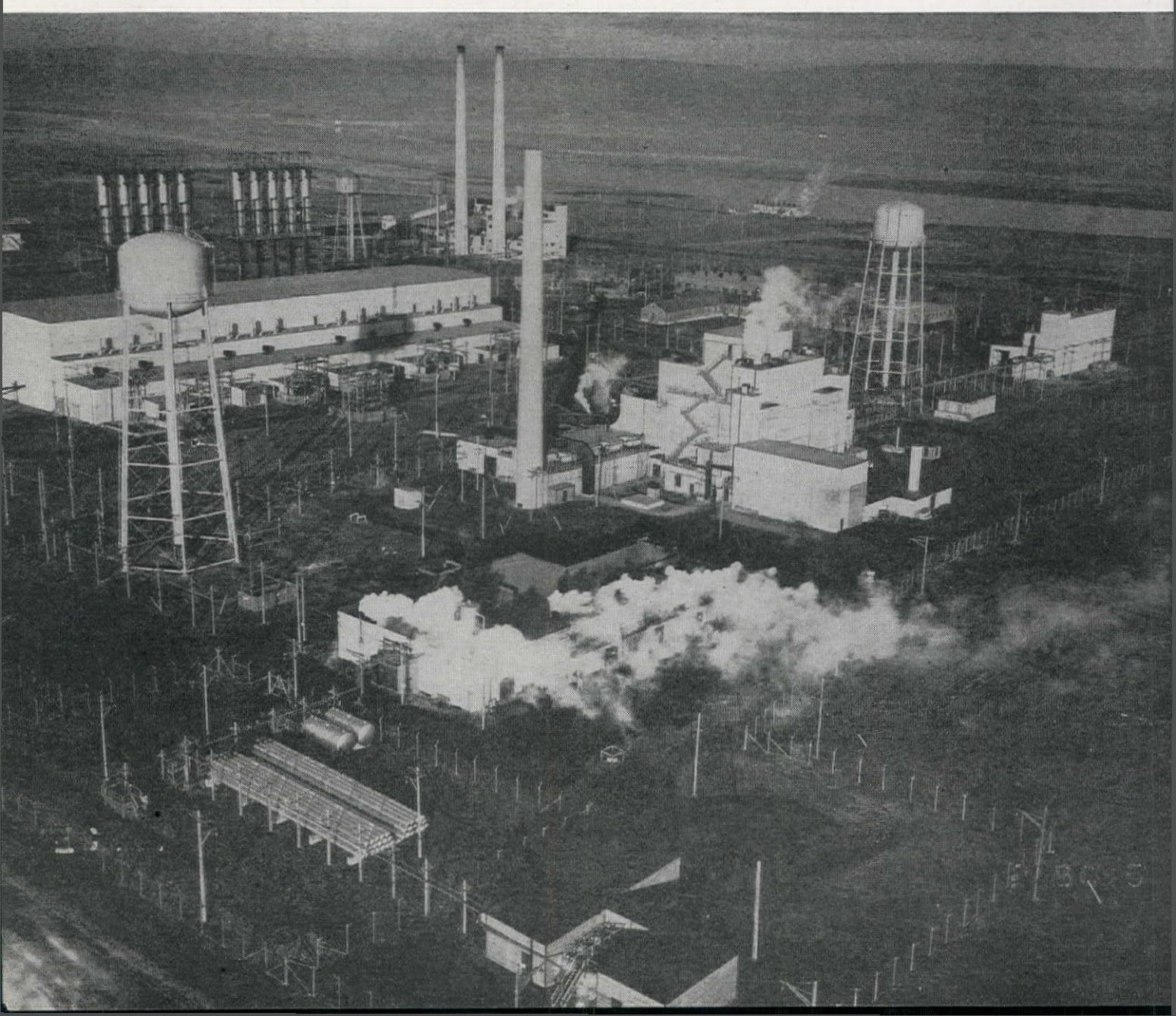
EVERYTHING ABOUT the atom bomb is fantastic and unbelievable. Its tremendous explosive force has, of course, been discussed in every available medium of expression, and is of a magnitude which even seasoned mathematicians find difficulty in expressing.

Similarly awe-inspiring is the vista of the future if the impetus put behind scientific development in the interest of bloodshed and destruction can be directed to the harnessing of atomic energy for peacetime civilian application. The introduction of this new power would render useless all hydroelectric generation, coal and oil mining, gasoline refining and the manufacture of engines and motors as presently understood. There would, of course, be required a complete new set of power application machinery, and doubtless a large number of men would be required in the industry of processing the atomic energy.

Mammoth construction job

In addition to the unprecedented effects of the atom bomb and the possible future completely revolutionary applications to every-day life, is the magnificent and inconceivably huge task performed by the construction industry in erecting in three years, the three greatest installations ever completed in the United States, at a total cost of approximately $2,000,000,000.

ONE UNIT of the atomic bomb plant at Hanford, Wash., showing the extremely heavy reinforced concrete buildings and the multiplicity of tanks and piping. Columbia river, source of electric power and cooling water, flows in the background.



The three great plants are located at Oak Ridge, Tenn., Hanford, Wash., and Los Alamos, N. Mex. The various component parts of the atomic bombs are manufactured at the first two plants, and the laboratory at Los Alamos is devoted to the study of assembling them into an effective explosive weapon. In each case, the sites were chosen for their remoteness and security from possible bombing, while at the same time having readily available adequate supplies of power and water.

The project was constructed under supervision of the U. S. Army Engineers, and to handle the work, a special unit was set up, known as the "Manhattan Engineer District," a cover name for the whole atomic bomb project, under command of Maj. Gen. Leslie R. Groves, recently promoted to the position of Deputy Chief of Engineers.

The Hanford job

The project in Washington is known as the Hanford Engineer Works. The name Hanford comes from a small farm center in eastern Washington some 40 mi. up the Columbia River from Pasco. It was engulfed in the project, the settlers being bought out and most of the orchards abandoned. Replacing it, a temporary construction town housing 60,000 people at the peak grew up in two years, but now it is only a ghost town.

To house the regular operating force, a new government-built village was established at Richland, about 12 mi. from Pasco, the former tiny cluster of stores and homes called Richland being torn down and moved away. Pasco is a railroad center through which the project is reached. Richland's population is given as 15,000, composed entirely of people connected with the project and their families.

The government purchased 233,000 ac. of land, most of it only fit for grazing without irrigation, and leased about 167,000 ac. more, the outside perimeter being 192 mi. It extends up the river for some distance beyond Hanford and down-river through Richland.

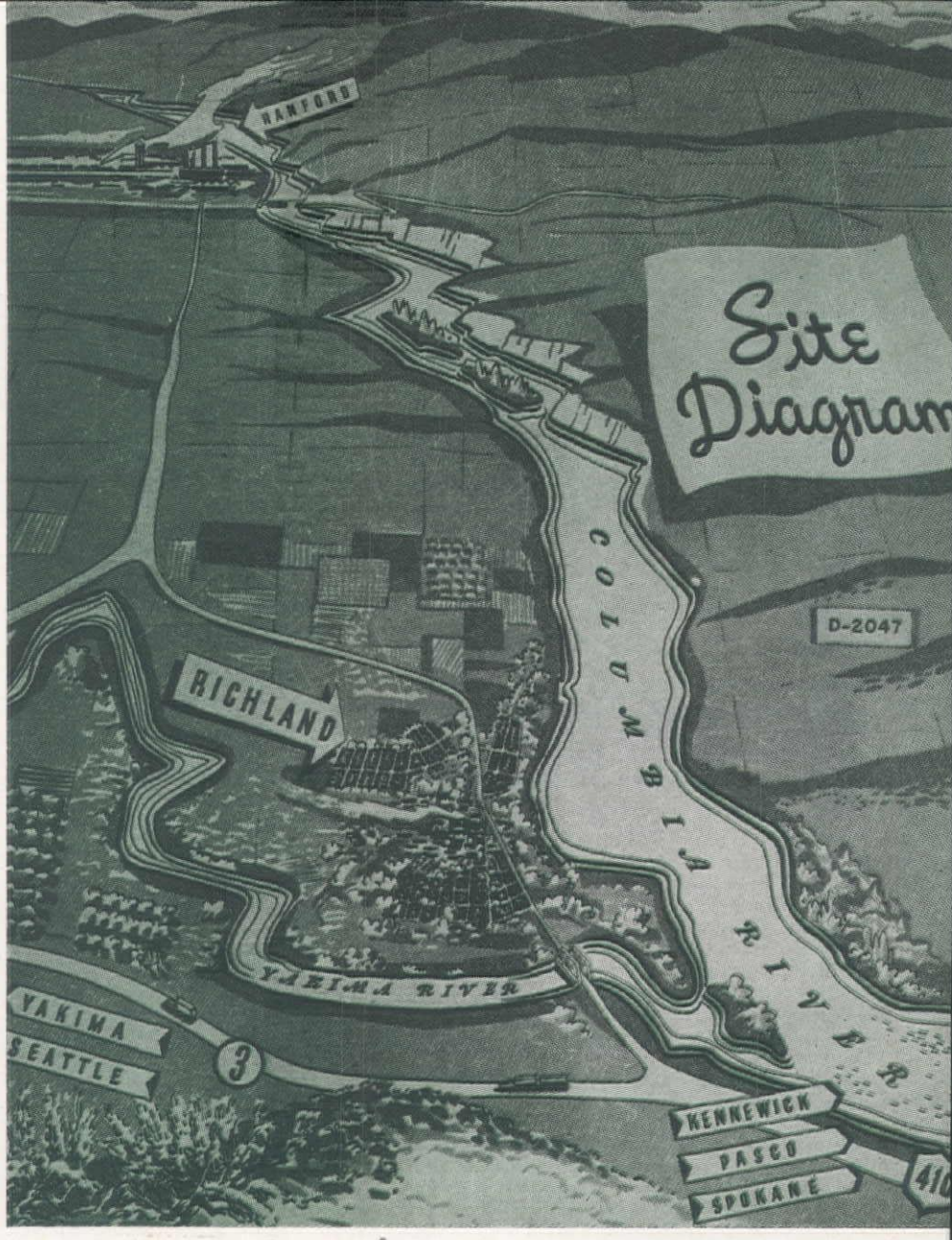
E. I. du Pont de Nemours & Co. were called in by the government to construct and operate the units because of their outstanding experience in chemical and explosives manufacture. Some adequately qualified organization had to translate the results of the theoretical scientific research carried on at the University of California and other colleges into working formulas, processes and equipment.

Du Pont contract

Du Pont's construction contract was cost-plus-fixed-fee, and the fee was $1. All the bills were paid directly by the government, and plans, formulas, equipment and everything else belong to the War Department. Subcontractors got their money directly from the government, not from the prime. Only the subs were in a position to make any profit.

According to Walter S. Carpenter, Jr., president of du Pont, "the specific responsibilities assumed by the du Pont company were to engineer, design, and construct a small-scale semi-works at the Clinton Engineer Works in Tennessee, and to engineer, design, construct, and operate a large-scale plant at the Hanford Engineer Works in Washington. * * *

"In the time and with the information available, the Clinton semi-works could not be designed to be an early edition of the Hanford production units, as would have been the normal procedure. Therefore, the Hanford units had to be designed, constructed, and operated without major guidance from Clinton experience. However, the Clinton semi-works proved to be an extremely important tool in the solution of the many completely new problems encountered at Hanford."

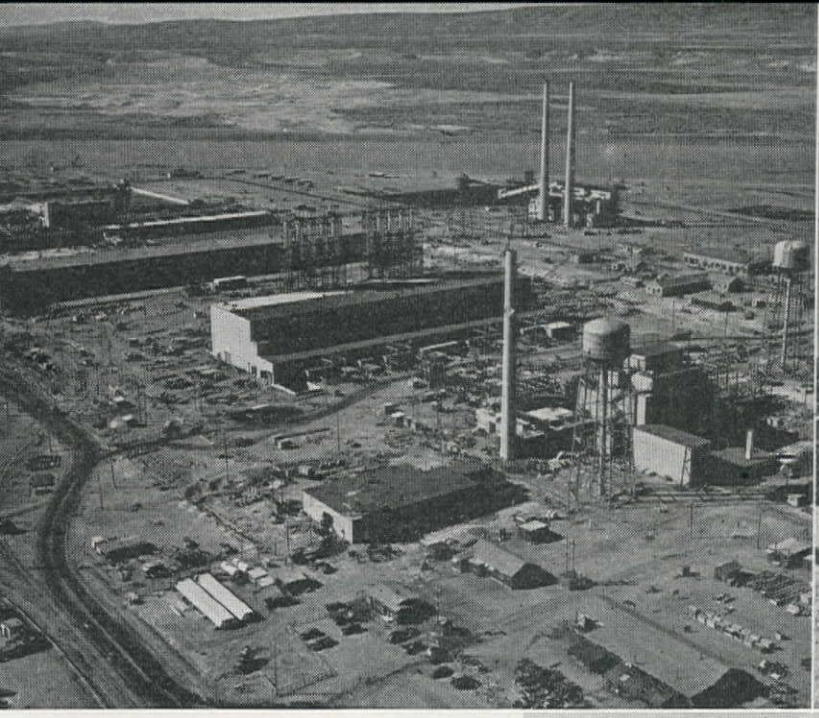


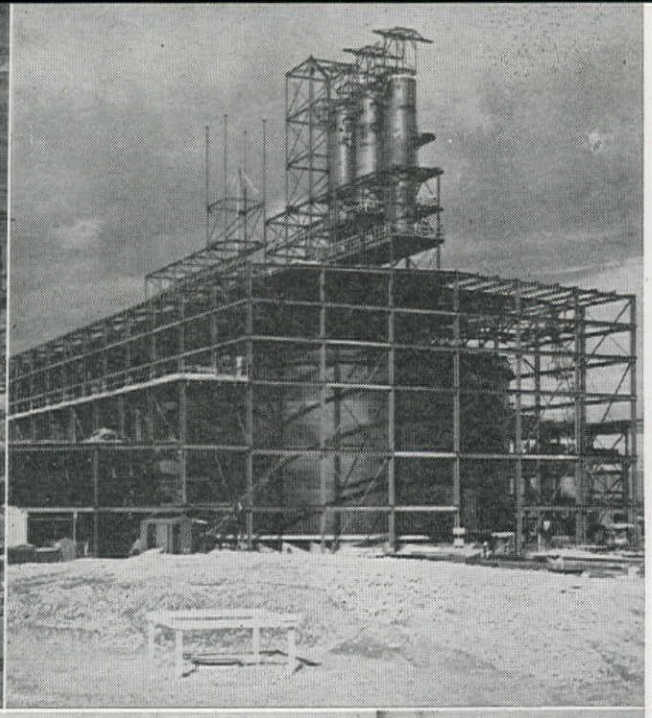
Terrific quantities

On the 631 sq. mi. in the government reservation at Hanford there was constructed 345 mi. of permanent highway, 158 mi. of railway, 123 of which were permanent, 554 buildings, excluding service buildings and those in the town of Richland, and 230 mi. of pipeline, exclusive of larger size water pipe and stainless steel process piping. The construction of these facilities necessitated excavation of 25,000,000 cu. yd. of earth and the pouring of 784,000 cu. yd. of concrete. Construction equipment used totaled 8,600 major items, and 40,000 carloads of material were received in all.

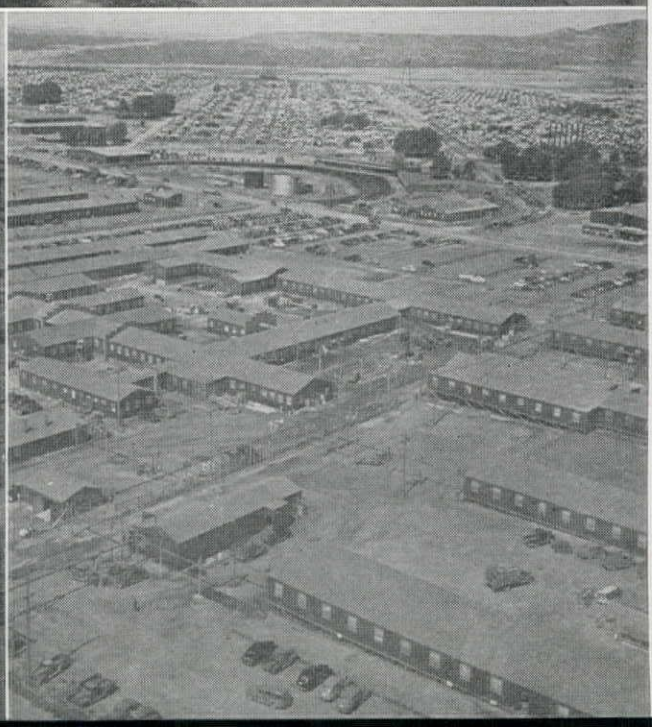
Continuing the astronomical figures, there are 1,200 transformers in the plant, having a total capacity of 142,750 kva.; power, light and telephone poles number 11,200, and 220 carloads of stainless steel were used. Because of the shortage of bricks, 1,470,000 concrete blocks and 768,000 concrete bricks were used in the various buildings. In the same structures, there are 20,000 tons of structural steel, 20,000 tons of reinforcing steel. The plant was one of the major wartime users of lumber, 1,600,000 bd. ft. being used during the construction period.

The safety record in this huge construction project was another almost inconceivable record when considered in proportion to the total man hours of work. Although 45,000 workers were employed at the peak of construction activities only 17 deaths were recorded,





TYPICAL CONSTRUCTION at the Hanford Engineer Works, Washington, cradle of the atomic bomb. Above, an airplane view which indicates the intensity of construction operations; upper right, steel tanks used in the atom-cracking process housed in structural steel building, which was erected around the tanks after they were installed; right, typical building construction, showing the extremely heavy reinforcing. In some cases the concrete building walls were several feet in thickness; bottom, two pictures of different sections of the construction town of Richland, built entirely within the Hanford Engineer Works enclosure, which totalled over 600 sq. mi. in area. At the peak, Richland had a population of 60,000. Trailer homes in background.



of which 5, it is believed, may be charged to heart failure and are therefore not directly attributable to the project.

Tanks

A tremendous number of tanks was required for handling the great variety of liquids. These containers were built of steel, stainless steel and concrete, as required by their anticipated use, which also dictated the lining of many of them, lead, sheet rubber and bituminous compounds being variously used.

The largest tank on the project was a 25,000,000-gal. fresh water storage tank filled direct from a pump house in the river. This tank is divided into two parts, one holding 10,000,000 gal., the other 15,000,000 gal. The floor of the tank was poured as a slab and reinforced with paving mesh. The side walls were excavated to a 1:1 slope and covered with reinforced slabs of gunite. Because of the size of the reservoir and the extreme heat changes in this region, much thought was put into water-proofing the joints between these slabs. A rubber bellows expansion joint backed up and reinforced with bitulithic compound was the system finally adopted.

The great demand for water is occasioned by the necessity for cooling the various processing units. In the physio-chemical processes involved in the realignment of neutrons in unstable elements, a terrific amount of heat is generated, and this must be dissipated. Not only are great quantities of cool water required but settling and cooling tanks are necessary before the water can be discharged back into the river.

Buildings

The finished major buildings at Hanford Engineer Works are rectangular structures, 800 ft. long. Because of the extremely dangerous character of the materials handled in these buildings enormous quantities pass through them without any human eye ever seeing the operation, it being remotely controlled by electric action directed from huge panel boards in central control headquarters.

One of the most interesting buildings is of such tremendously heavy construction that it alone contains 10,000 cu. yd. of concrete. There are huge apartments of solid reinforced concrete and every operation is done by indirect control and watched from indirect observation posts. A particularly interesting construction technique was employed in placing the roof of this building.

The building is covered with reinforced concrete roof slabs 3 to 4 ft. thick. In order to avoid the use of the huge amount of timber shoring which would be required to support this weight of concrete during the pouring operations, the craneway rails mounted on the inside walls for the ultimate purpose of carrying great traveling cranes were used to support a steel truss. Toggle joints were fitted to this truss so that it could be lifted into the exact position for supporting the timber forms into which the concrete for the roofing slabs was poured. When the concrete was set, the forms were removed, the truss lowered 4 in. by means of a jack, and moved along the craneway rails to the next pouring position.

PERHAPS most amazing among the many almost unbelievable facts associated with the atomic bomb plants at Hanford, Wash., and Los Alamos, N. Mex., was the complete secrecy which was maintained by engineers, workers, the press, and residents of the adjacent areas. Everyone knew some great thing was under way, but absolutely no one had any inkling of the exact nature of it. It is said that not over seven people knew the full secret until the first bomb was dropped.

As an interesting sidelight of this operation, the project eventually got its money out of the system because the truss was later sold to the Navy for use in one of its permanent buildings.

Concreting

In pouring concrete, a central batching and mixing plant system was used, thus assuring uniformity of mix and positive control. Central plants were set up in the midst of each important construction area. After mixing, the concrete was delivered by pipeline to those structures within convenient range of the central plant, usually embracing from 25 to 30 per cent of the total concrete poured in the particular area. For the more outlying structures in the area covered by each central plant, transit mixers were used for delivery.

Most actual placing of concrete was performed by pumpcrete machines, which were found very effective in large continuous pours and for getting the material into obscure places. Whenever possible, the mixed concrete was put directly in the pumpcrete machines by the pipeline from the mixer.

The installation at Los Alamos, N. Mex., was much smaller than that at Hanford. Included in the laboratory area are the buildings originally occupied by the Los Alamos Boys School and 37 new buildings. In addition, 200 other buildings related to the atomic operations were erected and accommodations for housing about 7,000 people, including workers and their families.

The Public Roads Administration allotted $4,965,200 in emergency funds to construct and maintain roads to, in, and around the three atomic bomb plants. Of this sum $975,300 was spent in the vicinity of Richland, Sunnyside and Moxee, Wash., and another $573,300 was used to construct an access road to the New Mexico works.

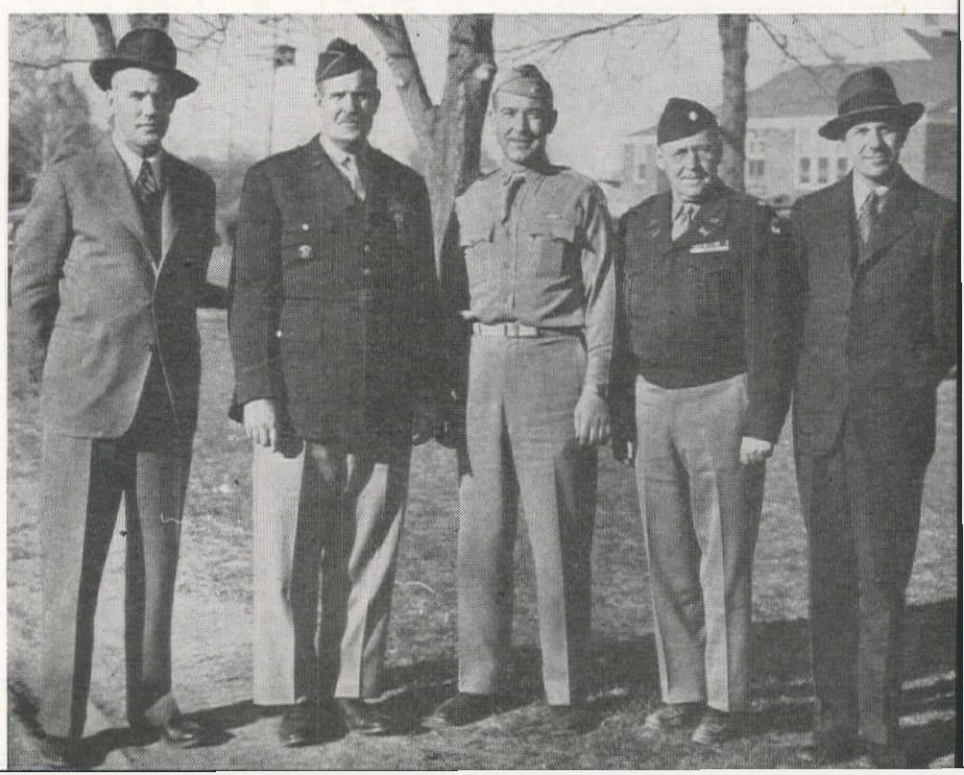
The Federal Works Agency also spent $3,761,400 in Lanham Act funds for construction and operation of schools, hospitals and other community facilities in the project areas.

Organization

Assisting Maj. Gen. Groves in directing the activities of the Manhattan Engineer District was Brig. Gen. Thomas F. Farrell. In direct charge for the District at Hanford was Col. Kenneth D. Nichols. Col. Franklin T. Matthias was area engineer at Hanford and his assistant was Lt. Col. B. T. Rogers.

Walter O. Simon was in charge of the du Pont operations at Hanford. Morrison-Knudsen Co., Inc., Boise, Idaho, was the largest subcontractor under du Pont, but practically every important contractor in the West contributed to a greater or less degree to construction of the vast undertaking. On Sept. 19 the Army-Navy E was awarded to the du Pont company for its activities at the Hanford Works.

IN CHARGE of construction at Hanford were, l. to r.: G. B. CHURCH, construction project manager for du Pont; GEN. L. R. GROVES, in charge of the bomb project nationally; COL. F. T. MATTHIAS, area engineer; LT. COL. B. T. ROGERS, deputy area engineer; WALTER O. SIMON, du Pont's plant manager.



Plan Realignment of "Sierra Hump"

Rehabilitation of the original transcontinental rail route over the Sierra proposes constructing 57 mi. of tunnel and electrification of the route, estimated to cost $125,000,000—An annual reduction of $7,667,100 in direct operating cost will amortize the project cost in 27 yr.

ONE OF THE MOST EXPENSIVE railroads to build and most expensive to operate is that section of the original "Pacific Railroad," the first transcontinental line in the United States, which crosses the Sierra Nevada mountains between Sacramento, Calif., and Reno, Nev.

In 1869, when the line was built, the mountain section seemed an almost insurmountable obstacle, and only by supreme courage, superhuman strength and indomitable determination was the task completed. The original construction problems were discussed in *Western Construction News* for June, 1944.

The road, a part of the Southern Pacific system, is still the most heavily traveled transcontinental route, and in spite of its 2.55 per cent grades and 33,000 deg. of curvature, has contributed outstandingly to the war effort. A study has been completed to realign and electrify the line so that tremendous savings in time, motive power, and equipment may be made. About 57 mi. of tunnel would be required in the new plan.

Information for this article prepared by the editorial staff of *Western Construction News* is based upon a survey made by the Kaiser Company, Inc. who initiated the study as a contribution to sound postwar planning. The prospectus was prepared by L. H. Nishkian, prominent western consulting engineer.

Engineer's report

The engineer's report follows:

This is a study to determine whether or not there is an economic justification for the relocation and electrification of the Southern Pacific Railroad from Roseville, Calif., to Sparks, Nev.

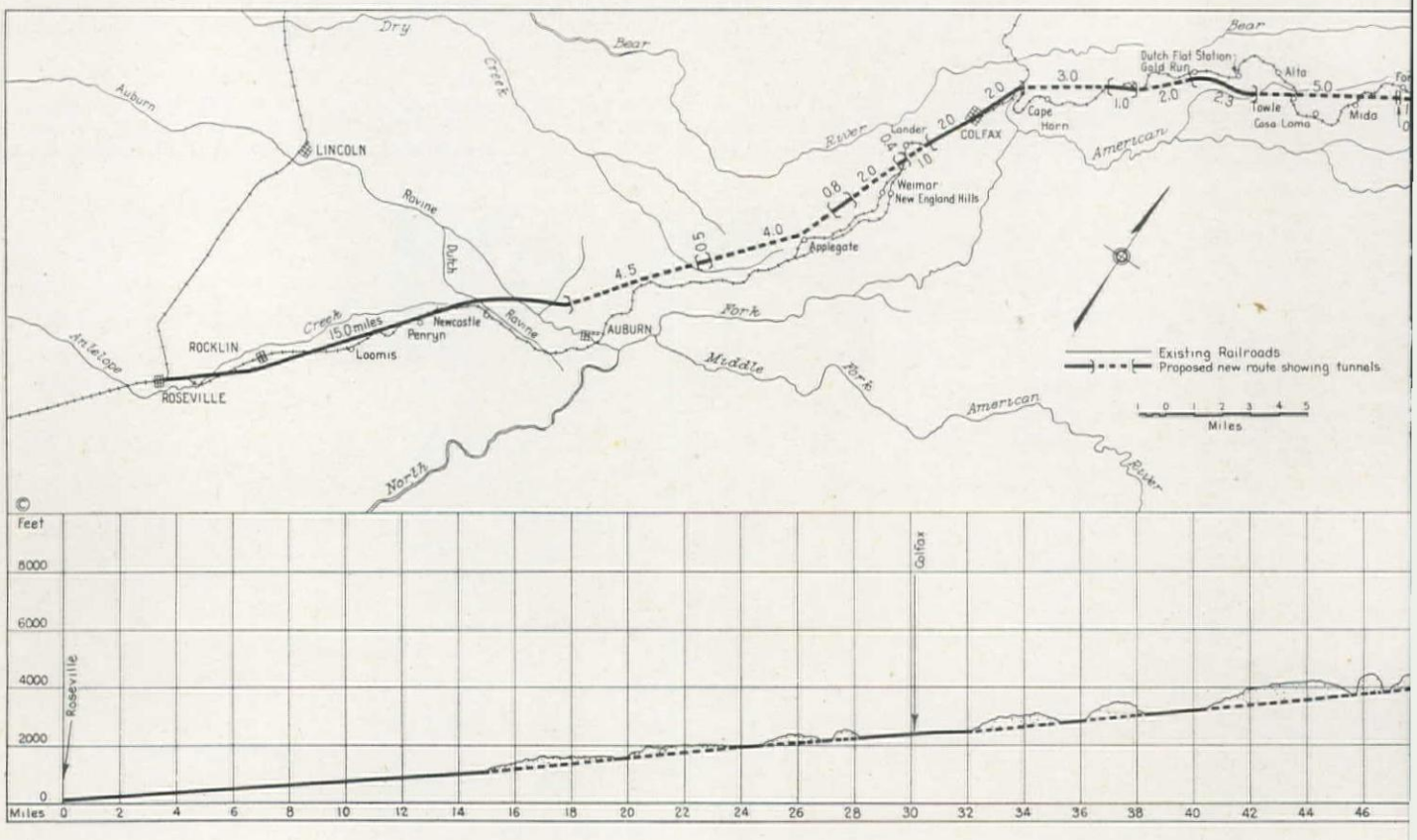
This portion of the railroad is a double track line approximately 138 mi. long. Roseville is one of the largest railroad yards on the Southern Pacific lines, being the terminal point for all traffic from the San Francisco Bay area and the central and northern parts of California. The line starts at Roseville at elev. 162 ft. and climbs approximately 85 mi. to the top of the Sierra Nevada mountains, reaching its peak at Summit, elev. 7,019 ft. From here, it descends approximately 53 mi. to Sparks, elev. 4427 ft.

The line was originally built in the late sixties. At that time, because of limited capital, difficulty in obtaining skilled labor and proper equipment to build tunnels and because of the desire to complete the project in the shortest possible time, the line of least resistance was followed in building the line. A route was chosen that would allow the railroad to climb over the mountains without the necessity of building tunnels, although in a great many instances snow sheds were constructed to cover and protect the tracks from the heavy snow that falls in the area. In order to maintain a maximum established grade of 2.55 per cent it was necessary to follow a circuitous route.

The existing westbound track has 18,630 deg. of curves, and the eastbound 15,005. It is now required to maintain helper engines over 84.5 mi. eastward and 15.9 mi. westward.

Although the route "over the hump" was, at its inception, considered one of the greatest accomplishments in the history of railroad engineering, this combination of grades, curves, snow sheds, etc., now constitutes one of the greatest bottlenecks of the entire system.

The great amount of freight carried over this branch requires the services of some of the largest steam engines ever built. With the increase of freight traffic and the resultant increase in the load in



PROPOSED RELOCATION of the mountain division of the Southern Pacific railway between Roseville, Calif. and Sparks,

each train, many of the original steep grades were eliminated by constructing short tunnels wherever possible. Longer tunnels were not considered because of the great expense of construction and the installation and maintenance of ventilating equipment.

Probable increased need

It can very well be accepted that with the normal increase in population of the State of California and the opening of foreign markets at the end of the war, the West Coast and the city of San Francisco will be the hub of and the distributing point for vast quantities of materials from the entire United States to the foreign markets, notably Russia and the Far East. With the coming of better living conditions, the growing needs for goods and materials, the increase of manufacturing facilities and agriculture in California, and the coming of cheap electric power, it can be assumed that the volume of freight and passenger traffic over this line will be increased several times, making the present facilities inadequate and creating a need for newer, faster and cheaper means of transportation. With the population of California consistently doubling every twenty years and the industrial and agricultural volume increasing by leaps and bounds, it is not impossible that the volume of traffic movement on the Roseville-Sparks division might soon exceed the existing maximum capacity.

Table "A" illustrates the actual rise in population in California compared with the gross tons of freight moved over the Roseville-Sparks district. When plotted, these curves rise within reasonable parallel zones. There is also a proportion, during normal years, of approximately 3,750,000 gross tons of freight to each million of population.

Since the actual population and tonnage curves are more or less parallel, it seems logical to believe that the future freight total will more or less follow the population gain. It is not unreasonable to predict that the over-all gross tonnage of combined freight and passenger service, including locomotives and tenders, should average in excess of 50,000,000 during the next thirty years.

Savings from reduced curvature

In the route selected, it is proposed to eliminate all steep grades as far as possible and all but approximately 1,600 deg. of curves by constructing a series of tunnels and taking advantage of any of the present easy grades. By maintaining a maximum grade of 1.9 per cent and by the construction of tunnels the new line will be practically a straight run. There will be a reduction in the length of the line from 138 mi. to 108 mi.

Elimination of curves in itself constitutes a major saving in maintenance, as wear on curved rails is as much as 300 per cent greater than on straight runs. Repairs increase up to 200 per cent on locomotives and 100 per cent on cars. Fuel, water and other operating costs also rise.

"Fortune" Magazine, issue of December, 1944, has the following to say concerning grades and curves: "The combined handicap of grades and curves has been dramatically revealed by ICC studies that work it out in terms of straight and level miles. The distance from San Francisco to Council Bluffs, Ia., via Southern Pacific-Union Pacific, is 1,830 mi., but curves and grades raise the cost of hauling a load between those points to the cost of hauling the same load over 2,998 mi. of level, straight track. The Western Pacific-Union Pacific route is 121 mi. longer than the S.P.-U.P. route, but easier and fewer curves and grades

SUMMARY
EFFECT OF PROPOSED RAILROAD REALIGNMENT

Item	Existing	Proposed	Saving
Length in miles	138	108	30
Curvature—both tracks	33,000°	1,600°	31,400°
Maximum curve	10°	4°	—
Percentage of curved track	58%	4%	—
Maximum grade	2.55%	1.9%	—
Annual direct operation cost	$12,600,000	$ 4,932,900	$7,667,100
Summit elevation	7,019	6,200	819
Total length of tunnels	—	57.3 mi.	—
Total length of open road	—	50.7 mi.	—
Cost	—	$125,000,000	—
Maximum number of years to amortize	—	27	—

Nev. The plan and profile, shown below, indicates graphically the large reduction in track curvature by the use of tunnels.

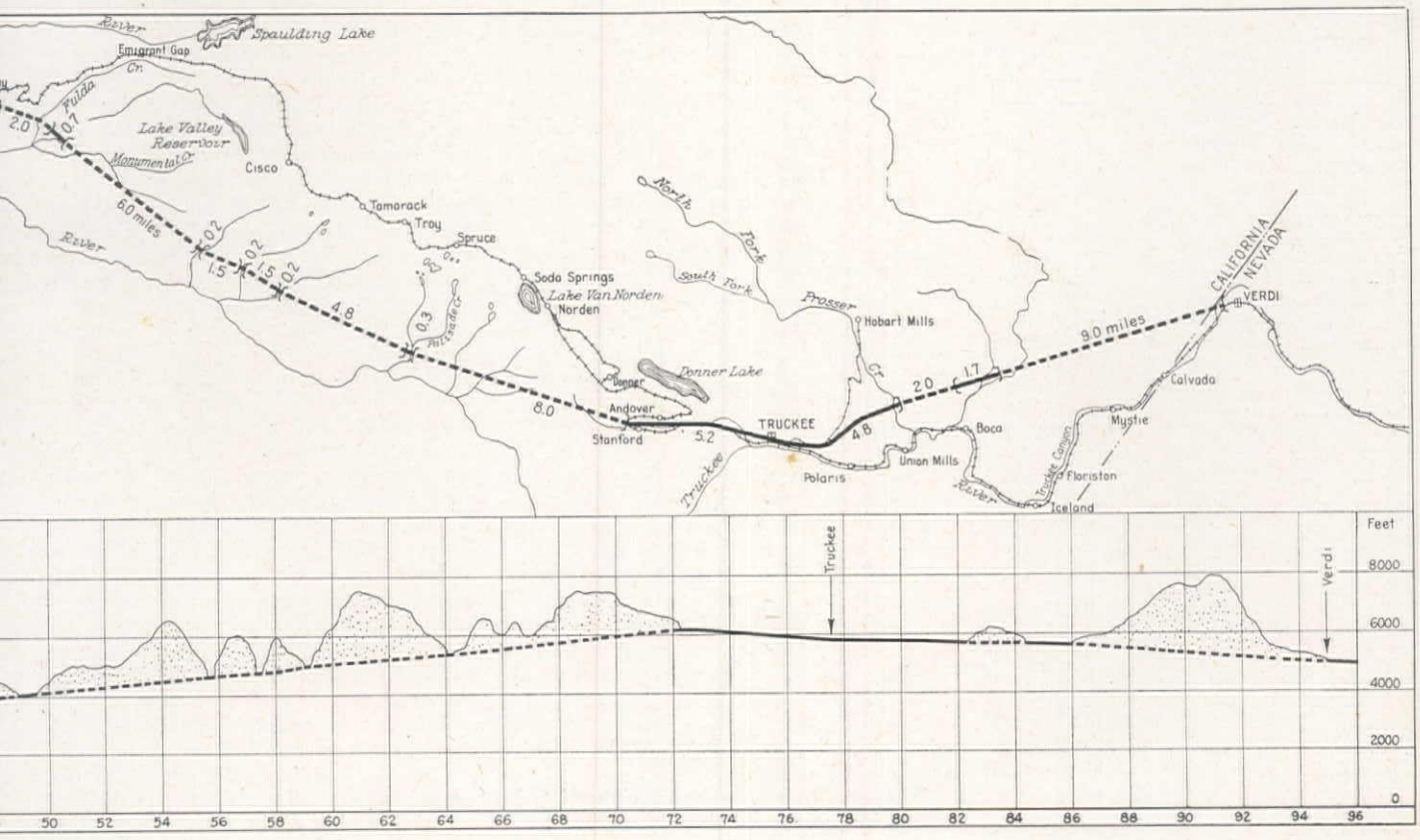


TABLE "A"

Year	Population	Gross Tons Roseville-Sparks District, including freight, passengers, tenders and locomotives
1900	1,485,953	.....
1901	1,559,000	.....
1902	1,629,000	.....
1903	1,687,000	.....
1904	1,766,000	.....
1905	1,859,000	.....
1906	1,965,000	.....
1907	2,040,000	.....
1908	2,112,000	.....
1909	2,251,000	.....
1910	2,377,549	.....
1911	2,453,000	.....
1912	2,595,000	.....
1913	2,729,000	.....
1914	2,883,000	.....
1915	2,960,000	.....
1916	2,990,000	.....
1917	3,003,000	.....
1918	3,120,000	.....
1919	3,183,000	.....
1920	3,426,861	.....
1921	3,706,790	.....
1922	3,949,040	.....
1923	4,183,990	.....
1924	4,615,320	.....
1925	4,762,750	17,180,800
1926	4,963,020	19,018,344
1927	5,132,080	19,943,238
1928	5,305,250	21,566,603
1929	5,446,650	20,864,064
1930	5,677,251	19,167,399
1931	5,812,000	16,698,397
1932	5,946,000	15,137,477
1933	5,902,000	14,017,483
1934	6,015,000	16,186,669
1935	6,031,000	16,731,503
1936	6,135,000	19,140,731
1937	6,453,000	22,461,210
1938	6,687,000	18,142,502
1939	6,755,000	19,203,815
1940	6,907,387	20,675,030
1941	7,070,000	25,987,599
1942	7,425,000	35,017,258
1943	7,795,000	42,882,818
1944	8,500,000	55,700,000*
1945	8,750,000	.....
1946	9,500,000	.....
1947	9,750,000	.....
1948	10,000,000	37,500,000*
1949	10,400,000	39,000,000*
1950	10,800,000	40,500,000*
1951	11,200,000	42,000,000*
1952	11,500,000	43,125,000*
1953	12,000,000	45,000,000*
1954	12,600,000	47,250,000*
1955	13,100,000	49,125,000*
1956	13,600,000	51,000,000*
1957	14,100,000	52,875,000*
1958	14,800,000	55,500,000*
1959	15,250,000	57,000,000*
1960	15,800,000	59,250,000*
1961	16,400,000	61,500,000*
1962	17,200,000	64,500,000*
1963	17,800,000	66,750,000*
1964	18,600,000	69,750,000*
1965	19,400,000	72,750,000*
1966	20,100,000	75,375,000*
1967	20,800,000	78,000,000*
1968	21,700,000	81,375,000*
1969	22,600,000	84,750,000*
1970	23,500,000	88,125,000*
1971	24,400,000	91,500,000*
1972	25,100,000	94,125,000*
1973	26,100,000	97,875,000*
1974	27,500,000	103,125,000*
1975	28,500,000	106,875,000*
1976	29,600,000	111,000,000*

*Estimated.

reduce the cost factor to the equivalent of 2,923 straight level miles."

The line under analysis will consist of a series of tunnels, a total of 57.3 mi. in length, plus 50.7 mi. of open road. The longest tunnel will be 9 mi. in length. Because of electrification it will not be necessary to ventilate these tunnels, thereby saving vast installation and maintenance costs. The tunnels will be double-track, approximately 31 ft. wide by 27 ft. 9 in. high, with a concrete lining 9 in. to 15 in. thick. The use of tunnels practically eliminates the necessity for snow sheds and the enormous cost of maintaining these sheds, together with fire patrols and lookouts.

Electrification

The power for electrification will come from outside sources. The Central Valley Project and the Army Flood Control dams, most of which will be completed by the time this would be ready, will provide cheap and plentiful power, making it superfluous to build special dams or power houses. Cheap power is a tremendous advantage in an age of rising fuel costs. It also eliminates the problem of transporting fuel.

It is estimated that the proposed new system will use approximately 138,000,000 kw. hr. annually at a cost of up to $1,500,000, depending on power factor, as against a probable fuel cost under steam traction of $3,000,000 for an estimated future tonnage of 50,000,000 tons.

The Virginian Railroad, which electrified 134 mi. of its road, found that on this run it saved 66 per cent on train personnel against steam operation, 66 per cent on locomotive repairs and 50 per cent on fuel. These savings were made without changing either alignment or grades. Being close to the source of coal, its cost to the Virginian Railroad is very low. It is significant that, despite this economic advantage, this road elected to use electric power and showed a 50 per cent saving on fuel costs. Power is cheaper in California than Virginia. It is reasonable to believe that the power saving in the route under discussion would therefore be greater than 50 per cent.

Saving in time

In our study we are considering actual costs in relation to the feasibility of this project, but it must be considered that reducing the running time of the line is an important factor to be taken into consideration, even though no dollar value is placed on it.

Due to reduction of mileage, grades and curves, savings in time can be made which are limited only to the speed with which man can operate trains. The streamliner City of San Francisco, as an instance, now operating over this line in approximately 4 hr. 15 min., should traverse the new route in about 2 hr. Freight trains, which now consume almost 10 hr. on the route, should save not less than 5 hr. By cutting the running time in half, the capacity of the track will be doubled.

There will be an over-all reduction in operation costs and time saved in carrying perishable goods. The State of Nevada, with its possibilities as a playground, the city of Reno, and the Lake Tahoe area will be readily accessible. Running time to the eastern part of the United States can be materially reduced, thus speeding up the movement of passengers and mail as well as freight. Thus the matter of competition with the private automobile, bus and airplane will, in no small way, be partially met. It is a certainty that any postwar transportation, in order to survive, will have to be rapid, efficient and competitive in cost.

The fall of the railroad from elevation 6,200 ft. to elevation 162 ft. will permit the economical use of regenerative braking. It is estimated that in this manner possibly 25 per cent of the power requirements would be returned to the power line. The feature of power conservation is of major importance on a line of this profile. However, other important features would be the smooth handling thus afforded heavy trains descending the grades, the reduction of wear on the braking equipment and rails, and the greater margin of safety afforded by supplementing the function of the air brakes with an entirely independent retarding mechanism.

The new line is laid out almost entirely apart from the existing line and will not interfere materially with the present traffic while being constructed. It passes through or is immediately adjacent to all important towns now located on the present line and will not isolate any major population centers. It is proposed to maintain the existing section from Verdi to Sparks with minor changes only.

Freight costs

The present cost of hauling freight over the Roseville-Sparks division was determined by a method devised by C. E. Day, Engineer in Charge, Bureau of Transportation Research, Southern Pacific Railroad. This method has been used before the Interstate Commerce Commission and other rate determining agencies.

The expenses of conducting rail transportation may be properly divided into two groups, indirect and direct expenses. Indirect expenses are frequently referred to as fixed or overhead expenses and, by definition, are unaffected by changes in the movement of any particular commodity. On the other hand, "direct" or "out of pocket expenses" are presumed to vary in direct proportion to changes in the volume of movement. By being unaffected by variations in the volume of traffic moving, the indirect expenses become charges, as distinguished from costs, which cannot be laid against any particular service. Indirect expenses represent the responsibility which the management assumes and hopes to meet out of the margin between the gross receipts from all traffic and all direct expenses.

Direct expenses are analyzed by what is commonly referred to as the "Eight Point Method." It subdivides the direct expenses and determines the unit cost of performing eight distinct and differ-

ent elements of service in order to reflect costs when performed under different operating conditions. By the application of these eight units of cost data to particular shipments, it is possible to reflect a difference in cost due to the amount of switching required, the number and size of road locomotives employed, the size of trains regularly operated over each district encountered, the size of the shipment, the type and weight of equipment, the movement of empty equipment and the length of the haul. The items in the eight-point formula are: yard engine hours, locomotive miles, locomotive ton-miles, train miles, trailing gross ton miles, revenue net ton miles, car miles (excluding caboose), and revenue carload. The foregoing items are standard items listed in annual reports of all first class railroads to the Interstate Commerce Commission.

The direct operating expenses are prorated to these various items by a method devised by Mr. Day and from a schedule of percentages in Table 2103 of the Manual of the American Railway Engineering Association. To these totals are added 5¾ per cent to cover payroll taxes and 4½ per cent for haul of company material (freight proportion). These totals are then divided by the total number of units in each point, the resultant being the unit cost per item. As we are concerned with line haul only, we use 6 of the 8 points, namely: (1) locomotive miles, (2) locomotive ton miles, (3) train miles, (4) trailing gross ton miles, (5) revenue net ton miles, (6) car miles excluding caboose.

Applying the six-unit method to the present district, we arrive at certain conclusions, in which:

138 equals total mi. for district

2,860 equals average train load in gross tons, less engine and caboose

1.86 equals number of engines used to haul one train

808.5 equals weight of 1.86 engines in tons

44.5 equals number of cars per train

18 equals weight of the caboose in tons

28 equals weight of contents of each car in tons

1.5 equals proportion of empty cars in train

64 equals weight of each car and contents in tons.

NOTE.—All figures are taken from Southern Pacific Co. records for year 1941.

Amortization of costs

The justification of these costs and their amortization are dependent upon the savings brought about by the proposed relocation and electrification of the route. These savings are reflected in the following figures:

Estimated traffic—50,000,000 gross tons yearly. (Average for next 30 years)

Cost per gross ton over existing Roseville-Sparks district, 25.2c.

Item	Totals	Total Costs	Unit Costs
1. Locomotive miles, including train switching	30,537,643	$ 8,869,330	$0.2904 each
2. Locomotive, ton-miles (in thousands) including train switching	8,432,612	28,648,191	3.40 per 1000
3. Train miles, including train switching	24,793,145	14,707,280	0.593 each
4. Trailing gross ton-miles (in thousands)	53,839,359	6,669,985	0.124 per 1000
5. Revenue net ton-miles (in thousands)	18,820,306	1,879,742	0.100 per 1000
6. Car-miles, excluding caboose, (in thousands)	1,313,260	13,008,991	0.00991 each

From the foregoing, the following costs for the total run of 138 mi. are deduced:

1. 144.9 locomotive mi. x 1.86 x 0.2904 equals ..... $ 78.27
   (wherein 144.9 is the total of 138 mi. plus 5% of 138 mi.)
2. 144.9 x 808.5 divided by 1000 x 3.40 equals 398.31
3. 138 train mi. x 0.593 equals 81.83
4. (2860 plus 18) x 138 divided by 1000 x 0.124 equals 49.24
5. 44.5 x 28 x 138 divided by 1000 x 0.100 equals 17.19
6. 44.5 x 1.5 x 138 x 0.00991 equals 91.29

Total cost of 138 mi. haul equals $716.13

From this the cost of hauling 1 car 138 mi. can be arrived at by dividing the total cost of $716.13 by 44.5, equals 16.09

The cost per gross ton for moving car and contents over the district is derived by dividing $16.09 (the cost of hauling 1 car complete with contents) by 64, equals ..... 25.2¢

The next consideration is the estimated cost of the new route, which is shown in the following figures:

Item	Unit	Unit Cost	Quantity	Total Cost
Tunnels	Miles	$1,400,000	57.3	$ 80,200,000
Tracks, including sidings	Miles	35,000	220	7,700,000
Signal System	Miles	15,000	95	1,425,000
Rights of Way	Lump Sum	—	—	500,000
Grading and Culverts	Lump Sum	—	—	5,675,000
Electrification	Miles	111,111	108	12,000,000
Motive Power	3-cab electric locomotives	300,000	20	6,000,000
TOTAL				$113,500,000
Contingencies, engineering and interest during construction				11,500,000
				$125,000,000

50,000,000 x 25.2c equals $12,600,000, direct cost of present steam operation.

138 existing mi. less 108 proposed mi. for the new route, equals 30 mi. shortened, a saving in actual run of 21.7%.

A careful consideration of savings effected through reductions in the cost of maintenance of way and equipment, reduction of train personnel, fuel costs, time of operation, number of locomotives, replacement of brake shoes, engine house expense, etc., shows a net saving in operating cost on the proposed line with electric power of 52.5%. A factor of 50% has been used in this report, being considered a safe and conservative figure.

From these savings, the following totals are arrived at:

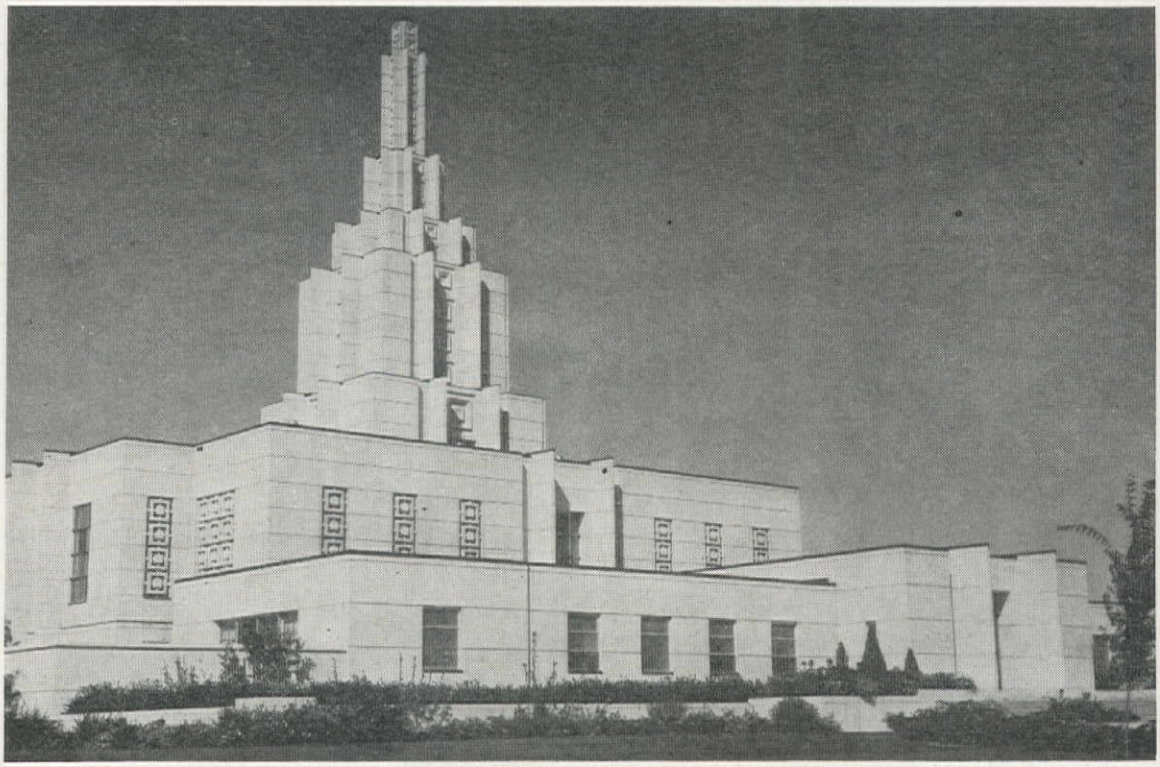
$12,600,000 x 21.7% equals $2,734,200 (saving in mileage); ($12,600,000–$2,734,200) x 50% equals $4,932,900 (saving in electrification). Total yearly saving, $7,667,100.

Based on the foregoing cost of $125,000,000 and annual saving of $7,667,100, it is found that the project will amortize itself, at a 3 per cent rate of interest, in slightly less than 23 years; at 3½ per cent in 25 years, and at 4 per cent in 27 years.

Whereas these figures have been determined only after comprehensive and careful study, it must be realized that actual costs will depend largely upon conditions at the time the project is undertaken. Costs may be more or less than those shown. On the other hand, savings and other figures should increase or decrease within comparable ranges.

It is seen, therefore, that the project should pay its own way over a reasonable period of years, thus substantiating its economic justification. Beneficial results to its backers, the railroad, business in general and the public would be numerous and comprehensive in addition to the savings in time and operation costs. In this manner, the railroad, which played no small part in founding the great empire of the West, will be an instrument of its future development and perpetuation.

New Temple for Idaho Falls



Modernistic Latter Day Saints Church constructed at Idaho Falls uses marble imported from Italy, France and Sweden for lobby and altars—Temple exterior is cast stone held in place with metal ties and anchors—Cost nearly a million dollars

By HOWARD TIPPETTS
Idaho Falls, Idaho

A BEAUTIFUL and impressive temple has just been completed at Idaho Falls, Ida., by the Latter Day Saints Church. Dedication of the modernistic structure was on Sept. 23, 1945.

Surveying of the site for the Idaho Falls temple began Sept. 20, 1937, and the construction began on Dec. 19, 1939. Construction was completed in the spring of 1945 at the cost of nearly one million dollars. About 50,000 people toured the temple when it was thrown open for public inspection. It is now closed to all except certified members of the L. D. S. Church.

Preliminary work

The site for the temple was decided upon by the first presidency of the church, Heber C. Grant, President. Part of this site was unimproved sand hills, and part was improved and occupied. This site was selected because of its proximity to the L. D. S. Hospital on the bank of the Snake River. With the aid of the Idaho Falls Chamber of Commerce, thirty-nine separate parcels of land, totaling seven acres, were purchased. It was anticipated at the first appraisal that the cost of the site would be about $16,000, but later purchases of adjoining property brought this figure considerably higher.

Architects who planned the structure include John Fetzer, Edward Anderson, John Fetzer, Jr., Lorenzo S. Young and Ramm Hansen, all members of the Temple Board of Architects, and residents of Salt Lake City, Utah. E. Milton Christensen, Salt Lake City, was supervising engineer, and Justin Knapp was regional work director for the project.

Contracts awarded

The contract was let for excavation for 23½c per cu. yd. Plans called for excavating to the dimensions of the building and 18 ft. deep. This was all accomplished during the winter months of 1939-40. At this depth a bed of solid lava is encountered, making an excellent foundation. During the month of March, 1940, 56 test holes were driven in the lava bed, 12 of them 10 ft. deep, and 44 of them 5 ft. deep. They disclosed that the rock was of excellent quality and not unduly cracked or seamed.

On July 15, 1940, the contract for the building was let to Bird Finlayson of Pocatello, Idaho, and actual construction work began Aug. 5.

Work continued all through 1941, and by September of that year, all of the outside work was complete. All tiling and marble was set and electric work and plumbing installed.

Principal dimensions

The temple center line bearing is north 14 degrees west. The building proper is 131½ ft. long and 95½ ft. wide. Rising from the center of the main building is a tower 37½ x 37½ ft. at the base and 143 ft. high, designed in the most modernistic style. The annex to the temple measures 34 ft. by 172 ft. 8 in. The assembly room connecting the annex with the main building is 36 by 53 ft.

In the basement of the building is the baptismal room, with a tiled font resting on the backs of 12 white bronze oxen, in the center of the room. Paintings on three walls of the baptistry are of baptismal scenes, and are the work of Lee Green Richards of Salt Lake City.

Among the 115 rooms and halls in the temple are the bride's room, locker rooms, groom's room, telestial, terestial and celestial rooms, two sealing rooms where marriages are performed, the

family sealing room, steam laundry and cafeteria.

Special features

Utah bird's-eye marble frames the interior of the east entrance. The main lobby is of French marble. The altar of the garden room is of Italian marble, and the altar in the world room is of Swedish marble. All of this stone was imported previous to the war. All doors are made of birch, oak or bronze.

The exterior is composed of cast stone, manufactured in Salt Lake City, being cast in slabs 2 in. thick. Masons set them in place, with metal ties and anchors holding them in position, where they acted as the outside form for the 16-in. reinforced concrete wall. The interior forms were of timber. By continuous erection of this dual formwork, the walls of the building became practically monolithic.

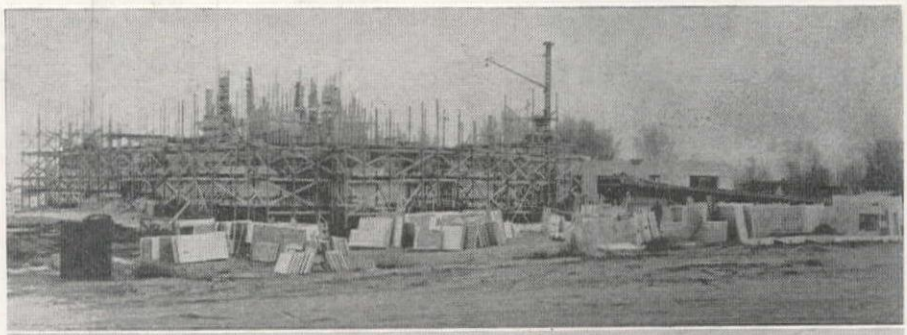
One of the distinguishing features is the elimination of interior stairways, and the installation of an automatic elevator. There are only two slight steps in the building, from one ordinance room to the other.

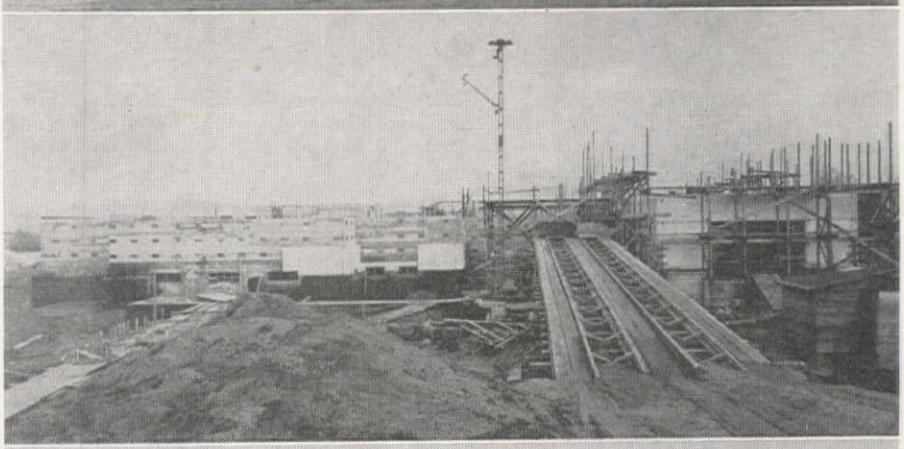
Another unusual feature of the building is the heating system. The L. D. S. Hospital, nurses' home and temple are all heated from one central steam heating plant, bringing about a considerable economy in the heating at all three large buildings. The temple is air conditioned, and illuminated with fluorescent lights throughout.

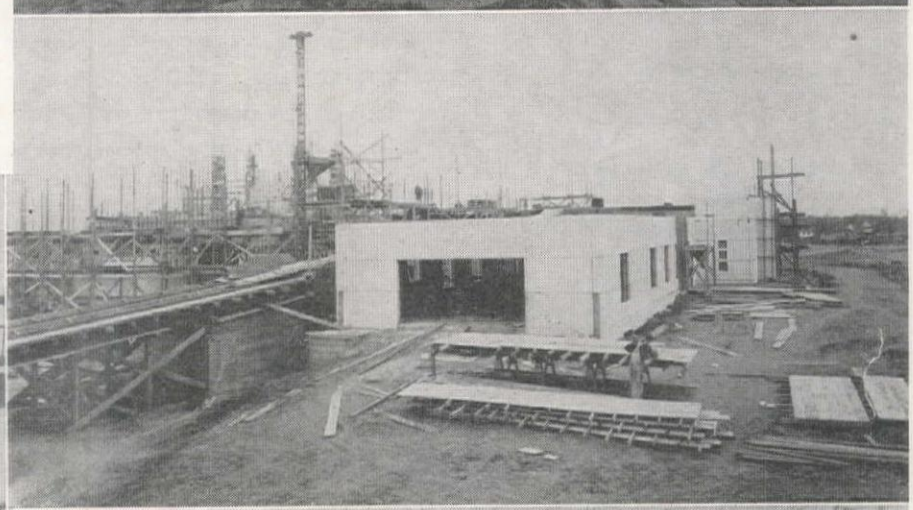
Quantities and costs

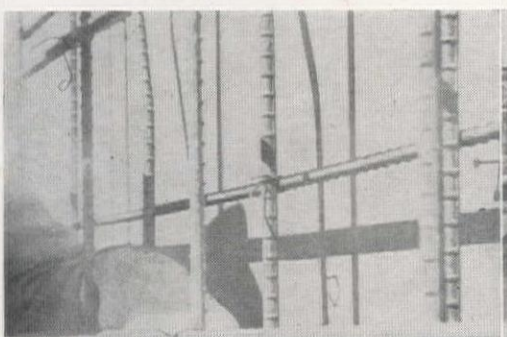
There are in the foundation and walls

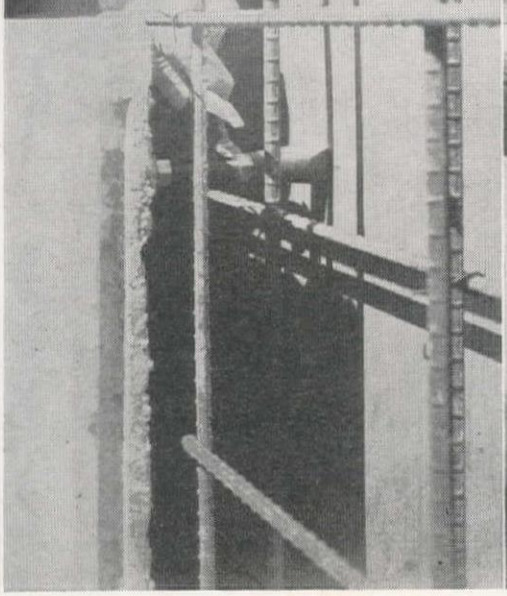
FIRST STORY FORMS in place—building stone stacked in the foreground, top. Delivery ramp facilitates pouring transit mix concrete for the building walls, two. South annex to the Temple shows cast stone in place to make exterior forms for the stone-faced walls, three. A gun, used by the stone fitters to seal the cracks between the cast stone exterior blocks, four. Close-up of spreader used in forms, lower left.

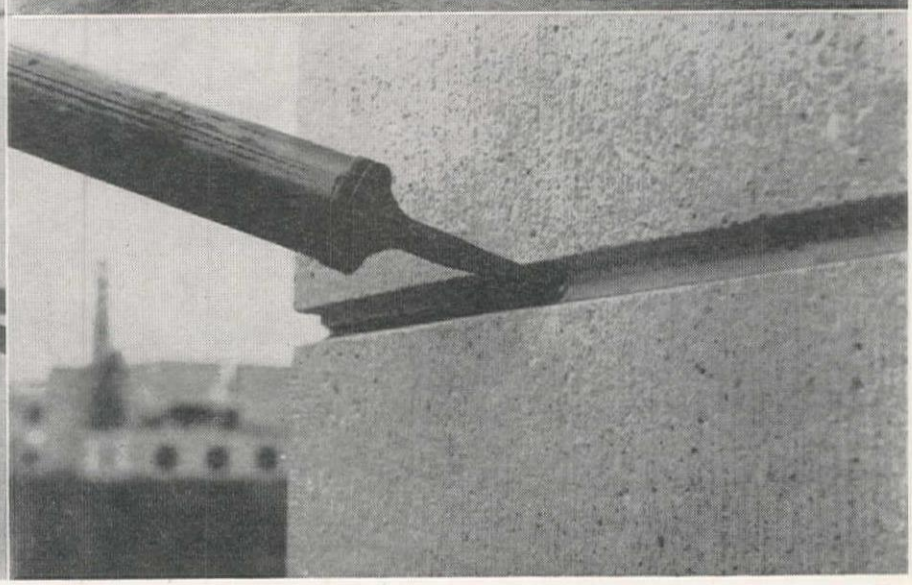


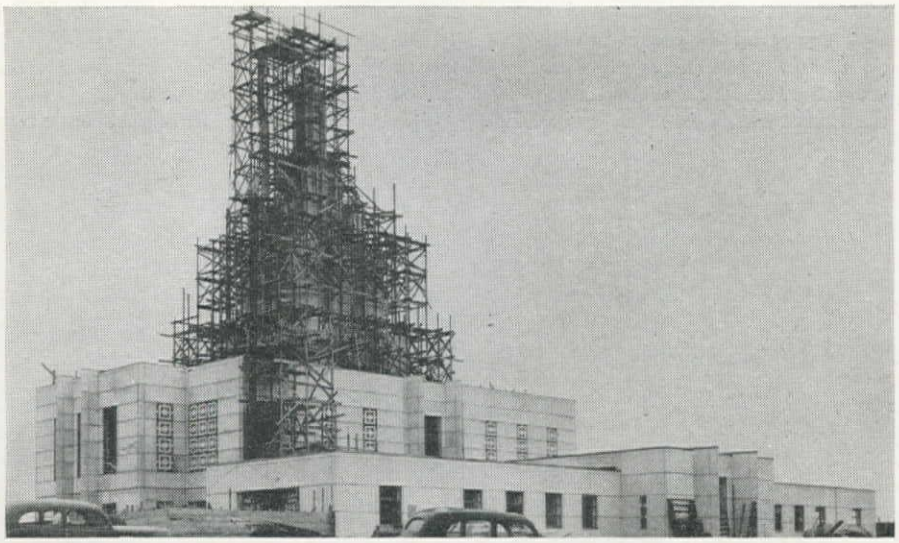












CENTRAL TOWER FORMS rise above the main structure. The tower is 37 ft. square and 143 ft. high. The Temple board of architects who designed the building include: John Fetzer, Edward Anderson, John Fetzer, Jr., Lorenzo S. Young, Ramm Hansen.

of the structure more than 13,000 tons of concrete, requiring 3,000 cu. yd. sand, 4,500 cu. yd. gravel, and 35,000 sacks of cement. There were 271 tons of reinforcing steel used in the walls.

The following are some of the major detailed costs of the construction:

Concrete (6,168 cu. yd.)	$117,189
Reinforcing steel (271 tons)	33,525
Cast outside stone	63,336
Masonry work	35,800
Ornamental iron and bronze	19,800
Window frames, etc.	11,400
Marble	13,000
Plumbing contract	54,081
Electric contract	29,325
Tile work	11,200
Rubber tiling	7,251

In addition to the above there are such items as paintings, laundry, kitchen and nursery equipment, furniture, carpeting, drapes and landscaping.

New Lumber Treatment Kiln Installed

An all-welded steel retort for the treatment of wooden members used in the construction of permanent docks and bridges is 6 ft. in diameter by 135 ft. long and develops working pressures of 200 psi.—A 29-in. track in the retort allows lumber to be wheeled into the treatment kiln on cars

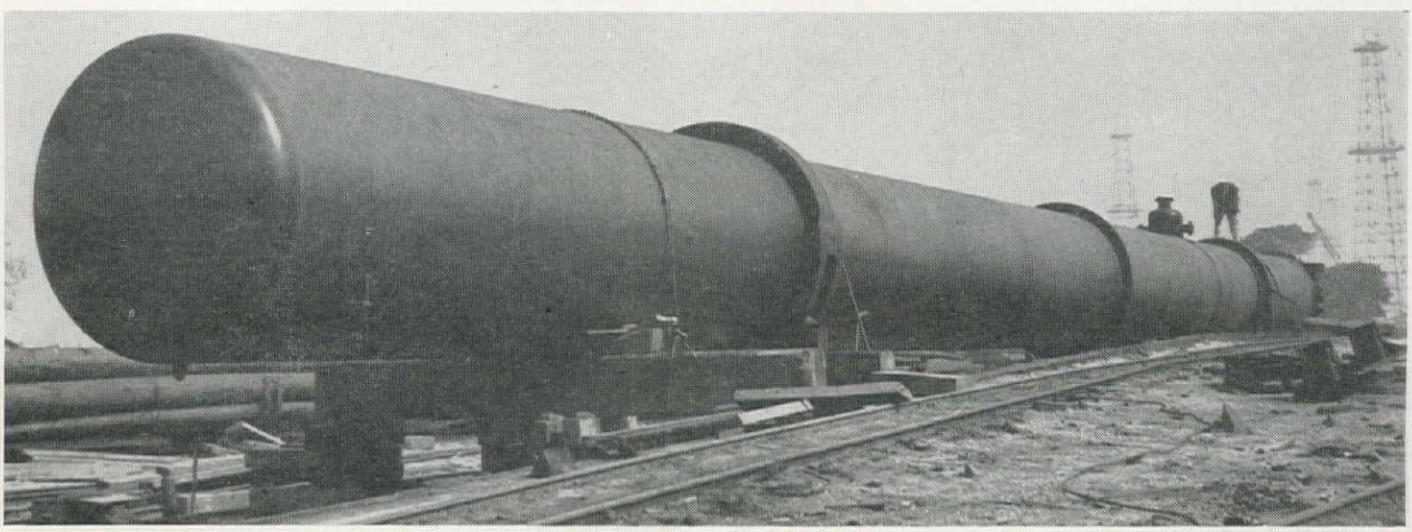
AS A CONTRIBUTION both to the final push of the war effort and to the timber construction field in the post-war days, the capacity of the lumber treating plant of American Lumber & Treating Co. at Wilmington, Calif., was enlarged about 20 per cent when a new 135-ft. pressure-treating cylinder was put into operation at the plant last summer.

The retort, all-welded in construction, was fabricated by Chicago Bridge & Iron Co., and was installed by A. L. & T. Co. forces. It is 6 ft. in interior diameter and made of steel plate 0.83 in. thick. One end is closed, the slightly rounded plate being welded to cylinder.

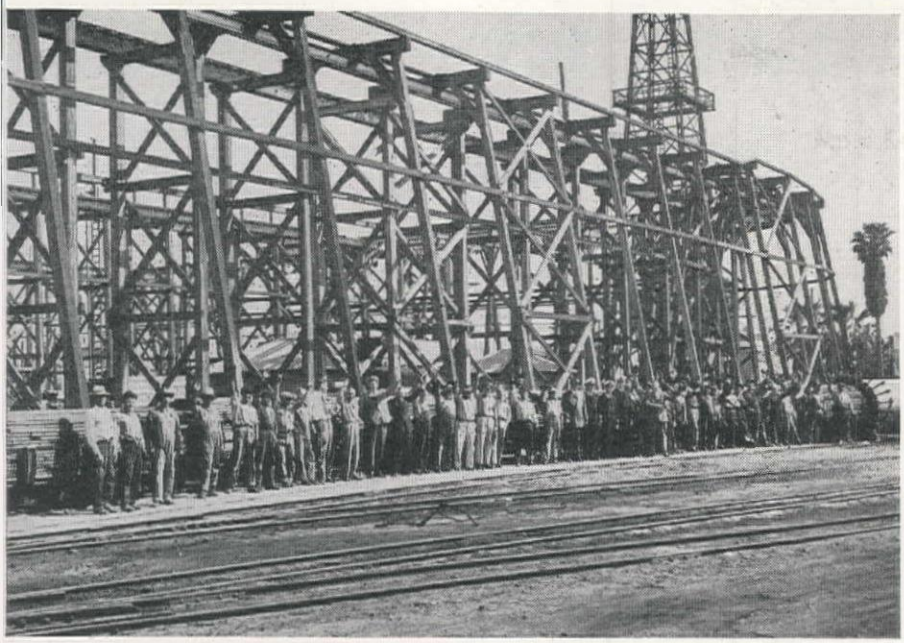
At the other end, however, a hinged door is mounted for admitting and removing the lumber which is to be treated. The lumber is piled on steel cars and shunted in and out of the cylinder as a train. Tracks with a gauge of 29 in. are laid on the bottom of the cylinder to accommodate the cars.

The door is secured, after a string of lumber cars is pushed into the retort, by 26 heavy swinging bolts mounted around the circumference of the cylinder on pinions slipped into anchor blocks welded to the cylinder. When the door is closed these bolts fall into grooved blocks welded onto the circular frame of the door and the nuts are tightened until all possible leakage is sealed off. The ordinary working pressure attained in pressure-treating lumber is 200 lb. per sq. in. The shell and door fastenings conform to the requirements of the A. S. M. E. code for unfired pressure vessels.

One piping dome is welded to the top



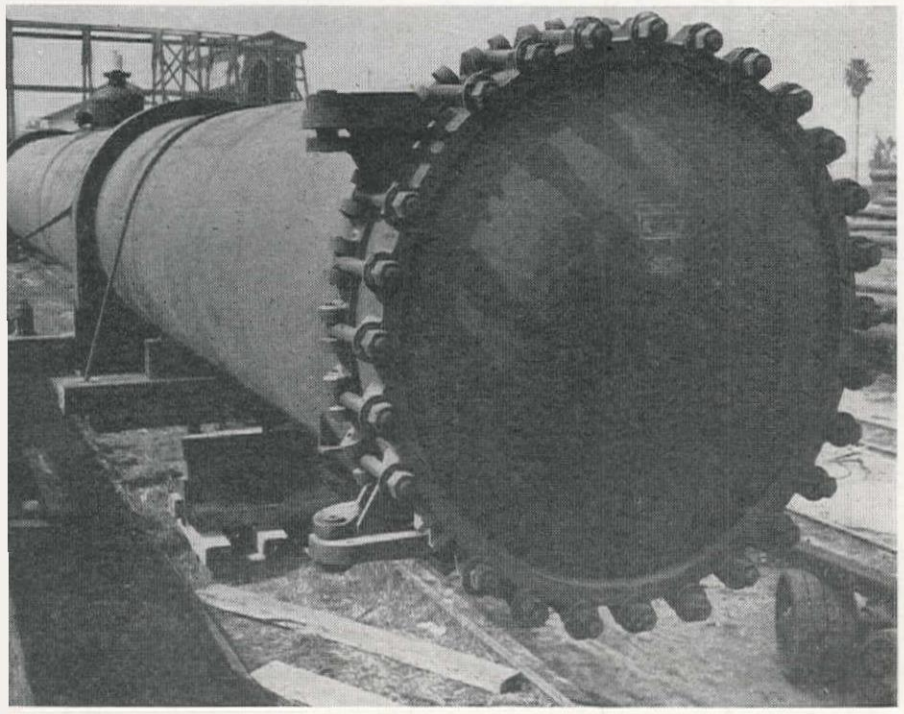
THE EXTERIOR REINFORCING rings on this kiln are expanded at the bottom to rest on supporting piers. Composed of 9 creosoted piling, the fixed pier is 23 ft. from the opening end and the rocker support pier is 27 ft. from the sealed end.



EMPLOYEES of the American Lumber and Treating Co. assembled in front of the first charge of treated timber to be processed by the new pressure kiln. Installation of this retort increased the lumber treating capacity of the plant 20 per cent.

NAVAL OFFICERS attending the opening ceremony, left to right, Lt. G. J. Phillips, Comdr. E. F. Keyes, and Lt. E. G. King. Comdr. Keyes explained that the useful life of untreated timber in the South Pacific is a few months, while pressure creosoted wharves are more permanent structures.

HEAVY DOOR that seals the pressure retort is secured by 26 adjustable swing bolts designed to fit a corresponding grooved block welded to the periphery of the door. The shell and door fastenings conform to the A. S. M. E. code for unfired vessels.



of the dome and the customary nozzles, heating coils, steam pipes, thermometer brackets, etc., are attached at proper place inside. The weight of the completed cylinder, when empty, is 115,200 lb.

The exterior reinforcing rings are fastened to the cylinder at approximately the quarter points. Of these, the two end rings are expanded at the bottom to fasten onto the supporting piers. These are reinforced concrete footings, on creosoted piling, nine piles under each support point. The fixed support is 23 ft. from the face of the door at the opening end of the cylinder, and the rocker support is 27 ft. from the closed end.

At the time the new unit was put into operation, officers of the Seabees addressed employees of the treating plant, commending them for their diligence, and telling them some of the uses treated timber has been put to in the tropical waters of the South Pacific. The accompanying pictures were furnished by Warren E. Hoyt, manager of the Los Angeles office of American Lumber & Treating Co.

Bethlehem to Build New Furnace on West Coast

NEW STEEL-MAKING and finishing facilities costing approximately $8,000,000 are to be built immediately by Bethlehem Steel Co. at Los Angeles, Calif., according to H. H. Fuller, Vice President in charge of Bethlehem's West Coast steel activities.

"This is the beginning of a long-range postwar building program by Bethlehem on the West Coast," Mr. Fuller states. "Plans are completed for further extensions at least as great as this program, as soon as peacetime markets warrant.

"The new mills at Los Angeles will provide wire rods, a wide range of bars including rounds, squares, flats, angles, spring steel and reinforcing bars, and bright wire in 20 gauge and heavier.

"The detailed engineering is now in process and ground will be broken the first of the year. The improvements will be made at the company's present plant and property.

"A new open hearth furnace of 4,000 tons capacity per month will be added to three present open hearths. The plant now makes 10-in. ingots weighing 1,560 lb. The new facilities are expected to provide 14-in. ingots weighing 3,400 lb.

"The new mill will be on the east side of the property along the Union Pacific tracks. The wire mill will occupy the first bay of the warehouse and an addition to be built adjacent to it. At the same time, another warehouse bay will be built on the north side to compensate for the space taken by the new mill.

"The present project calls for three new buildings, plus the warehouse additions. The two bar and rod mill buildings will cover 119,000 sq. ft. The warehouse additions, including the new wire section, will cover 64,400 sq. ft., and there will be a building for wire storage covering 10,000 sq. ft."

Salt Lake Aqueduct—
Built With Six-Foot Concrete Pipe

A 41-mile system will assure Utah's capital city an ample water supply of 150 cfs.—The precast concrete pipe has a bell and spigot type joint sealed with a rubber gasket and subjected to a maximum of 150 ft. hydraulic head. Tests run on a 9-mi. section in 1941 showed a water loss of only 235 gal. per mi. per 24 hours.

AFTER ALMOST three years of starts and stops, construction work on the Salt Lake City aqueduct is again going forward on a scale that promises completion to a point where part of its capacity could be utilized before any serious water shortage could develop. The intermittent starts were prompted by apprehension over a possible water shortage. The stops have been forced by war restrictions on materials and manpower.

A contract for 10½ mi. of low-head concrete pipe water line is scheduled to be completed by the end of this calendar year. The Bureau of Reclamation, in charge of construction, is ready to call for bids on 4½ mi. of high-head steel line in four sections. When these two contracts are completed about one-third of the aqueduct's ultimate capacity of 150 cu. ft. per sec. could be delivered to the Salt Lake City distribution system.

PLACING A 25-TON section of precast pipe with the same dragline equipment used to excavate the ditch. Construction of this aqueduct required the building of a good road along the location to deliver these heavy pipe sections and other equipment.

The complete project

The aqueduct, when completed, will be 41 mi. in length and will carry water from Deer Creek reservoir in Provo canyon to the Samuel Park distribution reservoir southeast of Salt Lake City. The original cost estimate was $5,800,000, but this will be substantially increased by the higher labor and material costs prevailing for the contract now under way, and which will presumably prevail for contracts still to be let. The Bureau of Reclamation and construction engineers for the project decline to estimate or even guess at the increase until trends in future cost factors become clearer.

The concrete and steel aqueduct is part of the Provo River reclamation project. The other major units are Deer Creek reservoir, the Duchesne tunnel and the Weber-Provo river diversion canal.

The reservoir, completed late in 1941, has a storage capacity of 150,000 ac. ft., but subscriptions have been made on a basis of an annual yield of only 100,000 ac. ft. The 50,000 ac. ft. of dead storage will be used for carry-over purposes. Inasmuch as the major subscriptions (aside from Salt Lake City's 46,000 ac. ft.) are for supplemental irrigation purposes, the city will have the large share of this dead storage for protection in prolonged drouths.

The Duchesne tunnel is a six-mile bore through one of the Uintah moun-

tains and will divert water from the North Fork of the Duchesne river (part of the Colorado basin drainage) to the upper Provo. It had been driven approximately three miles when the war brought that unit to a complete standstill. It is hoped that the work can be resumed in the near future but there is still an acute shortage of tunnel and mine workers in the area. Capacity of the Duchesne tunnel, unlined, is 325 cu. ft. per sec. This can be approximately doubled by concrete lining when additional contemplated trans-mountain diversions require the larger capacity.

The Weber-Provo canal unit diverts surplus Weber river water into the Provo river. It is completed except for concrete lining of a 4,800-ft. section.

An unusual feature of the project is the fact that while the storage reservoir is located on the Provo river, all the storage water will come from the Weber and Duchesne rivers. The Weber will contribute roughly 70 per cent and the Duchesne 30 per cent.

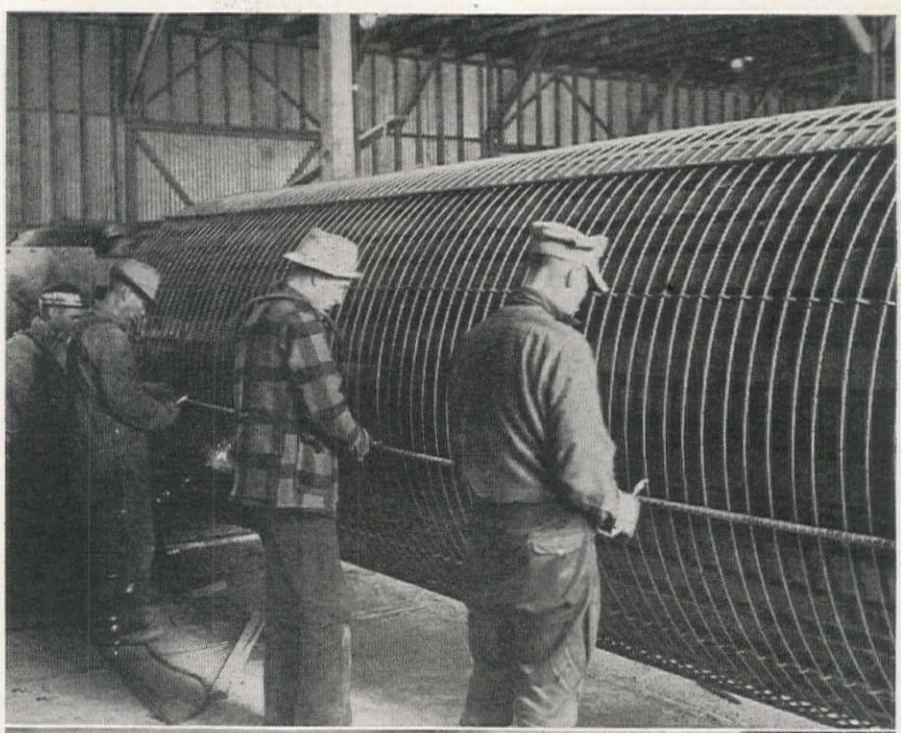
The aqueduct

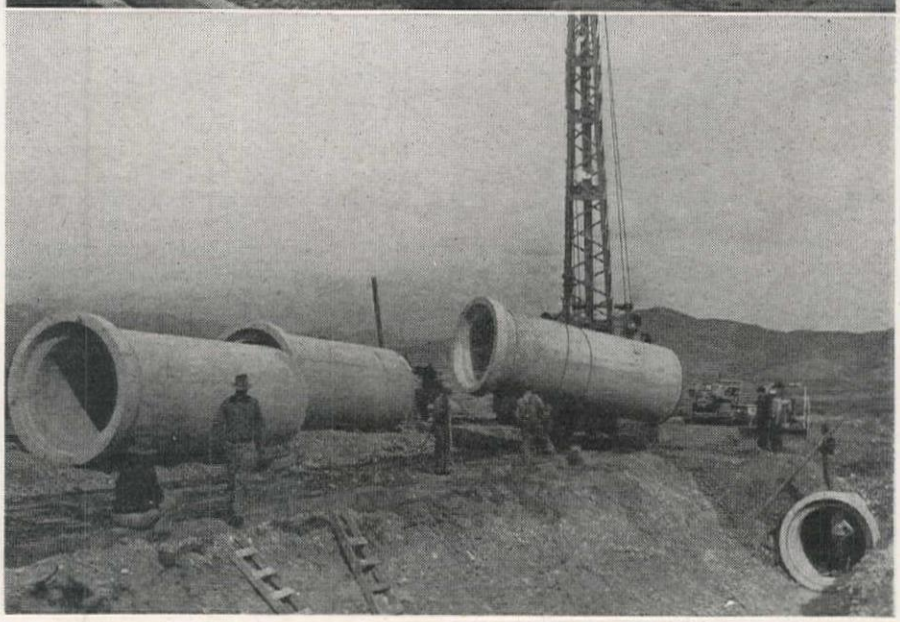
The Salt Lake aqueduct was added to the project when the city, by a referendum vote, decided to subscribe for 46,000 ac. ft. of the storage. A series of drouth years in the early and middle thirties convincingly demonstrated the necessity of an enlarged water supply. The aqueduct capacity of 150 cu. ft. per sec. is substantially more than the city's use has ever been. Maximum delivery into the system from existing sources during the past summer was about 115 cu. ft. per sec., an all-time record.

The first section of the aqueduct (9½ mi. of low-head concrete pipe) was completed in 1941 by the Utah Concrete Pipe Co., Salt Lake City. During the same period two tunnels, one 0.6 mi. long and the other 3 mi. long, were completed by George K. Thompson Co., Los Angeles, Calif. The contractor for the 10½ mi. now under construction is Carl B. Warren, Spokane, Wash. He has been working on this contract since March of last year but has been handicapped by labor and material shortages.

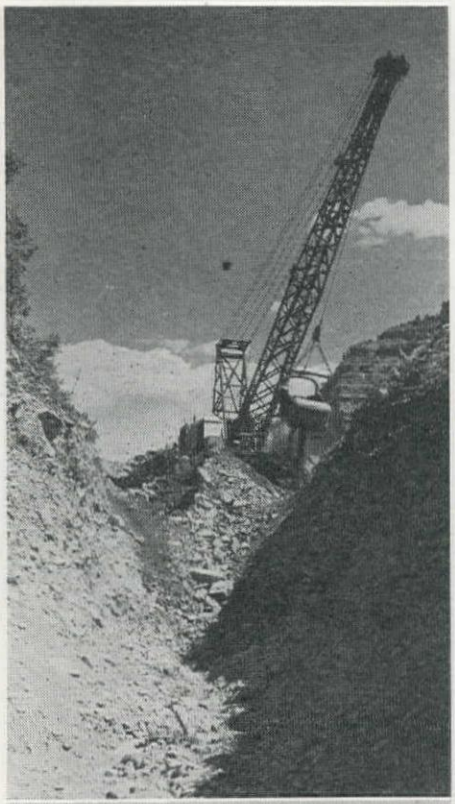
With completion of this contract, and the laying of 4½ mi. of high-head steel pipe, the aqueduct will extend from a point in Provo canyon 6½ mi. below Deer Creek dam to Salt Lake City's Little Cottonwood conduit. A pump lift of 90 feet in Provo canyon will put water into the line for delivery to the conduit and thence into the city's distribution system. The amount, however, would be limited at the present time to the capacity of the Little Cottonwood conduit, which is 50 cu. ft. per sec.

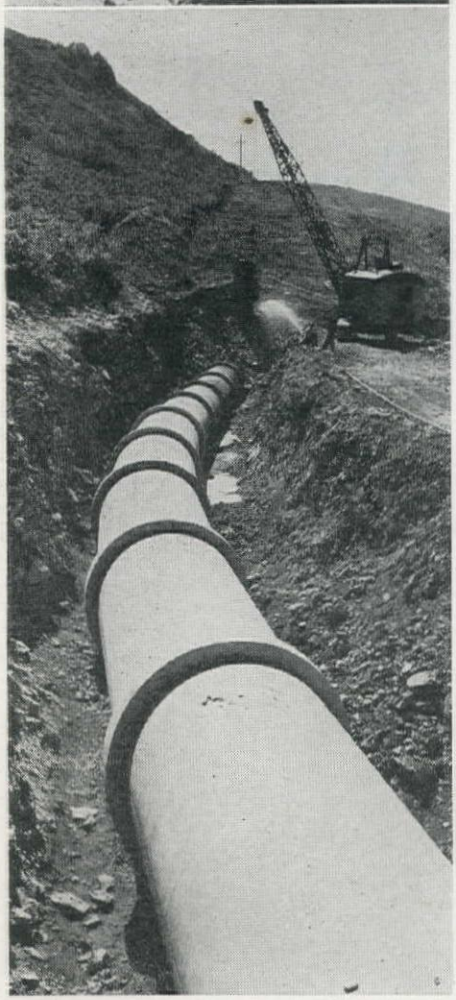
The entire line is being laid underground, the minimum cover being three feet.





TYING THE REINFORCING steel hoops in the frame of a 20-ft. section of pipe, top. Transporting one of the large pipes to the project with tractor and low bed trailer, center. Lowering a section of 69-inch I. D. concrete pipe into the ditch where it will be protected by a 3-foot earth fill.





HEAVY EQUIPMENT used in excavating the trench in which the concrete pipe was placed, top. Back filling the pipe line with the same machine, using water to assure proper settlement of fill, bottom.

Concrete pipe

The precast concrete pipe being used for the aqueduct has an inside diameter of 69 in., a 7½-in. shell, and is cast into 20-ft. lengths weighing from 22 to 25 tons. It is reinforced with steel for inside and outside pressures, the amount of reinforcing varying with the head to be carried. It is used for heads up to 150 ft.

The pipe is of the bell and spigot type and it is cast in steel forms to insure specification dimensions. Cast steel spigot and head rings are used to provide a close fit in the joint.

Bureau of Reclamation engineers designed a special joint for the project (a detailed description of which appeared in *Western Construction News*, Nov. 1940), utilizing a rubber gasket in slot indentations. Natural rubber was used at first, but when this product became short, synthetic rubber was substituted. It has been found to be entirely satisfactory and will probably be better than the natural rubber from the standpoint of deterioration.

The efficiency of the joint was demonstrated by tests on a nine-mile section completed in 1941. Allowable leakage for concrete lines, according to general acceptance, is normally 100 gal. per in. of diameter per 24 hours. This would give Salt Lake aqueduct an allowable loss of 6,900 gal. per mile per 24 hours. Bureau of Reclamation specifications for the project, however, were more strict and called for a maximum loss of 3,500 gal. per mi. per 24 hours.

Four tests were made in the nine-mile section, covering a period of 16 days. The loss was 235 gal. per mi. per 24 hours, less than 7 per cent of the allowable loss. This was less than the anticipated absorption, showing that the concrete was much denser than specifications required, and the leakage virtually nothing.

Because precasting of concrete pipe this size and weight had not theretofore been undertaken, it was necessary to design a plant for the job. This was done by the contractor and Bureau of Reclamation and the plant set up at Pleasant Grove, near the line. The steel framework of each section is woven on a shuttle and this is then placed in the form for casting.

The sections are hauled to the line on tractor semi-trailers of 35 tons capacity and are loaded, unloaded and otherwise handled with crawler type cranes. One of the minor construction problems is the handling of the large sections in the rugged mountainous country through which much of the line passes.

Steel pipe

The steel pipe will be used for heads up to 325 ft. It will be 70 in. in diameter, in 30-ft. sections and the plate thickness will vary from 6/16 to ½ in., depending upon the heads to which it will be subjected. The contractor will be required to fabricate and field-weld the pipe and coat it with coal tar enamel on the inside and gunite on the outside. On the entire aqueduct, steel will be used for a minimum of 6½ mi. in five different locations—mostly across creeks and canyons. Plate for the first 4½ mi. has been rolled at the nearby Geneva steel plant.

The major construction difficulty thus far was encountered in the driving of the three-mile Draper tunnel. A considerable part of this passed through heavy earth (andesite porphyry), which overnight would crush supports and track ties and fill the bore with ooze. The supports were moved closer together but the same thing happened. It was finally brought under control for sufficient time to allow setting of the concrete lining by using double sets of 12 x 12-in. timbers, 6-in. I-beam supports spaced from 2 to 6 ft. apart and ⅜-in. steel liner plate.

The unexpected formation pushed the tunnel costs far above original estimates.

Except for the tunnel sections and a few places where vent structures are installed, the entire aqueduct will be of the pressure type. The tunnels were constructed on the hydraulic gradient.

Geology

The terrain through which the line passes is extremely rugged in Provo canyon. From a point near the mouth of the canyon the aqueduct follows the west slope of the Wasatch range through moderately rugged slopes to Big Cottonwood Creek southeast of Salt Lake City. It then emerges onto the east bench and runs northerly thereon through country so sandy that it is necessary to lay the pipe sections immediately behind the excavating dragline to prevent filling in.

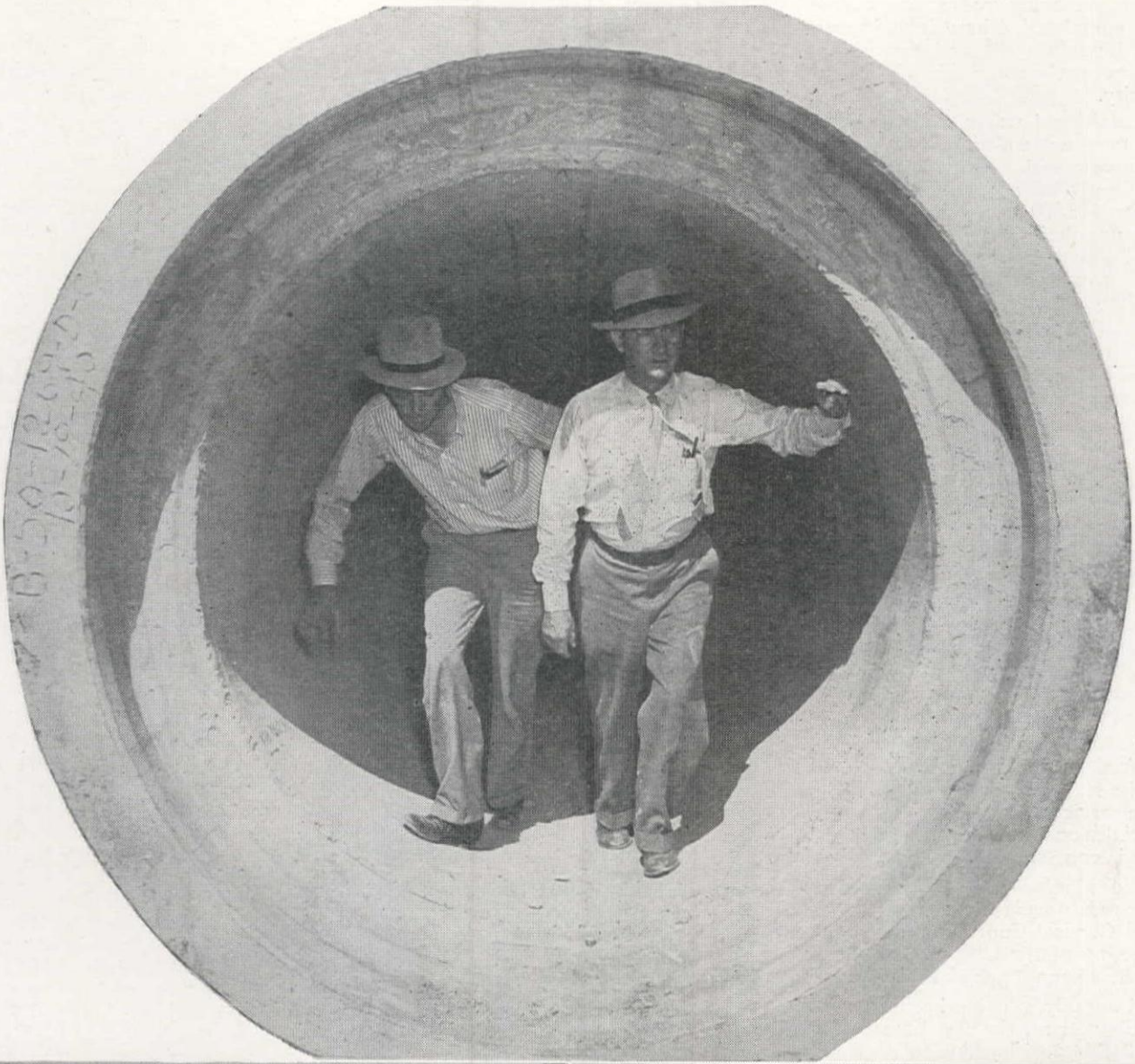
The major geological problem was posed by the Wasatch Fault, which runs along the base or near the base of the Wasatch mountains for the entire length of the aqueduct. Inasmuch as the water supply (Deer Creek reservoir) is east of the fault and Salt Lake City is west of the fault, it was necessary for the line to cross it at least once. One proposal was to cross once and then keep the line a considerable distance west of the fault. This would have involved long siphon sections and heads running up to 800 or 900 ft. The high heads would have multiplied the cost, making the economic feasibility of the project doubtful. The alternative was to follow close to the base of the mountain range, keeping as far away from the fault as possible and crossing the earth fracture where necessary at right angles. This latter plan is the one finally adopted.

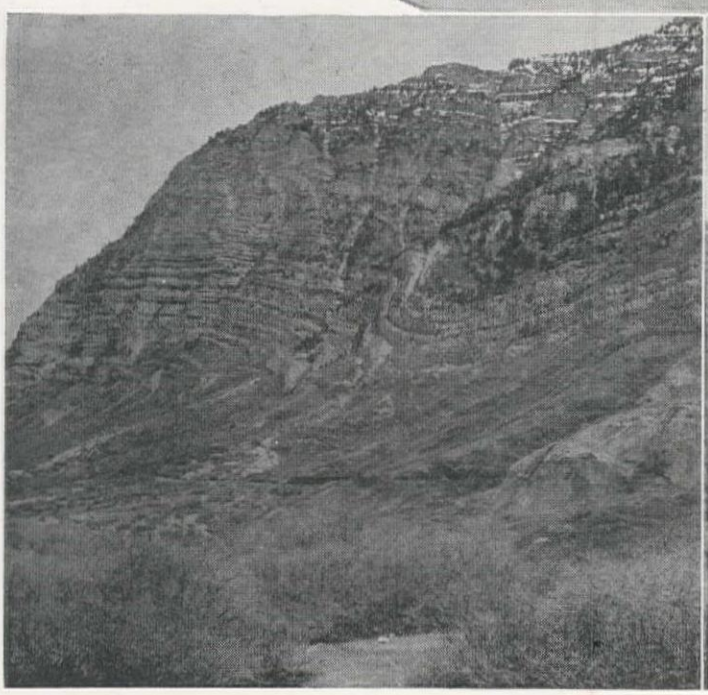
Reclamation Bureau engineers believe that by making the crossings at right angles only a small section of the line would be disturbed by an earth movement and that the break could be quickly repaired. Provisions for such contingency repairs are being made.

The Draper tunnel was originally located close to the fault but was shifted farther west. In its present location it is nowhere closer to the fault than approximately 2,000 ft.

City water supply

A temporary break in the aqueduct would not deprive the city of a water supply because it will continue to main-





E. O. LARSON (right), regional engineer, and L. R. DUNKLEY, resident engineer, inspecting a section of the aqueduct for Bureau of Reclamation, under whose supervision the project is being constructed (top). The aqueduct traverses Provo canyon (above right), and thence along the west slope of the Wasatch Uplift (above left), paralleling the controlling rugged topography sculptured by the Wasatch Fault. Most of the location is situated below the bedded rock on talus slopes.

tain all its present sources after the aqueduct is completed. These include artesian and pump wells and distribution reservoirs on the same side of the fault as the city.

The additional water made available by the aqueduct and the city's share in the reservoir will, it is estimated, provide a supply for a city of 300,000 people, about 125,000 more than Salt Lake's present population. It is probable that some of the new supply will be made available to territory contingent to the city, either on a temporary or permanent basis.

A filtration plant, to be located at the outlet of the aqueduct, is in the discussive stage. Officials of the Metropolitan Water District of Salt Lake are exploring the possibilities of getting this added to the Reclamation Bureau project.

Organization

The project was designed by engineers of the Bureau of Reclamation at Denver, Colo., and the aqueduct is being constructed under supervision of the local Regional office. Harry W. Bashore is Commissioner of the Bureau and Walker Young is chief engineer. Regional engineer at Salt Lake City is E. O. Larson. Resident engineer on the project is L. R. Dunkley.

Superintendent for the Warren company, contractors on the aqueduct, is M. S. Ross.

A.G.C. Chapter Appoints New Southern California Manager

EMERGING FROM the war with the greatest membership in its history, and the largest Chapter in the country, the Southern California Chapter of the Associated General Contractors, anticipating a great postwar construction boom, has moved swiftly to completely reorganize its staff in order to give the best possible service to its membership, public officials, and investors in Southern California construction projects.

Donald MacIsaac, President of the Southern California Chapter of the Associated General Contractors, at a special meeting of the Chapter held Monday, Oct. 15, announced the changes:

F. J. Connolly, who has been Manager of the Chapter for the past 12 years, has resigned this position due to ill health.

F. J. CONNOLLY, retiring manager, above, has guided the affairs of the Southern California Chapter for the past 12 years. W. D. SHAW, newly-appointed manager, was formerly manager of the Mountain Pacific Chapter situated in Seattle, Washington.

W. D. Shaw has been appointed Chapter Manager and in this capacity will direct the efforts of the entire Chapter staff in association activities. Mr. Shaw comes to the Southern California Chapter with a fine record of five years' experience as Manager of the Mountain Pacific Chapter of the Associated General Contractors in Seattle, Wash., during which time he was instrumental in organizing the construction industry in western Washington and the territory of Alaska.

Norris Poulson, former member of the California Legislature and former Congressman from Southern California, has been retained as legislative representative. He will devote his full time to legislative problems affecting the construction industry, particularly the immediate problems of the postwar period. Poulson has for many years, while serving as a public official, given particular attention to the interests of the construction industry and is well qualified to represent the general contractors on their legislative problems.

The Labor Relations staff of the Chapter remains unchanged with J. J. Christian as Labor Relations Director and Frank Boyce as his assistant. The Labor Relations Committee has just negotiated a resolution to continue the Southern California Master Labor Agreement, which grants some moderate wage increases, and promises to preserve peace and harmony between labor and employers in the Southern California construction industry.

The Dalles Dam and Locks Planned by Engineers

COL. RALPH A. TUDOR, Portland district engineer, has disclosed the tentative plans for the proposed construction of an 88-ft. dam across the Columbia river at The Dalles, Oregon, for the purpose of improving inland water navigation and developing power from the impounded water. At a recent hearing at The Dalles, Tudor heard testimony from opposing groups of witnesses in favor of building the dam and those hostile to the project.

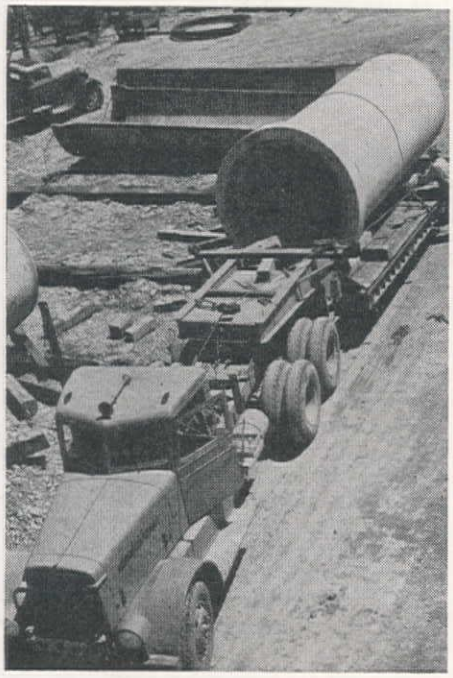
The proposed dam will cost $90,000,000 and will develop 1,150,000 kw. of power generated by 13 turbo-generators. A barge lock would be provided on the Washington side of the river to create an inland waterway past the Celilo falls. The lock would provide an 87.5-ft. lift, will be 86 ft. wide and 500 ft. long and have a 12 to 17-ft. clearance above the lock sill. The reservoir will inundate 6,000 ac. of land, including 86.5 mi. of railroad and highway which must be relocated at an estimated cost of $18,000,000.

Opposing the building of the dam are representatives of the salmon fishing industry, who claim their industry has produced $1,000,000,000 in wealth during the past 79 years. The five years prior to 1943 their industry averaged $10,000,000 annually but, it is said, during the past two years it has dropped to $6,000,000 annually. They attribute this drop in annual salmon catch to the building of Bonneville dam. Also in the opposition are representatives of the Yakima and Umatilla Indian tribes who have treaty rights to the fishing at Celilo Falls. The Oregon fish commission showed that the Indians caught and sold to commercial fish dealers 978,000 lb. of salmon in 1938. This amount did not include salmon kept for personal use by the Indians or sold to tourists.

Favoring the project are the inland industries represented by E. J. Harlan, manager of the Boise, Idaho, Chamber of Commerce. Harlan said Idaho suffers from "the most unfavorable freight rates in the nation." This highly productive area would like to use the inland water route of the Snake and Columbia rivers as an economical outlet for the products of a starch factory, huge dehydrators, large phosphate deposits, and many other valuable products.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

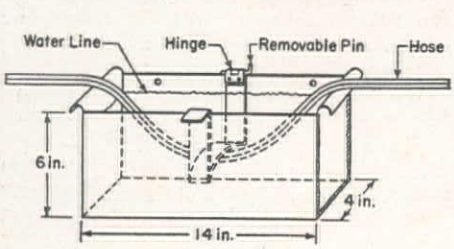


Concrete Pipe Sections Loaded by Winch Line

HEAVY CONCRETE PIPE for the Salt Lake City aqueduct, discussed on page 110 of this issue are loaded on trucks at the casting yard of Carl B. Warren by rolling with a light cable operated from the truck's own winch, as shown above. The line runs from the winch through three snatch blocks which finally direct the pull at right angles to the low body trailer. The pipe is 69 in. I.D., 20 ft. long, and weighs about 20 tons. Removable outside forms are shown in background of the above photo.

PORTABLE HOSE TESTER

OXYGEN AND ACETYLENE hose lines as well as any other hose carrying gases may be easily tested for leaks in the testing tank shown below which can be quickly welded together of light gage metal in any shop. The ends should be rounded, to prevent tearing the hose as it passes over. One end of the submerging bar fits against the side of the tank, while the other is attached by a hinge and pin, for easy removal. The idea is submitted by Linde Air Products Co.

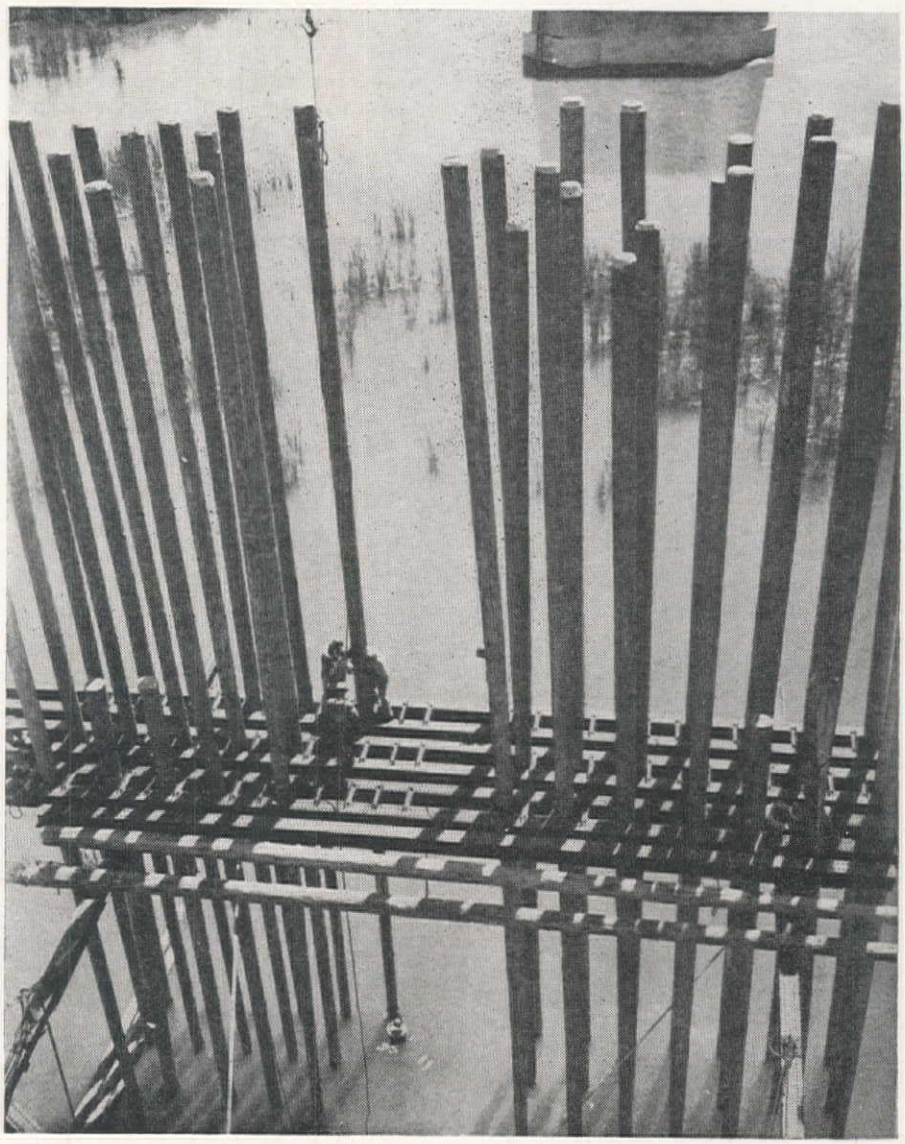


Temporary Timber Piling Is Spaced With I-Beam Template

DURING CONSTRUCTION of the new Santa Fe Railway bridge over the Colorado River at Topock, Ariz., the template illustrated below was employed to properly locate the temporary timber piling which supported the mid-points of the 400-ft. structural steel spans. The trusses were erected by traveller crane advancing along the top of the already placed steel, and the temporary piling bents were driven to add temporary support during the time the traveller was far out from the permanent concrete piers. When the trusses were completed, the temporary support was removed.

For some of the spans the temporary bents were of I-beams set on end to act as piling, and these, too, were carefully set in place by aid of the template, so as to make contact with practical areas on the bottom chord of the truss, and also to most effectively distribute the weight over the temporary support.

The bridge was completed and opened to traffic last spring. Construction articles on the structure appeared in *Western Construction News* for March and August, 1945. Contractor for erection of the steel was American Bridge Co., and the template was devised by their field men.



NEWS OF WESTERN CONSTRUCTION

NOVEMBER, 1945

San Diego Aqueduct Contract Continued by City's Action

THE SAN DIEGO AQUEDUCT, contracts on which were let by the Navy within recent months, was threatened with termination after V-J day, and in fact the Navy announced termination of all contracts awarded. However, prompt action by city officials of the city resulted on a resumption of work based on a repayment plan to extend over the next 32 years.

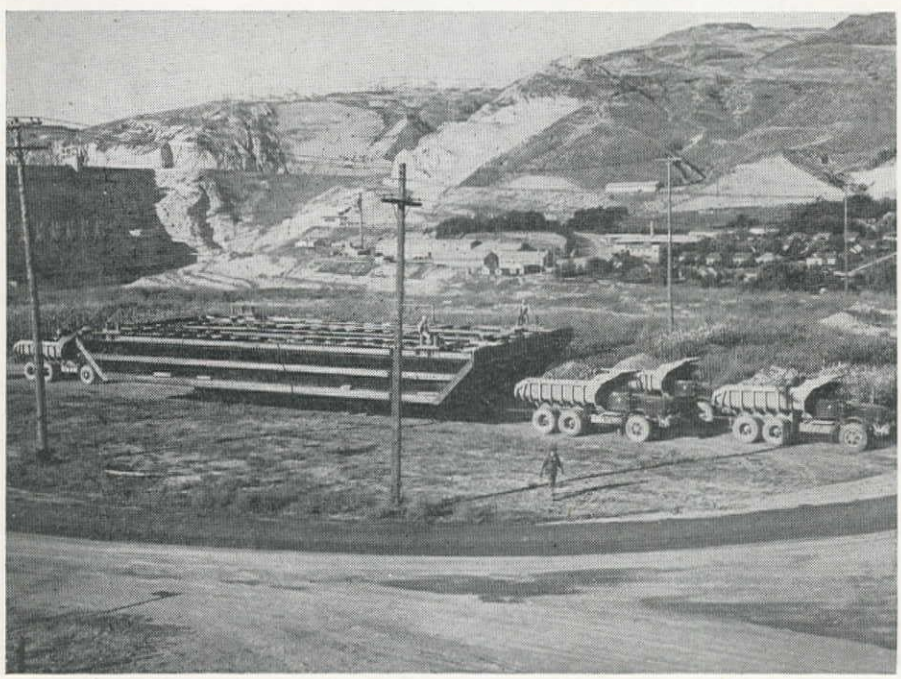
The sudden swelling of the population of the southern California city due to increased Navy facilities and erection of the Consolidated Aircraft Co. plant brought about a very serious water shortage. The use of water in the city has reached a point where the total runoff of the present source watersheds lying in the mountains east of the city is barely sufficient to balance consumption, and a dry year would mean serious shortages.

It has long been recognized that the only source of additional supply is the Colorado river, and surveys have been under way for some time to determine whether the most feasible plan was a connection to the aqueduct of the Metropolitan Water District of Southern California or a new aqueduct across the mountains directly from the river. Last December, the Navy announced that it would finance an aqueduct from the outlet of San Jacinto tunnel of the Metropolitan line to San Vicente reservoir of the San Diego municipal system. Total cost was estimated at $17,500,000.

After some delay due to securing of critical materials, contracts were awarded and work commenced. Then with V-J day, termination by the Navy was announced, but a delegation of San Diego officials hurried to Washington and secured reinstatement of the work, on the basis of repayment by the city in annual installments of $500,000. It is still necessary to reach an agreement with the Interior Department, and the Metropolitan District relative to securing the water from their system.

BARGE IS MOVED TO COLUMBIA RIVER LAUNCHING BELOW GRAND COULEE

THIS BARGE constructed from salvage materials in the shops at Grand Coulee, Wash. is being towed to its launching ramp in the Columbia River. The three ten-wheel diesel trucks each loaded with 10 tons of clay ballast to increase their traction are pulling the barge on a special 16-wheel trailer. The fourth diesel truck behind the barge carries a portable air compressor to furnish air for the trailer braking system. The barge will be used to transport materials dredged from the Columbia river channel below Grand Coulee. As shown without decking the barge weighs 175 tons.



Highway Funds Are Released to States

WITH THE PASSAGE of a concurrent resolution by the two Houses of Congress, construction of highways included in the 1½ billion dollar postwar Highway Bill approved last December may immediately proceed. This resolution released $270,000,000 of federal aid highway funds which had been frozen since the beginning of the war. In addition, all federal aid projects which were under way at the beginning of the war and were deferred at that time may now continue. These total 316 mi. of road, costing $16,300,000. Still further work on an additional 1,387 mi. of highway, costing $43,000,000, provided for in projects which were ready to start when federal aid funds were frozen may now proceed.

President Truman has also recommended to Congress that funds be released at an early date for starting the postwar program. Under the program authorized in the Federal Aid Highway Act of 1944, $5,000,000 is authorized for each of the first three postwar years.

Funds available to Western States from the amounts released through the concurrent resolution are as follows:

State	Amounts apportioned for programmed projects	Deferred Projects
Arizona	$ 403,186	——
California	2,459,249	140,000
Colorado	2,008,339	1,024,067
Idaho	556,202	177,825
Kansas	4,208,335	2,754,727

states, school and park districts, public boards and commissions, authorities and other public corporations or agencies. RFC will consider financing up to 100 per cent of the cost of the project.

Loans will in most cases be of the type repayable from the earnings of the project that is financed, such as bridge tolls, water service charges, etc., as may be permitted by state law. This kind of loan is usually made through the purchase of revenue bonds from municipalities. RFC will also purchase bonds payable from general taxes, or payable from special tax receipts such as gasoline taxes.

The loan commitments may be issued by RFC immediately upon approval of loan applications, and such commitments will remain effective to assure the certainty of funds throughout the full period of construction of the project.

Loans will be available for repayment upon a long or short term basis, depending upon what the financial position of the borrower or the project will support.

Prior to the war, RFC municipal loans benefited hundreds of municipalities throughout the country. Examples of prewar RFC financed projects include the Pennsylvania Turnpike, bridges across the Mississippi River, the modernization of the Seattle street car and bus transportation system, construction of the Georgia State Hospital, the Mobile (Alabama) Tunnel, the San Francisco - Oakland Bay Bridge, numerous municipal water systems throughout the country, and others.

Construction Program of 6 Billion Dollars Forecast for Nation in '46

THE NATION'S construction program in 1946, public and private, will probably total 6½ billion dollars, including an estimated 2 billion dollars in new housing, but the shortage of some critical materials may seriously delay the program, according to the newly-organized Construction Division of the Department of Commerce.

Materials in short supply include brick and cast iron soil pipe—both very short — asphalt roofing, gypsum lath, structural tile and clay sewer pipe. The latter are not so serious a problem.

The $6,500,000,000 figure includes military and industrial construction, housing, public works programs and road construction, but does not include repairs and reconstruction work for which no figures are available but which may aggregate as much as $4,000,000,000 or $4,500,000,000.

Following are the actual and estimated quarterly production figures for both 1945 and 1946:

	1945	1946
1st quarter..	$1,000,000,000	$1,200,000,000
2d quarter ..	1,100,000,000	1,600,000,000
3d quarter ..	1,225,000,000	2,000,000,000
4th quarter..	1,175,000,000	1,700,000,000

On the basis of the above figures, a conservative estimate indicates that 3,000,000 bricks will be needed in 1946 compared with 2,200,000,000 in 1945. In July, 1945, the latest month for which figures are available, the brick industry manufactured 191,000,000 bricks against shipments of 203,000,000.

OPA has recently granted a price increase and this, coupled with other factors, indicates that production in the last quarter of 1945 may reach 600,000,000, adequate to carry the building industry through this year. But for 1946 the outlook is that supply will be 20 per cent short of demand.

A survey of the cast iron soil pipe situation shows that total production in 1944 was 163,000 tons against actual shipments of 178,000 tons and this trend has continued during 1945. In July, 12,540 tons of cast iron soil pipe were produced but actual shipments totaled 13,100 tons. Inventory stocks are now negligible and production must keep up with demand if the construction program is not to bog down.

OPA expects the industry to produce 400,000 tons in 1946, but other estimates range from 300,000 to 320,000 tons. In any event the industry must step up its

WASHINGTON HIGHWAY WORK RESTRICTED BY LOCATION

THE LOCATION of the Kalama-Woodland Highway along the north bank of the Columbia River imposes difficult grading conditions. Above, developing a section of the new grade below the existing road calls for a limited use of explosives and coordinated excavation to avoid pulling the upper road and stopping traffic. Below, widening the grade at a location where the new and old roads both lie between the railroad and the steep bank rising in immediate background to restrict machine movement.

production immediately if the housing program is to get off to a fast start. The pipe is needed in the early stages of construction work and if it is not available, very little construction can be started.

Production of asphalt roofing in 1946 is expected to be about 70,000,000 squares, almost adequate to fill the demand. Demand for gypsum board, including lath, in 1946 is estimated at 2,300,000,00 sq. ft., a figure which the industry can meet.

In the case of structural tile and clay sewer pipe substitutes are available to help balance supply and demand.

Angostura Dam in South Dakota Will Be Start of Missouri Basin Project

FIRST SOUTH DAKOTA participation in the irrigation features of the Missouri river basin development plan is the 16,180-ac. Angostura unit in the southwestern corner of the state. Here the Bureau of Reclamation is carrying on final activities that will lead to construction in 1946 of the Angostura dam on the Cheyenne river, a short distance southeast of Hot Springs.

The Angostura unit was first authorized for construction under the Water Conservation and Utilization Act in 1941, but war intervened before active work could be undertaken. Included in the initial stage of the Missouri River basin plan, as authorized in the Flood Control Act of 1944, it was selected as one of the 11 units of that plan on which preconstruction activities are being centralized during the current fiscal year. Actual construction will begin soon after July 1, 1946, if funds are made available by Congress for that purpose.

When authorized in 1941 the capacity of the Angostura reservoir was primarily

Told to Planning Board

REVEALED FOR the first time at a meeting of the State Planning Board in Carson City, Nevada, were the studies of the Federal Power Commission on a plan to either transmit power to northwestern Nevada from Boulder Dam or develop additional power resources on the Carson, Truckee and Walker rivers.

J. H. Buehler, manager of the Bristol Silver Mines in Pioche, stated his company would be ready to build the first unit of an electro-chemical lead-zinc reduction plant at Pioche. The Pioche mining district is already a heavy user of Boulder power.

A. M. Smith, state engineer, reviewed the general electrical power situation within the state and pointed out the advantages to Nevada users of Boulder power which is the lowest in cost of any in the Western states, ranging from 2.1 to 2.3 mills per kilowatt hour at the switchboard.

Robert A. Allen, Planning Board chairman, announced the continuation of the state land mapping program in cooperation with the federal plan. Allen also stated his department is "ready to go" with an extensive highway construction program as soon as funds are released. Allen suggested as a means of more effectively advertising the state's attractions the possibility of incorporating in highway structures, at appropriate sites, mural reliefs depicting the development and historical events of Nevada.

WASHINGTON NEWS
. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—A group of Western Senators, joint authors of the amendment to the House Bill HR 694, repealing the unrepealed portions of the Railroad Land-Grant Law, have devised a potential law that is probably one of the most bewilderingly labyrinthine legal circumlocutions projected into Congress for many years. This reporter discussed the verbal puzzle with at least 18 persons on the Hill, getting a different interpretation from each one, with the final frank acknowledgment that the individual really did not know whether or not his understanding is correct. As a financial formula the gist of the Senate amendment appears to be one of the finest camouflages that has ever been used to befog a perfectly reasonable purpose.

The original bill, HR 694, was introduced by Congressman Lyle Boren of Oklahoma. It seeks, in effect, to wipe out what is left of the Land-Grant Act, under which, chiefly the Western railroads, mandatorily give the Federal Government differentials on passenger and freight rates which amount to a 50 per cent cut below normal tariffs. The Boren bill would still give the men and women of the armed services the benefit of the differential. The Western railroads, whose spokesmen say, are giving the Federal Government many special advantages in many other ways, feel the land-grant differentials are outmoded and unfair.

The muddled riddle

Sen. McFarland, of Arizona, once a Judge, and an earnest champion of reclamation, apparently proposed the 6-paged amendment to the Boren bill in the Senate, with the co-sponsorship of Senators Wheeler, Montana; Chavez, New Mexico; Hayden, Arizona; Hatch, New Mexico; Johnson, Colorado; Murdock, Utah; Mitchell, Washington; and O'Mahoney, Wyoming. (If you do not happen to know, it may surprise you to learn that the Senator from Wyoming accents the Mah like in Maggie, and places the emphasis on the Mah, not on the ho as was fashionable in Erin's circles in this reporter's younger days!) The terms of the Land-Grant Act and the Land-Grant States are related in some manner, not very clear to anybody in the Capital, which are interpreted by the sponsors to mean $7,000,000 in connection with Arizona; $14,000,000 to California; $1,000,000 to Idaho; $87,000 in North Dakota; $19,000,000 to Montana; $11,000,000 to Nevada; $5,000,000 to New Mexico; $171,000, Oregon; $349,000, Utah; $3,300, Wisconsin; $8,000,000, Washington; and $70,000, Wyoming. These are round figures; the total aggregates something over $68,000,000. The Senatorial amendment provides the Land-Grant railroads shall, when the law becomes effective, report to the Interstate Commerce Commission the sums of the profits gained on each transaction that formerly was subject to the differential limitations imposed by the Land-Grant Act. For instance, under the Land-Grant Act certain freight shipments would earn $5,000 for the railroads. When the differential is removed the same shipment would put $10,000 in the railroad treasury. In this case the railroad would report the added $5,000 to the I. C. C. As the plan is generally understood here, when the total so reported from all Land-Grant railroads totals an aggregate of $68,000,000 this total would show on the books of the U. S. Treasury as a segregated fund, and 75 per cent of the total would be credited to the Department of the Interior, and 25 per cent would be available to the Department of Agriculture. The fund accumulated would be spent by the Departments to finance reclamation and irrigation of Western lands, and to establish veterans as going ranchers and farmers on Western lands. It has not been made clear here whether the $68,000,000 added to Land-Grant differential tariffs would actually be retained and impounded in the special fund instead of being paid to the Land-Grant railroads, or recorded on the books of the Treasury as the basis of a duplicate fund to be used for the benefit of the veterans. Nor is it clear whether the lands intended for the veterans are additional to other acreage to be reclaimed, or would be part of the postwar reclamation program already planned by the Department of the Interior.

The original Boren bill was enacted on Oct. 4 by the House. The McFarland et al. amendment was also enacted by the Senate. There is, obviously, a wide gap between the intent of the House and the purpose of the Senate. Any barometric change in the House climate would make it easier to find an agreeable solution in the conference between the committees. The incident is reported here at length because it is unique in the devious business of shaping legislation, and it is a striking illustration of the tortuous ways in which laws are made, off the open spaces, in the cloak rooms and the byways where the rough spots are smoothed away.

Missouri Valley Authority

The subcommittee of the Irrigation and Reclamation Committee of the Senate reported unanimously to the Senate Committee of the Whole that it was ready to submit its recommendations as the result of the hearings held on the proposed Missouri Valley Authority legislation, but the report was blocked by the objection of Sen. Langer, North Dakota, a member of the subcommittee. Langer told the Senate he wished to make a minority report, but was not ready. It is not known when the recommendations may be filed. But it is no secret that four of the five of the subcommittee are opposed to the creation of the Missouri Valley Authority.

If the present schedule is followed,

LATE WIRE

A DEFICIENCY appropriation balance of $93,367,000 has been requested by President Truman for reclamation construction for the fiscal year ending June, 1946. Allocation of the funds for the various projects is as follows: Boise, $4,000,000; Minidoka, $720,000; Deschutes, $1,000,000; Klamath, $1,000,000; Owyhee, $200,000; Vale, $3,000; Kendrick, $500,000; Riverton, $1,000,000; Shoshone, $1,000,000; Gila, $2,000,000; Davis Dam (account Mexican Treaty obligation), $10,000,000; Central Valley, $18,500,000; Kings River, $200,000; Colorado - Big Thompson, $7,700,000; San Luis, $1,000,000; Palisades, $1,000,000; Hungry Horse, $1,500,000; Tucumcari, $2,000,000; Provo River, $860,000; Columbia Basin, $11,000,000; Yakima, $1,700,000; All American Canal, $4,000,000; Colorado River, $1,000,000; Missouri River, $12,000,000.

The House Appropriations Committee is still deliberating apprehensively the emphasis placed on cheap power by the Interior Department. It is feared Congress may be charged with subsidizing Western land and power development at the expense of the taxpayer, when the impending battle breaks over transmission lines. The President also asks $130,000,000 for immediate expenditure by the Corps of Engineers for the improvement of rivers, harbors and flood control. Also earmarked for immediate expenditure by the Public Roads Administration is $25,000,000 as part of 500 millions authorized. Civil Aeronautics Authority is to have $1,641,000 for expenditure on border, implementing Treaty. Also included is $50,000,000 for FWA, Bureau of Community Facility. The Land-Grant Bill, passed in conflicting forms by House and Senate, is now jammed in conference because of much fear that the $68,000,000 legerdemain cloaks a grab by somebody.

Senate Irrigation - Reclamation Committee finally formally reported MVA Bill, 12 votes opposing, 2 favoring. Senate referred bill to Senate Agriculture Committee, where hearings are yet unset. Generally assumed MVA bill killed.

Apparently, San Diego delegation acted percipitately, taking over all cost of San Diego aqueduct, since Navy has at least 49 per cent permanent interest.

after the above report is filed, the bill will go to the subcommittee of the Agricultural Committee of the Senate for further investigation. However, only four of the twenty members of the Agricultural committee are expected to favor the bill, and the general impression here is that it may be allowed to go to sleep, and rest in Committee until it fades out of memory.

The man sent here by the St. Louis Post-Dispatch, chief exponent of the bill, is reported to have been withdrawn because he is said to have advised his principals the overwhelming majority of the Senate are opposed to an MVA. Lately the paper has roundly scolded the President, a Missourian, for his failure to strike out affirmatively and specifically for an MVA. None of his addresses or utterances are regarded as giving definite encouragement to any specific Authority. He has emphasized that each proposal for an Authority is a local issue in the sense that a region is local rather than national; and he clearly regards the approach to each proposed Authority as being different. The policy enunciated by the President is clear, and the Senate is growing colder to the idea of Authorities.

The issue is by no means dead, however; it is said the plan now is for the proponents to follow the President's suggestion. Each Authority will be taken up separately. Where sentiment is most favorable, the champions of the idea will make their earliest fight. The Columbia Valley Authority is now regarded the easiest to put over. The Northwest is reported here to be overwhelmingly in favor of the plan. For instance, the only member of the Washington State delegation reported to be opposed to the CVA is Congressman Hal Holmes. They tell you here that Holmes not only is an academic economist with a professional background as a faculty member in a university, but that he is a highly successful business man with one of the largest holdings of sheep and cattle in the Northwest. While Sen. Mitchell leads the fight for the CVA, it is reported he has the assistance of the experts from all elements in the country who wish to join the issue where the field is in their favor. The word is that the workers are out in the field smoothing away objections by devising acceptable amendments; and, apparently, by horse-trading broadly and widely to obtain solid support. They tell us the labor unions out there are quietly doing their bit, as are all liberal organizations regardless of geography, east, south, north or west.

Philippine roads

Public Roads Administration has actively begun the studies and surveys, and to make plans to replace the highway system destroyed in the Philippines. The job is now actually under way. There were seven or eight men attached to the armed forces in the Philippines who are former engineer personnel of Public Roads Administration. At the request of PRA the Army detached the men, and they were assigned to proceed with the work. The engineers will naturally have the help of native personnel in the field and at the Manila headquarters. It is expected the preliminaries will be swiftly completed.

The PRA engineers released by the armed services to study the need of highways, bridges, and essential streets in the Philippines, to determine repair and rehabilitation work necessary, are acting under direct authorization by President Truman. The group comprises Lt.-Col. Arthur J. Siegle, assisted by Comdr. B. M. French (to make Navy contacts); also Lt.-Col. Robert H. Paddock, Maj. L. D. Asmus, Maj. K. B. Foster, Philip Mervyn Stephenson, civilian of the Engineer Technical Intelligence Team, who is a well-known bridge engineer on leave from Oregon State Highway Department; also Navy Lieutenants John Clarkson and James L. Shotwell.

WPB folds

J. A. Krug, once handy man for Dave Lilienthal of TVA, quit the WPB on Nov. 2 to enter private employment. At the same time what is left of WPB, approximately 2,000 of the original 22,000 personnel, become the Civilian Production Administration, under the direction of J. D. Small, whom Krug met in the Navy, and brought into WPB when Small became a civilian. Small is realistic and direct. In most instances those who have been chiefs of units will shed the rest of their helpers and go with the ultimate top of their division into the new organization, to function for 6 to 12 months in winding up the war controls, and in helping those who have not been able to get entirely free of war shackles. Approximately 60 orders are left, besides the inventory controls. These must all be administered, and the industries policed.

The five operating bureaus of the new agency are the Bureau of Reconversion Operations, the Bureau of Reconversion Priorities, the Bureau of International Supply, the Bureau of Field Operations, and the Bureau of Demobilization. It will be the job of CPA to expand production of materials that are short; limit the use of scarce materials; hold down inventories to stop speculation and unbalanced distribution; secure priorities to break bottlenecks; help relief and other export programs; and allocate scarce materials or facilities for production of low-priced items.

Odds and ends

John L. Haynes, recently director of construction bureau activities in WPB, has been made chief of the construction division of the Bureau of Foreign and Domestic Commerce in the Department of Commerce. Haynes has long been connected with various Government activities in the Capital. He is an engineer.

Headed by John C. Stevens of Portland, Oregon, president of the American Society of Civil Engineers, the Construction Industry Advisory Council holds its first meeting in the Capital at the U. S. Chamber of Commerce, on Nov. 1, to consider the major reconversion proposals of the industry. Approximately 90 national trade and professional associations will be represented.

American Road Builders' Director Charles M. Upham, who predicts the annual road building program will gross $2,000,000,000 annually by 1949, announced the forty-third annual convention of the Association will be held in Chicago the week of January 14-18, 1946, at the Hotel Stevens. Various reasons led to the decision to have no road show. There will, however, be a memorable exhibition in Feb., 1947.

Contracts between the three irrigation districts in the Columbia Basin and the Federal Government, covering the repayments to be made by the owners of the 17,000 irrigated farms comprising a total of 700,000 ac., were signed in the Capital in October. Gov. Mons C. Wallgren came east for the occasion. Diplomatist-Secretary of the Interior Ickes, just returned from London, issued an announcement, but did not mention the name of the Governor. Commissioner Harry Bashore told Boss Ickes the irrigation system cannot be brought into existence until Ickes manages to coax the first appropriation for the purpose from Congress. To soothe money-prickly Congress, Honey-tongued Harold proclaims revenues from the sale of power at Grand Coulee — to be the largest power plant in the world—will repay a large part of the construction costs of the project. The farmers will pay an average of $85 per acre, spread over 40 years.

Public Roads Administration is rather gleeful over the fact that it has received from Oregon the report of the first project completely processed and qualified under the terms of the use of postwar funds. The job comprised 34 mi. of resurfacing.

California Asphalt Corp. Builds a Portland Plant

CONSTRUCTION OF an asphalt refinery to be located in the Willbridge section of Portland, Oregon, has been announcd by H. D. Collier, president of the Standard Oil Company of California. The new plant will be operated by California Asphalt Corp., a new subsidiary of Standard Oil, for the purpose of refining and distributing road paving asphalts in the Pacific Northwest. The plant will cost over $1,000,000 and will have a daily capacity of between 4,000 and 5,000 bbl. Crude oil stocks will be shipped by tanker to the refinery from California fields. Finished products will be shipped from the refinery in both tank cars and tanker trucks.

Officers of the California Asphalt Corp. are: H. B. Fairchild, pres.; H. R. Cuyler and J. A. Blood, vice presidents; A. P. O'Kane, secretary; H. D. Armstrong, treasurer; and directors, C. E. Finney, Jr., E. V. Burns, L. M. Bussert and E. J. Timmons.

Cornell Gives Data on Light Gage Sheet and Strip Steel

RESEARCH which the Committee on Building Codes of American Iron and Steel Institute has been sponsoring since 1939 at Cornell University has provided sufficient data for presentation soon to the engineering profession in a specification for the design of light gage steel structural members. When available, the specification will provide a sound and rational basis upon which to design with light gage sheet and strip steel.

The testing program, involving over 700 structural specimens ranging in thickness from .1532 to .0245 in. and flange widths from 1 to 16 in., has provided many basic data. The results of the test work were paralleled and supplemented by extensive investigations of the theory of the strength and behavior of light gage structural members.

The specification being developed from the data will include provisions which distinguish between the behavior of stiffened and unstiffened flanges and their relative load carrying capacities.

Among other provisions in the specification will be:

1. In addition to the basic bending stress of 18,000 lb. per sq. in. for structural grade carbon steel, the use of higher strength steels at correspondingly increased unit stresses is permitted for those recognized grades whose minimum properties are guaranteed by the manufacturer.

2. Two sets of allowable column stresses are given, based on considerations of end restraint, and giving recognition to deviations from straightness of the member, and to unavoidable eccentricity due to loading.

3. Stresses for beams with laterally unbraced compression flanges are given in terms of the ratio of length to radius of gyration, rather than flange width. Recognition is accorded to the fact that many structural members are provided with lips, and that a flange with lips is inherently stiffer in resisting lateral distortion than a flange without such lips.

4. Maximum flat width ratios (ratio of width to thickness), as related to different unit design stresses, are specified for various types of compression elements.

5. Cognizance is taken of the bracing effect of collateral wall sheathing material on the strength of steel stud sections, and provisions are included for evaluating the lateral restraint required from, and supplied by, these wall materials and their attachments.

The Editor's Mail...

Denver, Colorado

Editor,
Western Construction News

Dear Sir:

Engineers must regret to see in your September issue a graph of an article by Mr. Gerrodette captioned "The top chart predicts an increase in rainfall from now until approximately 1965 which will be good news for the farm and ranch owners . . ." This type of unequivocal prophecy, appearing without supporting data or reasoning in a technical magazine, may unfortunately result in the public placing hydrological engineering among the occult or discredited sciences.

Methods of finding and combining a series of cyclic curves of varying amplitudes and periodicities so as to give any observed **fluctuating** graph are well known. But the proving that individual cyclic curves needed to fit a graph of the past have a causal meaning which will apply in the future is something different. H. P. Gillette has made a 40-year study of the subject, but directly contrary to Mr. Gerrodette, has decided that 1964 will be a year of minimum rainfall and that reservoirs will go dry within 25 years (Water Works and Sewerage, January 1940, p. 39). Both predictions cannot be right.

An impartial investigation of weather cycle predictions, made 10 years ago by J. B. Kincer of the U. S. Department of Agriculture, leads to the conclusion that "not one weather cycle, aside from the annual, has any practical value whatever as a means of long-range weather forecasting in the United States" (Engineering News-Record, July 12, 1934, p. 46). While all will hope this conclusion some day will no longer be applicable, it is incumbent on both writers on the subject and their publishers to be chary of claims that their methods forecast the future and to insist that with them go adequate supporting data.

Very truly yours,

S. P. WING

* * *

October 27, 1945

Attention: Mr. Ralph P. Dillon
Circulation Manager

Dear Mr. Dillon:

It is Saturday afternoon and the gal who writes pretty letters for me has gone to the beauty parlor for the afternoon. I will do the best I can to hunt and peck a reply to your "aspirin" letter which has just come to hand.

I had thought to let my subscription to the W. C. N. go by default but in the interests of conserving paper I had better tell you straight from the shoulder that I do not intend to renew. I have no beef against the magazine, and I am willing to concede that the editors who travel thousands of miles each month (though Lord knows how they manage it), and the compositors and engravers who sweat and cuss into the wee small hours, are competent craftsmen and do a swell job. But you see Mr. Dillon, I have returned to my first love, the Oil business. I am so darned busy with pipe lines that blow up at the most gosh awful hours, and with oil tanks that won't hold rabbits, and compressor plants that won't compress, that I never seem to make use of *Western Construction News* any more. Sometimes it lays on my desk for a week before I tear the wrapper off and turn to the Personally Speaking page to see who of my old gang is doing what.

So, for the time being I would like to take a rain check. If and when I return to the general construction field I will be back, hat in hand, begging to be reinstated into your good graces.

Yours very truly,

T. N. WHITFORD
Construction Engineer
Kettleman North Dome
Association
Avenal, California

Central Washington to Study Cascade Route

THE COUNTIES of northeastern Washington are seeking a shorter route for their produce to tidewater. The last state legislature appropriated $100,000 for a study of the most feasible route. The investigation was conducted by Joseph Wheeler of the State Highway Dept., with engineers of Okanogan, Whatcom and Skagit counties cooperating.

It was first anticipated that the route would cross the mountains either at Hart's Pass or Cascade Pass, upon which routes construction has been under way for the past fifteen years. However, the engineers discovered that a route up Early Winter St. above Mazama to Pine Creek, under Granite Pass and down into the Skagit Valley, could be built for less money and would furnish several other advantageous features. The summit of the new road would be at elevation 4,500, as compared with 6,197 ft. at Hart's Pass and 5,393 at Cascade Pass. The grade will not exceed 3½ per cent and a snow field only 10 mi. wide needs to be crossed. It will be necessary to construct a mile-long tunnel. About 60 mi. will be cut off the distance between Spokane and Vancouver, B. C. In addition it will become an important tourist highway because it connects the road across the top of Grand Coulee dam with the scenic country in the vicinity of Ross and Diablo dams.

Civilian Accident Toll 1 Out of 4 During War

THE NATIONAL SAFETY Council has revealed the staggering homefront accident toll suffered by the American workers from Pearl Harbor, December, 1941, to V-J Day, August 14, 1945.

Few, if any, Americans have been even faintly aware of these shocking facts. The Council reports that 36,355,000 people were injured or killed in that

period. That means that an average of 1 out of every 4 persons in this country suffered either an accident or a fatality. When compared with the war casualties the figures become even more impressive. Those killed in the armed forces for the period mentioned were 261,608; 651,911 were wounded, and 32,811 are missing, which, with 124,194 prisoners, make a total of 1,070,524. But the home-front accident toll was 355,000 killed and 36,000,000 injured, including 1,250,000 cases involving some permanent disability.

The accident toll to workers alone on and off the job are as follows: killed on the job, 66,000; killed off the job, 94,000; total workers killed on and off the job, 160,000. Those injured on and off the job total 15,000,000, of which 560,000 involved some permanent disability.

The Council breaks up the remainder of the figures into the number killed in traffic and the toll in homes.

This tremendous casualty list on the home front is not compared with the war casualties in order to disparage the latter, but it is used to emphasize the tremendous waste of human life that takes place every year and results in indescribable hardship and tragedy throughout the nation.

Shoshone Dam Supplies Wyoming With Power

TO MEET A CRITICAL power shortage in northern Wyoming, the Bureau of Reclamation will construct a 5,000-kw. hydroelectric plant on the Shoshone Irrigation Project as soon as funds are available, Commissioner of Reclamation Harry W. Bashore has announced.

The plant, known as the Heart Mountain power development, will be built at an estimated cost of $900,000 near the outlet of the Shoshone Canyon conduit, about three miles downstream from Shoshone dam. This dam was constructed by the Bureau to store water for the irrigation of fertile project lands.

The immediate need for more power is due to the discovery of a new oil field in the Elk Basin area, north of the Shoshone project. Various drilling companies are also operating in the vicinities of Meeteetse and Gebo, Wyo.

The Heart Mountain plant would supplement the output of the Shoshone plant by making additional power available for oil-well drilling and for oil pumping purposes. In addition it would provide power for an increased population on farms and in towns in the area served by the irrigation project.

The plant would be of direct benefit to project water users, since revenue from the sale of power will help repay part of the construction cost of the Shoshone Canyon Conduit. The power output from the proposed plant will also aid materially in stimulating industrial growth in the region. It is estimated that the cost of constructing the plant would be paid back at the end of 16 years of operation.

Texas-Mexico Negotiate For Rio Grande Bridge

LEGISLATION is now before Congress to authorize the State of Texas to renew negotiations with the Republic of Mexico concerning construction of a toll-free bridge across the Rio Grande between Laredo, Tex., and Nuevo Laredo, Mexico. The Texas State Highway Department has announced that these negotiations have proceeded to the point where it appears that such a bridge will be constructed in the immediate post-war period.

In conducting a study of existing Rio Grande crossings, the Highway Department found that there are 11 toll bridges, 1 free bridge and 2 ferry crossings. The toll bridges, all privately owned, are valued at $1,700,000 and are located at El Paso, Presidio, Del Rio, Eagle Pass, Laredo, Zapata, Roma, Hidalgo, and Brownsville. The free bridge at Ysleta is owned and operated by the International Boundary Commission.

Mexico has paved roads connecting with the Texas border at El Paso, Laredo and Hidalgo. Additional routes at Del Rio, Eagle Pass and Brownsville are rapidly nearing completion.

OBITUARIES . . .

Oliver Ahlers, 55, for many years foreman for the highway maintenance crew at Eureka, Nev., died at his home in that city in October. Mr. Ahler, a native of Austin, worked in Detroit, Mich., before settling at Eureka.

* * *

R. J. Clarke, acting city engineer of Redwood City, Calif., died September 27 in San Francisco after undergoing an operation. He was 58 years old.

* * *

Frank Dunn Stafford, 79, retired Denver, Colo., carpenter and contractor, died September 26 after a long illness. Stafford worked on many buildings in the city, including several on the Colorado Women's college campus, the Equitable building and the Barth block.

* * *

Richard B. Crater, construction worker and aircraft frame builder for Lockheed Aircraft Corp., who was formerly reported missing in action, has been reported dead. His plane crashed near Mullhouse, France, September 11, 1944. He was twenty-two years old and a resident of Pasadena, Calif.

* * *

Alma Olen Wilson, 34, builder, of Venice, Calif., missed his footing and plunged thirty-five feet to his death while working on a project in Hollywood, Calif.

* * *

John D. White, well-known contractor of Pasadena, Calif., died recently while in Warren, Ohio, on business. He was 65 years old.

* * *

Leonard De Waard, general city street foreman of Pasadena, Calif., died in September, as a result of a heart attack. Before entering municipal employment in 1935, he was engaged in the general contracting business. He was 47 years of age.

* * *

William F. Gillstrap, 45-year-old carpenter and building contractor of Los Angeles, Calif., was killed when struck by lightning October 6. The bolt passed through him and into the house on which he was working, burning out a light system just installed.

* * *

Ervin J. Young, prominent Nevada mining engineer, died suddenly at the Pershing Hotel, Lovelock, Nev., on October 8.

* * *

William F. McCollum died Oct. 4 at his home in Reno, where he had been a carpenter and contractor for 47 years. He was born in California but had spent most of his life in Reno, where at the time of his death he was a weather-stripping contractor.

Oil Line to Link Bay With San Joaquin Field

A NEW 175-MILE pipe line costing more than $3,000,000 to link the San Joaquin Valley oil fields with San Francisco Bay, will be built by Standard Oil Co. of California within the next few months.

With pumping capacity of more than 90,000 bbl. daily, the 18-in. line will run from Kettleman Hills, in Kings County, to Los Medanos, the oil company's big tank farm near Pittsburg, on the upper bay. Los Medanos supplies Standard's Richmond refinery.

Construction is expected to start in December, with completion scheduled for April.

This line will permit the Stanpac line to be reconverted to transportation of natural gas. Stanpac was changed over from natural gas to crude petroleum early in 1942 to meet the tanker shortage. Stanpac is owned jointly by Pacific Gas and Electric Co., Standard of California and Pacific Public Service Co.

Bechtel Brothers-McCone Co. of San Francisco, one of six bidders, was awarded the construction contract with a low bid of $1,002,400. Additional items included in the total cost are rights of way, and 21,000 tons of pipe, which will be supplied by A. O. Smith Corp. of Milwaukee.

Speaking of Employment . . .

AGENT WANTED

Long-established manufacturer of construction specialties desires representation in Bay area. Must be aggressive individual or firm experienced in concrete and acquainted with architects, engineers and contractors. Structural engineering knowledge valuable but not mandatory. Address Box 939 Western Construction News, 503 Market Street, San Francisco, California, giving all particulars.

BECAUSE MANY returning servicemen will be looking for positions in the construction field, *Western Construction News* is initiating a new service this month. Men seeking employment in this field may have published, at NO EXPENSE whatever, a brief statement of their availability and qualifications. A similar service is available to contractors needing men for specific projects. The job location and skills required will be published FREE. It is hoped this feature will be particularly valuable to discharged veterans, but all readers of the magazine are invited to use it.

ENGINEER

with broad experience in both field and office is available for immediate employment. Has had experience on estimates, highways, concrete drainage, and soil mechanics.

Reply Box 945
WESTERN CONSTRUCTION NEWS
503 Market Street
San Francisco 5 California

MEN WANTED

Laborers • Cement Men • Carpenters
Apply at Copperton, Utah Job or at
Bowers Building & Construction Co.
1033 So. State St., Salt Lake City, Utah

WANTED

COUNTY SURVEYOR AND EX-OFFICIO ROAD COMMISSIONER

For permanent appointment at salary from $425 to $510 per month. Position under Civil Service and appointment will be made by Board of Supervisors. Both Engineering and Administrative experience required. Official applications must be received by December 20, 1945. Write

SAN DIEGO COUNTY
CIVIL SERVICE COMMISSION
Room 212 Civic Center
San Diego California

CIVIL ENGINEER -- DRAFTSMAN

13 years with present connections. Experienced office, field, and highway design engineer. Location surveys, layouts and estimating. Supervision of construction. Neat draftsman. Excellent references. Box 938 Western Construction News, 503 Market Street, San Francisco, California.

WANTED—Iron Workers

Need A. F. of L. Union Iron Workers for placing reinforcing steel on Maximum Security Disciplinary Barracks Building Project at Camp Cooke, near Lompoc, Calif. Scale $1.50 per hour. Working 54 hr. week. Time and half over 40 hrs. Board and room available on site for single men. No quarters available for families. Contact

ROBERT E. McKEE
General Contractor
4700 San Fernando Road West
Los Angeles, California

Managerial—Top-Bracket

Construction Manager or General Superintendent is interested in firm alert to the importance of know-how, organized in creating profitable results. Will assume full charge, executing diversified Public - Commercial - Industrial Construction and Allied Works of magnitude.

- **Adaptable to Domestic and Foreign Assignments**
- **Extraordinary Co-ordination of Field and Office**
- **Competitive Operations, Seasoned Judgment**
- **Employment and Development of Key Personnel**
- **Purchasing, Expediting, Materials and Plant**
- **Practical Modern Methods, 25 Years' Experience**
- **Control of Sub-Contractors' Functions**

Desires ample opportunity for continued growth into general management, where experience can be used for greater net operating effect.

P. O. BOX 86
KEW GARDENS 15, N. Y.

POSITION WANTED

Field Engineer, now employed, desires to change to more permanent position in engineering or construction work. Fifteen years' experience in field work. Write—

H. G. MACKECHNEY
P. O. Box 781 Fort Stockton, Texas

BLACKSMITH—TOOL SHARPENER

Employment recently terminated with war contract. Desires reemployment in San Francisco Bay Area, but will consider job in other locations offering steady employment on large contract. Good references and experience record including 8 yr. on Hetch Hetchy. Write Box 943, Western Construction News, 503 Market Street, San Francisco, California.

WANTED

Man to take charge of engineering and construction. Must have full knowledge of concrete construction. Salary open. Write

W. V. HUTCHISON, *Contractor*
8949 Alpine La Mesa, California

Foreman and Operator

Experienced in operating Caterpillar Carryall and Tournapulls. Anxious to secure employment with construction company doing work outside United States. 15 years experience.

Reply Box 946
WESTERN CONSTRUCTION NEWS
503 Market Street
San Francisco 5 California

WANTED

SURVEYOR familiar with General Land Office Procedure, surveying and subdividing townships and sections. Combination field and office man. Location Northern California. Write, giving age and brief outline of experience.

Box 941,
WESTERN CONSTRUCTION NEWS
503 Market Street, San Francisco, California

CIVIL ENGINEER

graduate, age 35, with thirteen years' experience in design and construction of earth dams, appurtenant works, highways, and Army camps, desires position with contracting or engineering firm. Write Box 940, Western Construction News, 503 Market Street, San Francisco, California.

CONSTRUCTION ENGINEER

desires position as Estimator or Office Engineer. Age, 36. Graduate C. E. Licensed. 10 years experience in field, office, estimating, purchasing, expediting and general job planning. Available January, 1946.

Write Box 948
WESTERN CONSTRUCTION NEWS
503 Market Street
San Francisco 5 California

WANTED—Civil Engineer

Wanted—ex-service man. Young graduate Civil Engineer. Practical experience, either Army or otherwise, to work for a small general construction contractor. Must be willing to do diversified work. Salary will be excellent for individual that can qualify.

Reply Box 947
WESTERN CONSTRUCTION NEWS
503 Market Street
San Francisco 5 California

WANTED AT ONCE

5—BRICKLAYERS 10—CARPENTERS
ON HOUSING PROJECTS
Contact
FRONTIER CONSTRUCTION COMPANY
1700 Maple Boulevard, Tucson, Arizona

No Strike Pay From Unemployment Board

MEMBERS OF the California Unemployment Insurance Appeals Board recently fixed their policy with regard to the payment and denial of unemployment insurance to members of affiliated unions involved in the motion picture strike in Hollywood. A similar policy will prevail on strikes in every industry.

The Board held that members of unions steadily employed at the time of the strike, who refuse to cross picket lines maintained by the striking Screen Set Designers Union, are NOT entitled to unemployment insurance benefits.

On the other hand, members of unions who were unemployed prior to the strike, which commenced March 12 of this year, and who filed unemployment insurance claims either prior or subsequent to that date, may be paid benefits.

Members of the Board, Toland C. McGettigan, of Santa Rosa, Chairman, Michael B. Kunz, Sacramento, and Edgar E. Lampton, Los Angeles, said two other types of claimants are involved.

One is the group which failed to file appeals in conformity with the time provisions in the Unemployment Insurance Act, and these automatically are denied benefits. The other group, on which decisions are yet to be made, involves steadily employed claimants who received termination notices from their employers prior to a hearing by the National Labor Relations Board on the subject of union jurisdiction.

The decisions follow extensive hearings on the cases. Representatives of the California State Federation of Labor argued on behalf of the claimants at a hearing before the Board last month.

A MAJOR HIGHWAY CONSTRUCTION PROJECT IN SOUTHERN OREGON

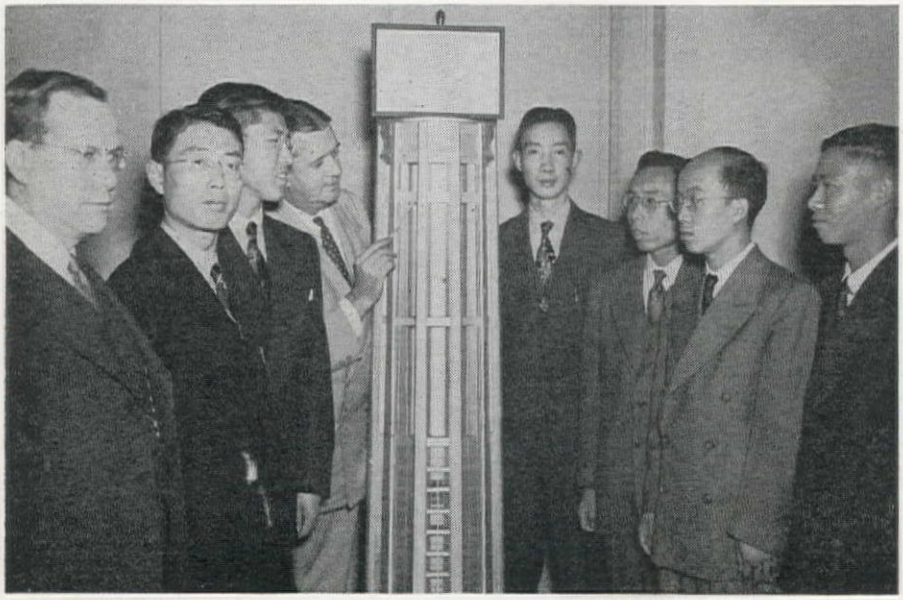
HEAVY EARTH MOVING EQUIPMENT excavating a cut on the Coyote creek-Graves creek section of U. S. Route 99 located in the Klamath Mountains 50 miles south of Roseburg, Oregon. McNutt Bros., Eugene, have the contract to construct 4.36 mi.

In rendering the decision, the Board pointed out that Section 56a of the California Unemployment Insurance Act provides that an individual shall not be eligible for benefits "if he left his work because of a trade dispute" and continues out of work because the trade dispute still is in active progress.

Refusal to cross a picket line by a steadily employed individual, the Board held, constituted a voluntary "leaving of work" because of a trade dispute, and the continued refusal to cross the line results in the individual continuing out of work because the trade dispute still is in active progress.

On the other hand, those persons out of work before the trade dispute was in active progress, are not actually involved in the trade dispute as far as unemployment insurance benefits are concerned, and therefore, as the result of unemployment occurring before the trade dispute started, the Board held this group is entitled to unemployment insurance on the same basis as any other eligible claimant.

SIX YOUNG CHINESE engineers listen as assistant commissioner of Reclamation Kenneth Markwell shows them a model of one of Boulder Dam's four mammoth intake towers. This group will join 19 others for training at the Denver office of the Bureau and for a study tour of Reclamation projects in the West. From left to right are: W. E. Corfitzen, acting chief of Special Assignments Section, Bureau of Reclamation; Chung-wei Wu, Chen-fu Tu, assistant commissioner Markwell, Ping-chuan Tsao, Peng-nien Chiang, Lien-cheng Le, and Hsin-min Lee.



Port Engineer Positions Open in San Francisco

ASSISTANT HARBOR ENGINEERS are needed by the Board of State Harbor Commissioners at San Francisco. Applicants having two years of engineering design, drafting, or construction experience including technical inspection work may submit their qualifications to the State Personnel Board, 108 State Building, San Francisco; 1015 L Street, Sacramento; or 401 State Building, Los Angeles.

The position will require doing structural engineering design, drafting plans of piers, wharves, ferry slips, railroad tracks and building of reinforced concrete, structural steel and timber; plotting test pile and sounding data. Examinations will be rated on the experience statements on the application. The position is open to U. S. citizens and nationals of allied nations. The salary is $250 per month with sick leave and vacation benefits.

PERSONALLY SPEAKING

Frank Bradley, chief of the Seattle Army Engineer fiscal division, has been assigned to a new post in Paris, France, it was announced recently. Bradley was requested by the Office, Chief of Engineers, Washington, D. C., for the task of compiling a special statistical and financial report on Corps of Engineer activities during and immediately following the war in the European theater of operations. He first joined the Army Engineer organization in Portland, Ore., in 1937 and went to Seattle from that city in 1941.

* * *

Bechtel Brothers McCone Company is a new corporation engaging in the engineering and construction business. The recently formed firm will maintain offices in San Francisco, Los Angeles, Calif., and other cities to be announced later. Executives and key personnel have been drawn from the Bechtel and the Bechtel McCone interests, extensively identified with major construction on the Pacific Coast principally, but also embracing a number of projects in Alaska, Canada, the Caribbean area, the Persian Gulf, and the Philippines. The Board of Directors consists of **S. D. Bechtel, John A. McCone, K. K. Bechtel, John L. Simpson, W. E. Waste,** president; **J. P. Yates** and **Van W. Rosendahl,** executive vice presidents; **Jerome K. Doolan** and **V. G. Hindmarsh,** vice presidents. W. E. Waste, president, and former vice president and general manager of Marinship Corp., defines the Bechtel Brothers McCone Co. enterprise as "an engineering and construction service for industrials and government bodies, placing special emphasis on work required by the petroleum, mining, chemical and other heavy process industries; railroads, public utilities and government authorities.

* * *

Lt. Comdr. Wilfred Jupenlaz, formerly supervising civil engineer, 12th Naval District, San Francisco, Calif., has joined the enginering staff of **John W. Cunningham,** consulting hydraulic engineer of Portland, Ore.

* * *

A. E. Niederhoff, well-known hydraulic engineer of the Northwest, is now in Alaska with the U. S. Army Engineers. Although the nature of his duties is not known at the present, Niederhoff plans to be in the Alaskan territory for the coming year.

* * *

Ben S. Sawyer, formerly of Seattle, Wash., has assumed duties of assistant city engineer and building inspector at Corvallis, Ore., filling a position which has been vacant for some time. Sawyer graduated at the University of Detroit in 1930 and has been engaged in work similar to that which he has undertaken at Corvallis. He was employed in engineering work in Seattle, Wash., and in Portland, Ore., previous to his new appointment.

* * *

J. A. Carruthers, chief engineer at the University of Alberta, is retiring after 12 years in that position. He is succeeded by **E. Mills,** who has been serving with the rank of chief engineer with the Canadian Navy for the past three years. Carruthers is a member of the Alberta Assn. of Professional Engineers and served on the council for two two-year terms. On the eve of his retirement he was the recipient of a presentation by the power plant staff and other friends associated with the university faculty.

* * *

Gordon A. Lilley, previously with the Army Service Force at Los Angeles, Calif., is now resident engineer for the U. S. E. D., San Diego, Calif., project.

* * *

Richard L. Boke, of California, was appointed by Reclamation Commissioner **Harry W. Bashore** to fill the important post of Director of Region II, U. S. Bureau of Reclamation. The Region embraces the Central Valley Project, Northern California, and a part of Oregon, with headquarters at Sacramento, Calif.

Boke succeeds the late **Charles E. Carey,** who died in September of this year. His appointment goes into effect immediately. For the past eight months he has been supervisor of operation and maintenance in Region II, for the Bureau, engaged in activities looking to resumption of construction of the authorized initial features of the half-completed Central Valley Project, the negotiation of CVP water-marketing contracts in the San Joaquin Valley, and other matters connected with building and operating the Bureau's projects in Northern California and Southern Oregon.

RICHARD L. BOKE, recently appointed Director of Region Two for the U. S. Bureau of Reclamation, with headquarters in Sacramento, Calif. Boke, a native Californian, formerly lived in Berkeley.

Before coming to the Bureau, he was connected with the Foreign Economic Administration in charge of food production and purchasing in Latin America. Previous to this, he was chief of operations for the Coordinator of Inter-American Affairs in a program of agricultural planning and cooperation in Latin America.

Since Mr. Carey's death, the work in Region II has been under direction of Acting Regional Director **R. S. Calland,** who will remain with the region in a high executive capacity.

* * *

Captain Roy A. W. Krows of Seattle, Wash., Corps of Engineers officer, will return to his civilian job at Coulee dam in January. Krow has been honorably discharged from the Army by reason of his service point score, spent 31 months on

CAPT. ROY W. KROWS will soon return to his civilian position at Coulee dam after extensive foreign duty in the China-Burma-India theater, where he worked on the Burma-Ledo road.

the Ledo-Burma road construction as well as duty in the United States. After leaving the China-Burma-India theater, he returned to the States in 1941, and saw duty at Fort Lewis, Santa Barbara and Fort Belvoir before serving in Seattle as chief of depot services, supply division.

* * *

Otto Hoefler, civil engineer, formerly with the U. S. Soil Conservation Service at Santa Susana, Calif., is now with the Civil Engineers Corps of the U. S. Navy. At present Hoefler is at Camp Parks, Calif., awaiting further orders.

* * *

Lt. F. M. Hines is division resident engineer for the Navy on the San Diego Aqueduct, Hemet Division, in California. Assisting him is **Howard C. Flanagan,** formerly resident engineer on the Bangor Pier in Washington. **L. W. Stone, Dan H. Thomas, J. C. Rous** and **C. W. Bates** are also key engineers on the large aqueduct project.

* * *

J. M. Floyd, for many years operating on cement construction in the San Diego, Calif., area, has moved to a new yard occupying 20,000 sq. ft., at 2175 Newton St., San Diego.

* * *

E. Reed Carter, formerly engaged in system design and construction for a number of large ranchers in the Rogue River, Ore., area, is now acting in an advisory capacity on irrigation problems in the same area.

SUPERVISING THE JOBS

A. H. Steiner, formerly project manager for Guy F. Atkinson Co., San Francisco, Calif., on the rock jetty and dredging work at the Naval magazine and net depot at Seal Beach, Calif., is now project manager for that company on its San Diego Aqueduct contract, with new offices at San Jacinto, Calif. **Bruce Wheeler** is master mechanic, with **Leo Ryser** and **Monty Montgomery** assisting him. **F. C. (Jack) Jackson** is superintendent of excavation, with **Walt Hill** in the same capacity on the night shift. **Brad Strobel** is mechanical superintendent and **Fred Jordan,** carpenter superintendent. **A. G. Chaussee** is job engineer, **Joe McNabb,** office engineer, with **T. F. Foran** acting as office manager, and **Pat Mitchell** as paymaster. **R. S. (Bob) Corr** is chief of party in the field for the company.

* * *

E. A. Ralston, of Hollywood, is contractor and construction foreman on a factory building being constructed at Pasadena, Calif., for the C. P. Hayes Plastics Co.

* * *

J. L. Morris, well-known job superintendent for Robert E. McKee, Los Angeles, Calif., is again supervising a $1,353,000 contract for that company which calls for the construction of the main hospital building at the site of the new Veterans' Hospital, Reno, Nev. **Oscar Kelfer** is chief engineer for the construction and field office manager is **H. H. Perkins.**

* * *

Ray Cook is superintendent for Bryce Trucking and Construction Co., of Wilmington, Calif., on various projects in that area. **Slim Bloomfield** and **Frank Tate** are other key men in the organization.

* * *

Floyd Rupp is superintendent on a new building for Virtue Brothers, on West Century Blvd., Los Angeles, Calif., with the firm of McIsaac and Menke Constructors. **Fay Dohrman** is carpenter foreman and **Lorin Martin** labor foreman.

* * *

Chris Nelson is superintendent for Fred E. Tucker & Son, who have the contract for a new theater building at San Antonio and Atlantic Aves., Long Beach, Calif.

* * *

Sydney Davis is general superintendent on the $1,500,000 addition to the General Motors Bldg. at Southgate, Calif., for the firm of Swinerton & Walberg Co., San Francisco, Calif. **Robert Wison** is the assistant superintendent on the job. **Harry Rugh** is general foreman, and division superintendents are **Henry Sherman, Bill Wiseman** and **Jerry Haskell.** Mill foreman is **W. L. (Leo) Kielhofer** and **Henry Clayton** is labor foreman. **William Gilbert** is office engineer, office manager is **Art Chapman,** and **J. D. Silverthorn** has charge of all personnel.

A. J. Albohn is job superintendent and **M. R. Hudson** construction manager for the Clyde M. Ludberg Co. of Spokane, Wash., on their $104,341 contract for remodeling and redecorating Sutton Hall, at the Eastern Washington College of Education, Cheney, Wash. Others holding key positions on the project are: **Joe Strang** and **Virgil Means,** carpenter foremen, and **William W. Wheatley,** office manager.

* * *

Frank Jones and **Foster Manning** are job superintendents for Henry George & Sons, Spokane, Wash., contractors, on that company's $204,000 contract to erect additional grain storage bins at the Port of Longview grain elevators, Longview, Wash. Another key man on the job is **O. M. Chaplin.**

* * *

W. J. Darkenwald is supervising work on the $198,451 levee enlargement program on the Sacramento River, from Colusa to Packers, Calif., for Morrison-Knudsen Co., Inc., Boise, Ida., who held the contract. Working closely with Darkenwald on the project is **T. J. Hopper,** clerk.

* * *

Al Spangler is job superintendent for Morrison-Knudsen Co., Inc., Boise, Ida., on that company's $84,250 contract for retard construction and enlargement of the U S. Dike on the Yuba river from Rubke Bend, southwest of Daguerre Point Dam, north of Sacramento, Calif.

* * *

Ralph J. Gibbs, many-time job superintendent for Ross B. Hammond Construction Co., Portland, Ore., is now supervising for that company the construction of a $500,000 beverage plant located at Portland. Job manager of the project is **H. M. Mason,** and general superintendent is **A. V. Petersen.**

* * *

B. C. Martin, formerly job superintendent on the construction of the San Bernardino County Hospital at San Bernardino, Calif., for the Stronach Construction Co. of Los Angeles, Calif., is now supervising the construction of a $250,000 wholesale mercantile bldg. at Broadway and Adams Blvd., Los Angeles, for which the Stronach Company holds the contract. **R. E. Frankenberger** is engineer on the project. Others holding key positions on the erection of the two-story building are: **H. D. Crockett,** timekeeper, and **H. M. Levold,** general foreman.

* * *

Raymond Anderson is supervising the construction of additional facilities at the U. S. Naval Hospital, San Leandro, Calif., for which the James I. Barnes Construction Co., of San Francisco, Calif., holds the $113,660 contract. Purchasing agent for the job is **J. B. Allen.**

* * *

Theodore P. Scholz is job superintendent for Dawson Construction Co., Bellingham, Wash., on the $77,395 contract for highway improvements, and three log bridges on the mine-to-market road, in the Williamson creek vicinity, Washington. **W. H. Miller** is in charge of grading and culverts and **Dick Layton** is equipment superintendent.

* * *

Arthur Farley is job superintendent on the construction of a steel frame storage building to cost $80,000 for Myers Brothers, Los Angeles, Calif., contractors. **Alex Edgren** holds the position of general superintendent, and purchasing agent is **Walt Whittacker.**

* * *

George Snodgrass is job superintendent for the J. L. Hair Construction Co., of Wichita Falls, Tex., on their $415,450 contract for the construction of a two-story senior high school building at Odessa, Tex. Assisting Snodgrass as superintendent is **Cal Monteith,** with **J. H. McAbee,** superintendent of all brick work.

* * *

R. J. (Jack) Parker is superintending a $122,466 job for the H. B. Zachry Co., San Antonio, Tex., which calls for alterations and repairs to taxiways and runways at the Laredo Army Airfield, Laredo, Tex. **D. P. Wylie** is general grading and asphalt foreman on the same project.

* * *

J. A. Golden, formerly job superintendent for M. H. Golden Construction Co., San Diego, Calif., on construction of a $1,810,825 quay wall at Spanish Bight, a portion of the Naval air station at San Diego, is now superintending a $75,603 contract for that company which calls for the construction of dolphins on the north side of the existing piers 1 to 5, inclusive, and north side of the mole at the Naval repair base at San Diego.

* * *

R. B. Guerin has been named job superintendent for Guerin Brothers, South San Francisco, Calif., contractors, on their $182,963 road job contract at Alder Creek, Calif. Besides grading and surfacing, the contract requires the construction of a steel plate girder bridge.

* * *

Ray E. Morris, for several years with F. E. Young, contractor of San Diego, Calif., is now superintendent for that company on the Wright Refrigerator Bldg. on the Coast Highway at San Diego.

* * *

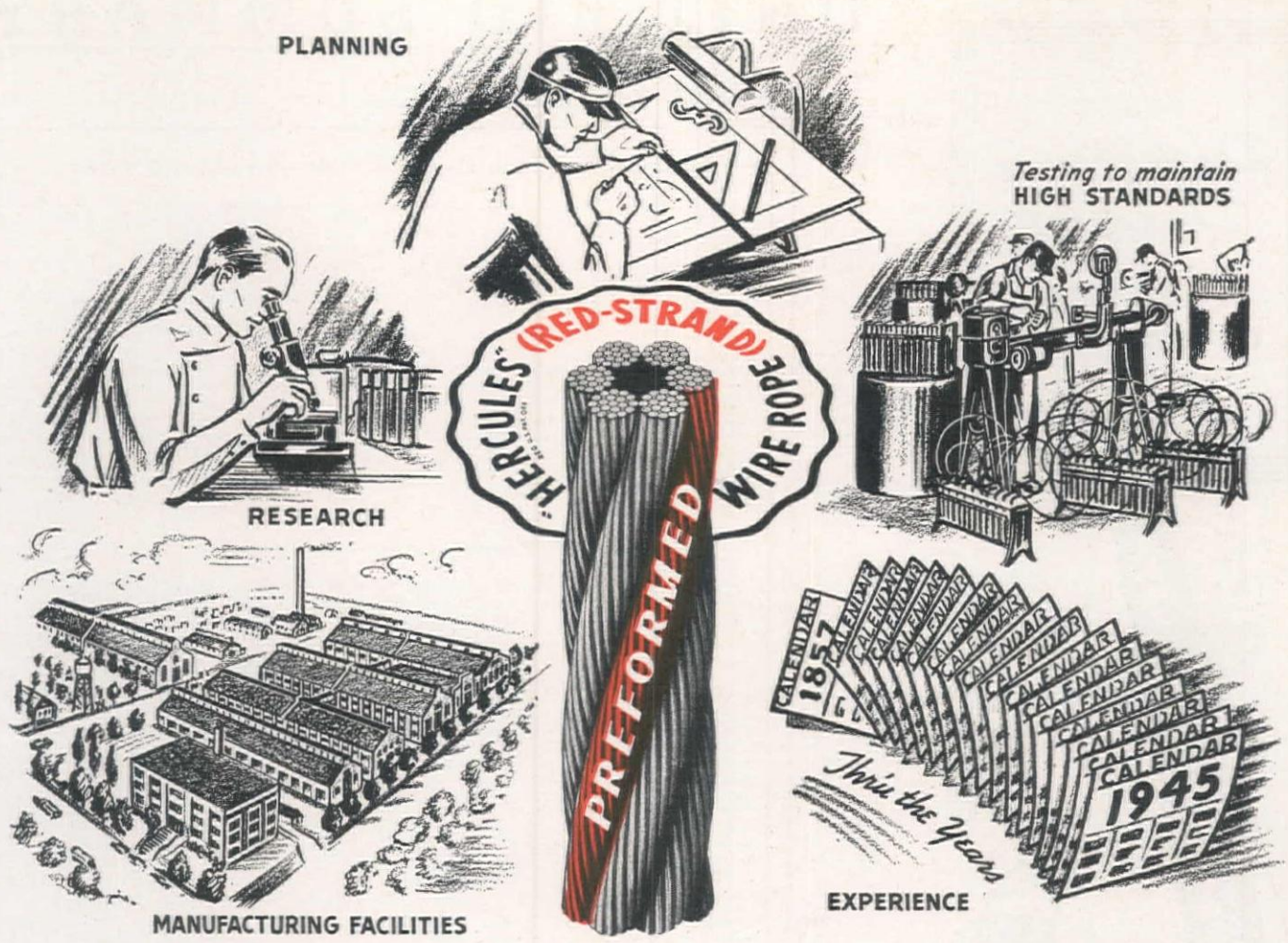
Stanley Ball is project manager for N. M. Ball Sons, of Berkeley, Calif., who have the contract for 9.4 mi. of highway under construction near San Clemente, Calif. **Ralph Cook** is construction superintendent and **Elmer Sholin** is master mechanic. Office manager on the job is **Kenny King.**

* * *

John Oberg is project manager for Oberg Brothers, Inglewood, Calif., on their San Mateo Bridge contract near San Clemente, Calif. **W. Harold Johnson** is project engineer for the state on the same job.

* * *

Thomas C. Loveday, formerly with Scherer and Pritchard of Riverside, Calif., on construction work at North Island, Calif., is representing that company again as superintendent on the erection of a new theater building at Hemet, Calif.



Factors that determine its QUALITY

The quality of "HERCULES" (Red-Strand) Wire Rope is never a matter of chance... it is the result of careful planning, diligent research, long experience, advance manufacturing facilities... *plus* high standards and the determination to maintain them.

As it is difficult to point out which is the most important leg of a three-legged stool, so it is hard to say which of these factors is the most vital... we know from experience that *all* are necessary. Proof of wire rope quality is in performance... find out for yourself just what "HERCULES" can do on your own job. Many who have made this test are now regular users.

Yes, there is a correct construction and type of "HERCULES" (Red-Strand) Wire rope to fit any job... anywhere.

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

UNIT BID SUMMARY

Highway and Street...

New Mexico—San Juan County—State—Grade and Surf.

J. E. Skousen, Gallup, submitted the low bid of $70,666 and was awarded the contract by the New Mexico State Highway Department for the construction of 10 mi. of the Bloomfield-Farmington section of SR No. 17. Summary of the unit bids received is as follows:

(1) J. E. Skousen $70,666
(2) E. M. Silver 79,870
(3) Allison & Armstrong 88,332
(4) D. D. Skousen 91,931
(5) Walter L. Denison ..... $ 94,995
(6) Peter Kiewit Sons Co. 95,349
(7) W. T. Bookout Construction Co. 100,753

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
636	hour rolling	4.50	6.00	5.00	5.00	5.00	5.25	5.00
387	M. gal. watering	2.50	3.00	2.50	3.00	4.00	2.80	2.50
16,845	T. ballast	.57	.67	.70	1.17	1.00	.99	1.00
21,861	T. leveling course	.77	.82	1.00	1.20	1.10	1.20	1.25
906	bbl. cutback asph., Type MC-1	5.80	5.80	7.00	5.20	6.00	6.65	7.50
8,784	T. top course surf.	.87	.82	.95	1.17	1.10	1.20	1.10
2,789	bbl. cutback asph., Type MC-3	5.40	6.55	7.00	5.10	6.50	6.55	7.50
9.981	mi. mixing asph. and aggr.	475.00	600.00	600.00	500.00	600.00	500.00	500.00
698	bbl. 200-300 pen. asph.	6.00	6.55	7.25	5.00	7.00	6.70	7.50
879	T. cover material	4.00	5.00	6.00	4.50	6.00	4.00	5.50

Oregon—Linn County—State—Slide Correction

Slate Construction Co., Albany, submitted the lowest bid of $76,445 to the State Highway Department, Eugene, for the correction of a slide area on Toll Creek-Snow Creek section of the Santiam Highway. Summary of the unit bids follows:

(1) Slate Construction Co. ..... $ 76,445
(2) Strong & McDonald, Inc. 125,754
(3) McNutt Bros. $169,212

		(1)	(2)	(3)
Lump sum,	clearing and grubbing	$7,000	$15,000	$28,900
680	cu. yd. trench excavation, unclassified	.75	1.00	10.00
131,000	cu. yd. general excavation, unclassified	.40	.66	.79
2,300	lin. ft. rounding cutbanks	.20	.20	.50
0.74	mi. finishing roadbed and slopes	500.00	600.00	800.00
110	sta. cleaning ditches	20.00	15.00	10.00
100	hours grading with bulldozer	6.50	8.00	12.00
200	lin. ft. 24-in. extra strength corr. metal pipe	5.00	6.00	5.00
1,200	lin. ft. 18-in. perforated corr. metal pipe	3.50	3.50	3.75
20	lin. ft. 18-in. corrugated metal pipe	3.25	4.00	3.50
200	lin. ft. 14-in. extra strength corr. metal pipe	5.00	6.00	5.00
530	cu. yd. hauling and placing rock backfill	.75	2.00	4.00
100	lin. ft. salvaging culvert pipe	2.00	2.00	2.00
4	only, concrete catch basins	30.00	150.00	150.00
13	cu. yd. Class "A" concrete	25.00	70.00	75.00
2,400	lbs. metal reinforcement	.10	.10	.20
Lump sum,	grate and grilles in place	150.00	240.00	$2,100
190	cu. yd. rock fill around intake	.75	2.00	7.00
5,600	cu. yd. hauling and placing base course surfacing	.75	1.50	1.80
820	cu. yd. hauling and placing top course surfacing	.75	2.00	2.00
130	M. gals. sprinkling	5.00	3.00	3.00

California—Mendocino County—State—Grade and Surface

Guerin Bros., So. San Francisco, offered the low bid of $182,963 to the Division of Highways, Sacramento, for the construction of 1.2 mi. of highway at Alder Creek, about 7 mi. north of Point Arena and the installation of a steel plate girder bridge in the same project. The following list of work quantities and unit bids were received from the bidders:

(A) Guerin Bros. $182,963
(B) Fredrickson Bros. 186,666
(C) Fred J. Maurer & Son 204,130
(D) Guy F. Atkinson Co. 215,671
(E) Fredrickson & Watson 218,837
(F) Dan Caputo & Edward Keeble $223,933
(G) E. B. Bishop 224,472
(H) Louis Biasotti & Son 235,006
(I) N. M. Ball Sons 246,472

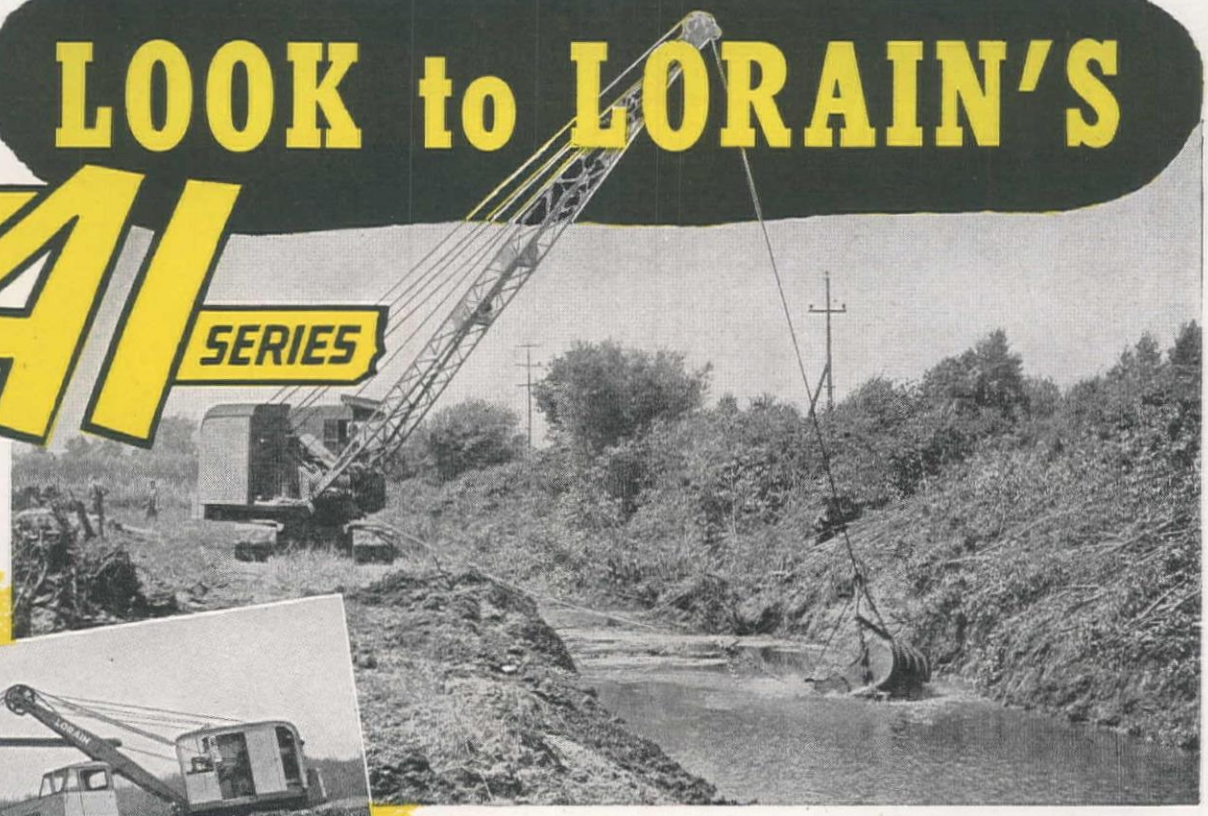
(1) 18 acres clearing and grubbing.
(2) 146,000 cu. yd. roadway excavation.
(3) 1,700 cu. yd. imported borrow.
(4) 160 cu. yd. ditch and channel excavation.
(5) 1,000 cu. yd. structure excavation (bridge).
(6) 1,800 cu. yd. structure excav. (except bridge)
(7) 9,000 cu. yd. trench excavation.
(8) 5,730 cu. yd. filter material.
(9) 188,000 sta. yd. overhaul.
(10) 2,800 sq. yd. compacting original ground.
(11) Developing water supply and furn. wtg. equip.
(12) 1,500 M. gal. applying water.
(13) 65 sta. finishing roadway.
(14) 8,200 cu. yd. gravel base (Type B).
(15) 5,600 cu. yd. gravel base (Type A).
(16) 29 tons liquid asphalt, SC-2 (prime coat).
(17) 110 cu. yd. min. aggre. (surf'd rdwy. gutters).
(18) 11 tons liq. asph., SC-3 (surf'd rdwy. gutters).
(19) 1,400 sq. yd. mixing and compacting (surf'd rdwy. gutters).
(20) 40 tons liq. asphalt, SC-6 (seal coat).
(21) 360 cu. yd. screenings (seal coat).
(22) 515 cu. yd. Cl. "A" P.C.C. (structures).
(23) 265 cu. yd. Cl. "A" P.C.C. (footing block).
(24) 100,000 lb. furnishing structural steel.
(25) 100,000 lb. erecting structural steel.
(26) 76,200 lb. furn. bar reinf. steel.
(27) 76,200 lb. placing bar reinf. steel.
(28) Miscellaneous items of work.
(29) 336 lin. ft. timber bridge railing.
(30) 220 cu. yd. sacked P.C.C. riprap.
(31) 4,700 lin. ft. 8-in. P.M.P. underdrains (16 ga.)
(32) 720 lin. ft. 12-in. P.M.P. underdrains (16 ga.)
(33) 150 lin. ft. 8-in. C.M.P. downdrains (16 ga.)
(34) 350 lin. ft. 12-in. C.M.P. downdrains (16 ga.)
(35) 315 lin. ft. 18-in. R.C.P. (std. str.)
(36) 90 lin. ft. 24-in. R.C.P. (std. str.)
(37) 342 lin. ft. 75-in. field assemb. plate culvert.
(38) 7 ea. spillway assemblies.
(39) 2.6 mi. new property fence.
(40) 12 ea. timber drive gates.
(41) 22 ea. culvert markers.
(42) 50 ea. guide posts.
(43) 60 ea. monuments.

		(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	.....	500.00	82.00	100.00	140.00	180.00	125.00	300.00	150.00	420.00
(2)	.....	.29	.31	.38	.33	.30	.50	.35	.32	.54
(3)	.....	.75	.54	.70	.85	.90	1.50	1.50	1.25	.85
(4)	.....	1.00	1.00	2.00	1.40	1.80	1.00	2.00	2.00	2.00
(5)	.....	2.00	1.00	6.00	2.60	5.40	4.00	5.00	8.40	2.00
(6)	.....	1.00	2.28	2.00	1.85	2.40	2.00	2.00	1.50	2.25
(7)	.....	.50	.63	1.00	2.00	.60	1.00	1.00	1.50	.70
(8)	.....	1.60	1.90	2.50	3.20	2.75	1.50	3.00	3.00	2.60
(9)	.....	.01	.01	.01	.01	.01	.01	.02	.0075	.01
(10)	.....	.10	.04	.20	.06	.06	.25	.10	.60	.05
(11)	.....	$1,000	600.00	300.00	350.00	$2,700	$2,000	500.00	750.00	$4,000

(Continued on next page)

LOOK to LORAIN'S

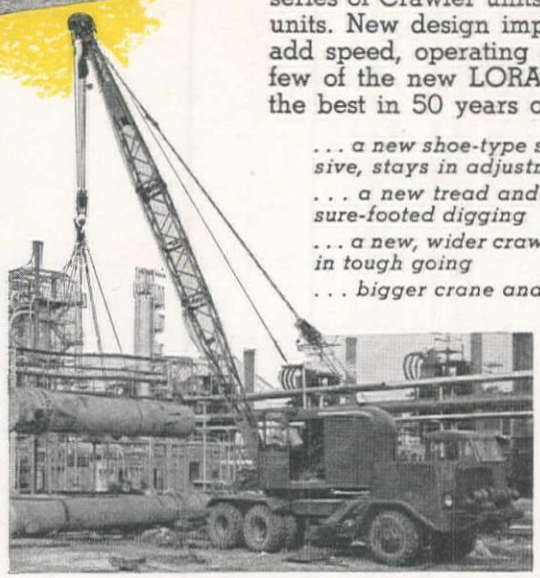
NEW 41 SERIES



(top) the new LORAIN 41 Crawler, shown as dragline, chain drive crawler, 2 travel speeds in both directions

(center) the MOTO-CRANE MC-414, shown as ¾ yd. shovel, 10 travel speeds to 28 m.p.h., power on 4 rear wheels.

(bottom) the MOTO-CRANE MC-416, shown as crane, 8 travel speeds to 31 m.p.h., power on 4 rear and 2 front wheels.



Performance at its best is built into the new LORAIN "41" series of Crawler units, Moto-Cranes and Self-Propelled units. New design improvements are incorporated that add speed, operating ease and longer life. Here are a few of the new LORAIN "41" features combined with the best in 50 years of manufacturing experience . . .

. . . a new shoe-type swing clutch, faster, more responsive, stays in adjustment longer

. . . a new tread and travel lock, easy to apply, adds sure-footed digging

. . . a new, wider crawler tread that means better travel in tough going

. . . bigger crane and clamshell capacities

All units in the LORAIN "41" series are fully convertible as shovel, crane, clamshell, dragline and hoe. Available with gas, diesel or electric power. See your dealer today.

THE THEW SHOVEL CO.
Lorain, Ohio

CRANES • SHOVELS • DRAGLINES • CLAMSHELLS • MOTO-CRANES

See Your thew-Lorain Dealer

Le Roi-Rix Machinery Co., Los Angeles 11
Cate Equipment Co., Salt Lake City 4
Liberty Trucks & Parts Co., Denver 1
Coast Equipment Company, San Francisco 1
A. H. Cox & Co., Seattle 4, Washington
Bunting Tractor Co., Inc., Boise, Twin Falls, Gooding, Fairfield, and Burley, Idaho; LaGrande, Oregon
Connelly Machinery Company, Billings and Great Falls, Montana
Sanford Tractor & Equipment Co., Reno, Nevada
The Mountain Tractor Co., Missoula, Montana
The Tractor & Equipment Co., Sidney, Montana
P. L. Crooks & Co., Portland 10, Oregon

(12)	2.50	1.80	1.50	2.80	1.50	1.00	2.00	1.50	1.75
(13)	12.00	8.80	12.00	11.00	12.00	10.00	15.00	12.50	10.00
(14)	1.60	1.71	1.70	1.65	2.75	2.00	2.50	2.85	2.60
(15)	1.60	1.71	1.70	1.70	3.30	2.00	2.50	2.85	2.70
(16)	40.00	26.00	40.00	31.00	31.00	50.00	35.00	31.00	30.00
(17)	1.60	2.50	5.00	2.30	3.30	4.00	2.00	7.50	12.00
(18)	40.00	31.00	40.00	32.00	31.00	50.00	50.00	31.00	20.00
(19)	.25	.20	.80	2.50	.30	.50	.75	.60	.20
(20)	40.00	28.00	40.00	32.50	31.00	50.00	40.00	34.00	40.00
(21)	4.00	7.00	5.00	2.30	6.00	6.00	6.00	9.00	4.50
(22)	40.00	48.50	50.00	44.00	53.00	45.00	40.00	47.25	45.00
(23)	30.00	35.00	35.00	47.00	36.00	30.00	30.00	31.50	32.00
(24)	.07	.077	.07	.09	.08	.10	.08	.08	.0735
(25)	.04	.036	.02	.05	.03	.02	.03	.042	.0365
(26)	.04	.04	04	.04	.04	.05	.06	.042	.0365
(27)	.015	.012	.02	.02	.02	.01	.03	.027	.0114
(28)	$1,000	$1,000	$1,200	850.00	$1,200	700.00	$4,000	900.00	$2,500
(29)	4.00	5.50	2.50	2.00	2.75	3.50	4.00	3.15	5.15
(30)	15.00	17.00	15.00	33.00	14.00	16.00	30.00	25.20	16.20
(31)	1.25	1.28	1.10	1.20	1.10	1.25	1.00	1.40	1.40
(32)	1.45	1.77	1.50	1.60	1.60	2.00	2.00	1.75	1.70
(33)	1.20	1.30	1.25	1.20	1.60	1.25	1.50	1.50	1.60
(34)	1.50	1.80	2.00	2.00	1.65	2.00	2.00	1.75	2.00
(35)	3.00	2.66	3.50	3.00	2.60	3.00	4.00	4.50	3.00
(36)	4.00	3.85	5.00	4.50	3.90	4.00	6.00	6.75	4.30
(37)	40.00	36.00	30.00	3.50	36.00	30.00	20.00	32.75	28.00
(38)	30.00	25.00	20.00	45.00	32.00	20.00	35.00	40.00	30.00
(39)	$1,800	$1,450	$1,000	$3,700	$2,160	$2,000	$2,000	$2,500	$1,700
(40)	20.00	15.00	30.00	28.50	31.00	25.00	45.00	35.00	40.00
(41)	5.00	5.00	4.00	3.00	3.00	4.00	5.00	7.50	4.00
(42)	5.00	3.80	4.00	3.00	3.00	4.00	5.00	7.50	4.50
(43)	5.00	5.00	4.00	6.00	3.50	6.00	5.00	5.50	4.00

Montana—Gallatin and Park Counties—State—Grade and Surface

Union Construction Co., Great Falls, Montana, offered the lowest bid of $436,924 to the State Highway Commission, Helena, for the construction of 3.8 mi. of the Bozeman Hill section of Livingston-Bozeman highway. The following is a summary of the work quantities and the unit bids received by the commission:

(1) Union Construction Co. $436,924
(2) C. & F. Teaming, Contracting Co. 451,650
(3) O'Neil Construction Co. 467,034
(4) Big Horn Construction Co. $469,635
(5) McLaughlin, Inc. 499,957

		(1)	(2)	(3)	(4)	(5)
511,886	cu. yd. unclass. excav. and borrow	.52	.53	.55	.60	.57
1,893	cu. yd. culvert excavation	1.00	1.50	1.50	1.60	1.50
587,000	sta. yd. overhaul	.01	.02	.005	.01	.01
107,664	mi. yd. overhaul	.15	.20	.20	.20	.20
35,700	ton base course crushed rock surf.	1.50	1.35	1.50	1.30	1.50
15,144	ton Type A top course crushed rock, Grading A	2.00	1.75	2.00	1.63	2.35
867	ton stone chips, Grading A	4.00	3.00	5.00	4.00	6.00
2,100	cu. yd. binder	.05	.10	.20	.50	.25
4,200	mi. yd. overhaul on binder	.05	.10	.20	.10	.20
5,100	M. gal. watering	1.30	2.00	1.30	1.60	2.00
210	units rolling	6.00	5.00	8.00	6.50	6.00
80,841	gal. appl. of SC-4 asph. Road Oil	.10	.12	.15	.10	.10
3.987	mile processing	800.00	600.00	800.00	800.00	800.00
24,412	gal. seal coat oiling (150-200 A cem.)	.10	.15	.15	.10	.13
4,215	gal. prime coat oiling (SC-1 A Road Oil)	.10	.12	.15	.10	.15
244	lin. ft. 15-in. reinf. conc. pipe culv.	2.00	3.00	2.10	2.25	2.50
76	lin. ft. 18-in. reinf. conc. pipe culv.	3.50	3.50	3.50	3.00	3.00
740	lin. ft. 24-in. reinf. conc. pipe culv.	4.00	4.00	4.00	4.50	4.50
168	lin ft. 36-in. reinf. conc. pipe culv.	10.00	10.00	8.00	9.00	9.00
184	lin. ft. 48-in. reinf. conc. pipe culv.	15.00	18.00	15.00	15.00	16.00
360	lin. ft. 24-in. extra strength reinf. conc. pipe culv.	6.00	5.00	5.00	4.50	5.00
116	lin. ft. 36-in. extra strength reinf. conc. pipe culv.	10.00	12.00	9.00	10.50	11.00
184	lin. ft. 4-in. vitrified tile drain pipe	1.00	2.00	3.00	.65	1.00
68	lin. ft. 18-in. corr. metal syphon pipe	4.00	3.00	5.00	3.75	2.50
440	lin. ft. 24-in. corr. metal syphon pipe	6.00	4.00	6.00	4.75	3.50
27,000	lb. reinf. steel	.10	.10	.15	.07	.10
248	cu. yd. Class A concrete	40.00	40.00	40.00	30.00	40.00
0.86	cu. yd. Class B concrete	40.00	40.10	40.00	32.50	40.00
14.86	M.F.B.M. treated lumber	200.00	200.00	200.00	175.00	200.00
0.36	M.F.B.M. untreated lumber	200.00	200.00	150.00	150.00	200.00
4	ea., 10-ft. treated timber piles	25.00	20.00	30.00	25.00	15.00
26	ea., 25-ft. treated timber piles	40.00	50.00	50.00	60.00	37.50
Lump sum,	rev. ex. str. and maint. tr. (222)	750.00	$1,000	$1,500	200.00	$1,000
Lump sum,	rev. ex. str. and maint. tr. (166)	750.00	$1,000	$1,500	400.00	750.00
550	lin. ft. No. 42 metal ditch lining	3.00	5.00	3.00	3.50	2.00
0.19	M.F.B.M untreated lbr. in hdgte.	200.00	200.00	150.00	200.00	200.00
106	ea., concrete guide posts	7.50	9.00	10.00	12.00	8.00
2	ea., concrete project marker	15.00	9.00	10.00	15.00	10.00
25	ea., concrete station marker	10.00	5.00	6.00	7.50	4.00
104	ea., concrete r/w monuments	3.00	3.00	4.00	3.00	3.00
600	ton stock piled crushed rock	2.00	1.75	1.50	1.10	2.00

Wyoming—Carbon County—State—Grade and Surface

Etlin E. Peterson, Casper, submitted the lowest bid and was awarded the contract for $104,163 by the Highway Department, Cheyenne, for the construction of 1.03 mi. of the Saratoga-Centennial road and the erection of an I-beam span bridge. Summary of the quantities and the unit bids submitted by the bidders follows:

(1) Etlin E. Peterson $104,163
(2) Charles M. Smith 105,041
(3) Northwestern Engineering Co. 107,384
(4) Inland Construction Co. $109,910
(5) Big Horn Construction Co. 110,816
(6) Engineer's estimate 98,026

		(1)	(2)	(3)	(4)	(5)	(6)
60,000	cu. yd. excavation	.42	.45	.23	.47	.36	.32
20,200	cu. yd. mi., cubic yard mile haul	.30	.22	.20	.35	.15	.20
500	M. gal. watering (emb.)	1.00	2.00	2.00	1.60	1.60	1.50
70	hr. sheepsfoot roller operation	5.60	5.00	5.00	3.60	3.65	4.50
190	hr. pneumatic tired roller operation	6.00	6.00	5.00	4.25	4.45	5.00
684	lin. ft. 18-in. C.M.P.	2.45	2.00	2.50	2.55	2.40	2.00
284	lin. ft. 24-in. C.M.P.	4.10	3.00	4.00	4.00	3.75	3.00
88	lin. ft. 36-in. C.M.P.	7.60	5.50	7.00	7.50	7.05	5.50
100	cu. yd. excavation for pipe culverts	1.40	1.50	3.00	2.00	1.60	1.30
2,500	ton crushed gravel base course (¾-in. max.)	2.10	1.75	1.80	1.00	2.51	1.50
1,100	ton. crushed gravel surfacing (¾-in. max.)	2.10	1.75	1.80	.85	2.88	1.50
150	ton stone chips	7.00	5.50	4.50	3.15	7.37	5.00
32	ton base treatment, MC-0	28.00	30.00	30.00	25.50	25.05	29.00
51	ton med. cur. liq. asphalt distr. MC-3	28.00	30.00	30.00	24.50	25.05	29.00
30	ton. seal coat RC-4	28.00	30.00	32.00	27.00	27.05	30.00
14,500	sq. yd. processing roadway	.07	.10	.08	.08	.09	.08

(Continued on next page)

"Conversion"
Check material availabilities
Bids in for Culvert jobs
Change to Cadel A.P.
in all equipment

CADEL A.P. (ALL PURPOSE)
HEAVY DUTY LUBRICANT

. . . The One Oil for All Heavy Duty Engines

Both gasoline and diesel equipment benefit from your use of Cadel A.P., Associated's all-purpose lubricant. Here is an oil that not only gives your engines eleven mechanical advantages, but actually saves you money by reducing inventories to one product for use in trucks, dozers, dumps, carryalls, and shovels.

Cadel A.P. is an *additive* oil; that is, it has special chemicals formulated right into it. With these additives, Cadel A.P. is both dispersive and detergent, to give you these advantages:

1. Clean engines
2. Low engine wear
3. Free piston rings
4. Free valve stems
5. Long bearing life
6. Clean oil passages
7. Cleaner filter elements
8. Clean intake ports (2-cycle diesel engines)
9. Easier starting at low temperatures
10. Economical oil consumption
11. *One oil for all purposes*

TIDE WATER ASSOCIATED OIL COMPANY

LET'S GET ASSOCIATED

SPECIALIZED LUBRICANTS FOR ALL INDUSTRIAL PURPOSES

20th YEAR Associated Football Sportcasts
Get Free Schedules at Associated Stations

40 M. gal. watering (base)	1.00	1.50	2.00	2.90	1.60	1.50
25 hr. roller operation (base)	10.00	7.00	5.00	6.00	4.45	6.00
260 cu. yd. structure excavation	2.00	2.50	3.00	2.20	3.80	1.75
245 hr. mechanical tamping	4.00	5.00	4.00	3.50	6.65	4.00
9,850 lin. ft. std. r/w fence	.08	.10	.13	.105	.14	.12
24 ea., end panels	10.00	10.00	14.00	16.00	9.60	10.00
30 ea., brace panels	7.00	7.00	8.00	11.00	6.00	8.00
0.2 mile rem. and reset. telephone line	250.00	150.00	200.00	300.00	$1,185	200.00
10 ea., 30-ft. telephone poles	10.00	10.00	25.00	30.00	39.10	5.00
10 rod telephone wire	1.00	.25	.20	.20	7.45	.25
2 ea., R.C. project markers	30.00	15.00	25.00	30.00	19.90	20.00
150 cu. yd. Class 1 riprap	6.00	5.00	6.00	10.00	7.30	5.00
78,880 lb. reinforcing steel	.07	.0725	.09	.087	.09	.08
232,230 lb. structural steel	.09	.09	.095	.105	.10	.095
257.2 cu. yd. Class AA concrete	30.00	31.00	50.00	33.00	38.45	35.00
415.6 cu. yd. Class A concrete	31.00	33.00	47.00	30.00	38.45	34.00
110 cu. yd. dry excavation for bridges	3.00	2.50	5.00	2.50	1.40	3.00
350 cu. yd. wet excavation for bridges	8.00	9.00	12.00	8.50	9.00	9.00
14 ea., r/w markers	6.00	7.00	25.00	20.00	9.95	10.00

Washington—Snohomish County—State—Grade and Bridge

Rumsey & Co., Seattle, was awarded the contract on the low bid of $112,596 by the Department of Highways, Olympia, for the clearing, grading, and surfacing with bituminous concrete, 0.145 mi. of SR 1-I Muckilteo to Everett road and installing a reinforced concrete bridge No. 1-1/3. Unit bids submitted by the contractors are as follows:

(A) Rumsey & Co. $112,596
(B) Manson Construction and Engineering 113,694
(C) David Nygren 115,616
(D) Cascade Contractors, Inc. 122,285
(E) M. P. Munter Co. 122,937
(F) General Construction Co. 124,307
(G) M. P. Butler $124,373
(H) Scheymann & Johnson 124,385
(I) Lockyear & White 124,721
(J) Beal & Roberts 127,482
(K) E. W. Elliott 134,954
(L) Macrae Bros. 139,930
(M) A. W. Stevens 153,596

(1) Lump sum, clearing and grubbing.
(2) 720 cu. yd. unclassified excavation, incl. haul.
(3) 105 cu. yd. structure excavation.
(4) 4 stas. (100 ft.) finishing roadway.
(5) 620 cu. yd. sel. rdwy. borrow in pl., incl. haul.
(6) 135 cu. yd. one cr. screen gravel surf. in pl.
(7) 40 cu. yd. sand filler in pl., incl. haul.

Bituminous Surface Treatment "Plant Mix"
Type—Class F
(8) 970 sq. yd. preparation of untreated rdwy.
(9) 112 tons furn., mixing and placing bit. mixt.

Miscellaneous Items
(10) 2 cu. yd. hand placed riprap.
(11) 150 lin. ft. std. guard rail, Type No. 4, in pl.
(12) 3 only, sp. conc. catch basin with C.I. grade complete in place.
(13) 2 only, reflector units, complete in place.
(14) 165 lin. ft. open wood flume in place.
(15) 150 lin. ft. remov. ex. wood guard rail.
(16) 430 sq. yd. remov. ex. cement conc. pavm't.
(17) Lump sum, remove ex. log bulkhead.
(18) 69 lin. ft. remov. and relay. exist. 12 in. conc. pipe.
(19) 32 lin. ft. pl. conc. or V.C. drain pipe 6-in. dia. in place.
(20) 40 lin. ft. pl. conc. or V.C. drain pipe 10-in. dia. in place.
(21) 150 lin. ft. pl. conc. or V.C. culv. pipe 12-in. dia. in place.

Bridge
(22) 980 cu. yd. structure excavation.
(23) 815 cu. vd. concrete Class A in place.
(24) 640 cu. yd. concrete Class B in place.
(25) 720 lin. ft. reinf. conc. bridge railing in place.
(26) 261,000 lbs. steel reinf. bars in place.
(27) 5,500 lb. structural steel in place.
(28) 8 only, bridge drains complete in place.
(29) 3,520 lin. ft. furn. precast conc. piling at site.
(30) 88 only driving precast conc. piles.
(31) 3 only, furn. and driv. precast conc. test piles.
(32) Lump sum, removing existing structure.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
(1)	500.00	500.00	$1,000	500.00	$1,500	$2,000	$2,500	600.00	500.00	$2,000	$1,000	920.00	$1,000
(2)	1.00	1.20	.75	.50	.55	1.00	1.25	1.20	1.50	1.25	1.50	1.25	1.00
(3)	4.00	2.00	2.00	2.50	2.75	4.00	3.50	3.50	5.00	5.00	10.00	3.00	10.00
(4)	20.00	25.00	30.00	20.00	14.00	10.00	25.00	30.00	15.00	20.00	50.00	30.00	15.00
(5)	1.50	2.00	1.00	1.50	.90	1.50	1.75	1.50	1.50	1.60	1.50	1.50	1.50
(6)	2.50	2.50	2.00	2.25	2.50	2.00	3.00	3.00	2.50	2.30	2.50	2.50	2.50
(7)	2.50	2.00	1.00	1.75	1.65	2.00	3.00	1.70	2.50	2.00	2.00	2.50	1.50
(8)	.12	.50	.10	.25	.14	.20	.15	.30	.25	.15	1.00	.15	.10
(9)	10.00	12.00	10.00	20.00	11.70	10.00	10.00	10.00	11.00	15.00	10.00	10.00	10.00
(10)	15.00	10.00	10.00	10.00	14.00	20.00	10.00	10.00	25.00	15.00	15.00	15.00	15.00
(11)	1.50	2.50	2.00	3.50	1.40	2.00	2.00	3.50	1.50	1.50	2.00	2.00	2.50
(12)	75.00	100.00	75.00	75.00	60.00	70.00	75.00	50.00	50.00	75.00	150.00	60.00	75.00
(13)	10.00	10.00	10.00	8.50	19.00	15.00	10.00	20.00	20.00	25.00	7.50	10.00	10.00
(14)	1.50	2.00	2.00	1.00	1.40	1.00	1.00	1.00	1.50	1.50	1.50	1.00	1.00
(15)	.50	.50	.10	.30	.40	.60	.50	.60	.60	.30	1.00	.20	.25
(16)	.75	1.50	.50	.50	.48	.40	1.00	.60	1.50	1.00	1.00	1.00	1.00
(17)	100.00	200.00	100.00	20.00	340.00	200.00	500.00	150.00	100.00	125.00	150.00	50.00	400.00
(18)	1.50	1.00	1.00	.75	.85	2.00	1.00	1.00	2.00	1.25	4.00	1.00	1.50
(19)	1.00	1.00	1.00	.50	.50	1.00	.75	1.00	1.50	.75	1.90	.80	1.00
(20)	1.25	1.50	1.25	1.00	1.30	2.00	1.00	1.20	2.00	1.25	2.10	1.25	1.25
(21)	1.50	2.00	1.50	1.50	1.50	3.00	1.25	1.80	2.50	1.50	2.50	2.00	1.50
(22)	8.00	6.00	6.00	5.00	4.00	5.00	7.00	6.00	5.00	2.50	6.00	5.50	8.00
(23)	45.00	45.00	45.00	46.00	52.50	50.00	49.00	50.00	46.50	44.00	49.00	59.00	62.50
(24)	36.00	35.00	45.00	46.00	52.50	40.00	49.00	50.00	46.50	43.00	40.00	59.00	55.00
(25)	6.00	5.50	6.00	4.00	5.00	6.00	6.00	5.50	7.00	6.00	7.00	5.00	6.00
(26)	.055	.06	.06	.06	.05	.065	.056	.06	.065	.065	.08	.055	.09
(27)	.25	.40	.20	.20	.40	.30	.25	.22	.40	.30	.25	.30	.40
(28)	40.00	80.00	50.00	40.00	55.00	75.00	50.00	60.00	50.00	50.00	60.00	60.00	60.00
(29)	2.75	3.00	3.00	3.00	2.40	3.50	2.50	2.75	3.25	4.00	3.70	3.00	3.00
(30)	45.00	35.00	50.00	50.00	40.00	40.00	37.00	60.00	44.00	120.00	50.00	75.00	50.00
(31)	350.00	350.00	400.00	400.00	450.00	400.00	300.00	300.00	350.00	400.00	500.00	970.00	400.00
(32)	$4,000	$4,000	$1,000	$7,780	$1,900	$4,800	$3,750	$2,000	$4,000	$4,000	$7,500	$2,000	$5,500

Washington—Grays Harbor County—State—Grade and Surface

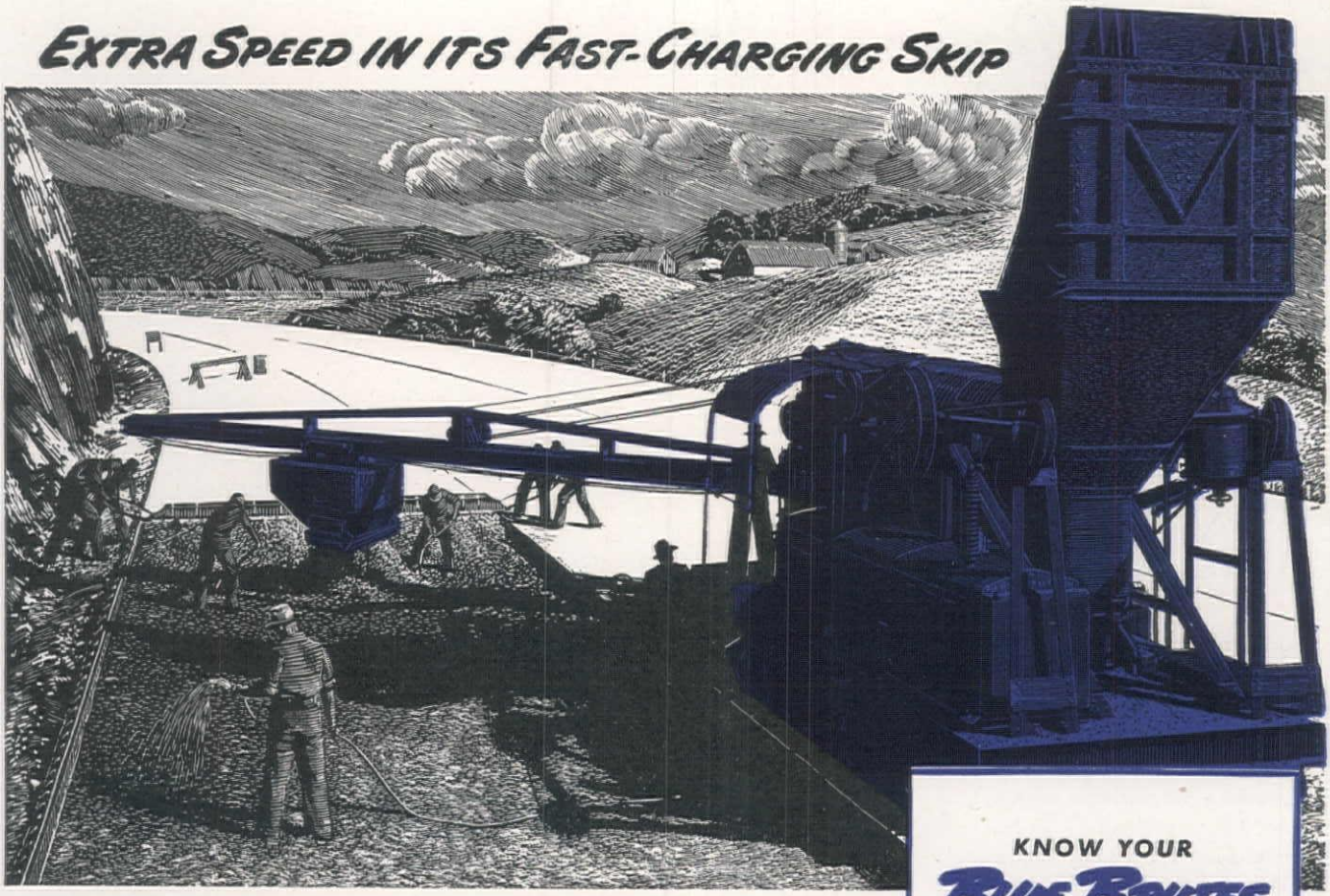
Axel Osberg, Seattle, was awarded the contract on the low bid of $256,763 to the Department of Highways, Olympia, for the construction of 2 mi. SR No. 9 from Little North River to Preachers Slough. Unit bids received are as follows:

(1) Axel Osberg $256,763
(2) Northwest Construction Co. 279,824
(3) Peter Kiewit Sons Co. $289,616
(4) Goetz & Brennan 337,659

	(1)	(2)	(3)	(4)
33.6 acres clearing	500.00	450.00	340.00	660.00
19.5 acres grubbing	400.00	450.00	400.00	780.00
280 cu. yd. stripping, including haul of 600 ft.	1.00	1.00	.51	1.00
248,160 cu. yd. unclassified excavation, incl. haul of 600 ft.	.39	.47	.51	.52
2,610 cu. yd common trench excavation, incl. haul of 600 ft.	1.00	1.50	1.10	1.50
189,990 cu. yd. stas. overhaul on above materials	.02	.02	.02	.02
2147.26 M. cu. yd. stas. overhaul on above materials	5.00	4.00	5.00	4.00
1,780 cu. yd. structure excavation	2.00	2.00	2.00	2.00
8,430 lin. ft. slope treatment	.12	.10	.10	.10
124.1 stas. (100-ft.) finishing roadway	15.00	12.00	12.00	10.00
26,240 cu. yd. ballast in place on roadway	1.90	1.65	1.95	3.00

(Continued on next page)

EXTRA SPEED IN ITS FAST-CHARGING SKIP



There are many reasons why this Ransome 34-ft. E Blue Brute "Dual Drum" Paver has the reputation for laying more footage per day than any other paver. But let's start at the beginning . . . with the skip.

Because the drum that receives the charge has a larger opening than other pavers, the skip's throat is wider. Add a 56 degree skip slope . . . steepest on any paver . . . and you can see why the charge wastes no time entering the mixer drum.

SKIP IS FOOL-PROOF, TOO

Slotted pivot bearings that allow skip to adjust itself on uneven subgrade to prevent warping and twisting when batch trucks back into it . . . *6" grill* that prevents damaging foreign material from entering mixer with aggregate . . . *low overhead framework* that permits paver to move through limited clearances — these features give extra insurance of trouble-free operation and longer life.

OTHER EXCLUSIVE BLUE BRUTE FEATURES

This "Dual Drum" Paver also has *hydraulically-controlled boom bucket* for laying any part of load where you want it even while speedy *hydraulically-operated boom* is swinging . . . *renewable boom track* . . . *metal-to-metal spiral cut-off in tank* for continued precision of water measuring . . . *mechanically-operated batch meter* for all-season accuracy — all adding up to more footage per day and lower maintenance cost per year.

RB-1

KNOW YOUR BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute construction equipment will put your planning on a profitable basis and prove that *there's more worth in Worthington-Ransome*. Act now! His name is listed on page 132. The number beside his name indicates the Blue Brutes he handles.

1.
Blue Brutes include: Pavers, Concrete Spreaders**, Concrete Mixers, Concrete Placing Equipment, Big Mixers, Finishing Machines**, Pneumatic Placing & Grouting Equipment, Truck Mixers, Plaster & Bituminous Mixers, and accessories.

2.
Blue Brutes also include: Diesel, gasoline and electric driven Portable Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs; Rock Drills and Air Tools in a wide range of weights and sizes; Contractors' Pumps.**

**Postwar Products

BUY BLUE BRUTES

Truck Mixers
Capacities:
2, 3, 4½, 5½ cu. yds.

Portable Mixers
Capacities:
3½, 7, 10, 14 cu. ft.

Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.

Pneumatic Placer
Capacity:
7, 14, 28 cu. ft.

WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division
Holyoke, Mass.

370	cu. yd. gravel backfill in place	3.00	4.00	2.75	6.00
5,230	cu. yd. cr. stone surf. base course in place on roadway	2.00	2.50	2.65	3.15
5,950	cu. yd cr. stone surf. top course in place on roadway	2.00	2.50	2.65	3.15
670	cu. yd. crushed cover stone in stockpile	3.00	3.00	2.75	3.15
790	cu. yd. cr. stone or sand filler in place incl. haul	3.00	3.00	3.00	3.15
240	M. gals. water	2.00	3.00	2.50	2.00
	LIGHT BITUMINOUS SURFACE TREATMENT—METHOD A				
2.3	miles preparation, construction and finishing	375.00	400.00	300.00	300.00
71.8	tons bituminous cement MC-2 in place	40.00	60.00	35.00	35.00
670	cu. yd. cr. cover stone in place on rdwy. from stockpile	1.75	4.00	2.35	1.25
	MISCELLANEOUS ITEMS				
59	only, reinf conc. r/w markers in place	5.00	3.00	3.00	3.00
6,850	lin. ft. std. guard rail Type 5 in place	1.25	1.50	1.60	1.25
5,405	lin. ft. special wood gutter, design No. 3, in place	1.00	1.40	.80	.75
376	lin. ft. special wood spillway in place	2.50	1.40	1.00	1.00
30	lin. ft. standard open wood flume in place	2.00	2.00	1.20	1.00
300	lin. ft. galv. iron water pipe 2 in. dia. in place	1.25	.75	.70	1.00
420	lin. ft. galv. iron water pipe ¾ in. dia. in place	.60	.50	.60	.50
350	lin. ft. pl. conc. or V.C. drain pipe 6 in. dia. in place	.70	.75	1.00	.80
174	lin. ft. pl. conc. or V.C. culv. pipe 12 in. dia. in place	1.25	1.25	1.75	1.25
654	lin. ft. pl. conc. or V.C. culv. pipe 18 in. dia. in place	3.00	2.50	2.85	2.00
459	lin. ft. pl. conc. or V.C. culv. pipe 24 in. dia. in place	5.00	3.50	4.25	3.25
822	lin. ft. std. reinf. conc. culv. pipe 18 in. dia. in place	3.50	2.50	3.50	2.75
105	lin. ft. std. reinf. conc. culv. pipe 24 in. dia. in place	6.00	4.00	5.00	4.00
72	lin. ft. std. reinf. conc. culv. pipe 30 in. dia. in place	7.50	6.50	7.50	6.00
114	lin. ft. std. reinf. conc. culv. pipe 36 in. dia. in place	10.00	8.00	10.00	8.50
30	lin. ft. ex. strength reinf. conc. culv. pipe 24 in. dia. in place	7.00	15.00	7.25	5.50
	BRIDGE				
20	cu. yd. structure excavation	3.00	5.00	2.00	5.00
12.5	M.F.B.M. timber and lumber (untreated) in place	125.00	250.00	150.00	90.00
760	lin. ft. furnishing timber piling (untreated) at st.	.25	1.00	.30	.30
18	only, driving timber piles (untreated) in place	20.00	25.00	30.00	40.00
1	only, furn. and driv. timber test pile	250.00	300.00	200.00	300.00

Bridge . . .

Arizona—Mohave County—State—Reinforced Concrete

H. L. Royden, Phoenix, submitted the low bid of $59,548 to the Arizona Highway Department, Phoenix, for constructing a new floor system for the abandoned Santa Fe railway bridge across the Colorado River at Topock. The project will include establishing a reinforced concrete floor on the original railroad deck. Unit bids are as follows:

(1) H. L. Royden $59,548
(2) W. E. Orr, Contractor 64,986
(3) Ventura Engineering Co. 65,346
(4) Fisher Contracting Co. $66,080
(5) Tanner Construction Co. 72,498

		(1)	(2)	(3)	(4)	(5)
503	cu. yd. Class "D" concrete (including cement)	37.50	36.00	32.00	55.00	35.00
142,900	lb. reinforcing steel (bars) (CIP)	.07	.08	.075	.08	.07
293,330	lb. structural steel (CIP)	.10	.11	.13	.10	.15
1	Lump sum, removal of structural steel	$1,600	$3,710	500.00	$2,650	$1,091
1	Lump sum, credit for salvage structural steel	250.00	530.00	100.00	$5,000	200.00

Oregon—Coos County—State—Ferry Service

Geo. F. Gunnell, Coos Bay, submitted the low bid of $1,599 to the State Highway Department, Salem, for the maintenance of a 24 hr. ferry service for Enegren Crossing of Coos River. Bids received are as follows:

(1) George F. Gunnell $1,599
(2) Portland Tug & Barge Co. 1,945
(3) Brunell Bros. $2,025

	(1)	(2)	(3)
24-hour continuous ferry service—per month	$1,599.25	$1,945.00	$2,025.00
20-hour continuous ferry service—per month	1,406.75	1,690.00	1,715.00

Washington—Grays Harbor County—State—Timber

Grays Harbor Construction Co., Aberdeen, was awarded the contract on low bid of $76,106 to the Department of Highways for the construction of South Bay Bridge on SR 13-A, a timber structure. The following is a summary of the bids received:

(1) Grays Harbor Construction Co. $76,106
(2) Hawkins & Armstrong 79,865
(3) Lockyear & White $88,555
(4) Doolittle Construction Co. 95,285

	(1)	(2)	(3)	(4)
15 cu. yd. structure excavation	13.00	5.00	7.00	3.00
680 M.F.B.M. timber and lumber (untreated) in place	85.00	103.00	118.75	118.00
Lump sum, removing portions of ex. structure	$18,111	$9,750	$7,700	$15,000

Washington—Pend Oreille County—State—Concrete Piling

Henry Hagman, Cashmere, submitted the lowest bid and was awarded the contract for $99,853 by the Department of Highways, Olympia, for the construction of culverts and bridges on SR-6 at McCloud, Kent, Tacoma, Ceder, and Sweet creeks.

(1) Henry Hagman ..... $ 99,853
(2) Sather & Sons 101,670
(3) Colonial Construction Co. $109,577
(4) Hawkins & Armstrong 162,729

		(1)	(2)	(3)	(4)
	Lump sum, clearing and grubbing	500.00	750.00	1000.00	2500.00
39,720	cu. yd. unclass. excav., incl. haul 600 ft.	.60	.45	.50	1.15
40	cu. yd. common trench excav., incl. haul 600 ft.	2.00	2.00	1.00	3.00
44,350	cu. yd. stas. overhaul on above materials	.02	.02	.02	.02
9,050	cu. yd. unclass. excav., incl. haul	.70	.50	.60	1.15
120	cu. yd. structure excav.	2.00	5.00	5.00	5.00
2,110	cu. yd. selected roadway borrow, incl. haul	1.30	1.50	1.00	1.50
510	cu. yd. cr. stone surf. top, cr. in pl. on rdwy. from stkpl.	1.50	1.50	2.50	2.50
60	M. gals. water	4.00	4.00	2.50	4.00
218	5 cu. yd. conc., Class A, in place	40.00	45.00	47.00	45.00
35,840	lbs. steel reinf. bars in place	.07	.06	.07	.075
10	cu. yd. dry rubble masonry in place	15.00	10.00	10.00	15.00
6	cu. yd. hand placed riprap in place	15.00	6.00	9.00	15.00
4	only, reflector units complete in place	7.50	10.00	10.00	10.00

(Continued on next page)

Preformed wire rope

SAVES MONEY 3 WAYS

Are you looking for new ways to cut your production costs? Then follow the lead of successful operators, in every industry, who use Preformed wire rope. Their records prove that it saves money. First, because it lasts longer. This results from Preformed's ability to resist bending fatigue. Second, it saves money because it withstands heavy shock loads and thus helps avoid costly shut-downs. Third, Preformed spools better on the drum, and helps to maintain a profitable speed of operation. You can gain these and many other advantages by specifying Preformed the next time you order wire rope.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

Lump sum, removing existing structures (3)	$900.00	$1,500	$5,000	$5,000
240 lin. ft. pl. conc. or V.C. sewer pipe 6-in. dia. in place	.80	.60	1.00	1.00
——BRIDGES——				
320 cu. yd. structure excavation	5.00	6.00	4.00	5.00
614 cu. yd. concrete Class A in place	42.00	47.00	50.00	65.00
74 cu. yd. concrete Class B in place	42.00	45.00	47.00	45.00
85,500 lbs. steel reinf. bars in place	.07	.06	.07	.075
82,000 lbs. bending and placing steel reinf. bars	.05	.04	.04	.05
514 lin. ft. reinf. concrete bridge railing in place	5.00	6.00	5.00	6.00
8 only, bridge drains complete in place	45.00	60.00	25.00	60.00
1,440 lin. ft. furn. precast concrete piling at st.	2.25	3.25	4.00	5.00
36 only, driving precast conc. piles in place	45.00	95.00	60.00	75.00
1 only, furn. and driving concrete test pile	250.00	400.00	400.00	500.00
Lump sum, removing existing structures (2)	$2,000	$3,500	$2,000	$1,000
Lump sum, const. and remov. std. temp. pile or frame single lane detour bridge (1)	500.00	600.00	$1,500	$2,500
Lump sum, const. and remov. std. temp. pile or frame single lane detour bridge or wd. box culv. (1)	500.00	300.00	700.00	$1,000

Sewerage . . .

California—Los Angeles County—City—Sewer

Artukovich Bros., Hynes, submitted the lowest bid of $461,123 to the Los Angeles Board of Public Works, Los Angeles, for the construction of a storm drain and miscellaneous work included in the Bixby Slough and Downing St. drainage district. The following is a summary of the work quantities and unit bids received:

(1) Artukovich Bros. $461,123
(2) United Concrete Pipe Co. 554,584
(3) P. & J. Artukovich 597,950
(4) Clyde W. Wood, Inc. $812,839
(5) Case Construction Co., and Peter L. Ferry Sons 859,385
(6) Engineer's estimate 417,390

	(1)	(2)	(3)	(4)	(5)	(6)
2,500 cu. yd. rock mattress in pl., incl. excav.	3.00	5.00	5.00	5.25	4.50	4.50
3,888 sq. ft. Class AC-8 trench resurfacing	.60	.50	.275	.50	.60	.35
5,351 sq. ft. Class RO-4 trench resurfacing	.40	.40	.132	.20	.40	.20
Lump sum, for culvert under Lomita Blvd.	$20,000	$24,000	$12,829	$18,900	$26,526	$10,900
Lump sum, for culvert under Pacific Coast Highway and related work complete in place	$12,650	$26,000	$5,361	$17,300	$20,196	$9,040
Lump sum, for storm drain and related work	$438,000	$486,000	$564,693	$759,000	$795,190	$383,462
Lump sum, for field office for FWA engr.	$1,500	$2,000	792.00	$1,500	500.00	300.00

Miscellaneous . . .

New Mexico—Dona Ana—Bureau of Reclamation—Transmission Line

Reynolds Electric and Engineering Co., El Paso, Texas, submitted the low bid of $314,479 to the Bureau of Reclamation office in Alamogordo, for the construction of 115-kilovolt transmission line from Las Cruces to Alamogordo. The following is a summary of the work and unit bids received:

(1) Reynolds Electric and Engineering Co. $314,479
(2) H. H. Walker, Inc. $329,654
(3) Larson Construction Co. 335,865

	(1)	(2)	(3)
Lump sum, clearing land and right of way	$4,075	100.00	$2,000
3 structs. furn. and constr. Type HS structs. with 45-ft. poles	196.27	243.00	280.00
312 structs. furn. and constr. Type HS structs. with 50-ft. poles	227.40	280.00	280.00
170 structs. furn. and constr. Type HS structs. with 55-ft. poles	225.87	298.00	320.00
30 structs. furn. and constr. Type HS structs. with 60-ft. poles	234.52	330.00	320.00
10 structs. furn. and constr. Type HS structs. with 65-ft. poles	257.01	342.00	320.00
1 struct. furn. and constr. Type HT structs. with 50-ft. poles	231.72	285.00	300.00
1 struct. furn. and constr. Type HT structs. with 55-ft. poles	230.35	304.00	300.00
3 structs. furn. and constr. Type HA structs. with 50-ft. poles	246.09	292.00	330.00
3 structs. furn. and constr. Type HA structs. with 55-ft. poles	244.69	310.00	330.00
1 struct. furn. and constr. Type HA structs. with 60-ft. poles	254.41	340.00	330.00
1 struct. furn. and constr. Type HA structs. with 65-ft. poles	275.71	354.00	330.00
7 structs. furn. and constr. Type HTR structs. with 60-ft. poles	286.86	364.00	360.00
1 struct. furn. and constr. Type HTR structs. with 65-ft. poles	308.15	379.00	390.00
5 structs. furn. and constr. Type 3A structs with 50-ft. max. pole length	248.37	330.00	370.00
2 structs. furn. and constr. Type 3A structs. with 55-ft. max. pole length	246.28	347.00	380.00
2 structs. furn. and constr. Type 3A structs with 60-ft. max. pole length	260.91	385.00	380.00
3 structs. furn. and constr. Type 3AB structs. with 50-ft. max. pole length	266.92	328.00	350.00
1 struct. furn. and constr. Type 3AB structs. with 55-ft. max. pole length	264.84	363.00	380.00
1 struct. furn. and constr. Type 3AB structs. with 60-ft. max. pole length	279.85	386.00	380.00
3 structs. furn. and constr. Type 3AT structs. with 50-ft. max. pole length	273.67	326.00	430.00
1 struct. furn. and constr. Type 3AT structs. with 55-ft. max. pole length	271.59	350.00	450.00
1 struct. furn. and constr. Type 3AT structs. with 60-ft. max. pole length	286.20	396.00	450.00
1 struct. furn. and const. Type 3AT structs. with 65-ft. max. pole length	318.13	432.00	450.00
5 structs. furn. and constr. Type 3T structs. with 50-ft. poles	426.03	478.00	500.00
2 structs. furn. and constr. Type 3-T structs. with 55-ft. max. pole length	423.94	506.00	550.00
3 structs. furn. and constr. Type 3T structs. with 60-ft. max. pole length	438.58	550.00	550.00
1 struct. furn. and constr. Type 3T structs. with 65-ft. max. pole length	470.53	580.00	550.00
100 x-brace furnishing, assembling and attaching x-braces	49.88	35.00	40.00
75 guy furn. and constr. single guys without strain insulators, complete except placing anchors	19.76	17.00	16.00
150 guy furn. and construct. double guys without strain insulators complete except placing anchors	35.52	30.00	25.00
200 anchor furn. and placing concrete anchors	11.33	30.00	22.00
12 anchor furn. and placing grouted anchors	17.48	20.00	10.00
13 anchor furn. and placing rock anchors	10.24	10.25	10.00
1,650 insulator string furn., assemb., and attach. suspension insulator assemb. with 7 insulator units	22.89	18.00	17.00
12 insulator string furn., assemb., and attach. suspension insulator assemb. with 8 insulator units	25.74	20.00	19.00
42 insulator string furn., assemb., and attach. suspension insulator assemb. with 9 insulator units	28.57	22.50	21.00
12 insulator string furn. assemb., and attach. tension insulator assemb. with 8 insulator units	26.52	22.00	19.00
102 insulator string furn. assemb., and attach. tension insulator assemb. with 9 insulator units	29.37	25.00	21.00
62 circuit mi. line furn. and stringing No. 4/0 A.W.G. steel-reinforced aluminum conductor	.....	.....	$1,600

(Continued on next page)

546 P's and 822 Q's for PITS and QUARRIES

A general view of Gallager-Nelson's Universal 546-P primary crushing unit and "800" secondary crushing unit forming the "822-Q" quarry plant shown working near Polo, Ill. Note the close-coupled compactness of this electrically-powered rock reduction plant.

Gallager-Nelson of Oregon, Ill., know their P's and Q's. Having some time ago purchased a Universal No. 800 gravel plant consisting of a 40″x 22″ roller bearing roll crusher, 4′ x 12′—2½ deck screen with a 30″ feed conveyor on a pneumatic tired truck, *it was a simple matter to convert this unit into an 822-Q rock crushing plant* by the addition of a No. 546-P primary unit. This unit consists of a 20″ x 36″ WRB jaw crusher, a 36″ x 8′ apron feeder, a grizzly and by-pass, a 30″ under-conveyor—all mounted on a pneumatic tired truck. We repeat—Gallagher-Nelson know their P's and Q's.

An inbuilt feature of Universal gravel and rock crushing, screening and loading plants long recognized by contractors and public works officials is the ease with which new standardized units may be added to increase capacity, to change over from gravel to rock crushing or to add washing or other processing not included in the original plant.

Ask your Universal dealer to show you these exclusive design features common only to Universal-engineered equipment.

Sold and Serviced by

Arnold Mchy. Co. Inc. Salt Lake City Utah	LeRoi-Rix Mchy. Co. Los Angeles, Calif.	State Tractor & Equip. Co. Phoenix, Ariz.
Fisher C. Baily Co. Reno, Nevada	Liberty Trucks & Parts Co. Denver, Colo.	Western Traction Company San Francisco Calif.
J. D. Evans Equip. Co. Casper, Wyo.	Held-McCoy Mchy. Co. Denver, Colo.	Bud Fisher Company Albuquerque, New Mexico
Hendrie & Bolthoff Mfg. & Supply Co. Denver, Colo.	The Mine & Smelter Supply Co. Denver, Colo.	

UNIVERSAL ENGINEERING CORPORATION

323 8th St. West
Cedar Rapids, Iowa

ARMY NAVY

UNIVERSAL

ROCK AND GRAVEL CRUSHERS, CRUSHING ROLLS, HAMMER MILLS, COMPLETE CRUSHING AND SCREENING PLANTS, WASHING PLANTS, ASPHALT PLANTS, SPREADEROLLERS.

62 circuit mi. line furn. and stringing 133,100 circular mil hollow copper conductor	$1,880	$1,740	$1,800
200 damper furn. and attaching vibration damper for aluminum conductor	.....	.....	3.00
3 weight furn. and attach. 25-lb. hold-down weights for susp. insulators	6.60	8.50	5.00
3 weight furn. and attach. 50-lb. hold-down weights for susp. insulators	9.80	13.75	10.00
3 weight furn. and attach. 75-lb. hold-down weights for susp. insulators	13.00	20.00	15.00
1½ mi. ground mi. lines furn. and stringing two ⅜-in. galvanized steel overhead ground wires	688.40	820.00	750.00
250 post furn. and placing fence-ground rods and grounding fences	5.36	1.00	3.00

Irrigation . . .

Montana—Phillips County—Bureau of Reclam.—Earthwork and Struct.

Union Construction Co., Great Falls, Montana, offered the low bid of $52,582 to the Bureau of Reclamation office in Malta, Montana, for the construction of the Dodson Pumping Plant and for earthwork and structures of the Dodson Pump canal and laterals, a part of the Milk River Project.

(1) Union Construction Co. $52,582
(2) Malcolm G. Long 54,594
(3) Campbell Construction Co. 55,046
(4) McLaughlin Construction Co. $59,394
(5) S. Birch & Sons 66,231

	(1)	(2)	(3)	(4)	(5)
Lump sum, unwatering foundation for pumping plant	200.00	$2,000	$1,800	850.00	$2,400
1,200 cu. yd. excavation, all classes, for structures	3.00	2.50	2.50	4.00	3.50
53,000 cu. yd. excavation, all classes, for canal	.43	.35	.27	.45	.48
2,000 sta. cu. yd. overhaul	.05	.05	.05	.05	.02
750 cu. yd. backfill	.50	1.00	1.50	.50	2.00
350 cu. yd. puddling or tamping backfill	2.00	3.00	2.00	1.25	3.00
276 cu. yd. concrete in structures	40.00	50.00	58.00	57.50	60.00
36,000 lbs. placing reinforcement bars	.08	.05	.08	.05	.045
350 sq. yd. dry-rock paving	5.00	3.00	8.50	6.00	4.00
630 lin. ft. furn. and driving untreated timber piles	1.75	2.00	3.00	2.00	2.00
160 lin. ft. furn. and driving treated timber piles	2.00	3.00	3.10	2.50	3.00
15 M.F.B.M. erecting timber in structures	75.00	75.00	100.00	75.00	60.00
140 sq. ft. furn. and installing doors and windows	1.50	2.00	4.50	2.00	10.00
Lump sum, furnishing and installing roofing	175.00	200.00	300.00	125.00	180.00
5,700 lbs. installing gates	.20	.15	.20	.12	.10
1,250 lbs. furn. and installing pump dis.-pipe connections	.40	.40	.65	.40	.60
320 lin. ft. laying steel pipe for pump discharge line	1.00	6.00	5.00	4.00	6.00
260 lin. ft. laying 15-in. dia. corr. metal pipe	.50	1.00	.60	.50	.60
48 lin. ft. laying 18-in. dia. corr. metal pipe	.50	1.00	.75	.60	.72
90 lin. ft. laying 24-in. dia. corr. metal pipe	.50	1.50	1.00	.75	.96
284 lin. ft. laying 30-in. dia. corr. metal pipe	4.00	4.00	1.25	1.00	1.20
150 lin. ft. laying 36-in. dia. corr. metal pipe	3.00	4.00	2.00	1.25	1.44
2,500 lbs. furn. and installing misc. metalwork	.40	.40	.60	.50	.90
5,500 lbs. installing pumping unit	.15	.15	.10	.075	.10
Lump sum, furn. and installing hoist and trolley	325.00	400.00	275.00	500.00	232.00
220 lin. ft. installing electrical metal conduit	.25	1.00	.50	.50	.75
150 lbs. installing grounding system	.30	1.00	.15	.25	.75
1,100 lbs. installing electrical conductors and apparatus	.20	1.00	.35	.50	.38

Arizona—Yuma County—Bureau of Reclamation—Earthwork

Macco Construction Co., Clearwater, Calif., offered the lowest bid of $146,866 to the Bureau of Reclamation, Yuma, Arizona, for the construction of canal B and A and B laterals as outlined in specification 1104.

(1) Macco Construction Co. $146,866
(2) Case Construction Co. and M. H. Hasler 153,980
(3) F. W. Case $195,040

	(1)	(2)	(3)
21,000 cu. yd. excavation for canals	.48	.50	1.70
17,000 cu. yd. compacting embankments	.68	.30	2.06
60,000 sq. yd. trimming foundations for mortar lining	.45	.80	.75
60,000 sq. yd. pneumatically applied mortar	1.60	1.42	1.10
74,000 lbs. placing reinforcement fabric	.03	.07	.18

Waterway Improvement . . .

California—Los Angeles County—County—Flood Control

Charles J. Dorfman, Los Angeles, submitted the low bid of $41,695 to the Board of Supervisors, Los Angeles, for the excavation of the Dominguez Channel and the installation of 2,500 lin. ft. of 72 in. corrugated iron pipe and approximately 1,000 lin. ft. of 39 in. diameter reinforced concrte pipe branch lines. The following is a summary of the bids and work quantities for the project:

(A) Charles J. Dorfman ..... $ 41,695
(B) Basich Bros. Construction Co. 42,580
(C) Clyde J. Wood, Inc. 42,825
(D) A. A. Bainter 42,985
(E) Ralph A. Bell, and A. F. Heinze 63,375
(F) Griffith Co. 68,645
(G) P. J. Artukovich 72,742
(H) United Concrete Pipe Corp. ..... $ 73,622
(I) Artukovich Bros. 74,270
(J) Guerin Bros. 95,020
(K) Livingstone Truck and Materials 96,035
(L) Guy F. Atkinson 104,490
(M) Mark C. Walker & Son 131,910
(N) Bryce Trucking and Construction Co. 152,400

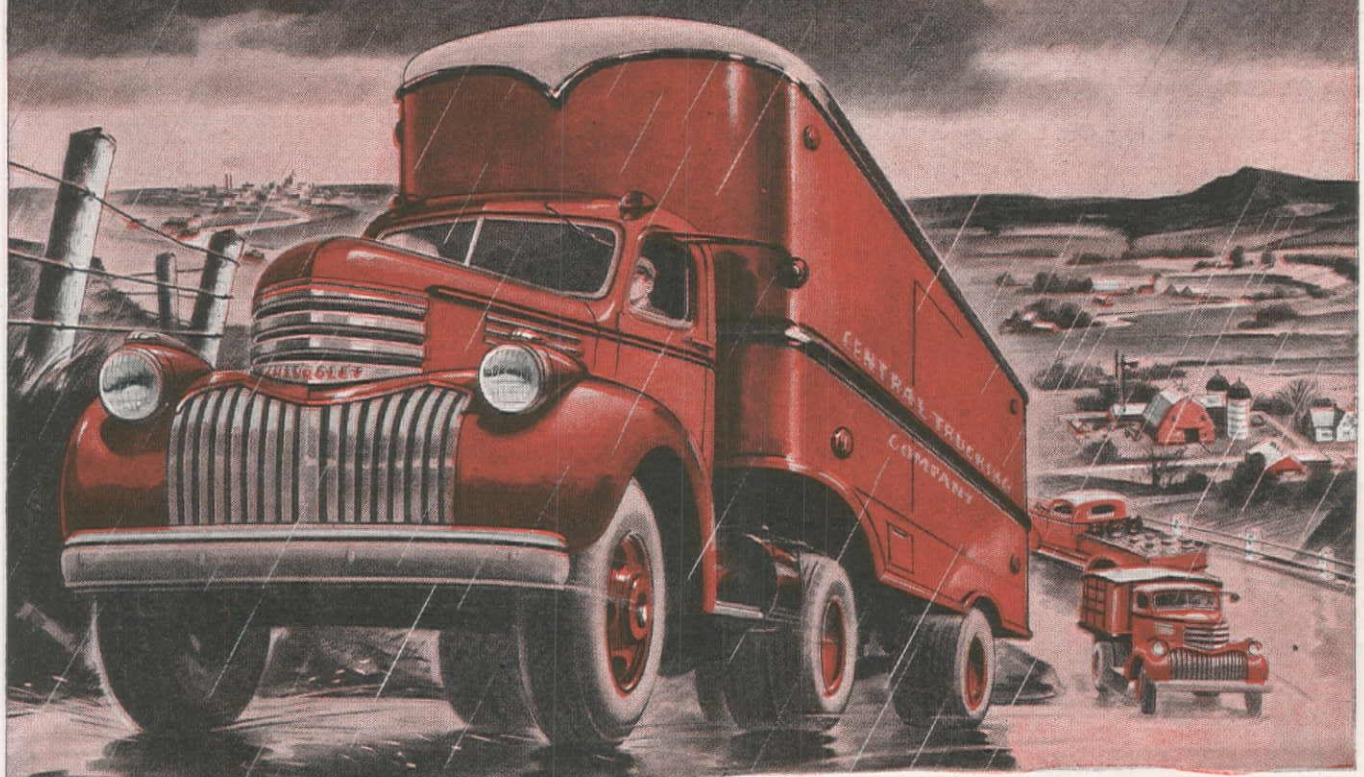
(1) 119,000 cu. yd. channel excavation.
(2) Install corr. iron pipe culvert.
(3) Install corr. iron pipe and related work at Gramercy Pl.
(4) Install corr. iron pipe culvert at 174th St.
(5) Install corr. iron pipe culvert at Western Ave.
(6) Construction of Western Ave. drain and appurtenant work.

	(A)	(B)	(C)	(D)	(F)	(F)	(G)
(1)	.18	.22	.175	.26	.275	.375	.44
(2)	$3,130	$2,500	$3,200	$1,635	$3,750	$3,600	$2,580
(3)	$3,830	$2,700	$3,700	$1,960	$4,600	$4,240	$4,032
(4)	$2,900	$2,100	$3,000	$1,400	$3,350	$3,700	$3,150
(5)	$3,910	$3,100	$4,500	$2,300	$4,950	$5,740	$4,620
(6)	$6,505	$6,000	$7,600	$4,750	$14,000	$6,740	$6,000

	(H)	(I)	(J)	(K)	(L)	(M)	(N)
(1)	.45	.48	.58	.605	.64	.75	1.16
(2)	$2,937	$2,300	$3,600	$3,685	$2,730	$4,720	$2,275
(3)	$3,427	$2,700	$5,000	$3,740	$4,800	$8,945	$2,555
(4)	$2,570	$2,000	$3,600	$3,795	$3,300	$6,395	$2,450
(5)	$4,312	$4,500	$5,600	$3,740	$7,500	$8,453	$2,250
(6)	$6,825	$5,650	$8,200	$9,075	$10,000	$14,910	$4,830

PROFESSIONAL TRUCK OPERATORS

use Chevrolet trucks to deliver the goods



ONE OUT OF EVERY THREE TRUCKS IS A

CHEVROLET TRUCK

Buy Victory Bonds

CHEVROLET

. . . over all kinds of roads—in all kinds of weather—day after day and night after night

Professional truck operators—whose vehicles deliver goods for the nation's business and industry—have but one source of income. That is *the earning power of their trucks.* . . . To meet competition and operate at a profit, professional operators *must* have trucks that combine efficiency and economy. Their trucks must have ample power—to move their loads speedily and smoothly. They must have dependability—to remain on the job day in and day out. *And—above all—they must be low in first cost, low in operating costs, low in maintenance costs.*

Chevrolet trucks provide these essential qualities in correct balance—no one quality over-developed at the expense of another, no one quality skimped. That is why so many professional operators choose Chevrolets . . . why Chevrolet trucks have led all other makes in sales in seven out of the last nine prewar years . . . why one out of every three trucks on the road today is a Chevrolet.

Buy the truck that many professional truck operators buy. . . . Buy the truck that saves you money. . . . *Buy a Chevrolet.*

CHEVROLET MOTOR DIVISION, *General Motors Corp.*, DETROIT 2, MICH.

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information on many of these projects is often available, and will gladly be furnished upon your request to the Editor, WESTERN CONSTRUCTION NEWS, 503 Market Street, San Francisco.

CONTRACTS AWARDED

Large Western Projects . . .

Louis C. Dunn Co., San Francisco, Calif., has a contract for $3,000,000. The company will construct a two-story reinf. conc. office bldg. at Beverly Blvd. and La Cienega Blvd., Los Angeles, for the United Rexall Drug Co., Los Angeles.

The Collins Construction Co., Kansas City, Mo., was awarded a $2,250,000 contract to build a new factory and $650,000 for a new service branch for Fruehauf Trailer Co., at Vernon, Calif.

Valley & Lincoln & Co., San Leandro, Calif., is starting construction on a $3,500,000 project to build 400 homes and a shopping center at San Leandro, Calif., for themselves.

Leach Brothers, Cheyenne, Wyo., on bid of $304,490, received the contract for excavating, grading and draining 8.6 mi. of the Laramie-Cheyenne Rd. from the State Highway Commission, Cheyenne, Wyo.

N. Fiorito, Inc., Seattle, Wash., received a $393,790 contract for surfacing and paving 5.1 miles of primary State Highway No. 1 from Martins Bluff to the Kalama River. The State Director of Highways made the award from Olympia, Wash.

Peter Kiewit & Sons Co., San Francisco, Calif., holds a $476,363 contract for grading, draining and paving 5.7 mi. of Primary State Highway No. 1. The award was made by the Director of Highways in Olympia, Wash.

The Fisher Contracting Co., Phoenix, Ariz., will do earthwork, concrete lining and building construction on the Coachella Canal and the All-American Canal system. The Bureau of Reclamation, Denver, Colo., has awarded the $320,903 contract.

Steel Tank & Pipe Co., Portland, Ore., received a $440,716 contract from the City Council of Portland for construction of additions to the city water system.

Isbell Construction Co., Reno, Nev., received from Martin Kronberg & Henry Shriver a $400,000 contract to build an airport one mile north of Sparks, Nev.

Western Construction & Lumber Co., Edmonton, Canada, holds a $400,000 contract for the construction of a dam at Pothole Coulee, 25 miles south of Lethbridge. The Alberta Dept. of Agriculture in Edmonton awarded the contract.

The Meers Construction Co., Dallas, Tex., has been awarded a $1,000,000 contract by the Certain-teed Products Corp. of Dallas, Tex., for construction of a plant at Linfield Dr. and Holmes Street Rd., in Dallas.

Dimmit & Taylor, Los Angeles, Calif., holds a $493,273 contract for grading and surfacing 4.7 miles of highway between Fairview Ave. and Tecolote Creek for the Division of Highways, Sacramento, Calif.

Sound Construction & Engineering Co., Seattle, Wash., has been awarded a $700,000 contract for a building addition on Utah St. in Seattle, Wash., by Young & Richardson, Seattle, Wash.

A. S. Hainsworth, Seattle, Wash., holds a $600,000 contract by Kemper Freeman and Miller Freeman, Jr., Bellevue, Wash., to

FACTORY AND GENERAL OFFICES
LOS ANGELES, CALIF. BRANCHES:
SAN FRANCISCO HOUSTON PORTLAND

construct a shopping center on a 10-ac. site at Bellevue, Wash.

H. J. Ferguson Co., Cleveland, Ohio, has been awarded a $800,000 contract for factory building additions in Dallas, Tex., by Procter & Gamble Co., Dallas, Tex.

Mead & Mount Construction Co., Denver, Colo., has received a $700,000 contract from the Ford Motor Co., Detroit, Mich., for construction of an auto parts building near E. 4th St., Denver, Colo.

Pittsburgh - Des Moines Steel Co., San Francisco, Calif., will construct the steel structure for a supersonic wind tunnel at Moffett Field, Calif. The $688,336 contract was awarded by the Natl. Advisory Committee for Aeronautics, Moffett Field, Calif.

C. L. Peck, Los Angeles, Calif., has a $900 - 000 contract for the construction of a new factory project at Vernon, Calif., for Byron Jackson Co., Vernon, Calif.

United Concrete Pipe Corp., Los Angeles, Calif., was awarded a $3,361,089 contract for construction of concrete pipelines and structures on the San Diego aqueduct by the Bureau of Yards and Docks, Washington, D. C.

Morrison-Knudsen Co., Inc., Boise, Ida., holds a $580,000 contract for repair and gunite work on the tunnel at Kern Power Plant No. 3 and Borrell Conduit, by Southern California Edison Co., Los Angeles, Calif.

Myers Brothers, Los Angeles, Calif., holds a $721,000 contract from Sears, Roebuck & Co., Los Angeles, to build a three and a four - story addition to their mail order building in Los Angeles, Calif.

Walter Mackin, Billings, Mont., will make highway improvements on the Chinook-Havre Rd. and the Glacier Park Trail Rd. The State Highway Commission in Helena, Mont., awarded the $340,305 contract.

Highway & Street...

California

CONTRA COSTA CO.—**Lee J. Immel,** Box 65, Sta. A, Berkeley—$61,599 for improvement and extension of Castro St. from the Belt Line Railroad to Filbert St. in North Richmond — by City Council, Richmond. 10-24

KERN CO.—**Phoenix Construction Co.,** Box 906, Bakersfield—$84,697 for construction of 18.1 mi. of access road to Elk Hills Petroleum Reserve—by Public Roads Administration, San Francisco. 10-19

LOS ANGELES & ORANGE COS.—**Griffith Co.,** 502 Los Angeles Railway Bldg., Los Angeles—$21,543 for highway improvements on Firestone Blvd. between Carmenita Rd. and Orangethorpe Avenue, portions only, a net length of about 2.9 mi. to be repaired by placing plantmix surf. and bitum. surf. treatment on shoulders—by Division of Highways, Sacramento. 10-29

LOS ANGELES CO.—**Matich Bros.,** Box 390, Colton — $111,381 for improvements along Holt Ave. and Valley Blvd. between Bellevue Ave. and Pomona Blvd. for 2.2 mi.—by Board of Supervisors, Los Angeles. 10-12

LOS ANGELES CO.—**M. S. Mecham & Sons,** 1210 W. 48th St., Los Angeles—$14,-672 for construction of a road at Clarence W. Pierce School of Agriculture, Los Angeles—by Los Angeles Board of Education. 10-19

ORANGE CO.—**John J. Swigart,** E. Walnut, Torrance—$10,126 for improvements on S. Main St. between Anahurst St. and Hobart St., Santa Ana, about 0.8 mi. in length—by City Council, Santa Ana. 10-12

PLUMAS CO. — **Fredrickson & Watson Construction Co.,** 873 81st Ave., Oakland—$272,478 for about 9.8 mi. of highway at Almanor, Plumas National Forest — by Public Roads Administration, San Francisco. 10-4

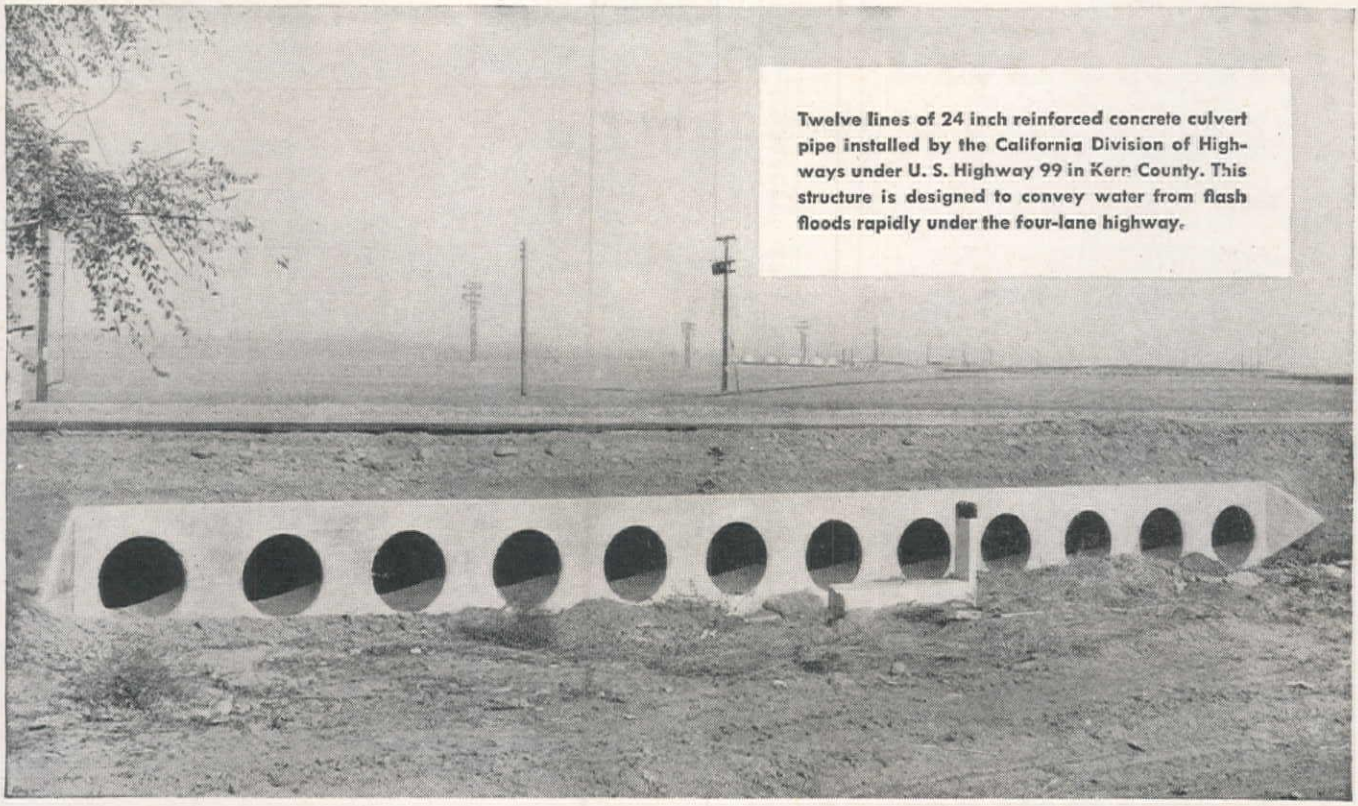
SAN DIEGO CO.—**R. E. Hazard,** 2548 Kettner Blvd., San Diego—$11,191 for repairing with plantmix surf. state highway between the north city limits of Chula Vista and south city limits of National City, about 0.6 mi. in length — by State Division of Highways, Sacramento. 10-12

SAN JOAQUIN CO.—**Louis Biasotti & Son,** 40 W. Clay St., Stockton—$12,100 for reconstructing Dagett Road, Stockton Naval Supply Annex — by Bureau of Yards and Docks, Washington, D. C. 10-15

SAN MATEO CO.—**L. C. Smith,** 1st and Railroad Ave., San Mateo — $58,932 for construction of sewers, streets, sidewalks, curbs and gutters in Brentwood Subdivision No. 1—by City Council, South San Francisco. 10-12

SANTA BARBARA CO. — **Dimmitt & Taylor,** 815 E. 59th St., Los Angeles—$493,273 for about 4.7 mi. to be graded and surfaced with plantmix surfacing, between Fairview Ave. and Tecolote Creek—by Division of Highways, Sacramento. 10-8

SANTA BARBARA CO.—**Western Motor Transfer, Inc.,** 118 State St., Santa Barbara—$11,500 for resurf. streets in Santa



Twelve lines of 24 inch reinforced concrete culvert pipe installed by the California Division of Highways under U. S. Highway 99 in Kern County. This structure is designed to convey water from flash floods rapidly under the four-lane highway.

Low Headroom but Adequate Drainage with

CONCRETE PIPE LINES

Long service records of concrete pipe lines for sewerage, drainage structures for Highways, Railroads and airports demonstrate these advantages:

AMPLE STRENGTH for most severe load and impact conditions is built into concrete pipe.

MAXIMUM HYDRAULIC CAPACITY is assured by clean, even joints and smooth texture of inside surface.

HIGH WEAR RESISTANCE to abrasion by suspended grit in high velocity flow.

MINIMUM INFILTRATION and LEAKAGE assured by tight joints and uniformly dense concrete.

ACCURATE CONCENTRICITY—can be laid true to line and grade.

Members of this Association—list furnished on request—manufacture concrete pipe in strict compliance with the standard specifications for concrete sewer pipe, reinforced concrete sewer and culvert pipe of the American Society for Testing Materials and the American Association of State Highway Officials.

BUY MORE WAR BONDS

CALIFORNIA ASSOCIATED CONCRETE PIPE MANUFACTURERS

P. O. BOX 152 — FRESNO 7, CALIF.

Barbara, on which the company formerly held a franchise for street car service. The streets will be surfaced with 2-in. asph. conc. from curb to curb—by Southern California Edison Co., Los Angeles. 10-2

SANTA CLARA CO.—**A. J. Raisch,** 900 W. San Carlos St., San Jose—$10,412 for improvement to Timber Road from Capitol Ave. to San Jose-Oakland Road—Santa Clara Board of Supervisors, San Jose. 10-30

SHASTA CO.—**W. C. Railing,** 27 Lowell St., Redwood City—$33,140 for about 10.0 mi. of access road to Deschutes Lumber Co. timber areas—by Public Roads Administration, San Francisco. 10-4

SOLANO CO.—**Fredrickson Bros.,** 1259 65th St., Emeryville—$107,897 for paving open area for storage at the U. S. Navy Yard, Mare Island—by Bureau of Yards and Docks, Washington, D. C. 10-26

SONOMA CO.—**Peter Onsrud,** 2008 Fulton Rd., Santa Rosa—$29,425 for widening and paving of Sebastopol Ave. from Santa Rosa Ave. westerly for 3,800 ft.—by City Council, Santa Rosa. 10-3

YUBA CO.—**H. Earl Parker,** 12th and F Sts., Marysville—$286,242 for about 3.6 mi. of highway, Nevada City-Downieville—by Public Roads Administration, San Francisco. 10-4

Idaho

ADA, BOISE, CANYON, ELMORE, VALLEY & WASHINGTON COS.—**Nic Burggraf,** Box 397, Idaho Falls—$67,430 for furnishing crushed gravel and crushed rock maintenance stockpiles, types A and B cover coat and materials in stockpiles adj. to U. S. Hwy. 30, S. R. 15 and S. R. 21—by State Director of Highways, Boise. 10-24

FREMONT CO.—**Western Construction Co.,** Box 628, Pocatello—$22,775 for furnishing crushed gravel maintenance stockpiles and type B cover coat material in stockpiles adj. to U. S. Hwy. 191—by State Director of Highways, Boise. 10-24

Montana

BEAVERHEAD CO.—**Chas. Shannon & Son,** 2400 2nd Ave., No. Great Falls—$61,008 for the grading, crushed gravel surf. roadmix oiling, and small drainage structures on the Dillon - Butte Rd.—by State Highway Commission, Helena. 10-31

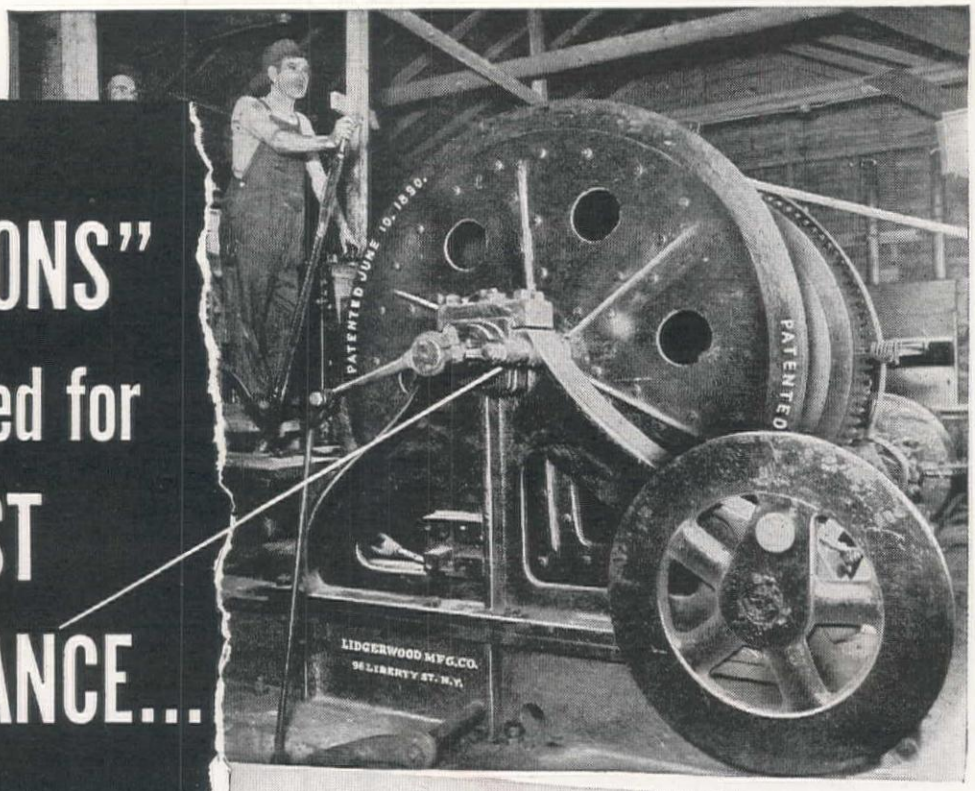
BLAINE & HILL COS.—**O'Neil Construction Co.,** Havre, and **Nilson-Smith Construction Co.,** Box 1147, Great Falls—$282,993 for regrading, surfacing with crushed gravel, bituminous surface treatment and the construction of small drainage structures on the Chinook-Havre Rd. and Section A of the Glacier Park Trail Rd.—by State Highway Commission, Helena. 10-31

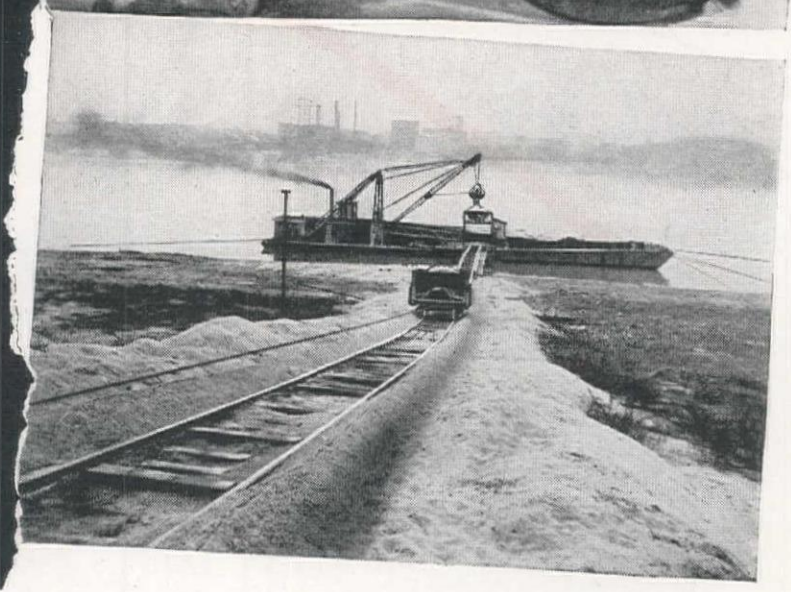
FERGUS CO.—**S. Birch & Sons Construction Co.,** 314 Ford Bldg., Great Falls—$169,956 for grading, crushed gravel surf. bitum. surf. treating, and small drainage structures on the Armington-Lewiston Rd.—by State Highway Commission, Helena 10-31

FLATHEAD CO.—**Nyberg Construction Co.,** Box 7, Yardley, Wash.—$108,949 for small drainage structures, surfacing and roadmix oiling of Section "A" of the Kalispell-Libby Rd.—by State Highway Commission, Helena. 10-31

ROOSEVELT CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha, Nebr.—$193,326 for grading, surf. with gravel surf. treating and small drainage structures

if "CITATIONS" were awarded for STAR HOIST PERFORMANCE...





50 YEARS of continuous performance should earn this LIDGERWOOD Slope Hoist a citation for day-in day-out devotion to duty!
Originally built for steam operation before the turn of the century, it has been converted to electric motor operation and is *still* seeing daily heavy service, handling the output of a large mid-western gravel plant.

LIDGERWOOD Hoists, correctly designed and engineered, are job-tested and backed by more than 71 years of "Know How"—your guarantee of long years of dependable, efficient operation.

LIDGERWOOD Steam, Electric, Gasoline, Diesel and Belt operated hoists, built to fit the job, are currently being furnished to the Government and other war-related industries—but our excess facilities are always available to study your requirements and make recommendations on your present and post-war needs.

A request on your business stationery will promptly bring your copy of the NEW LIDGERWOOD Combination Hoist Bulletin and General Illustrated Bulletin.

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS • ELIZABETH 8, NEW JERSEY
EXPORT OFFICE, 50 CHURCH STREET, NEW YORK 7, N. Y.
CABLE ADDRESS—BROSITES

Represented in California by Industrial Equipment Co., Emeryville, California

of the Glacier Park Trail Rd.—by State Highway Commission, Helena. 10-31

STILLWATER CO. — **Stanley H. Arkwright, Inc.,** 208 Securities Bldg., Billings —$66,333 for grading, surf. roadmix oiling, and drainage structures and a 25-ft. timber pile trestle on the Witt Hill Rd.—by State Highway Commission, Helena. 10-31

Nevada

WASHOE CO.—**Isbell Construction Co.,** E. 4th St., Reno—$85,594 for portland cement concrete combined curbs and gutters, grading, and placing of gravel base, bitum. prime coat; plantmix bitum. surf. and the vitrified pipe sanitary sewers, in an area known as the Westfield Village Improvement District, Reno — by City Council, Reno. 10-5

Texas

BEXAR CO. — **Collins Construction Co.,** Box 1192 Austin—$17,694 for repairing and sealing of streets and parking areas at Fort Sam Houston—by U. S. Engineer Office, San Antonio. 10-1

NUECES CO.—**Fred Perrenot Co.,** 613 Virginia, Corpus Christi—$29,550 for 14.6 mi. of resurf. of roads in Precinct 2 and about 20 mi. resurf. in Precinct 3—by County Commissioners, Corpus Christi. 10-2

Washington

ADAMS, LINCOLN AND WHITMAN COS. — **Curtis Gravel Co.,** 1401 Fancher Way, Spokane—$29,400 for manufacturing and stockpiling crushed cover stone and mineral aggreg. on State Hwys. Nos. 2, 3 and 11-E, section 1, Davenport to Grant County line; section 2, Colfax to Dusty, and section 3, Ritzville to Washtucna—by State Director of Highways, Olympia. 10-18

CLALLAM CO. — **J. D. Shotwell,** 1624 Puget Sound Bank Bldg., Tacoma—$21,959 for surf. of existing roadway with crushed stone top course, and stockpiling on 13.6 mi. of secondary state highway, La Push and Mora Roads—by State Director of Highways, Olympia. 10-16

COWLITZ CO.—**Peter Kiewit & Sons Co.,** 442 Post St., San Francisco—$476,363 for grading, draining and paving 5.7 mi. of primary State Highway No. 1—by Director of Highways, Olympia. 10-12

COWLITZ CO.—**N. Fiorito, Inc.,** 844 W. 48th St., Seattle—$393,790 for surf. with selected roadway borrow and crushed stone surf., paving with cement conc. and asph. conc. on 5.1 mi. of primary State Hwy. No. 1, Martins Bluff to Kalama River—by State Director of Highways, Olympia. 10-18

GRAYS HARBOR CO. — **Axel Osberg,** 6206 Phinney, Seattle—$256,763 for highway improvements to include clearing, grubbing, draining, grading, surfacing and construction of light bitum. surf. treatment and one timber bridge on State Hwy. No. 9—by State Director of Highways, Olympia.

KING CO. — **Beal & Roberts,** Republic Bldg., Seattle, Wash.—$28,329 for grading, draining, surfacing and constructing light bitum. surf. treatment on 3.3 mi. of Highway No. 1-J, Sand Point Naval Station to Lake City vicinity—by Director of Highways, Washington. 10-19

LEWIS CO.—**T. W. Thomas,** Imperial Hotel, Portland, Ore.—$28,902 for clearing and grubbing, draining, surf. with selected roadway borrow and crushed stone surf. on 4.2 mi. of primary State Highway No. 5, Mayfield to Morton—by Director of Highways, Olympia. 10-2

SKAGIT CO. — **Hawkins & Armstrong,** 5265 16th N.E., Seattle—$33,314 for reconstructing approaches to the Skagit River bridge near Sedro Woolley—by Director of Highways, Olympia. 10-18

SPOKANE CO.—**D. A. Sullivan, Box** 39, Parkwater — $35,096 for surfacing with crushed stone surf. 8.8 mi., stockpiling crushed stone and preparation of picnic areas in Mt. Spokane State Park—by State Director of Highways, Olympia. 10-2

YAKIMA CO.—**Colonial Construction Co.,** E. 1702 Broadway, Spokane—$75,510 for stockpiling at seven points within Yakima County—by County Commissioners, Yakima. 10-15

Wyoming

ALBANY CO. — **Leach Brothers,** 332 Grand Ave., Cheyenne—$304,490 for highway improvements involving 496,000 cu. yd. of excavation, grading, draining and misc. work on 8.6 mi. of the Laramie-Cheyenne Road — by State Highway Commission, Cheyenne. 10-31

CARSON CO.—**Etlin E. Peterson,** Casper —$104,943 for 1 mi. grading, drainage, base course surf., oil treatment by roadmix method, stone chip and seal coat, 2 reinf. conc. culverts, 1 bridge and miscellaneous work on Saratoga-Centennial Road — by Highway Department, Cheyenne. 10-25

Bridge . . .

Arizona

MOHAVE CO.—**H. L. Royden,** Box 3707 Phoenix—$59,948 for adapting the abandoned railroad bridge across the Colorado River at Topock to highway use by construction of a new floor system—by State Highway Commission, Phoenix. 10-10

California

CALAVERAS CO.—**Fredrickson Brothers,** 1259 65th St., Emeryville—$36,126 for a concrete bridge and approaches across Angels Creek in Angels Camp—by Division of Highways, Sacramento. 10-25

PLACER CO.—**Jas. H. McFarland,** 17 Marcela Ave., San Francisco—$15,430 for bridge foundations on the North Fork of Middle Fork of American River—by Public Roads Adm., San Francisco. 10-26

VENTURA CO.—**F. Fredenburg,** 1717 Garibaldi Ave., Temple City—$15,175 for construction of one reinf. conc. bridge, 136 ft. long, consisting of five spans, at Senor Canyon, approximately 1¼ mi. east of Ojai—by County Board of Supervisors, Ventura. 10-5

VENTURA CO.—**F. Fredenburg,** 1717 Garibaldi Ave., Temple City—$9,694 for repairing a bridge across San Antonio Creek, about 1 mi. east of Ojai—by State Division of Highways, Sacramento. 10-4

Montana

BEAVERHEAD CO.—**Cahill - Mooney Construction Co.,** Box 398, Butte—$44,607 for one double 4 x 6 x 68-ft. conc. box culvert and one three-span 149.5-ft. steel and conc. bridge over the Beaverhead River—by State Highway Commission, Helena. 10-31

BLAINE AND HILL COS.—**Walter Mackin,** Billings—$340,305 for structures on the Chinook-Havre Rd. and Section A of the Glacier Park Trail Rd.—by State Highway Commission, Helena. 10-31

FERGUS CO.—**W. P. Roscoe Co.,** Box 633, Billings—$24,650 for one 6 x 6 x 14-ft. conc. box culvert; one 11-ft. std. treated timber stock pass; one 19-ft. treated timber bridge; one 57-ft. treated timber bridge; and one 75-ft. treated timber bridge on the Armington-Lewiston Rd.—by State Highway Commission, Helena. 10-31

Nevada

EUREKA CO.—**Del R. Beebe,** Fallon—$12,756 for a structural steel bridge over the Humboldt river at Palisade—by Dept. of Highways, Carson City. 10-30

Washington

GRAYS HARBOR CO.—**Grays Harbor Construction Co.,** 412 S. Park St., Aberdeen—$76,106 for reconstructing south bay bridge on secondary State Highway No. 13-A—by State Director of Highways, Olympia. 10-2

SNOHOMISH CO.—**Rumsey & Co.,** 3821 Airport Way, Seattle—$112,596 for constructing a reinf. conc. girder bridge and grading, surfacing and placing bitum. surf. treatment, plantmix type, on the approaches thereto on 0.2 mi., Mukilteo to Everett—by State Director of Highways, Olympia. 10-16

WAHKIAKUM CO.—**C. J. Eldon,** Box 5686, Portland, Ore.—$14,035 for removing two existing bridges, portions of third structure, grading, draining and surf. on 0.1 mi. of secondary State Highway No. 12-F—by State Director of Highways, Olympia. 10-16

Canada

BRITISH COLUMBIA—**Moncrieff Construction Co., Ltd.,** Vancouver—$14,585 for erection of the Haslan Creek Bridge substructure on the Island Highway—by British Columbia Dept. of Public Works, Victoria.

Airport . . .

California

LOS ANGELES CO.—**Oswald Brothers,** 366 E. 58th St., Los Angeles—$39,763 for paving and otherwise improving parking areas and service roads at the Los Angeles Airport—by Board of Public Works, Los Angeles. 10-31

LOS ANGELES CO.—**Clyde W. Wood, Inc.,** Architects Bldg., Los Angeles—$11,634 for treatment of runways and taxiways at the Santa Maria Army Airfield, Santa Maria—by U. S. Engineer Office, Los Angeles. 10-16

Nevada

WASHOE CO.—**Isbell Construction Co.,** 1300 E. 4th St., Reno—$400,000 for construction of an airport one mile north of Sparks—by Martin Kronberg & Henry Shriver. 10-18

Utah

GARFIELD CO.—**Utah Construction Co.,** 57 E. 4th South St., Salt Lake City—$90,513 for the construction of runways at the Bryce, Utah, Airport—by Civil Aeronautics Administration, Santa Monica, Calif.

Water Supply . . .

California

ALAMEDA CO.—**McGuire & Hester,** 796 66th Ave., Oakland—$15,250 for construction of pipeline, venturi meter, fittings and valves, etc., at Hayward—by City Council, Hayward. 10-17

ALAMEDA CO.—**Steel Tank & Pipe Co.,** 1100 4th St., Berkeley—$82,887 for approx. 9,200 lin. ft. 36-in. cement lined and gunite-coated steel pipe for distribution system near San Leandro Blvd., Oakland—by East Bay Municipal Utility District, Oakland. 10-26

KERN CO.—**Edward Green,** 3001 Coolidge Ave., Los Angeles—$18,803 for the construction of water mains in the Mojave Fire Protection District—by County Board of Supervisors, Bakersfield. 10-8

LOS ANGELES CO.—**California Gunite Co.,** 2022 Hyperion Ave., Los Angeles—$13,623 for a 600,000-gal. reservoir at Wapello St. and Loma Alta Dr., Altadena—by the Lincoln Ave. Water Co., Altadena. 10-26

NAPA CO.—**H. E. Connor,** 1222 Whipple Ave., Redwood City—$10,352 for a 12-in. steel water transmission pipeline with 12-in. and 8-in. diam. cast iron connections to existing facilities, together with gate valves, cast iron fittings and couplings at Calistoga—by City Council, Calistoga. 10-12

SAN BERNARDINO CO.—**The Roscoe Moss Co.,** 4360 Worth Ave., Los Angeles—$208,910 for drilling a new well and installing four submarine pumps and an estimated footage of pipe at Kelso—by Union Pacific Railroad Co., Omaha, Neb. 10-17

SAN DIEGO CO.—**United Concrete Pipe Corp.,** Box 1, Station H, Los Angeles—$3,361,089 for construction of concrete pipeline and structures on San Diego aqueduct—by Bureau of Yards and Docks, Washington, D. C. 10-30

Texas

DALLAS CO.—**E. H. Reeder Construction Co.,** Dallas—$59,200 for concrete water mains along Inwood Rd., from Denton

Dr. to Hines Blvd., Dallas—by City Council, Dallas. 10-5

KLEBERG CO.—**Lee Aikin,** Box 2350, Corpus Christi—$14,470 for the construction of a pumphouse at Kingsville—by City Council, Kingsville. 10-16

LUBBOCK CO.—**Pittsburgh-Des Moines Steel Co.,** Praetorian Bldg., Dallas—$15,600 for elevated water tank at Texas Technological College—by Wyatt C. Hedrick, Ft. Worth. 10-26

ROCKWALL CO.—**O. J. Parrott Construction Co.,** Tower Petroleum Bldg., Dallas—$47,767 for improvements to the city water distribution system at Rockwall—by City Council, Rockwall. 10-16

Sewerage . . .

California

KERN CO.—**B. C. L. Construction Co.,** 3726 Lee St., Los Angeles—$44,776 for a sewer line for the Arvin Sanitation District—by County Board of Supervisors, Bakersfield. 10-5

LOS ANGELES CO.—**Artukovich Bros.,** 7320 N. Atlantic Ave., Hynes—$18,104 for construction of 0.87 mi. sanitary sewers on Third St., and other sts.—by County Board of Supervisors, Los Angeles. 10-19

LOS ANGELES CO.—**Artukovich Bros.,** 7320 N. Atlantic Ave., Hynes—$20,728 for construction of 0.8 mi. of sanitary sewer in Motz St. and other streets—by County Board of Supervisors, Los Angeles. 10-12

LOS ANGELES CO.—**Artukovich Bros.,** 7320 N. Atlantic Ave., Hynes—$65,776 for 2.5 mi. of sanitary sewer and appurtenances in Coke Ave. and other streets in the vicinity of Bellflower—by County Board of Supervisors, Los Angeles. 10-5

LOS ANGELES CO.—**Frank Chutuk,** 1242 S. Bonnie Beach Pl., Los Angeles—$5,929 for construction of sewers and appurtenances in Kraft Avenue, Los Angeles—by Board of Public Works, Los Angeles. 10-12

LOS ANGELES CO.—**Charles J. Dorfman,** 124 N. La Brea Ave., Los Angeles—$41,695 for excav. and construction of storm drain between Arlington Ave. and Denker Ave., a continuation of the minimum relief channel for Laguna Domingues—by County Board of Supervisors, Los Angeles. 10-26

LOS ANGELES CO.—**Leko & Radich,** 818 No. Coronado St., Los Angeles—$4,421 for construction of sanitary sewers in Baird Ave. from Cohasset St. to Valerio St., Los Angeles—by Board of Public Works, Los Angeles. 10-12

LOS ANGELES CO.—**Paul Vukich Construction Co.,** 112 W. 9th St., Los Angeles—$32,770 for construction of a sanitary sewer which covers an area from Arlington St. to 223rd St. and from Hesperia to Santa Fe Ave., Long Beach—by City Council, Long Beach. 10-15

LOS ANGELES CO.—**R. A. Wattson,** 5528 Vineland Ave., North Hollywood—$9,735 for construction of sanitary sewers in right-of-way east of Cahuenga Blvd., Valley Spring Lane to 950 ft. southerly—by Board of Public Works, Los Angeles. 10-12

LOS ANGELES CO.—**Leko & Radich,** 818 N. Coronado St., Los Angeles—$41,637 for sanitary sewers, water mains and appurtenances in Santa Ana Blvd. and other streets—by County Board of Supervisors, Los Angeles. 10-5

LOS ANGELES CO.—**B. D. Zaich & Son,** 309½ W. Broadway, Glendale—$17,895 for construction of sanitary sewers and appurtenances in Radford Ave. and Victory Blvd., Los Angeles—by Board of Public Works, Los Angeles. 10-12

LOS ANGELES CO.—**B. D. Zaich & Son,** 309½ W. Broadway, Glendale—$12,236 for 0.8 mile of sanitary sewers in La Brea Ave. and other streets — by County Board of Supervisors, Los Angeles. 10-12

LOS ANGELES CO.—**B. D. Zaich & Son,** 309½ W. Broadway, Glendale—$29,708 for a sanitary sewer and appurtenances in Riverton Ave. and Denny Ave., Los Angeles—by Board of Public Works, Los Angeles. 10-29

RIVERSIDE CO. — **C. Stahlman,** 3695 Tyler, Riverside—$4,036 for sanitary sewer installation on Riverside Ave., Chamblin Ave., Del Ray Court and Ter., Riverside—by City Council, Riverside. 10-26

SACRAMENTO CO.—**R. Goold & Son,** Box 190, Stockton—$90,071 for a trunkline sewer in 18th St., and N. B St., at Sacramento—by City Council, Sacramento. 10-9

SAN FRANCISCO CO.—**M. J. Lynch,** Barneveld and Oakdale Ave., San Francisco—$128,034 for the Ingleside sewer system, Section "B," in Urbano Dr., Victoria St. and Ocean Ave., San Francisco — by Dept. of Public Works, San Francisco. 10-29

SOLANO CO. — **Parish Brothers,** Box 1019, Benicia—$21,330 for construction of grounds improvement, including grading, paving of roads, concrete gutters and pipe drains and draining ditches and misc. concrete manholes at California Maritime Academy, Carquinez Straits, near Vallejo—by State of Calif., Division of Architecture, Sacramento. 10-19

SONOMA CO.—**John C. Spaletta,** 442 S. A St., Santa Rosa—$13,912 for construction of a storm drain of conc. pipe in Santa Rosa Ave. from the Mill St. and Sebastopol Ave. intersection north for 1,250 ft. to Santa Rosa Creek—by City Council, Santa Rosa. 10-3

Texas

DALLAS CO. — **P. C. Sorenson & Co.,** Southland Life Bldg., Dallas—$68,111 for installation of storm sewers through the Fair Park race track area at Dallas. 10-2

Washington

KING CO.—**Nettleton, Baldwin & Anderson,** 1109 N. 36th St., Seattle—$64,750 for expansion of sewage treatment plant at the Naval Hospital, Seattle — by Bureau of Yards and Docks, Washington, D. C. 10-19

Waterway . . .

California

KERN CO. — **Geo. Von Kleinsmid,** Box 971, Bakersfield — $59,563 for repair of a flume near Grapevine Station—by Division of Highways, Sacramento. 10-30

LOS ANGELES CO.—**Newport Dredging Co.,** 631 31st St., Newport Beach—$64,000 for dredging 400,000 cu. yd. of sand from Alamitos Bay and depositing on the east beach between Granada Ave. and 72nd Pl., Long Beach—by City Council, Long Beach. 10-22

SAN DIEGO CO.—**Case Construction Co.,** P. O. Box 6, Berth 109, San Pedro—$18,423 for construction of a seawall at the radio station, Imperial Beach — by Bureau of Yards and Docks, Washington, D. C. 10-23

SAN FRANCISCO CO.—**Mercer-Fraser Co.,** 83 McAllister St., San Francisco—$130,873 for construction of the inner wharf at the fleet landing, Ferry Bldg., San Francisco—by State Harbor Commission, San Francisco. 10-4

SAN FRANCISCO CO.—**William D. Willits,** 460 23rd Ave., San Francisco—$73,605 for steel framework for fleet landing at the Ferry Bldg., San Francisco—by State Harbor Commissioners, San Francisco. 10-25

TULARE CO.—**Clyde W. Wood, Inc.,** 816 W. 5th St., Los Angeles—$266,000 for cleaning and guniting 41,700 lin. ft. of open canals at Kaweah No. 2 and Kaweah No. 3 hydroelectric plants—by Southern California Edison Co., Los Angeles. 10-26

Oregon

CLATSOP CO.—**Cannon Diamond Drilling Co.,** Box 549, Compton—$23,730 for underwater soil explorations and sampling at Cathlamet Bay—by 13th Naval District, Seattle, Wash. 10-30

MULTNOMAH CO.—**Steel Tank & Pipe Co.,** 518 No. Columbia, Portland—$440,716 for construction of water system in Portland—by City Council, Portland. 10-30

POLK CO.—**Oscar Butler & Son,** 4900 N.E. 42nd, Portland—$23,111 for repair and construction of revetment and drift barrier along Willamette river at Independence Bend near Independence—by U. S. Army Engineers, Portland. 10-29

Texas

ELLIS CO.—**Adams Construction Co.,** Dallas—for clearing ground and constructing levees—by County Levee Improvement Dist., No. 4, Galveston. 10-15

Utah

WASHINGTON CO.—**Armco Drainage & Metal Products,** 631 So. Third West, Salt Lake City—$30,000 for furnishing and laying of steel pipe and fittings at St. George—by City Council, St. George. 10-4

Dam . . .

California

KERN CO.—**Cannon & Jeffries,** Box 549, Compton—$11,535 for core drilling at Isabella Dam site near Bakersfield—by U. S. Engineer Office, Sacramento. 10-10

SACRAMENTO CO.—**Mitchell Diamond Drill Co.,** 779 Bryant St., San Francisco—$26,630 for core drilling at Folsom dam site, Folsom—by U. S. Engineer Office, Sacramento. 10-10

Canada

ALBERTA — **Western Construction & Lumber Co.,** Edmonton—$400,000 for construction of a dam at Pothole Coulee. The new dam is 25 mi. south of Lethbridge, and work will involve moving of approx. 450,000 cu. yd. of dirt—by Alberta Dept. of Agriculture, Edmonton.

Irrigation . . .

Arizona

YUMA CO.—**Macco Construction Co.,** 815 Paramount Blvd., Clearwater, Calif.—$146,860 for the earthwork and lining, B canal and A and B laterals, Yuma Mesa division, Gila Project, near Yuma—by Bureau of Reclamation, Denver, Colo. 10-22

California

IMPERIAL CO.—**Fisher Contracting Co.,** 516 S. 7th St., Phoenix, Ariz.—$320,903 for earthwork, concrete lining and structures, wasteway No. 1, Sta. 3 plus 96.5 to Sta. 170 plus 00, Coachella Canal; Sta. 4782 plus 01.6, All-American Canal System, Boulder Canyon Project—by Bureau of Reclamation, Denver, Colo. 10-18

STANISLAUS CO.—**Markland & Harve,** 109 Flower St., Turlock—$15,595 for construction work in the Mayfield Ditch and the W. R. Appling Ditch at Turlock—by Turlock Irrigation District, Turlock. 10-8

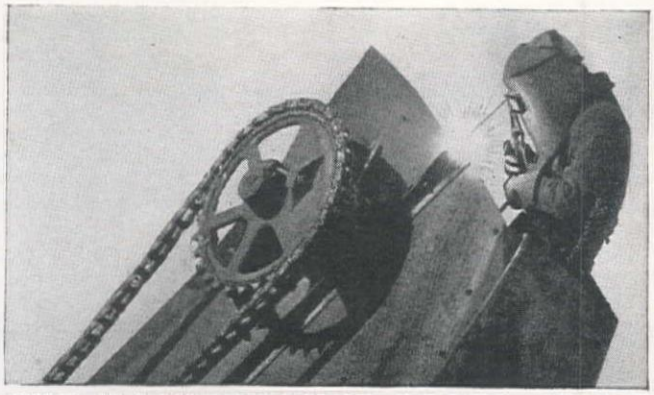
STANISLAUS CO.—**McMillen & Norseen,** 427 Mill St., Turlock—$39,910 for construction on McHenry Ditch near Turlock—by Turlock Irrigation District, Turlock. 10-8

STANISLAUS CO.—**Lloyd W. Terrell,** 221 9th Ave., Turlock—$36,924 for construction of improvements at north branch of the lower Maze-Wren ditch, the Hickman ditch and the Upper Jefferson ditch near Turlock—by Turlock Irrigation District, Turlock. 10-8

Tunnel . . .

California

KERN CO.—**Morrison-Knudsen Co., Inc.,** Box 1518, Boise, Ida.—$580,000 for repairing and guniting tunnel linings and con-



CUT MAINTENANCE COSTS—TIME WITH P&H WELDING ELECTRODES

Take advantage of the time, money and machinery saving benefits of arc welding! Use P&H Welding Electrodes for the repair and maintenance of your equipment . . . to keep it on the job longer . . . to avoid lengthy lay ups for want of replacement parts. Often a few hours of welding time saves days.

Whatever your welding requirements—P&H can supply you. There are all types and sizes—AC or DC—for welding all kinds of steels and for building up and hard-surfacing to provide unusual resistance to wear, impact and abrasion.

Your P&H field man can help you. Call your nearest P&H representative today or write for P&H's complete-line booklet.

General Offices: 4490 W. National Ave., Milwaukee 14, Wis.

HARNISCHFEGER CORPORATION

WELDING ELECTRODES • MOTORS • HOISTS P&H ELECTRIC CRANES • ARC WELDERS • EXCAVATORS

RELIABILITY COUNTS

Complete streamlining – inside, where it counts – results in higher efficiency and freedom from clogging. Gorman-Rupp centrifugal pumps are totally self-priming – built to run months without shut-down. Sizes range from 3,000 to 125,000 Gallons Per Hour. Whatever the size, a Gorman-Rupp gives you more for your dollar!

Pacific Hoist & Derrick Co., Seattle, Wash.; Andrews Equipment Service, Portland, Ore.; Western Construction Equipment Co., Billings, Mont.; The Sawtooth Company, Boise, Idaho; The Lang Co., Salt Lake City, Utah; Harron, Rickard & McCone Co., of Southern California, Los Angeles; Francis Wagner Co., El Paso, Texas; Neil B. McGinnis Co., Phoenix, Ariz.; Lomen Commercial Co. (Alaska Dis. exclusively), 327 Colman Bldg., Seattle, Wash.; Allied Equipment Co., Reno, Nev.; Wortham Machinery Co., Cheyenne, Wyo.; Western Construction Equipment Co., Missoula, Mont.

THE GORMAN-RUPP COMPANY

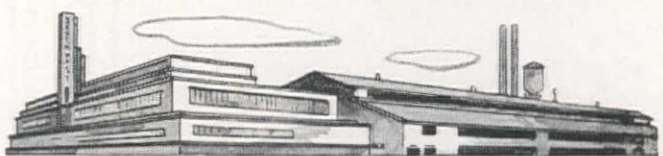
MANSFIELD • OHIO

FOR GREATER STRENGTH

SOUTHWEST RAIL STEEL reinforcing bars provide maximum resistance to emergency overloads, shock and impact. Moreover, they have high elastic limit, which gives maximum resistance to crack formation in reinforced concrete. That's why rail steel reinforcing bars are used in such structures as the Chicago Merchandise Mart.

When specifying or buying RAIL STEEL REINFORCING BARS remember that Southwest Steel Rolling Mills, Los Angeles, is convenient, for fast deliveries . . . fully equipped to furnish bars bent to your specifications . . . and always ready to serve you efficiently . . . whether your order is large or small.

WRITE FOR COMPLETE DETAILS AND PRICES



SOUTHWEST

STEEL ROLLING MILLS

9901 S. ALAMEDA ST. ✦ LOS ANGELES 2, CALIF.

creting floors of flumes at Kern Power Plant No. 3 and Borrell Conduit — by Southern California Edison Co., Los Angeles. 10-15

Building...

Arizona

MARICOPA CO.—**J. A. Nesbitt Construction Co.**, 604 Grand St., Mesa—$250,000 for a parochial school to include a church with a seating capacity of 300 persons, and accessory bldgs., at Phoenix — by Sacred Heart Parish, Phoenix. 10-18

California

ALAMEDA CO.—**M. J. King, Inc.**, 231 Franklin St., San Francisco—for the construction of a two-story and basement structural steel telephone exchange bldg. at Hayward—by Pacific Telephone & Telegraph Co., San Francisco. 10-5

ALAMEDA CO. — **Parker, Steffens and Pearce**, 135 South Park, San Francisco—for construction of a loading dock, office bldg., and sheds at Oakland—by Haslett Warehouse Co., Oakland. 10-24

ALAMEDA CO.—**Valley & Lincoln & Co.**, 750 Dowling Blvd., San Leandro—$3,500,000 for approx. 400 residences and a shopping center at San Leandro—by Self. 10-9

CONTRA COSTA CO.—**De La Braindais Bros.**, Pinole—$150,000 for construction of service station, auto appliance shop, and 13 five-room stucco residences—by Self. 10-30

CONTRA COSTA CO. — **Miles A Leavens**, Walnut Creek—$43,000 for a modern frame and stucco apartment court, landscaping, garages, etc., at Antioch—by Yates Hamm, Antioch. 10-26

FRESNO CO. — **Harry E. Brown**, 701 Laurel St., Modesto—$50,000 for a masonry retail grain warehouse, wood trusses, etc., at Fresno—by Grange Co., Modesto. 10-29

LOS ANGELES CO.—**S. N. Benjamin**, 718 E. 16th St., Los Angeles—$110,000 for alterations to a building at 1101 Gayley Ave., West Los Angeles—by Janss Investment Corp., West Los Angeles. 10-22

LOS ANGELES CO.—**Bethlehem Steel Co.**, E. Slauson Ave., Vernon—$127,460 for power plant construction at the Harbor Steam Plant, Wilmington—by Los Angeles Water & Power Dept., Los Angeles. 10-26

LOS ANGELES CO.—**Cal-Sierra Corp.**, 1530 E. 16th St., Los Angeles—$70,000 for store building additions at 1613-31 Tarleton St.—by Self. 10-26

LOS ANGELES CO.—**The Collins Construction Co.**, 912 Baltimore, Kansas City, Mo. — $2,250,000 for a new factory and $650,000 for a new service branch, each to be constructed of reinf. conc., with steel roof trusses, at Los Angeles—by Fruehauf Trailer Co., Vernon. 10-17

LOS ANGELES CO.—**Contracting Engineers Co.**, 2310½ W. Vernon Ave., Los Angeles—$60,540 for a frame and stucco theater building at San Gabriel—by Ote Lewis & Associates, San Gabriel. 10-15

LOS ANGELES CO. — **Ted R. Cooper Co., Inc.**, 1031 S. Broadway, Los Angeles—for a one-story laboratory building at 12th and Evergreen, Los Angeles—by the McClellan Laboratories, Los Angeles. 10-26

LOS ANGELES CO. — **Ted R. Cooper Co.**, 1031 S. Broadway, Los Angeles—$91,734 for a factory building to be constructed of brick, at 6418 Avalon Blvd., Los Angeles—by Progress Upholstering Co., Los Angeles. 10-16

LOS ANGELES CO.—**The Ted R. Cooper Co., Inc.**, 1031 S. Broadway, Los Angeles—for an office and factory bldg. of brick and reinforced conc., to be located at Los Angeles—by All-American Meat and Bone Cutter Co., Los Angeles. 10-29

LOS ANGELES CO.—**Louis C. Dunn Co.**, 799 Monadnock Bldg., San Francisco—$3,000,000 for construction of a 2-story reinf. conc. office bldg. at Beverly Blvd. and La Cienega Blvd., Los Angeles—by United Rexall Drug Co., Los Angeles. 10-25

LOS ANGELES CO.—**William O. Gray**, 10911 Atlantic Blvd., Linwood—$57,229 for a steel frame factory bldg. at 61st and Walker Sts., Maywood — by Westbuilt Metal Products Co., Maywood. 10-18

LOS ANGELES CO.—**O. W. Karn**, 3406 W. Washington Blvd., Los Angeles—$70,000 for construction of factory and office bldg. on Airport Ave., Venice district—by Davis Precision Machine Co., Los Angeles. 10-19

LOS ANGELES CO. — **Albert A. Lew**, 1939 N. Commonwealth Ave., Los Angeles —$75,000 for a frame and stucco factory bldg. at Los Angeles—by Baby Line Furniture Co., Los Angeles. 10-3

LOS ANGELES CO.—**Russell Mangum Co.**, 745 E. First St., Long Beach—$60,000 for a three-story, 24-unit, 56-room apartment building at 130 Roycroft Ave., Long Beach—by Mrs. Leslie C. Foley, Long Beach. 10-26

LOS ANGELES CO.—**E. S. McKittrick**

Co., 7839 Santa Fe Ave., Huntington Park—$84,000 for a one-story frame and stucco office building and a steel frame shop bldg. at Hawthorne—by Northrop Aircraft, Inc., Hawthorne. 10-8

LOS ANGELES CO.—**J. A. McNeil Co.**, 714 W. Olympic Blvd., Los Angeles—$60,000 for constructing service station and alterations to various buildings at Idell St. and E. 55th St., Los Angeles—by L. A. Transit Lines, Los Angeles. 10-12

LOS ANGELES CO.—**Myers Brothers**, 3407 San Fernando Rd., Los Angeles—$721,000 plus fixed fee, for a four-story addition and a three-story addition at the mail order building, 2650 E. Olympic Blvd., Los Angeles—by Sears, Roebuck & Co., Los Angeles. 10-15

LOS ANGELES CO.—**Myers Brothers**, 3407 San Fernando Rd., Los Angeles—$250,000, plus fixed fee, for the construction of an addition of a reinf. conc. third story to a building at 236 N. Central Ave., Glendale—by Sears, Roebuck and Co., Los Angeles. 10-15

LOS ANGELES CO.—**Harvey A. Nichols**, 938 E. Slauson Ave., Los Angeles—$100,000 for a five-story reinforced concrete warehouse bldg. at Van Nuys—by Bekins Van & Storage Co., Los Angeles. 10-29

LOS ANGELES CO.—**C. L. Peck**, 223 H. W. Hellman Bldg., Los Angeles—$70,000 for a 1-story office bldg. on Wilshire Blvd. near Santa Monica Blvd., Beverly Hills—by West Coast Improvement Co., Beverly Hills. 10-31

LOS ANGELES CO.—**C. L. Peck**, 223 H. W. Hellman Bldg., Los Angeles—$900,000 for the construction of a new factory project, to include 10 misc. buildings and a spur track at Vernon—by Byron Jackson Co., Vernon. 10-2

LOS ANGELES CO.—**A. V. Perkinson**, 1149 N. Las Palmas Ave., Los Angeles—$140,000 for a theater building on Washington Blvd., opposite the Culver City city hall—by the Preston Theaters, Los Angeles. 10-26

LOS ANGELES CO.—**A. V. Perkinson**, 1149 N. Las Palmas Ave., Los Angeles—for the construction of a reinf. conc. and brick theater bldg. at Lynwood—by Hanson & Zimmerman, Lynwood. 10-11

LOS ANGELES CO.—**William Simpson Construction Co.**, 816 W. 5th St., Los Angeles—$500,000 for a 4-story steel frame department store bldg., at S.W. corner of Wilshire Blvd. and Bedford Dr., Beverly Hills—by I. Magnin & Co., San Francisco. 10-26

LOS ANGELES CO.—**Fred E. Tucker & Son**, 1225 W. 14th St., Long Beach—$300,000 for construction of theater and store bldg. at Atlantic Ave. and San Antonio Ave. in Long Beach—by Cabart Theaters, Inc., Long Beach. 10-12

LOS ANGELES CO.—**Weymouth Crowell Co.**, 2104 E. 15th St., Los Angeles—$88,000 for a 2-story addition to a garage bldg. at San Pedro. Building will have reinf. conc. walls on the first story, wood frame on second story—by Southern California Telephone Co., Los Angeles. 10-15

LOS ANGELES CO. — **Zimmer Construction Co.**, 1227 S. La Brea Ave., Los Angeles—$200,000 for two 40-room, two-story brick hotel buildings on Mariposa Ave., Los Angeles—by Chapman Park Hotel, Los Angeles. 10-25

MARIN CO.—**Litchfield Construction Co.**, 721 Francisco Blvd., San Anselmo—for a two-story reinf. conc. bldg., providing 12,-

000 sq. ft. of floor space and modern automobile ramp, to be located at Mill Valley—by B. R. Randolph and L. J. Rilla, Mill Valley. 10-25

MONTEREY CO. — **Permanente Metals Corp.**, Latham Square Bldg., Oakland—$65,000 for a steel and concrete addition to present plant at Moss Landing—by Self. 10-8

SAN FRANCISCO CO.—**Fred J. Early, Jr. Co.**, 369 Pine St., San Francisco—$136,000 for a two-story class C warehouse and office bldg. at the northeast corner of Seventh and Townsend Sts., San Francisco—by Dallman Supply Co., San Francisco. 10-18

SAN JOAQUIN CO. — **Bartlett & Hosking**, 541 Civic Center, Richmond—$100,000 for a theater building to seat 1,100 people, to be erected at the southwest corner of Main and American Sts., Stockton — by Blumenfeld Enterprises, Inc., San Francisco. 10-17

SAN MATEO CO.—**Peter Sorensen**, 927 Arguello St., Redwood City—$68,900 for a group of farm bldgs., and roadwork on the Log Cabin Ranch for Boys at La Honda—by Dept. of Public Works, San Francisco. 10-29

SANTA BARBARA CO. — **Harry Graham**, 1238 N. Nopal St., Santa Barbara—$59,067 for a one-story addition to a warehouse in Santa Barbara—by Lyon Van & Storage Co., Los Angeles. 10-10

SANTA BARBARA CO.—**William Simpson Construction Co.**, 816 W. 5th St., Los Angeles—$200,000 for a 2-story steel frame department store bldg., to be located at Santa Barbara—by I. Magnin & Co., San Francisco. 10-26

SANTA CLARA CO.—**Wells P. Goodenough**, 49 Wells Ave., Palo Alto—$42,500 for a one-story store building at Palo Alto —by W. H. Sloan, Los Altos. 10-18

SANTA CLARA CO. — **Pittsburgh - Des Moines Steel Co.**, 629 Rialto Bldg., San Francisco—$688,336 for construction of the steel structure for a new supersonic wind tunnel at Moffett Field—by National Advisory Committee for Aeronautics, Moffett Field. 10-29

Colorado

DENVER CO.—**F. J. Kirchhof Construction Co.**, 700 Lawrence St., Denver—for the construction of a three-story addition to the mint at Denver—by Treasury Department, Washington, D. C. 10-18

DENVER CO. — **Mead & Mount Construction Co.**, 422 Denver Natl. Bldg., Denver—$700,000 for construction of auto parts building near E. 4th St. on the C. B. & Q. tracks—by Ford Motor Co., Detroit, Mich. 10-23

Idaho

BUTTE CO. — **Brennan & Cahoon**, Box 507, Pocatello—$238,530 for the construction of civilan employee housing at Arco—by Bureau of Yards and Docks, Washington, D. C. 10-29

Nevada

CLARK CO.—**Pioneer Construction Co.**, Box 2111, Las Vegas—$250,000 for a one-story and part basement club and casino bldg. at Second and Fremont Sts., Las Vegas—by Guy McAfee, Las Vegas. 10-18

WASHOE CO.—**L. W. Butler**, Reno—$90,000 for construction of a one-story brick market bldg. in the 400 block, Sierra St., Reno—by Sewell Brothers, Reno. 10-3

Oregon

LANE CO.—**Waale-Camplan,** 2100 S.W. Jefferson, Portland—$289,260 for a junior high school to include 11 classrooms, library, cafeteria, and other rooms, at Eugene—by School District No. 4, Eugene. 10-26

MULTNOMAH CO.—**William Simpson Construction Co.,** 816 W. 5th St., Los Angeles, Calif.—$300,000 for an office bldg. at Portland—by Farmers' Automobile Inter-Insurance Co., Los Angeles. 10-26

Texas

ANDREWS CO.—**C. H. Leavell & Co.,** 1300 Wyoming St., El Paso—$328,750 for a two-story high school bldg. at Andrews—by Andrews Independent School District, Andrews. 10-9

DALLAS CO.—**H. J. Ferguson Co.,** 1650 Hanna Bldg., Cleveland, Ohio—$800,000 for factory building addition at 1226 Loomis St., Dallas—by Procter & Gamble Co., Dallas. 10-26

DALLAS CO.—**Meers Construction Co.,** 501 Great Natl. Life Bldg., Dallas—$1,000,000 for a plant at the intersection of Linfield Dr., and Holmes Street Rd., Dallas—by The Certain-teed Products Corp., Dallas. 10-1

Washington

KING CO.—**A. S. Hainsworth,** 3028 Western Ave., Seattle—$600,000 for a shopping center on a 10-ac. site containing accommodations for 14 shops and stores with combined floor area of 124,500 sq. ft., at Bellevue—by Kemper Freeman and Miller Freeman, Jr., Bellevue. 10-8

KING CO.—**Sound Construction & Engineering Co.,** 1403 W. 45th Street, Seattle—$700,000 for construction of an addition to building at 2465 Utah St., Seattle—by Young & Richardson, Seattle. 10-30

Territories

CANAL ZONE—**Pan-Pacific Construction Co.,** Box E, Pedro Miguel—$221,043 for 7,500 louvers in connection with low-cost housing at Coco Solo—by Bureau of Yards and Docks, Washington, D. C. 10-9

Miscellaneous...

California

ALAMEDA CO.—**Grinnell Co. of the Pacific,** 601 Brannan St., San Francisco—$107,923 for the installation of an automatic sprinkler system at the Naval Hospital, Oakland—by Bureau of Yards and Docks, Washington, D. C. 10-10

Colorado

BACA & BENT COS.—**Snyder & Johnson,** Humboldt, Iowa—$93,803 for the construction of 75 mi. of 24,000-volt transmission line—by Southeastern Colorado Power Assn., La Junta. 10-25

DOUGLAS, ELBERT & EL PASO COS.—**R. N. Campsey Construction Co.,** 2520 Leyden St., Denver—$353,486 for approx. 392 mi. of electric transmission lines to serve 399 members—by Mt. View Electric Assn., Colorado Springs. 10-25

New Mexico

OTERO CO.—**Reynolds Electrical and Engineering Co.,** 708 N. Piedras St., El Paso, Tex.—$314,479 for a 115-kw. transmission line from Las Cruces to Alamogordo Air Base—by Bureau of Reclamation, Washington, D. C. 10-8

Oregon

DESCHUTES CO.—**Huenegard Electric Co.,** 7309 S.W. Benze Park Court, Portland—$64,508 for 71.7 mi. of transmission line to serve 56 members throughout the county—by Central Electric Cooperative, Inc., Redmond. 10-5

Texas

BAILEY CO.—**Taylor and Montgomery,** Lubbock—for 30 mi. of electric line—by Bailey County Electric Cooperative Assn., Muleshoe. 10-1

CAMERON CO.—**Noser Construction Co.,** Box 872, McAllen—$61,000 to construct a gymnasium at Brownsville—by Independent School District, Brownsville. 10-17

Utah

MORGAN CO.—**The G. T. McDowell Co.,** Denver, Colo.—$300,000 for the expansion of a cement plant to include 12 silos, at Devil's Slide—by Union Portland Cement Co., Salt Lake City. 10-16

Washington

PIERCE CO.—**Sam Bergesen,** Box 428, Tacoma—$100,000 for additional staging area facilities for Seattle Port of Embarkation at Fort Lewis by U. S. Engineer Office, Seattle. 10-15

PROPOSED PROJECTS

Highway & Street...

Oregon

THE DALLES CO. — Improvement of about 70 mi. of county roads is planned at The Dalles. The work, which will consist of grading, surfacing and oiling, is estimated to cost approx. $400,000. 10-8

Airport...

California

SAN MATEO CO.—Adrian Levy & Associates, San Francisco, have reported plans for the construction of an airport at San Mateo. Two runways and 12 steel and concrete hangars will be built at an estimated cost of $250,000. 10-26

Sewerage...

Texas

DALLAS CO.—The city of Dallas is planning the construction of an extensive sewerage program that will cost approx. $825,000. 10-1

Dam...

Territories

ALASKA—A water storage dam estimated to cost $60,000 will be built at Wrangell, as soon as materials are available. 10-9

Building...

Arizona

MARICOPA CO.—The Phoenix Civic Center Assn. has approved plans for the construction of a group of public buildings costing $1,250,000 at Central Ave. and McDowell Rd., Phoenix. A civic auditorium, art gallery, public library and little theater will be included.

California

LOS ANGELES CO.—Plans are under way for construction of a new Earl Carroll theater on Sunset Blvd., Hollywood. The structure will have a seating capacity of 7,000 and will house three huge revolving stages. Estimated cost, $5,000,000. 10-16

Nevada

WASHOE CO.—Plans are now being prepared for the construction of a $1,500,000 senior high school building on a 30-ac. site at Reno. 10-16

Washington

PIERCE CO.—Pacific Lutheran College plans the construction of three additional buildings and sewage disposal plant—cost estimated at $650,000. 10-30

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Guy J. Coffey is the new vice president in charge of sales for the CHICAGO PNEUMATIC TOOL CO., Chicago, Ill. Coffey was promoted to this position from manager of the Los Angeles, Calif., district office, a post he has held since 1939. He joined the company in 1933 as a salesman in the Philadelphia branch, next being advanced to the Cleveland office, and finally to manager of the West Coast office.

☆ ☆ ☆

Art Nay has been named general manager for SANTA FE TRAILWAYS' WESTERN LINES, and will maintain headquarters at Los Angeles, Calif. The appointment brought Nay from Albuquerque, New Mexico, where, as assistant general manager, he was in charge of truck and bus operations in two major divisions of Trailways. He has been in the transportation field since 1914, and first entered Santa Fe service in June, 1938, when he became assistant superintendent at Bakersfield, Calif. Appointed assistant general manager for the company at Los Angeles in October of that year, he held that post until 1942, when he was headquartered in the same capacity at Albuquerque, where he remained until his current promotion. Nay succeeds **Gene Allen**, who has resigned.

GEORGE M. PHILPOTT CO., San Francisco, Calif., is opening an office in Oakland, Calif., to serve the East Bay territory. This office will stock ball and roller bearings and allied products. This new office will be under the management of **Sam Barnes**, in charge of the Bearings Division, with **Floyd Newton** in charge of the office. Sam Barnes has been bearings manager for a number of years, and Newton is experienced in the bearing replacement business since before the war. Headquarters for the new branch will be 3255 San Pablo Ave., Oakland.

☆ ☆ ☆

Philip H. McManus has been appointed Pacific Coast sales manager of TEMPLETON, KENLY & CO., Chicago, Ill., manufacturers of Simplex lever, screw and hydraulic jacks. He will maintain offices at 50 Hawthorne St., San Francisco, Calif. McManus has been with the company for more than twenty years, much of the time in the Chicago sales department.

☆ ☆ ☆

In view of the excellent record in the production of equipment vital to the war effort, the MALL TOOL CO. of Chicago, Ill., received a fourth renewal of the Army-Navy "E" Award. The company's western offices are located in San Francisco and Los Angeles, with distributorships in all the principal cities of the West.

Edwin M. Ames is the new manager of the GENERAL ELECTRIC SUPPLY CORP., Sacramento, Calif., it was announced recently by **C. W. Goodwin, Jr.**, district manager for the company in San Francisco. Ames will make his headquarters at the General Electric Supply Corp. Bldg., Sacramento.

☆ ☆ ☆

ROBERT S. KIRKSEY, vice president and general manager of Fruehauf Trailer Co., Western Division, congratulates GUS DEWEY, shop superintendent, and WALTER E. LAURITZEN, manager of the Fresno, Calif., branch (right) on winning the National Safety Award over 39 other branches. They completed 49,235 man hours without lost time due to accidents.

☆ ☆ ☆

ARROWHEAD RUBBER CO., Division of NATIONAL MOTOR BEARING CO., Redwood City, Calif., has been awarded for the fourth time an Army-Navy star to affix to its original Army-Navy award

for excellence in production. In swinging over from wartime to peacetime production, **H. K. Pohlman,** president of Arrowhead, states that the firm is now seeking a new manufacturing site in order to consolidate its manufacturing operations under one roof.

☆ ☆ ☆

A. N. Anderson will be the sales manager for ANDERSON-O'BRIEN CO., newly-appointed retail sales outlet for the GM Series 71 Diesel engine, with headquarters at 746 E. Washington Boulevard, Los Angeles, Calif. Anderson brings to the company over 10 years' experience in selling and servicing Diesel engines in all lines of industry. For the past seven years he has been associated with the Sales Dept. of DETROIT DIESEL, supervising applications of its Diesel engines to diverse industrial end products. **Milt O'Brien** will direct the service activities of the company, and is well qualified for this assignment, having served in executive service capacities for the Pontiac and Buick Divisions and on the service staff of General Motors Corp.

☆ ☆ ☆

PACIFIC NORTHWEST

H. E. Tenzler, president of the NORTHWEST DOOR CO., Tacoma, Wash., was presented the Army-Navy "E" pennant by **Capt. E. A. Verpilot,** USNR, recently. Employees of the company have the double distinction of being the first workers to earn the award for producing both fir plywood and fir doors as well as being among the last groups so honored by the military.

☆ ☆ ☆

THE GENERAL MACHINERY CO., Spokane, Washington, was appointed distributors for OSGOOD CO. and GENERAL EXCAVATOR CO., both of Marion, Ohio. The Spokane company will provide sales, maintenance and warehouse service in The Inland Empire region for construction, excavating and materials handling equipment.

☆ ☆ ☆

BROWN BEARING CO., Seattle, Washington, has recently opened a branch store in Portland, Ore.

☆ ☆ ☆

AMONG THE MANUFACTURERS

RHEEM MANUFACTURING CO. should be turning out a full line of "Stokermatics" by mid-December at its 3400 South Kedzie, Chicago, plant it was announced recently. The Salt Lake City plant will continue to produce for the West and Northwest.

☆ ☆ ☆

N. J. Clarke was elected senior vice president, and **J. M. Schlendorf** vice president in charge of sales of REPUBLIC STEEL CORP., it was announced following the directors' meeting of the corporation. Clarke has been vice president in charge of sales for Republic since 1930, and will be succeeded in that position by Schlendorf, who was assistant vice president in charge of sales.

☆ ☆ ☆

M. R. Randlett has been appointed assistant divisional director of PITTSBURGH PLATE GLASS COMPANY'S Milwaukee, Wis., paint factory. Randlett has been with the company for over twenty years, and since 1932 has been manager of trade sales at the Milwaukee paint plant.

Walter N. Fischer has been appointed to the newly-created position of assistant to the general sales manager of R. G. LETOURNEAU, INC., Peoria, Ill. He joined LeTourneau as manager of its newly-created war contracts division, in charge of inter-departmental coordination with the

war sales structure. Fischer is well acquainted with heavy equipment dealers and contractors, having been Chicago district manager for Schramm, Inc., compressor manufacturer, and prior to that affiliated with them for 12 years at their offices in West Chester, Pa., and with their West Coast distributors.

☆ ☆ ☆

Leonard E. Barton was recently named resident manager of the Seattle, Wash., offices for SPENCER & MORRIS, Los Angeles, Calif. Barton has been associated with the firm, who are West Coast engineers and manufacturers of materials handling systems, in executive capacities in various departments, and his appointment extends the facilities and services of the company to the Pacific Northwest.

☆ ☆ ☆

Chester Park has been named sales representative of road machinery and Ardrier farm crop dehydrators, for the HEIL CO., Milwaukee, Wis. Park will work out of the recently established Kansas City, Mo., sales offices which are under the direction of district sales manager **Sam Tuttas**, and service the states of Iowa, Missouri, Nebraska, Kansas, and Colorado. Park was formerly a sales representative for the Ann Arbor-Klughartt Sales Co., of Kansas City, distributor of farm machinery. Another recent addition to the Kansas City sales staff is **Vernon (Casey) Jones**, who will devote his attention to sales of Heil truck bodies and hoists and transportation tanks. Jones formerly sold the same products out of the company branch at Philadelphia.

☆ ☆ ☆

ATHEY TRUSS WHEEL CO., Chicago, Ill., announces a change in name, to ATHEY PRODUCTS CORP. **B. F. Lease**, president, also announces its products will bear the trade name, "Apcor." In the future the company's line will include MobiLoaders, force-feed loaders, rubber-tired trailer, logging cruiser wheels, forged-track wheels, wagons and trailers, and will be sold through the world-wide "Caterpillar" distributor organization. The company headquarters remains in Chicago.

NEW EQUIPMENT

Welding Electrode

Manufacturer: Sight Feed Generator Company, Richmond, Indiana.

Equipment: Rexaloy Welding Electrode.

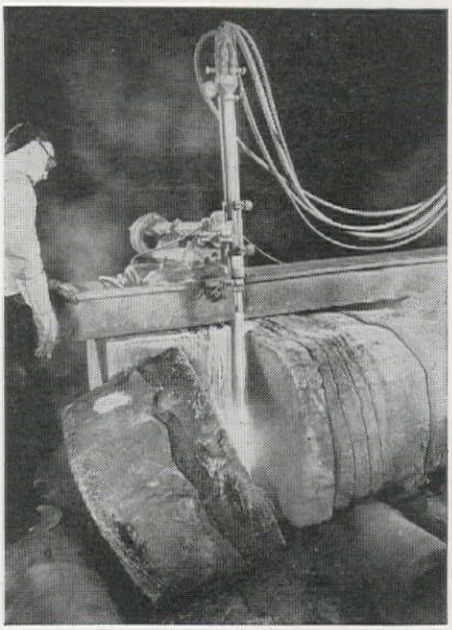
Features claimed: The Rexaloy electrodes will perform satisfactorily on either A.C. or D.C. machines. This is a distinct advantage over many types of overlay rods. Furthermore, the coating is metallic, which means it blends with the core rod, rather than forming slag. Deposits from these electrodes have a Brinell hardness rating of 300 to 687, depending on the base metal on which deposited. They are made in sizes of 1/8, 5/32, 3/16, and 1/4 in.

Heavy-duty Cutting Torch

Manufacturer: Linde Air Products Company, New York, N. Y.

Equipment: Oxweld C-45 machine-cutting blowpipe.

Features claimed: This blowpipe, which cuts steel ranging in thickness from 16 in. to 50 in., is particularly suited for hot top cutting, ingot splitting, cutting large forging and scrap cutting. The C-45 is water cooled and is intended to be mounted on a heavy-duty, straight-line cutting machine. A 50-lb. gauge is attached to the blowpipe body for checking cutting-oxygen pressures which are unusually low, never over 35 lb. per sq. in. The C-45 is designed for operating with medium-pressure acetylene and will operate satisfactorily on a generator of a manifold having a minimum hourly capacity of 500 cu. ft. of acetylene. Unless cutting oxygen is supplied from a pipeline, at least 10 cylinders should be manifolded to provide sufficient capacity.



Hydraulic Valve Indicator

Manufacturer: Liquidometer Corporation, Long Island City, N. Y.

Equipment: Remote control hydraulic valve indicator.

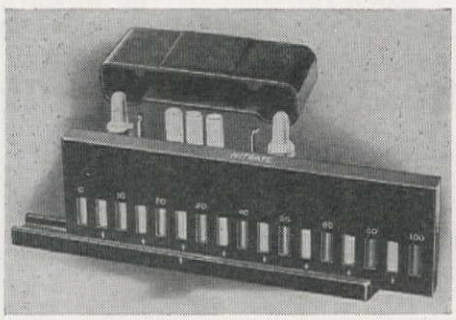
Features claimed: Originally developed for the Navy, this system of valve control and position indicator is now available for industrial users. The valve stem position is transmitted to the indicator dial through the liquidometer temperature-compensated dual hydraulic transmission system, which requires no outside source of power. Thus it will continue to function in case of temporary failure in the plant's power supply. With this system, the indicator dial may be located at the transmitter or any reasonable distance from the valve. When used in industrial plants, all the indicators can be located on a single panel with the transmitter adjacent, thus making it possible for one operator to see and control the position of every valve.

Nitrate Tester

Manufacturer: W. A. Taylor & Co., Baltimore, Md.

Equipment: Taylor-Betz nitrate slide comparator.

Features claimed: A simple, rapid, accurate procedure for the determination of nitrate concentration in boiler water where nitrate-hydroxide ratios are maintained to control tendencies toward caustic embrittlement. The set consists of a Taylor pH slide comparator base, a color standard slide with 9 standards representing from 0 to 100 ppm of nitrate as NO_3. A determination is made by placing 5ml of the boiler water in the beaker and adding measured quantities of Brucine and sulfuric acid. Five minutes after mixing, 10ml of distilled water is added. A yellow color develops, the intensity of which is proportional to the nitrate content. A sample of the mixture is placed in one of the 5ml test tubes in the base and the color compared with the standards. If the nitrate content is higher than 100 ppm NO_3, the boiler water can be diluted with nitrate free water to bring it within the range of the comparator. Accuracy of the method is not affected by ions normally present in boiler water such as phosphates, sulfites, silicates, and chlorides.



Variable Pitch Fan

Manufacturer: Evans Products Company, Detroit, Michigan.

Equipment: Thermo-control engine fan.

Features claimed: A uniform temperature distribution throughout the engine compartment is accomplished by the thermo-control fan introducing the right amount of cooling air to meet the varying conditions of engine load and weather temperature. This is controlled by a built-in heavy duty Vernatherm thermal power ele-

★

STATEMENT OF THE OWNERSHIP, MANAGEMENT, CIRCULATION, etc., required by the Acts of Congress of August 24, 1912, and March 3, 1933, of Western Construction News, published monthly at San Francisco, California, for October 1, 1945.

State of California, County of San Francisco, ss.: Before me, a Notary Public in and for the state and county aforesaid, personally appeared L. P. Vrettos, who, having been duly sworn according to law, deposes and says that he is the Business Manager of the Western Construction News and that the following is, to the best of his knowledge and belief, a true statement of the ownership, management, etc., of the aforesaid publication for the date shown in the above caption, required by the Act of August 24, 1912, as amended by the Act of March 3, 1933, embodied in section 537, Postal Laws and Regulations, printed on the reverse of this form, to wit:

1. That the names and addresses of the publisher, editor, managing editor, and business manager are:

Publisher—Arthur F. King, 503 Market Street, San Francisco, Calif.

Editor—John M. Server, Jr., 503 Market Street, San Francisco, Calif.

Managing Editor—T. Douglas Overton, 503 Market Street, San Francisco, Calif.

Business Manager — L. P. Vrettos, 503 Market Street, San Francisco, Calif.

2. That the owner is: (If owned by a corporation, its name and address must be stated and also immediately thereunder the names and addresses of stockholders owning or holding 1 per cent or more of total amount of stock. If not owned by a corporation, the names and addresses of the individual owners must be given. If owned by a firm, company, or other unincorporated concern, its name and address, as well as those of each individual member, must be given.)

KING PUBLICATIONS, 503 MARKET STREET, SAN FRANCISCO, CALIFORNIA; Arthur F. King, 503 Market Street, San Francisco, California, Louise B. King, 503 Market Street, San Francisco, California.

3. That the known bondholders, mortgagees, and other security holders owning or holding 1 per cent or more of total amount of bonds, mortgages, or other securities are: (If there are none, so state.)

None.

4. That the two paragraphs next above, giving the names of the owners, stockholders, and security holders, if any, contain not only the list of stockholders and security holders as they appear upon the books of the company but also, in cases where the stockholder or security holder appears upon the books of the company as trustee or in any other fiduciary relation, the name of the person or corporation for whom such trustee is acting, is given; also that the said two paragraphs contain statements embracing affiant's full knowledge and belief as to the circumstances and conditions under which stockholders and security holders who do not appear upon the books of the company as trustees, hold stock and securities in a capacity other than that of a bona fide owner; and this affiant has no reason to believe that any other person, association, or corporation has any interest direct or indirect in the said stock, bonds, or other securities than as so stated by him.

5. That the average number of copies of each issue of this publication sold or distributed, through the mails or otherwise, to paid subscribers during the twelve months preceding the date shown above is: (This information is required from daily publications only.)

L. P. Vrettos, Business Manager.

Sworn to and subscribed before me this 21st day of September, 1945.

(SEAL) ELEANOR J. SMITH,

Notary Public in and for the City and County of San Francisco, State of California.

(My commission expires January 3, 1947.)

★

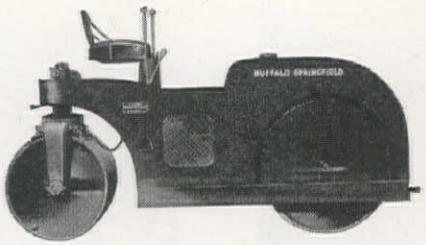
ment, which automatically changes the pitch of the fan blades to meet engine cooling requirements, and is especially useful in controlling the temperature of heavy diesel locomotives, trucks or stationary engines.

Small Tandem Roller

Manufacturer: Buffalo-Springfield Roller Company, Springfield, Ohio.

Equipment: Three to four-ton tandem roller.

Features claimed: A high degree of mobility is one of the outstanding features of this new roller, designed to operate in small drives, sidewalks, and to reduce the necessity of hand-tamping in restricted space. The roller is able to move freely along walls and curbs. It has the same hydraulic steering equipment with which the larger



rollers are equipped. The engine and the two-speed transmission are mounted as a single unit to assure trouble-free operation.

Termite Control

Manufacturer: Hollywood Termite Control Company, Hollywood, Calif.

Equipment: Preventing infestation of either termites or dry rot fungi.

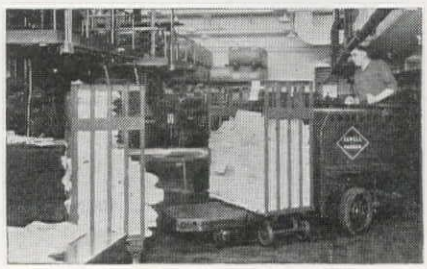
Features claimed: This method of termite control is being employed in new home construction in Bell, Calif., and in Tucson, Arizona. It is based on the blockade principle and consists of blocking off each section of the basic framing structure with strategically-placed sections of pressure-treated lumber repellent to termites and dry rot. A low-cost service policy accompanies each termite installation, so that for the entire life of the building the owner may enjoy protection from termite and dry rot infestation. It is claimed the annual loss caused by termites in Los Angeles alone is greater than the annual loss from fire.

Wheeled Dolly

Manufacturer: Elwell - Parker Electric Company, Cleveland, Ohio.

Equipment: Steel rack auxiliary for lift truck.

Features claimed: Racks made from light steel shapes welded into a strong, rigid structure and mounted on wheels have been devised for use in handling heavy loads of printed paper stock as fast as it comes off the press with an Elwell-Parker



low-lift power truck. The racks are about 2 ft. wide, 4 ft. long, and 4 ft. high, and open at the sides for easy loading and unloading. They are equipped with two sets of wheels, one on each end of the steel strut. In use, the truck's platform is pushed under the side of the rack, between the two sets of wheels, and the load lifted and distributed quickly in printing plant or stock room.

Vertical Drip-proof Motor

Manufacturer: Crocker - Wheeler Division of Joshua Hendy Iron Works, Ampere, N. J.

Equipment: Drip-proof vertical electrical motor.

Features claimed: A protected type A.C. motor of vertical construction, rated at 40 degree C rise for continuous duty. The motors are designed to operate on either 50 or 60 cycle current of two or three phase connection to standard voltages. All ventilating openings in this new type motor are shielded against the entrance of dripping liquids and falling particles. Rotor weight and shaft thrust are carried by oversize ball bearings. Another new feature is a centrifugal bearing seal which permits the use of softer grease for better lubrication and longer bearing life. Motor junction box is recessed in the cast frame and allows ample room for making up the electrical connections. The rotor, with its bars, fan and end rings is cast of aluminum alloy.

Electrode For High Tensile Steels

Manufacturer: Lincoln Electric Company, Cleveland, Ohio.

Equipment: Fleetweld 11-HT electrode for welding high tensile steels.

Features claimed: A new shielded arc

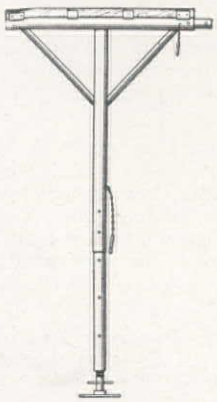
electrode for groove butt joints and welding horizontal or flat fillets in the higher tensile steels. The electrode may be used with either A.C. or D.C., and if D.C. is used the electrode should be negative. The new Fleetweld 11-HT conforms to the American Welding Society specifications E-7020 and/or E-7030, and is available in 5/32 in. and ¼ in. diameter sizes, 18 in. long, shipped in standard containers of 50 lb. each.

New Shoring Aid

Manufacturer: Ray J. Moths Company, Inc., Milwaukee, Wis.

Equipment: New shoring developed from tubular steel.

Features claimed: A handy shoring aid for construction work in the form of adjustable Tee-posts and expansible trusses fabricated from tubular steel stock having a tensile strength of 110,000 lb. per sq. in.



Top: Adjustable Tee-Post

Above: Expansible Trusses

The Tee-posts have a screw adjustment feature at the bottom, similar to a jack, making them equally practical for floor and wall shoring, as well as beams and pilasters. Proven by field tests on large construction projects, this new equipment will be available soon on either a purchase or lease basis, through equipment dealers.

Postwar Jeep

Manufacturer: Willys-Overland Motors, Inc., Toledo, Ohio.

Equipment: Multi-use Jeep for industrial and farm users.

Features claimed: The fame of the Jeep is too well known to need expansive description. The postwar model is ready for use in mines, oil fields, lumber camps, farms, factories and railroad yards. The peacetime model embodies all the dependable ruggedness of the war model including four-wheel drive. A new feature is the power take-off for use with either a spline shaft or for direct power to belt-driven units. The power take-off is capable of delivering 30 h.p. at varying speeds through the transmission and axle transfer case. The machine is capable of operating at speeds from 3 to 7.5 mph. for farm or traction haul and will develop a road speed of 60 mph.

Joint Sealing Compound

Manufacturer: Philip Carey Mfg. Co., Lockland, Cincinnati, Ohio.

Equipment: Hot-poured rubber-asphalt compound.

Features claimed: Careylastic is a product containing rubber, asphalt and other ingredients, combined to form a positive seal for expansion joints. The new material retains its resiliency and cohesion through the wide range of seasonal temperatures to maintain an infiltration-proof seal. Due to the elasticity of Careylastic the seasonal variation in joint dimensions does not result in extrusion of the seal, nor will its bond to adjacent construction break at low temperature. Due to the non-extruding characteristics and bond of the seal, expensive maintenance is eliminated. The yearly task of cutting out, cleaning and repouring of the ordinary joint seal is dispensed with to effect an appreciable reduction in maintenance budgets.

Cable Splice

Manufacturer: American Chain & Cable Company, Inc., Bridgeport, Conn.

Equipment: Safety wire rope splice.

Features claimed: A method of flexible splice for wire rope slings which renders hand-tuck splicing obsolete and unnecessary. The splice does not distort the wire rope and develops 100 per cent of the rope's strength. The splice applies the load stress in direct line with the pull, has no seizings to loosen, unravel or to get in the way; no wire ends to barb and tear workmen's hands. It is wide open for visual inspection

at all times. It may be used on any standard fitting hook, ring, shackle, or thimble, and when the sling assembly is retired such fittings may be salvaged and reused. At the present time the new ACCO-LOC SAFETY SPLICE can be applied only at the factory.

Paint Brush Cleaner

Manufacturer: Nashway Company Ltd., 1401 W. Pershing Rd., Chicago 9, Ill.

Equipment: Centrifugal brush cleaner.

Features claimed: A handy centrifugal action brush cleaner supplied in hand, air and electric operated mechanism. Drill chuck, paint mixing impeller, and a roller stippler cleaner are supplied as accessories to the device. Hand model is priced at $12.50 and the electric-driven model sells for $21.95. Descriptive folder will be mailed upon request to the manufacturer.

Soft Face Hammers

Manufacturer: Greene, Tweed & Co., New York, N. Y.

Equipment: Replaceable face hammers.

Features claimed: A new hammer face that does not chip, is not affected by solvents, and is non-inflammable and non-explosive. In contrast to rawhide, it does not mushroom, shrink, expand or come apart. Its lack of rebound produces far less worker fatigue, and it also protects the worker from shocks caused by blows of metal-faced hammers. These new Basa replaceable face hammers provide the convenience of a single all-purpose material which is adapted to all soft-face hammer uses. They can be used until worn completely down to the head of the hammer, after which the exclusive split-head feature of the hammer permits quickly replacing them by simply loosening a single nut.

LITERATURE FROM MANUFACTURERS . . .

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the *Western Construction News*, 503 Market Street, San Francisco, California.

F. H. McGraw & Co., Hartford, Conn.—A newsy, interesting and well-illustrated publication has been issued by this company of engineers and constructors, entitled "Plans and Projects," describing some of the firm's current operations in various parts of this country, and in foreign fields, concerning some of the largest projects now on the world docket.

Caterpillar Tractor Co., Peoria, Ill.—Many qualities of the "Caterpillar" Diesel D6 Tractor are thoroughly described in a 32-page color catalog just released. The publication freely illustrates the features of this tractor and the Diesel engine that motivates it. Specifications and the complete line of matched equipment for the D6 are listed.

Gale Oil Separator Co., Inc., New York, N. Y.—A leaflet entitled "The Gale System of Conservation and Prevention," is now being circulated by this company. This illustrated format lists operation facts and shows work in process on the installation of two of the Gale systems. Specifications are also covered thoroughly.

American Forest Products Industries, Inc., Washington, D. C.—"Lumber After the War: How Good? How Much? How Long?" is the title of an article by S. R. Black, vice president of the Weyerhaeuser Sales Co., which has just been published in booklet form. Vital questions in considerable detail are discussed, reaching conclusions encouraging to distributors, dealers, builders and architects.

Dow Corning Corp., Midland, Mich.—A new booklet has just been introduced presenting "Silicones," produced from synthetic materials. This new publication lists all of the silicone products now available, and contains many charts and graphs demonstrating the unusual properties of this rapidly increasing family of organo-silicon-oxide polymers. These Silicones, produced in many forms including fluids, greases and compounds, resins and varnishes, and Silastic, the silicone rubber, extend permissible operating temperatures far above and below those at which comparable organic materials are serviceable.

The Hayward Company, New York, N. Y.—Full details pertaining to the improved Class E-15 Hayward Grab Bucket are given in a new bulletin No. 675 that has just been published by that company. It contains interesting illustrations showing the most modern methods in handling coal efficiently, as well as a valuable chart of bucket load capacities, weights and dimensions.

Caterpillar Tractor Co., Peoria, Ill.—The many benefits of "Caterpillar" ownership are discussed and pictured in a 12-page color booklet just published by the Caterpillar company. Covering numerous fields and widely diversified operations, the new publication brings out graphically the benefits it cites. Many of the illustrations show the products in action on the jobs. This new booklet is Form 9002, entitled, "It Pays to be a Caterpillar Owner."

The Ric-wiL Company, Cleveland, Ohio —"A Practical Plan for Incorporating Cen-

tral Heating and Air Conditioning in a Proposed Suburban Apartment Housing Development" is the title of a 24-page book issued by the Ric-wiL Company. The text discusses the economics of supplying heating, cooling and other services to a planned housing project from a central source. It gives a detailed factual analysis of the subject, with blueprints, cost tables, etc. An appendix describes a number of interesting case histories where central heating has been installed and is now operating.

The Lincoln Electric Co., Cleveland, Ohio—A complete revision of "Building Your Career in Arc Welding," is well illustrated and contains valuable information concerning arc welders and their equipment. A leaflet also has been issued covering "The Lincoln Courses in Welding Engineering."

Air Reduction Sales Co., New York, N. Y.—"How to Cash in on the Silver Ring," Airco's new 16-page, 2-color booklet describing the Silbraz Joint. Profusely illustrated, the booklet shows how Silbraz Joints are made from patented bronze pipe fittings, valves and flanges—containing a factory-inserted ring of silver brazing alloy in each port opening. Other explanatory sections describe the Aircobraze Outfit for making these joints and the many other uses for the outfit.

Ideal Commutator Dresser Co., Sycamore, Ill.—This company has just published a folder which gives a bird's-eye view of their company and the operations it is identified by. The folder introduces this company's business photographically.

Sanstorm Sales Co., Fresno, Calif.—Available now is a leaflet covering the "Sanstorm Sand Blasting Machine," listing the features of the equipment. The machine, which is built in four and seven cubic foot sizes, mounted on wheels or stand, is technically illustrated.

Dewey & Almy Chemical Co., Cambridge, Mass.—A new booklet has just been published by this company outlining the technicalities of air-entrained concretes and the difficulties of controlling the addition of air to the product. Darex AEA, a water-soluble compound that comes ready to use, minimizing the former problems, is fully explained in this publication by telling what it is, how it works, and the benefits derived.

Acme Tank Mfg. Co., Los Angeles, Calif.—A comprehensive, informative booklet on Cylindrical Wood Tanks, has just been published. This booklet is designed to give com-

plete engineering data to interested parties. It includes a large amount of engineering facts and forms a hand-book for persons interested in this important phase of manufacture.

Automobile Manufacturers' Assn., Detroit, Mich.—Issued as thousands of wage-earners are due soon to resume manufacturing operations, and as thousands more will take up jobs connected directly or indirectly with the building of motor cars, the booklet, "A Car Traveling People," shows the automobile industry's position in the national economy. The format of this new publication is truly outstanding, beautifully illustrated, and traces the changed trends in the growth of cities in recent years as a result of almost universal ownership of passenger cars, and points to the highway and building construction that must be done immediately to meet the needs that will exist when 40,000,000 cars are on the road a few years hence. This booklet is packed with both valuable and interesting pictures, data, and national trends.

American Smelting and Refining Co., New York, N. Y.—A new 43-page booklet covering ASARCO Lead and Lead-lined Valves will be of unusual interest to those connected in any way with the usage of these items. The contents are technically prepared and very little of the information has been previously available in printed form. Price lists and specifications are listed in this exceptionally well illustrated book.

W. A. Taylor & Co., Baltimore, Md.—A completely revised edition of the Taylor combination handbook and catalog contains both simple and technical explanations of the meaning of pH control; specific discussions of the application of pH, chlorine and phosphate control to 35 industries; the precautions to be observed in making determinations; and descriptions of all Taylor outfits, including 8 new sets.

R. G. LeTourneau, Inc., Peoria, Ill.—Profitable hauling with Tournatrailer from shovel or dragline is described in a new 4-page folder. Prepared for equipment owners and operators, the profusely-illustrated folder shows how the Tournatrailer cuts the cost of hauling rock and other material—points the way to a wider range of work through Tournapull interchangeability with Tournatrucks, Tournatrailers, Tournacranes and Carryalls.

Hall-Scott Motor Car Co., Berkeley, Calif. — Specifications of the Hall-Scott

Series 400 industrial engines are contained in a recent publication issued by the company. Many illustrations of the complete units appear, as well as sectional views and drawings, and the features and advantages of the equipment are pointed out.

Bellingham Chamber of Commerce, Bellingham, Wash.—"Profit for Your Industry" is the name of a new color booklet designed to point out the many natural advantages of Whatcom County, Wash., for industry looking westward for relocation of plants, for the establishment of branches, or for plants to produce new products. Such things as shipping facilities, rail, water and air; labor supply; climatic conditions, raw products, power and many other problems confronting industry and business are all discussed in this very interesting and useful 56-page booklet.

American Smelting & Refining Co., New York, N. Y.—Of interest and of unusual value is the new catalog published by the company covering Asarco lead fittings. The fore part of the booklet is devoted to a complete description of previous procedures on lead fittings and their limitations, and a careful analysis of ASARCO prefabricated and standardized lead fittings and their advantages. The second half of the book contains complete specifications and a price list of the equipment discussed.

The Jaeger Machine Co., Columbus, Ohio—A new catalog (M-5) is now available. In its 27 pages are described by means of pictures, diagrams and text the 3½S "Big Boy" Tilt-trailer and "Auto-loader" non-tilt; the 6S and 11S non-tilt trailer; the 16S non-tilt trailer; the 28S plant mixer, as well as the plaster-motor mixer.

Automotive Council for War Production, Detroit, Mich.—The job of the motor truck in combat, for special military uses, on the home front, and in agriculture is reprinted in a new 18-page booklet. Graphic photographs illustrate the many interesting stories therein.

Nashway Co., Ltd., Chicago, Ill.—The new electric "Spin a Brush" is presented in a recently released leaflet. How this equipment with drill and mixer attachments cleans paint brushes in 90 seconds is clearly described in four pages by means of cuts and text. A price list also appears.

Drive-all Manufacturing Co., Detroit, Mich. — The company has issued a new pamphlet on Drive-all selective speed transmissions. Described in its pages are three models: No. 500 (Standard) 4 speeds; No. 500 (heavy duty) 3 speeds; and No. 200, 4 speeds, the latter specially designed for small machines. Drawings and pictures clearly illustrate the equipment and complete specifications are given. Time-saving brackets for mounting of the units on all types of machines are shown.

The Jaeger Machine Co., Columbus, Ohio—Leaflets describing a bituminous paver with automatic leveling and a 3½-cu. ft. concrete mixer have been released. Features of the paver, which are explained in detailed text and drawings, include automatic leveling, controlled compaction and finish, dual spreading, full crawler traction, limitation of weight and traction to hard subgrade, with no weight on new-laid material. Advantages claimed for the "Big-Boy" Tilt-trailer are capacity, more power, and less weight. Specifications and pictures are completely descriptive.

American Smelting and Refining Co., New York, N. Y.—A recently published booklet on Expanded Lead Lined Steel Pipe offers technically prepared and well-illustrated information, much of which has not been previously available in printed form. General specifications and precautions for usage of this pipe are listed under such headings as pressure, temperature, vacuum, vibration, abrasives, velocity, etc.

Davidson Brick Company, Los Angeles, Calif.—A 22-page booklet presenting important engineering data and construction details as related to 1943 building codes for Steeltyd reinforced brick masonry has just been released. In addition to illustrations of the varied effects obtainable by use of special shaped bricks, general code specifications and tables of allowable stresses in various types of masonry are given.

Chicago Tool and Engineering Co., Chicago, Ill.—An illustrated folder describing the Palmgren Underwater Arc-Oxy Cutting Torch Kit is presented. Cutting and welding methods are explained and the complete unit is catalogued.

OPPORTUNITY SECTION

INDEX TO ADVERTISERS
★ IN THIS ISSUE ★

	Page
Adams, J. D., Company	47
Air Reduction Sales Company	22
Allied Steel Products, Inc.	166
Allis-Chalmers Mfg. Co.	18 & 19
Alloy Steel & Metals Co., Inc.	142
American Chain & Cable Co., Inc.	3d cover
Angier Sales Corp.	150
Athey Truss & Wheel Co.	31
Austin-Western Company	86
Autocar Company, The	35
Barber-Greene Company	72
Barco Mfg. Co.	46
Bay City Shovels, Inc.	48
Beall Pipe & Tank Corp.	166
Beebe Bros.	150
Bethlehem Steel Company	30
Broderick & Bascomb Rope Co.	11
Brown, Andrew, Company	71
Brunson Instrument Co.	173
Buckeye Traction Ditcher Co.	158
Bucyrus-Erie Company	74
Buda Company	70
Buffalo-Springfield Roller Co.	152
California Assoc. Concrete Pipe Mfgrs.	143
California Corrug. Culvert Co.	159
Cast Iron Pipe Research Co.	54
Caterpillar Tractor Company	6 & 7
Ceco Steel Products Corp.	12
Chapman Valve Mfg. Co.	43
Chicago Bridge & Iron Company	84
Chicago Pneumatic Tool Co.	44
Cleveland Trencher Company	154
Columbia Construction Company	173
Consolidated Steel Corp.	81
Cook Bros.	169
Cummins Engine Company	79
Dawson & Corbett, Contractors	173
De Soto Foundry, Inc.	56
Diamond Iron Works, Inc.	52
Dulien Steel Products, Inc.	173
Eccles & Davies Machinery Co.	167
Edwards, E. H., Company	163
Electric Steel Foundry Co.	45
Electric Tamper & Equipment Co.	144
Etnyre, E. D., Co.	172
Euclid Road Machinery Co.	4
Four Wheel Drive Auto Co., The	9
Fuller Manufacturing Co.	146
Galion All Steel Body Co.	172
Galion Iron Works & Mfg. Co.	16
Gar Wood Industries	37 & 63
General Electric Company	29
General Excavator Co., The	64
General Motors Corporation, Chevrolet Division	139
General Motors Corporation, Detroit Diesel Division	59
Goodall Rubber Company	157
Goodyear Tire & Rubber Company	13
Gorman-Rupp Company	153
Grinnell Company, Inc.	39
Harnischfeger Corporation	28 & 153
Heil Company, The	164
Hercules Roller Company	160
Highway Equipment Company	165
Huber Mfg. Co.	38
Independent Pneumatic Tool Co.	8
Industrial Equipment Company	36
Ingersoll-Rand Company	65
Ingersoll Steel & Disc Division, Borg-Warner Corporation	164
Insley Mfg. Co.	156
International Harvester Co., Inc.	24 & 57
Iowa Manufacturing Co.	50
Isaacson Iron Works	20
Jaeger Machine Company	151
Johns-Manville Corporation	32
Johnson, C. S., Company	136
Kay-Brunner Steel Products, Inc.	170
Kelite Products, Inc.	167
Koehring Company	40
Leschen, A., & Sons Rope Company	127
LeTourneau, R. G., Inc.	14, 15 & 161
Lidgerwood Mfg. Co.	145
Lima Locomotive Works, Inc.	10
Linde Air Products Company, The	60
Loggers & Contractors Machinery Co.	173
Lynch Bros.	162
Mack Mfg. Corporation	82
Mall Tool Company	138
Marion Steam Shovel Co.	147
Marlow Pumps	62
Master Vibrator Company	165
McKiernan Terry Corp.	162
Michigan Power Shovel Co.	167
Mine Safety Appliances Co.	151
Moore Equipment Co.	34
Northwest Engineering Company	3
Novo Engine Company	148 & 149
Oliver Corporation	25 & 33
Osgood Company	64
Owen Bucket Company	174
Pacific Car & Foundry Co.	83
Pacific Constructors, Inc.	171
Pacific Wire Rope Company	141
Pacific Wire Works, Inc.	165
Page Engineering Company	168
Parsons Company	66
Peerless Pump Division, Food Machinery Corp.	162
Peterbilt Motors Company	41
Pettibone Mulliken Corp.	61
Pierce Governor Company, Inc.	49
Pioneer Rubber Mills	161
Pittsburgh-Des Moines Steel Company	58
Preformed Wire Rope Manufacturers	135
Quick-Way Truck Shovel Company	68
Rapid Pavement Breaker Co.	163
Raymond Concrete Pile Company	4th cover
Reconstruction Finance Corporation	78
Richfield Oil Company	67
Richkraft Company	51
Riddell, W. A., Corporation	140
Seaside Oil Company	128
Shell Oil Company	80
Sheppard, R. H., Company	157
Shunk Mfg. Co.	151
Smith Engineering Works	26
Southwest Steel Rolling Mills	153
Standard Oil Company of Calif.	21
Syntron Company	172
Templeton Kenly & Company	134
Texas Company	2nd cover
Thew Shovel Company, The	129
Tide Water Associated Oil Co.	131
Timber Engineering Company	76
Timken Roller Bearing Co., Inc.	17
Trackson Company	23
Twin Disc Clutch Company	155
Union Carbide & Carbon Corp.	60
Union Iron Works, Inc.	130
Union Oil Company	53
Unit Crane & Shovel Corp.	42
Universal Engineering Corp.	132
Vickers, Incorporated	73
Victor Equipment Company	27
Western Pipe & Steel Company	75
White, David, Company, Inc.	172
White Motor Company	69
Wood Mfg. Company	77
Wooldridge Company	55
Worthington Pump & Machinery Corp.	132 & 133