WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXI, No. 6

JUNE • 1946

35 CENTS A COPY
$3.00 PER YEAR

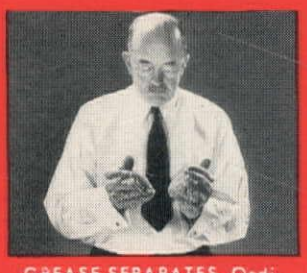
IN THIS ISSUE

ELECTRIC ARC welding on a high-head steel section of the 41-mi. Salt Lake Aqueduct line to be laid under the Provo River this summer by contractor Carl B. Warren. The pipe is being fabricated by Southwest Welding & Mfg. Co. as a sub-contractor under Utah Construction Co. Bureau of Reclamation photo.

IT S-T-R-E-T-C-H-E-S

THE LIFE OF YOUR EQUIPMENT

MARFAK IS COHESIVE. See how *Marfak* holds together — s-t-r-e-t-c-h-e-s. Seals out dirt and moisture — protects parts longer.



GREASE SEPARATES. Ordinary grease is not cohesive, has no stretch. It permits entrance of dirt and moisture — fails to protect parts.

MARFAK STAYS PUT. Hit it as hard as you can, Marfak cushions the blow, doesn't splatter — stays in the chassis bearings.

GREASE SPLATTERS. Hit ordinary chassis lubricant and it flies in all directions — leaving parts unprotected.

THIS unique "stretch test" is convincing proof that *Texaco Marfak* has amazing ability to *hold together*. That means it stays where you put it. It won't squeeze out under heavy loads, won't jar out under the hammering of rough service. It also seals out dirt and moisture, protects parts longer.

Contractors everywhere find that *Marfak* gives greater protection with fewer applications. *Marfak*-protected machinery stays on the job longer. Fewer repairs and parts replacements are necessary. Maintenance costs are reduced.

To prolong the life of wheel bearings, use *Texaco Marfak Heavy Duty*. It forms a protective film inside the bearing, while retaining its original consistency at the outer edges — thus sealing itself in, sealing out dirt and moisture. It gives longer-lasting protection. Requires no seasonal repacking.

More than 200 million pounds of Marfak have been used to date!

For Texaco Products and Lubrication Engineering Service, call the nearest of the more than 2300 Texaco distributing plants in the 48 States, 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 EVERY SUNDAY NIGHT STARRING JAMES MELTON WITH HIS GUEST, ED WYNN—CBS

Don't TIE YOUR MONEY UP IN A ONE-PURPOSE DITCHER!

WIDE DITCH

The Northwest Pullshovel is an *all* purpose ditcher. It will cut a wide trench or narrow trench, a shallow, flat bottom ditch or a deep one. It will cast to spoil banks or load trucks, set pipe, backfill, dig bell-holes and when you need another type of machine, just change the boom and you have a crane, dragline or shovel.

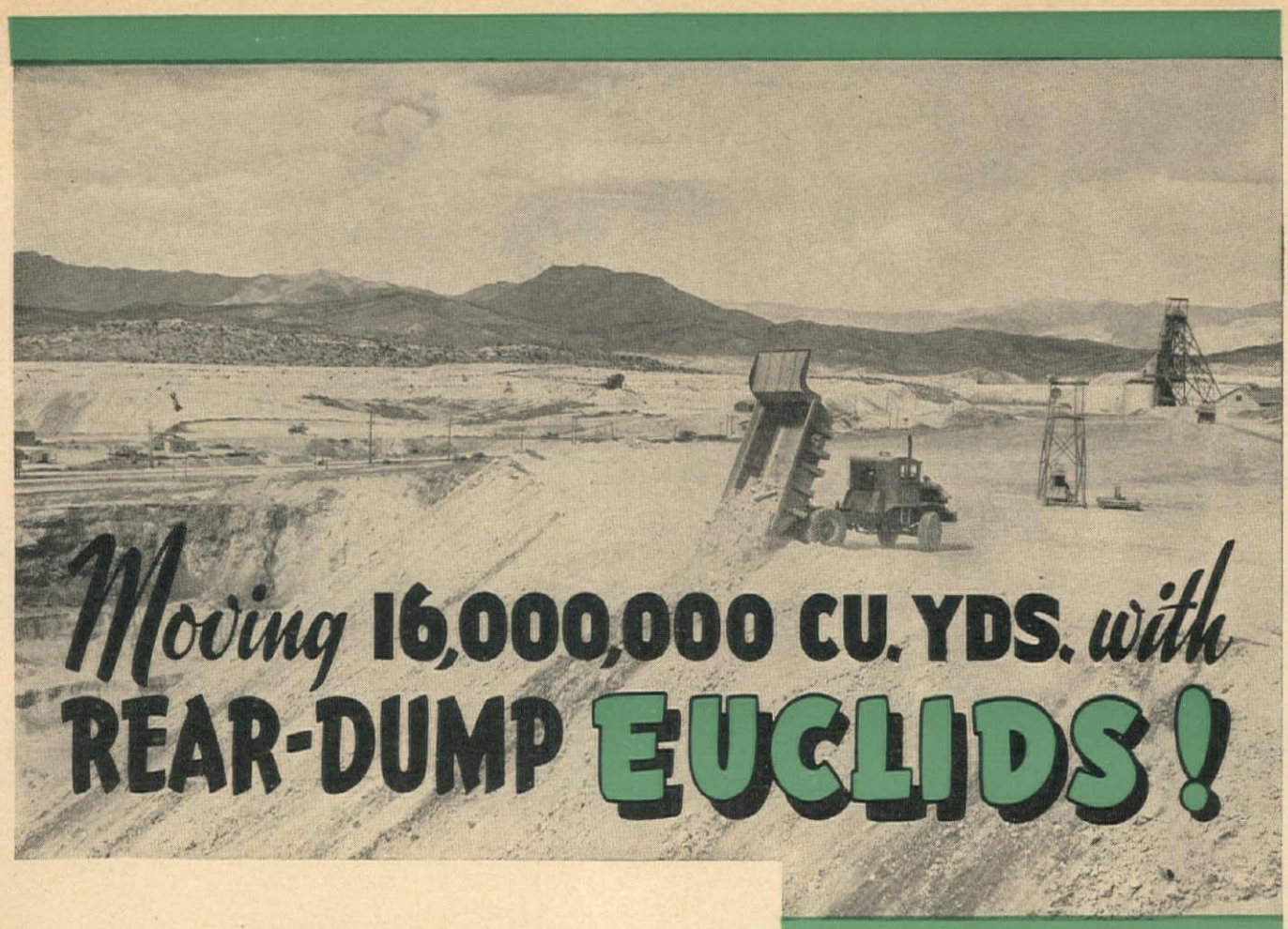
Northwest Pullshovels are built in 11 sizes, ½ to 2½ yd. capacity—a size for every ditch and sewer job. Keep your equipment set-up flexible—don't tie your money up in a one-purpose machine. Ask for details on the size that interests you.

NARROW DITCH

NORTHWEST
ENGINEERING COMPANY
1727 Steger Bldg.
28 E. Jackson Blvd., Chicago 4, Ill.

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.



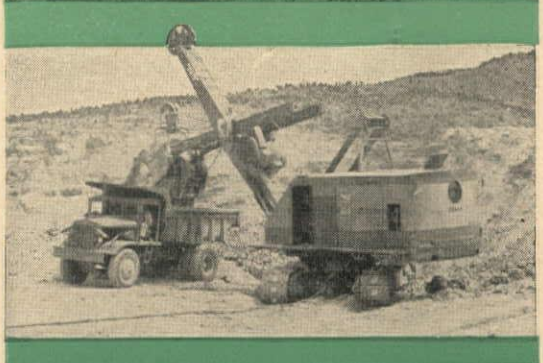
Moving 16,000,000 CU. YDS. *with* REAR-DUMP EUCLIDS!

The Isbell Construction Co. of Reno, Nevada is moving about 30,000 tons of overburden every working day of fifteen hours at this big open pit operation for one of the large copper producers in eastern Nevada.

Loaded by 2½ cu. yd. shovels, 23 Rear-Dump Euclids carry full 15-ton loads on hauls up to one mile in length. Working at an altitude of approximately 7,000 ft. the Euclids have plenty of power and speed for the long hauls and maximum adverse grades of 8%.

A leading contractor in the West, Isbell Construction purchased 10 Rear-Dumps of 15-ton capacity in 1943 and now has a total of 23 Euclids. Coming from men who know equipment and use it on the toughest jobs, these repeat orders are evidence of the efficient and reliable performance that is built into every Euclid.

Write for facts and figures on what Euclids can do for you on present or future work.



The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLIDS *Move the Earth*

EUCLID — THE PIONEER

Brown, Fraser & Co., Ltd., Vancouver, B. C.; A. H. Cox & Co., Seattle, Wash.; Hall-Perry Machinery Co., Butte, Mont.; Lively Equipment Co., Albuquerque, New Mexico; Constructors Equipment Co., Denver, Colorado; Pacific Coast Branch: 3710 San Pablo Ave., Emeryville, Calif.; Intermountain Equipment Co., Boise, Idaho, and Spokane, Washington.
REPRESENTATIVE: M. H. Johnson, W. 2411 Crown Avenue, Spokane, Washington.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for June, 1946

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Published Monthly by King Publications

OFFICE OF PUBLICATION
503 Market St., San Francisco 5, Calif. . . . . Telephone YUkon 1537
SOUTHWEST OFFICE
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Please address correspondence to the executive offices, 503 Market St., San Francisco 5, California

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

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.

UNIT 1020

for the TOUGH *jobs*

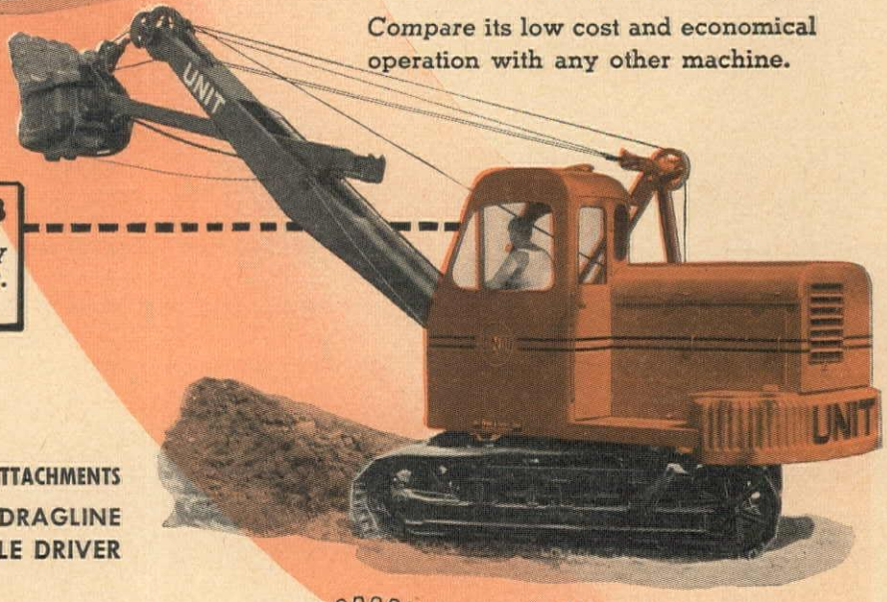
10 TON CRANE

Consider these exclusive features *not* found in any other comparable crane or shovel:

- New style full vision cab.
- Gasoline engine mounted in straight line with main machinery.
- Drop-forged alloy steel gears and splined shafts.
- Automatic traction brakes . . . no manual control required.
- One-piece cast gear case, simple in design and built as carefully as the finest automotive transmission . . . dust proof and oil tight.

Compare its low cost and economical operation with any other machine.

FULL VISION CAB
Complete 360 degree visibility at all times. Promotes safety. Increases job efficiency.



Convertible **TO ALL ATTACHMENTS**
• SHOVEL • CLAMSHELL • DRAGLINE
• TRENCHOE • MAGNET • PILE DRIVER

3/4 YARD SHOVEL

CONTACT FACTORY DIRECT
FOR PRICE AND DELIVERY

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MILWAUKEE 14,
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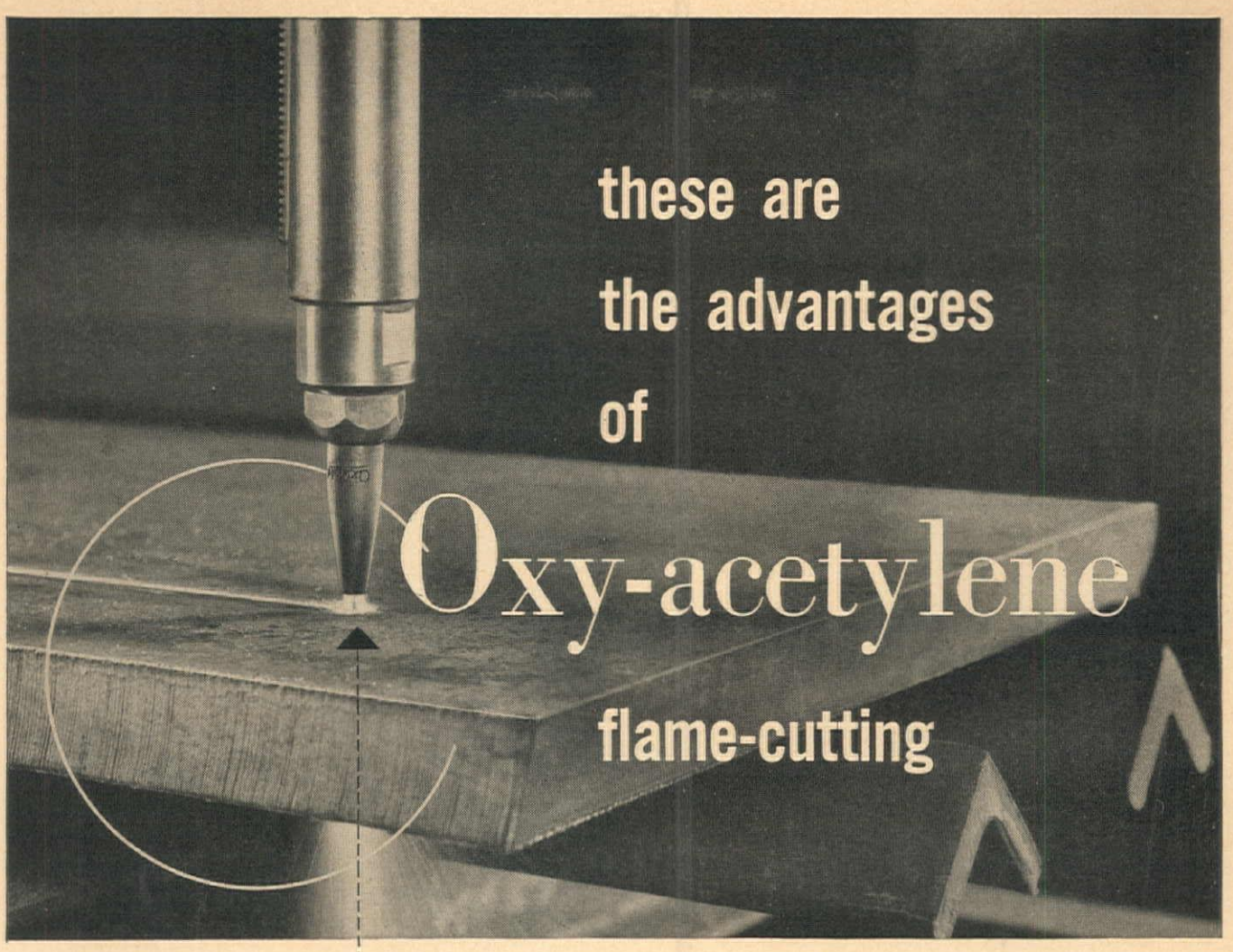
A 4848-1PCR-3



SPEED — OXWELD high-speed flame-cutting nozzles slice two-inch plate at rates ranging from 62 to 72 ft. per hour . . . 10-inch plate from 15 to 35 ft. per hour.

ACCURACY — Smooth-edged identical parts can be cut to such close tolerances that frequently no machining is required before use.

ECONOMY — Equipment, maintenance, and operating costs are less than those required for purely mechanical means of doing the same work.

DIVERSITY — Light gage sheet, or sections as thick as 50 in. can be cut along straight lines, and around circles or irregular shapes.

Ask LINDE to show you how you can use oxy-acetylene flame-cutting to best advantage in your shop.

LINDE OXYGEN
PREST-O-LITE ACETYLENE
UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD, UNIONMELT APPARATUS
OXWELD AND UNIONMELT SUPPLIES

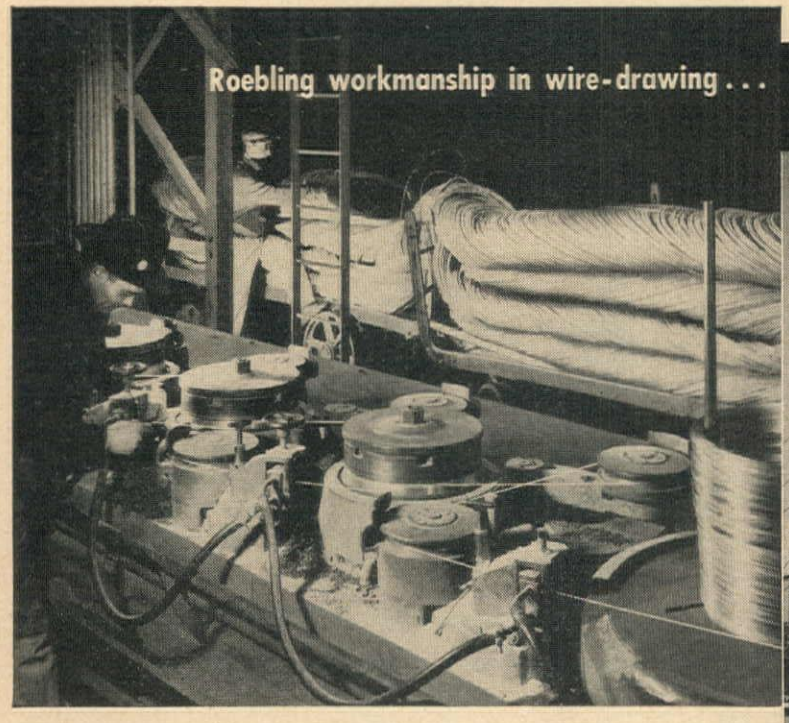
THE LINDE AIR PRODUCTS COMPANY
Unit of Union Carbide and Carbon Corporation
30 E. 42nd St., New York 17, N. Y. UCC Offices in Other Principal Cities
In Canada: Dominion Oxygen Company, Limited, Toronto

The right Wire Rope

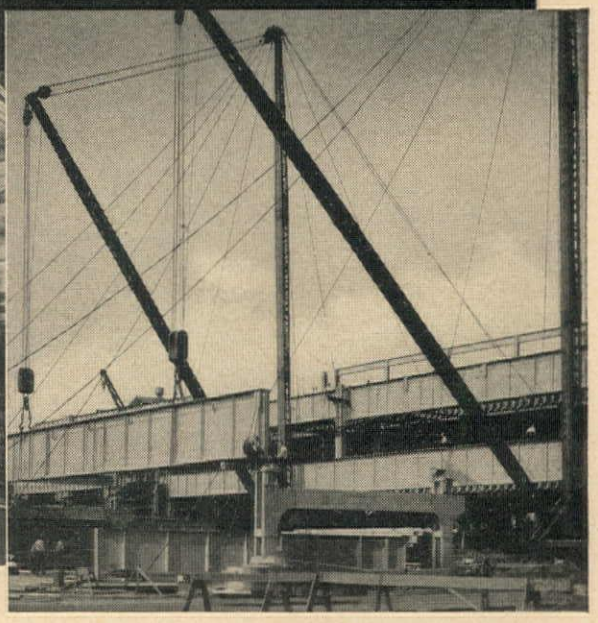
CAN HELP CUT CONSTRUCTION COSTS

Old Man Competition Is Getting Ready . . .

Roebling wire rope can help keep your costs down



means longer rope performance on the job!



TODAY, the construction business is returning to "normal" peacetime conditions. But it's far from the pre-war normal. Material costs are up. Labor costs are higher. Operating costs *must be held down*. One way to help hold them down is to specify Roebling "Blue Center" Steel Wire Rope.

Here's a *tough* rope that stands up under shocks, strains or high speeds. Specify it in the *right* construction and you'll have long-life wire rope adding efficiency to your shovels, scrapers, hoists and draglines.

Whether your needs call for preformed or non-preformed wire rope, Roebling engineers can help you save . . . with sound advice on rope selection, installation and operation. Ask our nearest branch office about it.

JOHN A. ROEBLING'S SONS COMPANY
OF CALIFORNIA

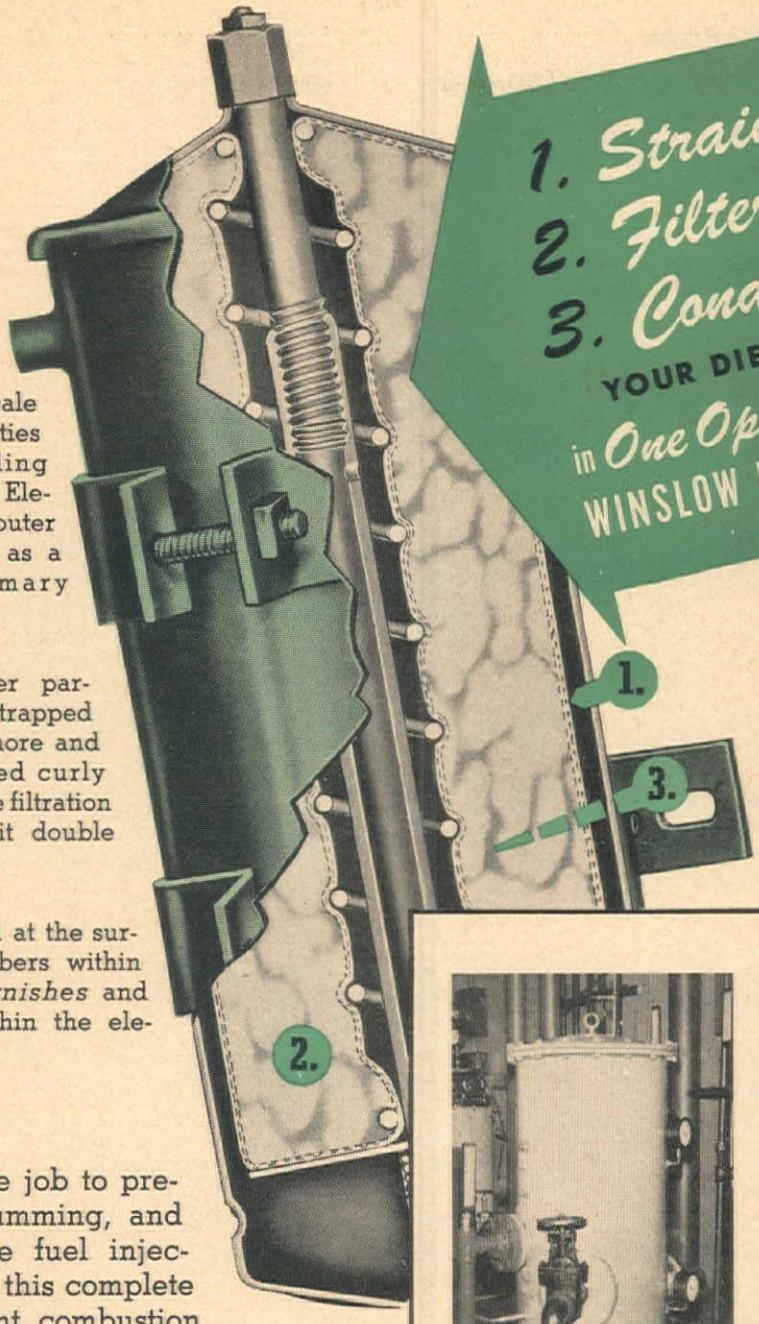
San Francisco • Los Angeles • Seattle • Portland

WIRE ROPE AND STRAND • FITTINGS • SLINGS • SUSPENSION BRIDGES AND CABLES
COLD ROLLED STRIP • HIGH AND LOW CARBON ACID AND BASIC OPEN HEARTH STEELS
AIRCORD, SWAGED TERMINALS AND ASSEMBLIES • AERIAL WIRE ROPE SYSTEMS • ROUND
AND SHAPED WIRE • ELECTRICAL WIRES AND CABLES • WIRE CLOTH AND NETTING

ROEBLING

PACEMAKER IN WIRE PRODUCTS

1. Strain
2. Filter
3. Condition
YOUR DIESEL FUEL in *One Operation* with WINSLOW FUEL FILTERS

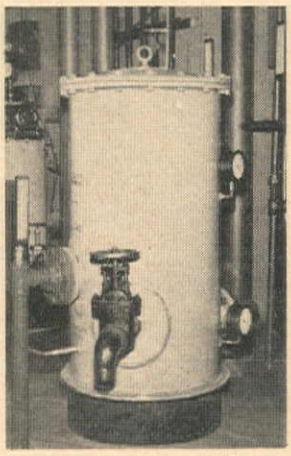


1. Large particles of scale and other heavy impurities are cast into the settling sump by the Winslow Element's double fabric outer covering, which serves as a highly efficient primary strainer.

2. Smaller and smaller particles are permanently trapped as fuel passes through more and more tightly compressed curly fibers, with final ultra-fine filtration through the closely knit double fabric at the center.

3. *Moisture* is stopped at the surface or absorbed by fibers within the element; *gums, varnishes* and *resins* are trapped within the element.

It takes this complete job to prevent costly wear, gumming, and corrosion of delicate fuel injection systems. It takes this complete job to insure efficient combustion and a clean engine. Winslow also manufactures lubricating oil conditioners and replacement elements for every marine, industrial, and automotive service. Mail the coupon today for more complete details.



In addition to Winslow Fuel Filters on engines to catch pipe-scale, dust and moisture, it is recommended that all fuel be passed through a Winslow batch-type filter when pumping from storage tanks into operating tanks. Maximum fuel efficiency—whether Diesel or gasoline—will thus be attained. Shown here is Model 38-1645-AF Winslow batch-filter, which handles up to 90 gpm.

WINSLOW
ENGINEERING COMPANY
4069 HOLLIS STREET, OAKLAND 8, CALIFORNIA

WINSLOW ENGINEERING COMPANY
4069 Hollis Street, Oakland 8, California Dept. 17

Please send me, without obligation, the colorful 20-page booklet entitled "The Case of the Dirty Drip or The Inside Story of Winslow."

*Name*_____

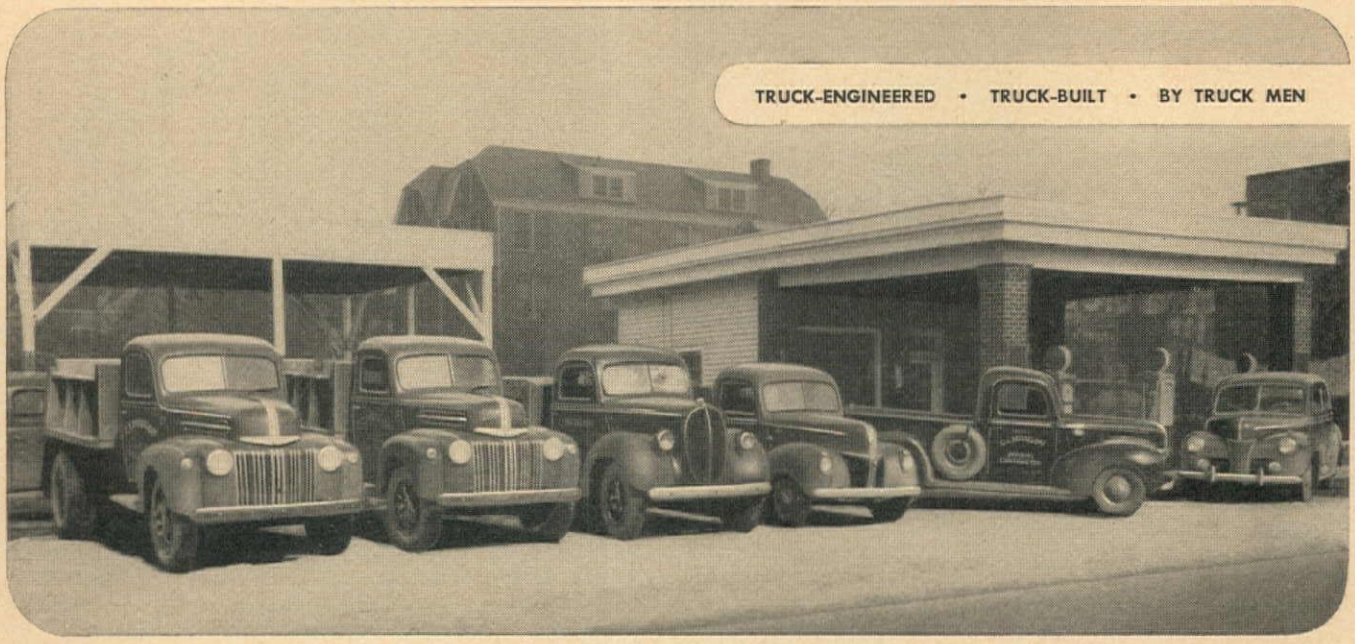
*Company*_____

*Street*_____

*City*_____ *Zone*____ *State*____

TBC-4603

Ford Trucks Last Longer



"WE'VE FOUND FORD TRUCKS TOPS IN ECONOMY AND RELIABILITY!"

"Ford Trucks are the most economical and reliable of all trucks we have ever used in our business," wrote Mr. C. C. Mangum, grading contractor, of Raleigh, N. C., recently.

"We have been using Ford Trucks for the last twenty years, starting with the Model T, then Model A, and on down to our present fleet of nine Ford units."

Mr. Mangum's work includes concrete construction as well as grading, and his experience with Ford Truck equipment is typical of that of hundreds of construction and engineering firms, large and small. All through the industry, it's common knowledge, proved over the years, that Ford Trucks stand up splendidly in the toughest off-the-road service.

There's a new 1946 Ford of two-ton rating, with two-speed axle and 8.25-20 dual rear tires. That's profit-news to heavy hauling operators. And there are more than thirty important engineering advancements in the 1946 Ford Trucks, designed to make them still more economical, more reliable, more enduring! Check with your Ford Dealer for early delivery!

Ford

FORD ADVANCED ENGINEERING!

THE FAMOUS V-8 ENGINE, for toughest service, now 100 HP, with NEW steel-cored Silvaloy rod bearings for trebled endurance • NEW Flightlight aluminum alloy 4-ring pistons for added oil economy • Tougher, rust-proofed valve springs • NEW moisture-sealed distributor • NEW coolant-saving radiator closure • Auto-balanced carburetion for still more thrifty power • Servicing simplified still further. And the rugged, thrifty 90 HP Ford six-cylinder engine, for stop-and-go jobs, with many important advancements, available in all except C.O.E. chassis.

Ford Truck rear axles—world-famous for load-lugging—provide generous reserve capacity • Light duty chassis have sturdy ¾-floating axles with triple-roller-bearing, straddle-mounted pinion; full-floating axles in all other chassis • 2-speed axle and vacuum power braking for 2-ton rating • Improved 4-speed transmission at extra cost in light duty chassis, standard in all others.

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE

2-CYCLE DIESEL TRACTORS

put more in the Profit Pocket...

take less from the Cost Pocket

FASTER — quick pick-up . . . high working speeds . . . fast maneuvering . . . more trips per shift.

S-M-O-O-T-H-E-R — easier on engine and tractor . . . more time on the job . . . less in the shop.

START INSTANTLY — electric starting and operation on Diesel fuel . . . go to work quicker.

LESS SHIFTING — Maintain high torque over a wide speed range . . . hang-on in tough going . . . less operator fatigue!

The way of all costs is DOWN with Allis-Chalmers 2-Cycle Diesel Tractors . . . the way of PROFITS UP!

ALLIS-CHALMERS
TRACTOR DIVISION — MILWAUKEE 1, U. S. A.

FOUR 2-CYCLE DIESEL MODELS
HD-7, HD-10, HD-14, HD-14C (Torque Converter)
60 to 132 Drawbar H.P.

KOEHRING

605 WORTH MORE IN LIFTING CAPACITY ALONE

At a 12′ radius, lifts better than 60,700 honest pounds, (75% rating) based on built-in stability and strength, *not* heavy counterweight.

Plus these Extra Values

30½ TONS

Power Clutch Retains "Feel" — A 10# pull sets big 37" clutches. Heavy hand pull is eliminated. Operator definitely gets "feel" of load, retains accurate control. When lifts call for exceptional accuracy, inserting one set-screw quickly changes to manual clutch.

Independent Live Boom, Power Lowering Available — Changing boom reach is safe and easy with 605 independent boom hoist . . . raise or lower while you travel or swing. Power lowering for extra smooth boom control also available.

High A-Frame Raised and Lowered by Power — Cut time for clearing under overhead obstructions. Remove two pins, lower and raise by power . . . boom suspension cables stay in place.

Exceptional Cable Economy — Main drum clutch cannot jerk, cannot shock load cable. Boom-hoist drum with extra spooling width cuts cable wear common with long booms. Hoist cable spools over top of large drum . . . better boom clearance, hugs drum closer.

Jib boom extension, shown above, is also available. Second drum permits reeving two hoist lines, using either, one on main boom or one on jib, depending on load and lift desired.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN
Subsidiaries
JOHNSON • KWIK-MIX • PARSONS

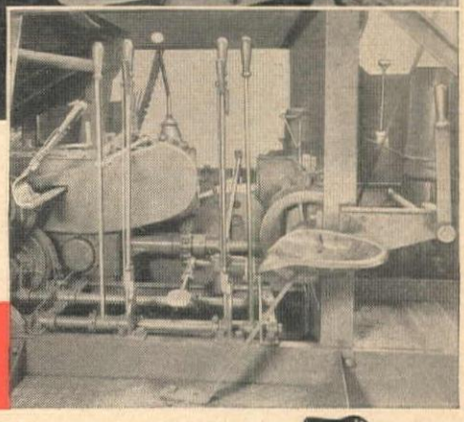
KOEHRING HEAVY DUTY

HEAVY-DUTY CONSTRUCTION EQUIPMENT

PARSONS 250 TRENCHLINER

with Centralized one-man controls

One man controls all operations of the Parsons 250 Trenchliner because all operating levers are centrally grouped, every lever within easy reach from the operator's seat. All digging speeds . . . 25 of them, ranging from 2½" to 136" per minute . . . and all 5 conveyor belt and bucket line speeds are controlled by the centrally located, convenient lever bank.



All operating levers are within easy reach of the operator on the Parsons 250 Trenchliner.

THE PARSONS COMPANY
Koehring Subsidiary NEWTON, IOWA

How Big is Your Market for

READY-MIXED CONCRETE...
TRANSIT-MIXED CONCRETE...
CONCRETE PRODUCTS.....

You analyze the market, determine the volume you want, and Johnson engineers will do the rest.

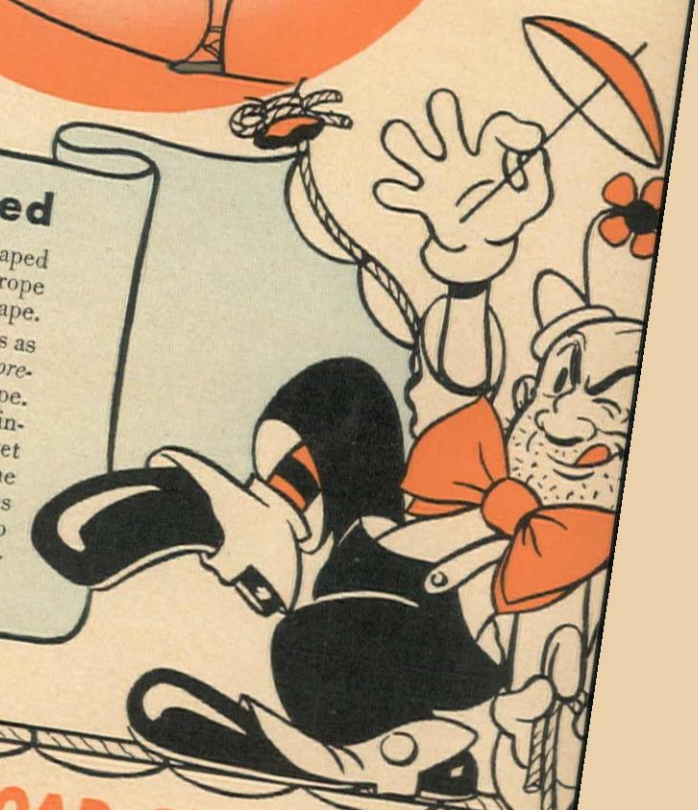
Because their line is complete, Johnson engineers have available exactly the right combination of bin, batcher, conveying, elevating and storage equipment you need to operate profitably. Investment cost per yard will be low. Volume and quality will be high, because every unit in the complete Johnson line is tops in design and construction.

THE C. S. JOHNSON COMPANY
Koehring Subsidiary CHAMPAIGN, ILLINOIS

union-formed Is Preformed

Ordinary wire rope is like a plump lady in a girdle. It is shaped by forcing the wires and strands to take the right shape as the rope is made. Remove the seizing wires and the parts fly out of shape.

Extra seizing on Union-formed wire rope is about as useless as a girdle on a shapely lady. That is because each wire is *preformed* into the helical shape it will take in the finished rope. Many pleasingly profitable advantages result. There are no internal stresses in Union-formed wire rope to cause it to kink, get cranky on the drum, start twisting in the sheave grooves, become fatigued from reverse bending or get as dangerous to handle as a porcupine when outer wires wear and break. These all add up to give you a wire rope that will run longer with less down-time. Specify *Union-formed—get the ultimate in low cost wire rope.*

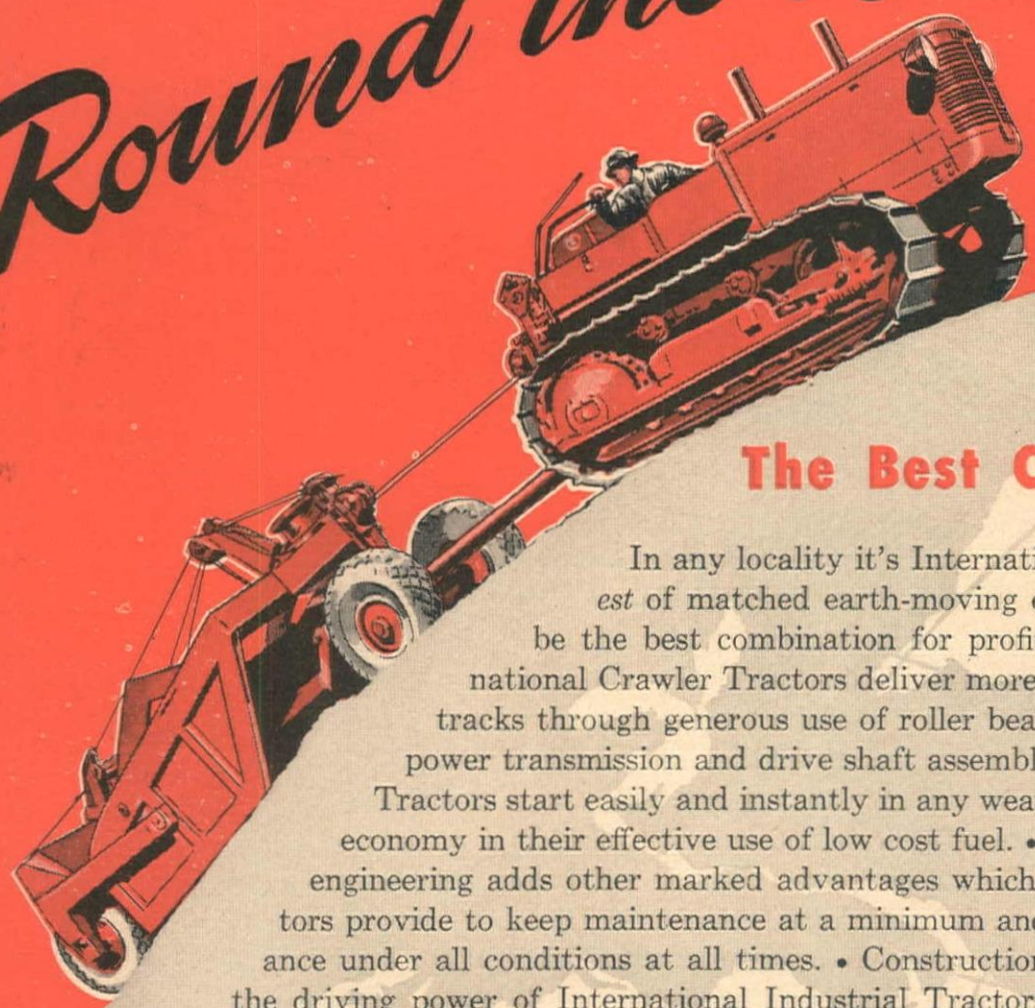


ROAD SHOW BIGGES

More To See Than At A 3 Ring Circus

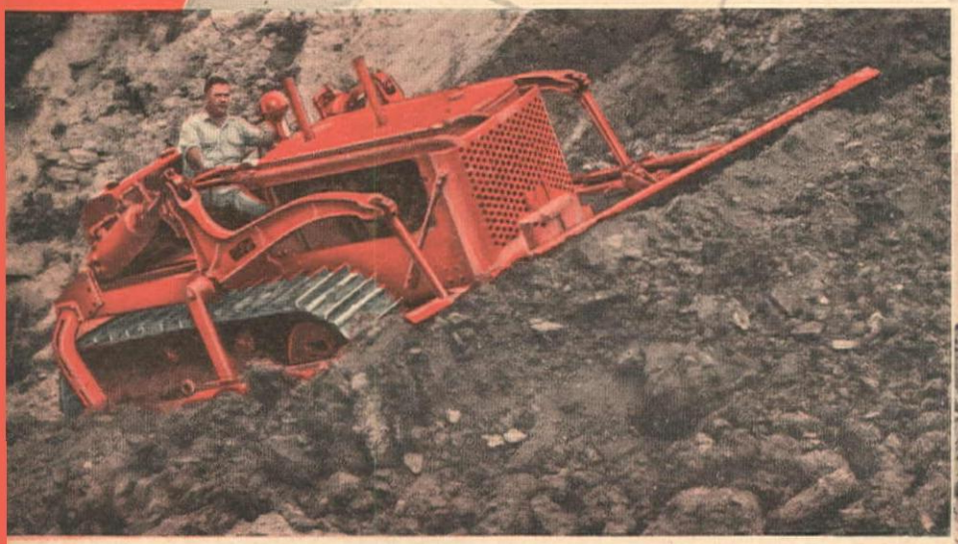
Plans are shaping up now for the biggest ever Road Builders Show to be held early in 1947. Plan now to be there then. It will bring together the professional brains of the industry—Federal, State, County Officials — engineers, contractors and material men and the greatest display of plans and machinery ever assembled.

Round the World...



The Best Combination—

In any locality it's International Tractors and *the finest* of matched earth-moving equipment that proves to be the best combination for profitable operations. • International Crawler Tractors deliver more engine horsepower to the tracks through generous use of roller bearings and ball bearings in power transmission and drive shaft assemblies. • International Diesel Tractors start easily and instantly in any weather yet deliver *full Diesel* economy in their effective use of low cost fuel. • International's advanced engineering adds other marked advantages which only International Tractors provide to keep maintenance at a minimum and to assure peak performance under all conditions at all times. • Construction gains momentum under the driving power of International Industrial Tractors and Engines. • Seabees



Above: It's a TD-18 TracTracTor cutting out a roadway on a hillside with a bullgrader blade. Wherever roads are built, Internationals speed the job, help keep costs down to bedrock.

Opposite Page: An International TD-9, with bullgrader and 2-wheel scraper, builds an addition to an airport in a resort community. Fast worker! It averaged a yard per minute on 100-ft. hauls at a cost for fuel of $1.43 per 9-hour shift.

At Right: This International TD-18, grading for a new building, has a loaded uphill job which its power-packed, *full-Diesel* engine handles easily.

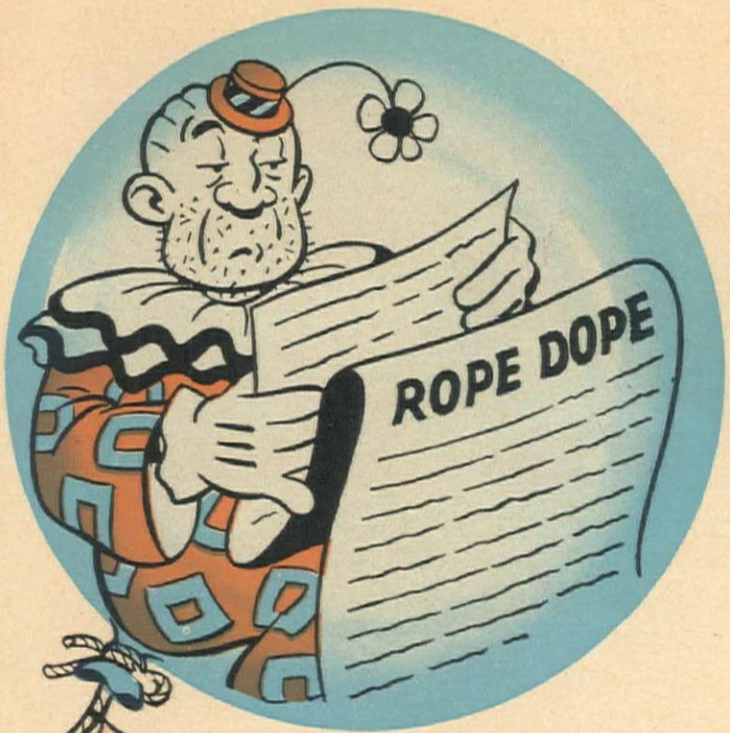
INTERNATIONAL INDUSTRIAL POWER DISTRIBUTORS

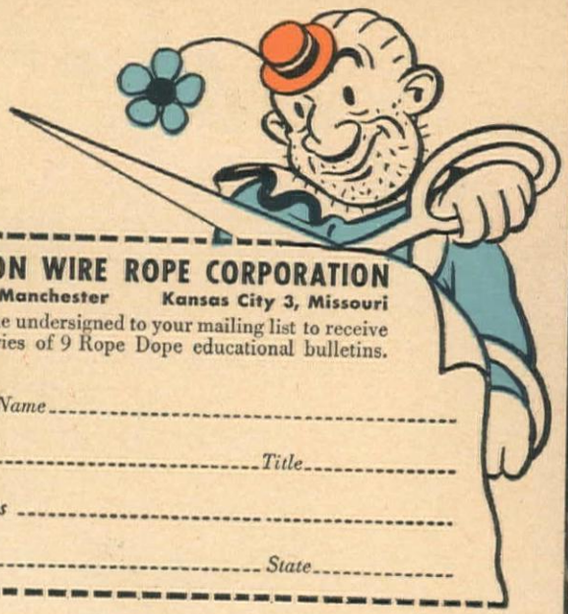
J. G. Bastain
Redding, California

Brown Motors
Reno, Nevada

Brown Tractor Company
Fresno, Madera, Reedley, Cal.

Farmers Mercantile Company
Salinas, California





UNION WIRE ROPE CORPORATION
2146 Manchester Kansas City 3, Missouri

Add the undersigned to your mailing list to receive the series of 9 Rope Dope educational bulletins.

*Firm Name*_____

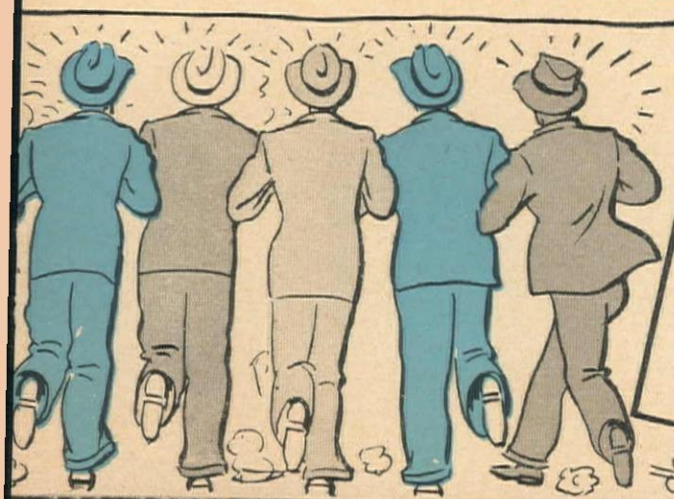
*By*_____ *Title*_____

*Address*_____

*City*_____ *State*_____

FREE...ROPE DOPE BULLETINS...GIVE YOU THE RIGHT DOPE ON THE SELECTION, CARE, HANDLING AND OPERATION OF YOUR WIRE ROPE—Here's a complete, easy to understand, interestingly written and illustrated course in getting the most out of your wire rope. Fill out and send the coupon above—Today. Get your name on the mailing list. The series of 9 Bulletins will be sent at frequent intervals—ALL at no cost—each will bring money-saving information. Send the coupon NOW.

EVER HELD--COMING EARLY IN 1947



Plan Now To Be In On The Making Of A ROAD-UNITED STATES

All industry, all commerce, yea, every American has an economic stake in a *Road-United States*. Protect it against manhandling. Come! Improve your "know-how" Prepare to carry out your part of the road building program the competitive, cooperative American way.

INTERNATIONAL Tractors

Speed up Construction at New Low Cost

and Marines used them on the beaches wherever they landed and for airstrip construction. They proved the stamina of Internationals 'round the world and showed with what speed construction could be completed. • And contractors everywhere are today enjoying the new low costs which International's economical use of fuel and oil and manpower makes possible. • Check with the nearest International Industrial Power Distributor the many outstanding features of International Tractors—Diesel or gasoline—and profit by the use of International Power on the many important projects you're planning.

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue • Chicago 1, Illinois

INTERNATIONAL Industrial Power

INTERNATIONAL INDUSTRIAL POWER DISTRIBUTORS

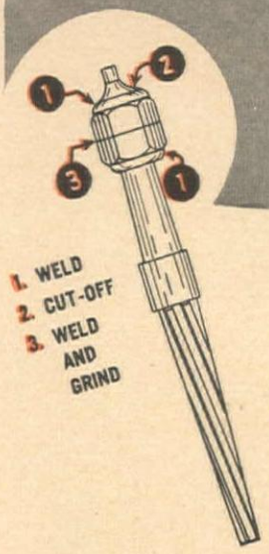
Sutton-Morf Tractor Company
Sacramento, California

Thompson-Sage, Inc.
Stockton, California

Valley Equipment Company
San Jose and San Francisco, Cal.

A TOUGH JOB *made easy*

with the IMPACT WRENCH



Reaming and bolting of structural steel is often a really tough operation. It can be made an easy job by using one tool—an Impact Wrench—for both the reaming and bolting operations.

Reamers can be easily fitted to the wrench chuck by simply slipping over the reamer shank one or two nuts, of the size used on the job, welding them fast and cutting off any shank projection.

The rotary impact action of the I-R Impact Wrench is ideal for reaming and produces a clean hole free from chatter marks.

The Impact Wrench is light enough to be used in all positions, and the torque on the operator is so slight that the dead handle is seldom used. But the main point is—the wrench is *always at hand* bolting up, and when reaming is required it can be done immediately with the same machine.

In addition to a greatly reduced breakage of reamers, contractors report that the Impact Wrench in many cases is cutting the reaming and bolting-up time in half.

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

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

8-834

How a B-G Travel Plant Gives You Two Advantages

• Low costs per yard and a high quality mix are two advantages enjoyed by the owners of B-G Travel Plants.

The B-G Paving Bucket Loader and Portable Mixer team up to form this high-capacity, portable unit. Its accuracy in proportioning, measuring and mixing means a far better road-mix than is possible with ordinary "on-the-road" units.

The second important advantage is the fact that with this B-G Travel Plant you can cut your yardage costs through the use of low-cost local materials.

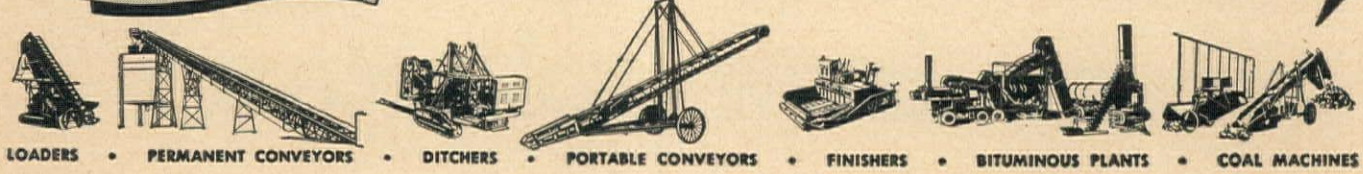
There are many other Barber-Greene constant-flow units for mixing and placing bituminous mix—and for cement and soil stabilization. Like this Barber-Greene Travel Plant they might well help you bid for, and get, more profitable jobs. Write for the Barber-Greene Catalog No. 848 which describes and illustrates B-G asphalt equipment.

Barber-Greene Company, Aurora, Illinois.

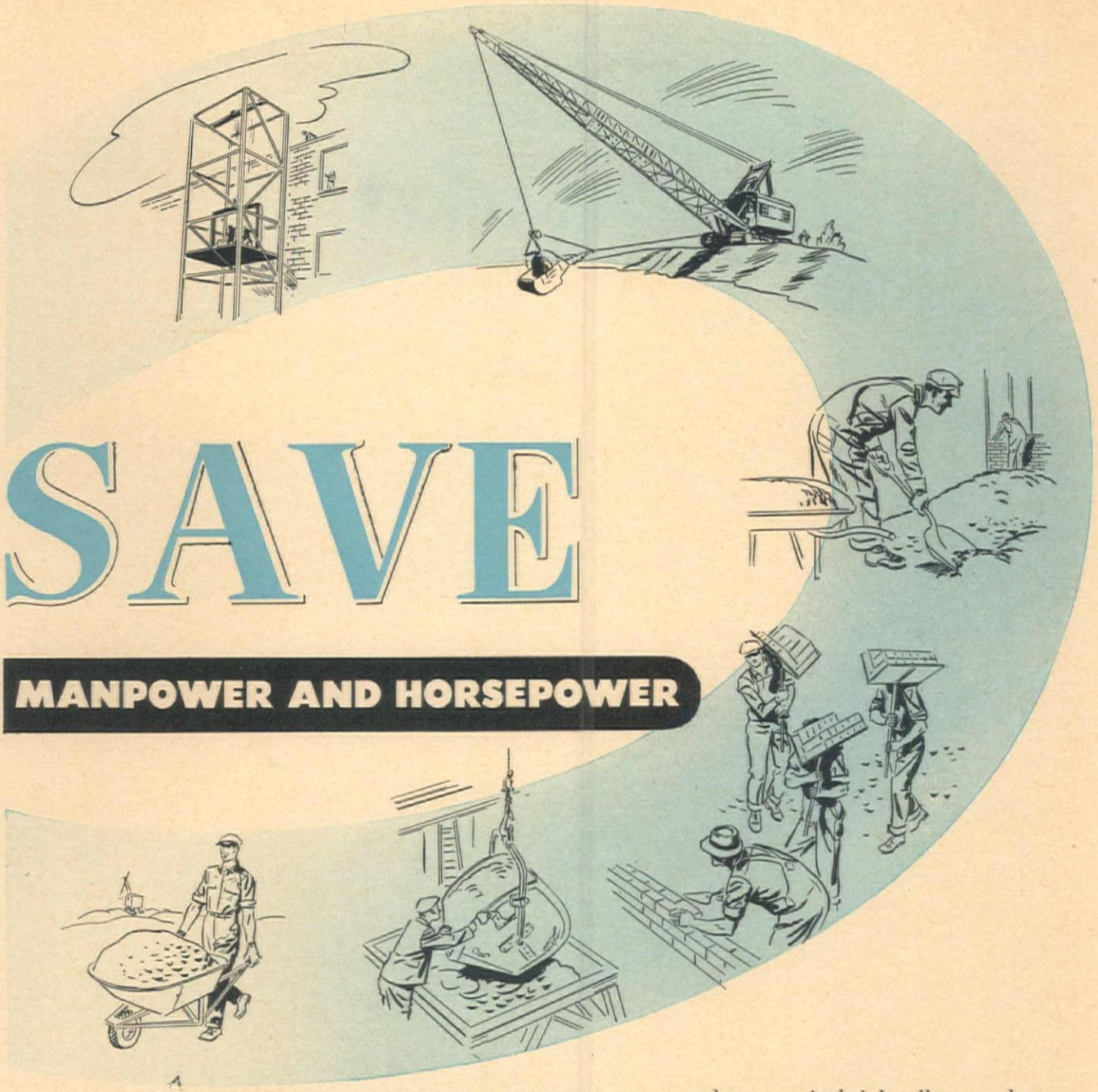
• B-G Mixers serve a dual purpose—as part of the Travel Plant or as an integral unit in a Central Plant set-up shown here. Included is the Gradation Control Unit which accurately proportions aggregate for best quality "high-type" mixes.

***BARBER-GREENE** Regional Addresses*—Brown-Bevis Equipment Co., Los Angeles 11, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Columbia Equipment Co., Spokane, Washington; Columbia Equipment Co., Seattle, Washington; Columbia Equipment Co., Boise, Idaho; Columbia Equipment Co., Portland 14, Oregon; Contractors Equipment & Supply Co., Albuquerque, New Mexico; Ray Corson Machinery Co., Denver 2, Colorado; Jenison Machinery Co., San Francisco 7, California; Western Construction Equipment Co., Billings, Montana; Western Construction Equipment Co., Missoula, Montana, Kimball Equipment Co., Salt Lake City 10, Utah.

B-G Barber-Greene CONSTANT FLOW EQUIPMENT



LOADERS • PERMANENT CONVEYORS • DITCHERS • PORTABLE CONVEYORS • FINISHERS • BITUMINOUS PLANTS • COAL MACHINES



SAVE

MANPOWER AND HORSEPOWER

Use ALCOA ALUMINUM *Building Tools . . .*

Shovels, wheelbarrows, hods, hoist elevators, scoops, draglines—these building tools can well be made of Alcoa Aluminum. The lighter weight of aluminum hand tools saves the productive energy of manpower, speeds construction, while on big equipment you lighten power loads, save wear and tear—do a more efficient and economical job all around. Alcoa Aluminum for building materials in the form of structural shapes, sheets, castings, is also solving many difficult construction problems where resistance to corrosion, durability and high strength are important factors. Our engineers will gladly discuss these problems with you. Call your nearby Alcoa sales office or write ALUMINUM COMPANY OF AMERICA, 1811 Gulf Building, Pittsburgh 19, Pennsylvania.

ALCOA FIRST IN **ALUMINUM**

REG. T. M.

ALCOA ALUMINUM

then he said to himself:

Tell the people what's cookin'

Master of the picturesque is Fiorello H. LaGuardia. Asked why he chose a radio spot after relinquishing the Mayor spot in New York . . . his simple answer:

"People ought to be told what's going on."

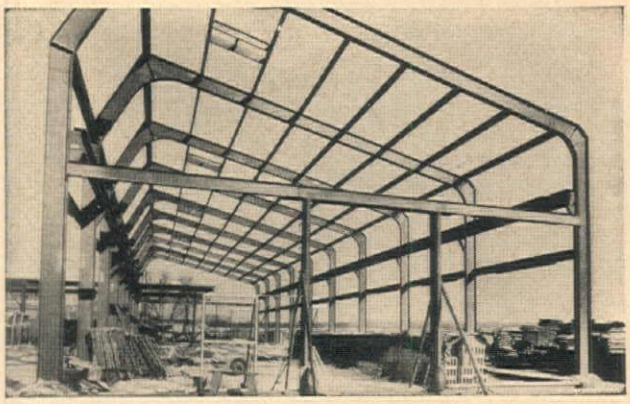
And, there's plenty going on in industry that people can be told about:

. . . new designs . . . new techniques that give the people more value for less money. For example:

LOOK, MR. LAGUARDIA, how engineers and contractors are stepping out in front with the world's leading electrode—

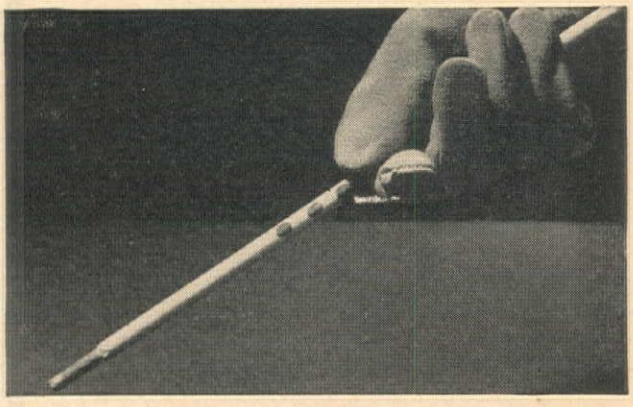
"Cooking" with *Fleetweld*...

Boosting capacity 100%. Flooring of this 53-year old bridge at Scranton, Pa., was strengthened by welding floor buckle plates to stringers and reinforcing with spirals of ⅝" and ½" round bars, each loop welded to floor plates. Former load limit was 6 to 8 tons. Now 15 tons. Eliminates former vibration. "Fleetweld 7", ¼" size with 300 amps., speeded the job.



Creating better structures. Improvements, such as this rigid frame structure, are made possible by arc welding. Cuts tonnage 15% to 25%. Maximum use of shop fabrication with speedy "Fleet-Welding" Technique cuts costs. Only 300 man-hours required for erection of this structure.

Simplifying roof installation. Panels of 20-gauge formed sections are applied by plug welding them to purlins. Enamel was broken with a hammer, and 5/32" "Fleetweld 5" with 200 amps. penetrated through sheet and welded it to purlin. Total of 1680 welds made in 14 hours.



The sign of good "cooking". When you see 3 DOTS on an electrode, you know you have genuine "Fleetweld" . . . the world's leader for *low cost*, *speed* and *quality*. New, handy pocket manual giving procedures for all kinds of jobs free on request. Ask for Bul. 437.

New Lincoln sound-color movies available free for showing to groups. Write for information.

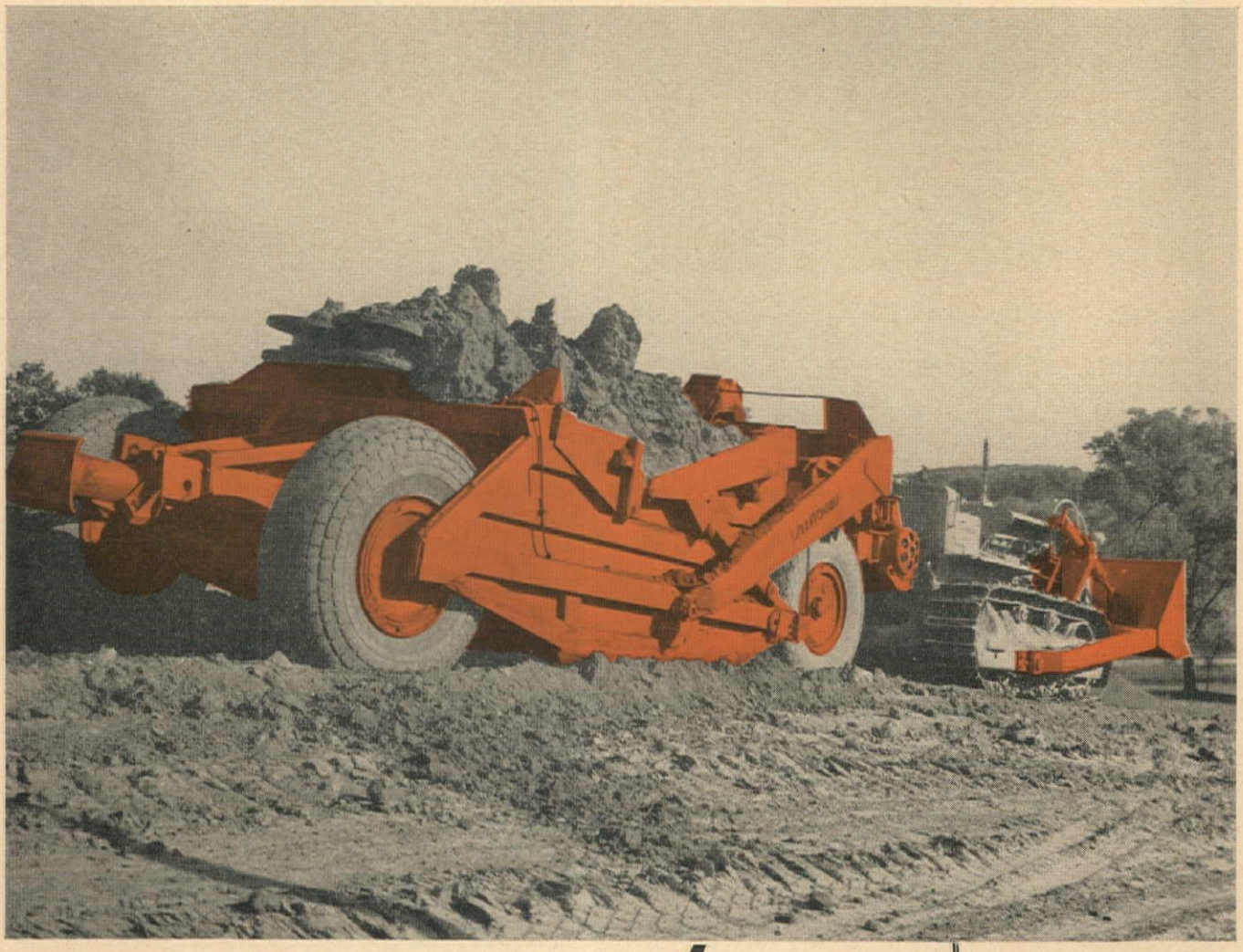
THE LINCOLN ELECTRIC COMPANY • DEPT. 361 • CLEVELAND 1, OHIO

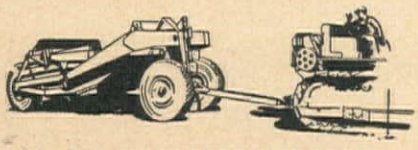
America's greatest natural **recourse**

ARC WELDING

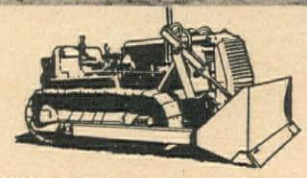
FOR *Western* SERVICE AND SALES ON

LaPLANT-



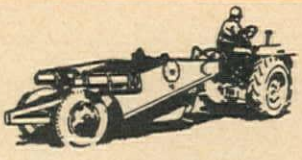


CABLE OPERATED SCRAPERS
6, 8 and 14 yard capacities for use with all makes of crawler tractors



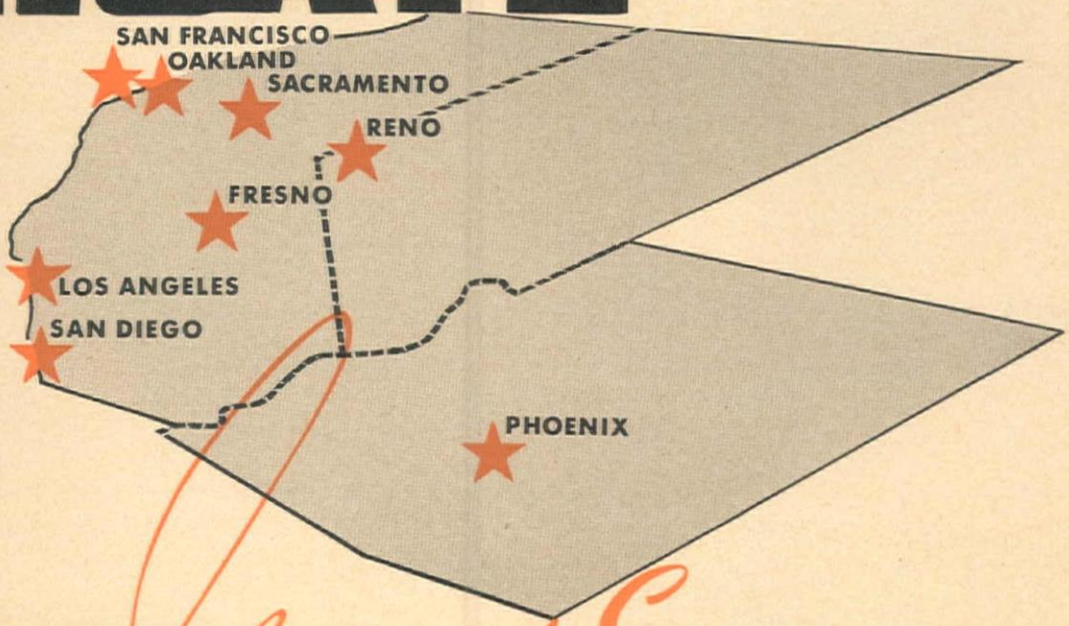
HYDRAULIC DOZERS
Straight or angling blade for all "Caterpillar" tractors

HYDRAULIC SCRAPERS
For crawler tractors



HYDRAULIC SCRAPERS
For rubber-tired tractors

CHOATE



Job-proved Equipment

Industrial Equipment Company is ***proud*** to announce its appointment as exclusive distributor in the West for La Plant-Choate earth movers. ***Proud*** because La Plant-Choate equipment is ***job-proved.*** Earth movers specified by you engineers and construction men for the toughest assignments.

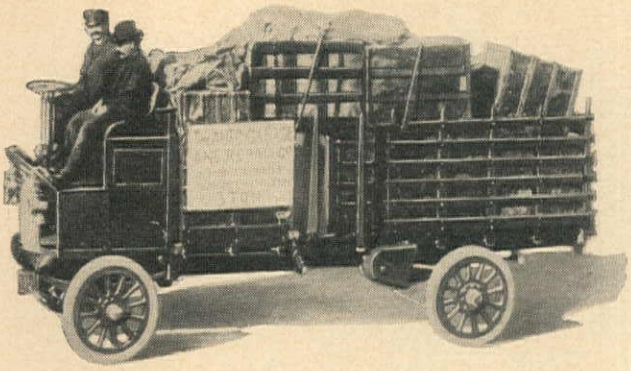
Industrial Equipment's service and sales branches in the eight cities shown on the map spell convenience. Convenience for you in ***high-gearing*** your work pace. Trained personnel are on hand to help you . . . your assurance of maximum service, minimum maintenance expense and lay up time. For earth movers that cut costs to bed rock, it's La Plant-Choate . . . for La Plant-Choate, go to your nearest Industrial Equipment Company branch!

INDUSTRIAL EQUIPMENT COMPANY

★ SAN FRANCISCO ★ OAKLAND ★ RENO ★ FRESNO

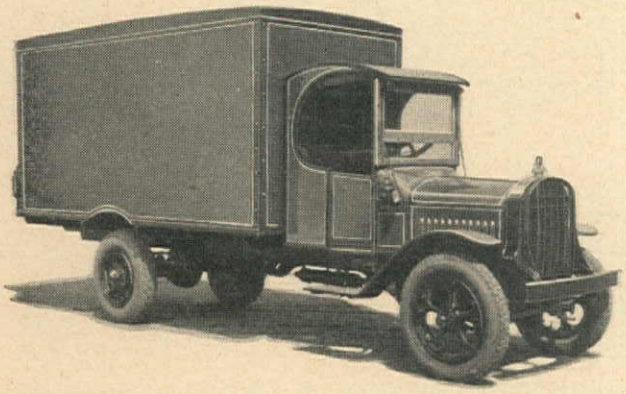
★ LOS ANGELES ★ SAN DIEGO ★ SACRAMENTO ★ PHOENIX

Half a Century of Truck Progress... A PICTURE HISTORY

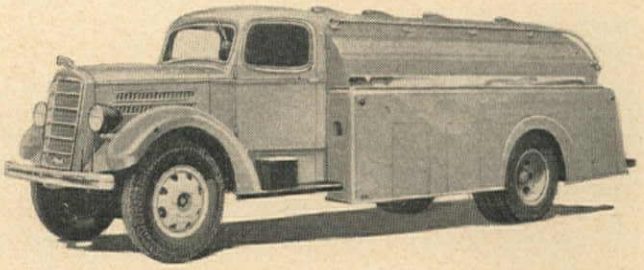


1906 The first Mack commercial gasoline vehicle was delivered in **1900**. It operated as a bus and later as a truck for 17 years. By 1906, the automotive industry's tenth birthday, Mack trucks had many advanced features, including the "high cab" (above), granddaddy of today's cab-over-engine design.

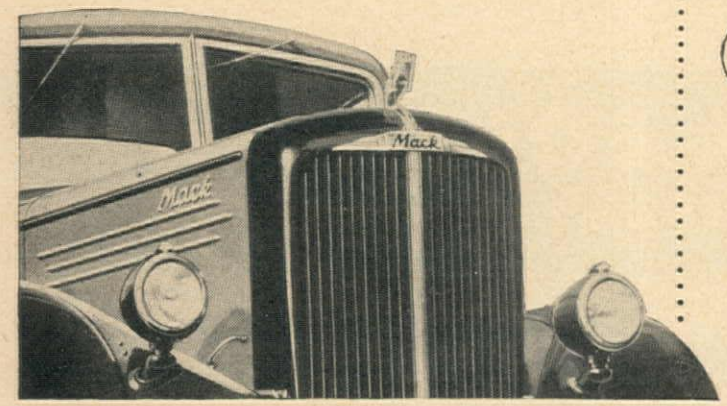
1916 Ten years later came the famous AC "bulldog" model which made the phrase "built like a Mack truck" a popular synonym for rugged strength. You can still see many of these trucks grinding along through city streets, steadfastly making money for their owners and looking quite at home in modern traffic.



1926 More powerful engines were being used, and by 1926 pneumatic tires were fast displacing solids and making possible greater road speeds. These progressive trends, plus certain exclusive refinements of Mack engineering, were embodied in the Mack AB.



1936 An important milestone in truck history was the introduction, in 1936, of the now widely-used Mack EH—a model which surpassed anything previously attained in truck performance.



1946 Today, with World War II experience crowning its 46 years of production, Mack again takes the lead in building the world's hardest-working trucks . . . ***trucks which set industry standards for stamina, performance, economy and long life.***

The Automotive Industry's 50th Anniversary is Mack's 46th

Mack

TRUCKS

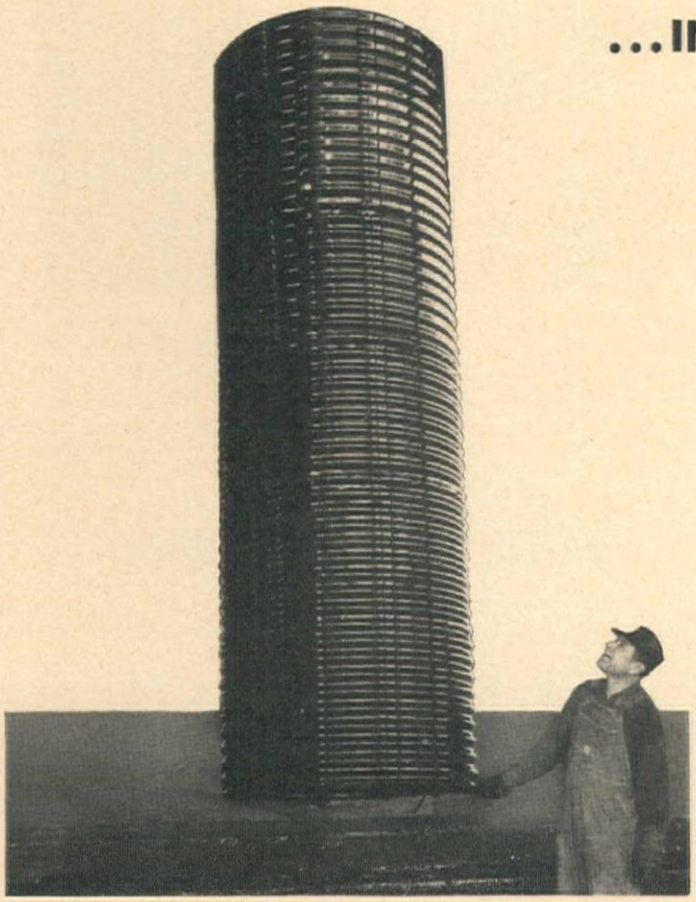
FOR EVERY PURPOSE

Mack-International Motor Truck Corporation. Los Angeles, Sacramento, San Francisco, Seattle, Portland Factory branches and dealers in all principal cities for service and parts.

PERFORMANCE COUNTS!

Corrosion-Resistant . . . CULVERT PIPE

. . . IN DIAMETERS FROM 8" to 96"



Asphalt coating culvert pipe to give it additional protection.

Where durability and resistance to corrosion are important, Western Pipe & Steel's corrugated culvert pipe is being specified. It is available in both iron and steel; also, asphalt-dipped and plain.

Corrugated galvanized culvert pipe possesses the advantages of light weight and comparative low cost. Its use for highway, railroad and airport drainage is increasing, together with its use for storm drains, sewage disposal plants, and as replacements for small bridges.

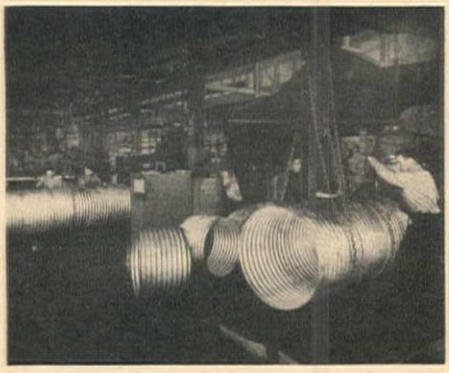
Western's facilities for the fabrication of corrugated culvert pipe and other steel products are unmatched in the West. With its five plants, Western is in position to handle large volume production.

Sectional plate pipe and arches are also available in sizes from 60 inches to 180 inches.

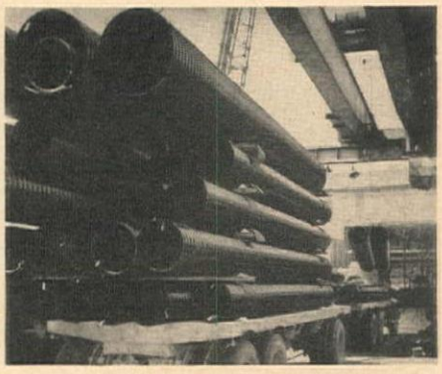
★

For nearly 40 years, Western Pipe & Steel has taken the lead in pioneering methods for improving the quality of steel fabricated products. *For information concerning the company's products and engineering services, call any Western Pipe & Steel office.*

★



Riveting section of corrugated culvert pipe in one of Western's five plants.



Loading asphalt dipped culvert pipe for shipment to big drainage project.

WESTERN PIPE & STEEL COMPANY of CALIFORNIA

FABRICATORS • ERECTORS

P.O. Box 2015—Terminal Annex
5717 Santa Fe Ave., Los Angeles 54

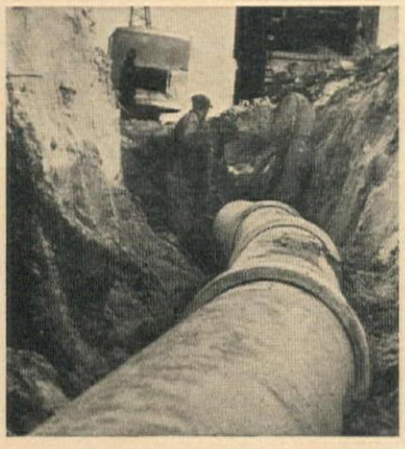
200 Bush Street
San Francisco 6

BAKERSFIELD, FRESNO, SOUTH SAN FRANCISCO, TAFT, CALIFORNIA; PHOENIX, ARIZONA

UNDER CITY STREETS, Transite saves by permitting narrower trenches, reducing disturbance to pavement. Fast assembly minimizes traffic tie-ups.

IN AGGRESSIVE SOILS, Transite guards against destructive corrosion. Thousands of installations prove its stability under a wide range of conditions.

IN THE TRENCH, man-hours are cut. Fewer men are needed for handling. Most sizes can be installed without mechanical handling equipment.



IN SUPPLY LINES, Transite's immunity to tuberculation means lower pumping costs. Its high flow capacity (C=140) is tuberculation-proof.

AS DISTRIBUTION MAINS, Transite Pipe cannot cause "red water." Its high corrosion resistance means low maintenance over the years.

Wherever it's used . . .

AS YOU CAN SEE—Transite Pipe is unusually light in weight . . . easily handled and unloaded. Installation takes less time . . . and fewer men.

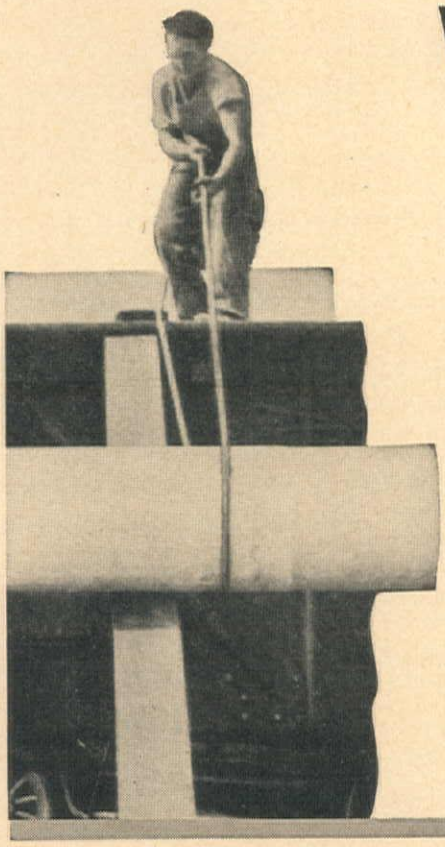
JOHNS-MANVILLE
JM
PRODUCTS

ON CURVES and in hilly terrain, Transite Pipe's flexible Simplex Coupling permits up to 5° deflection at each joint without use of fittings.

UNDER HEAVY TRAFFIC the Simplex Coupling provides a flexible joint that effectively withstands vibration—absorbs the shocks of heavy vehicles.

AT THE JOINTS, Simplex Couplings mean quick, easy assembly. They safeguard against underground leakage and undermining of supporting soil.

TRANSITE PIPE HOLDS DOWN WATER LINE COSTS



WITH an eye to *future economy* as well as *present-day efficiency*—thousands of forward-looking communities are using TRANSITE PRESSURE PIPE—in both water transmission and distribution lines.

Made of asbestos and cement, this tough durable pipe saves installation, operating and maintenance costs.

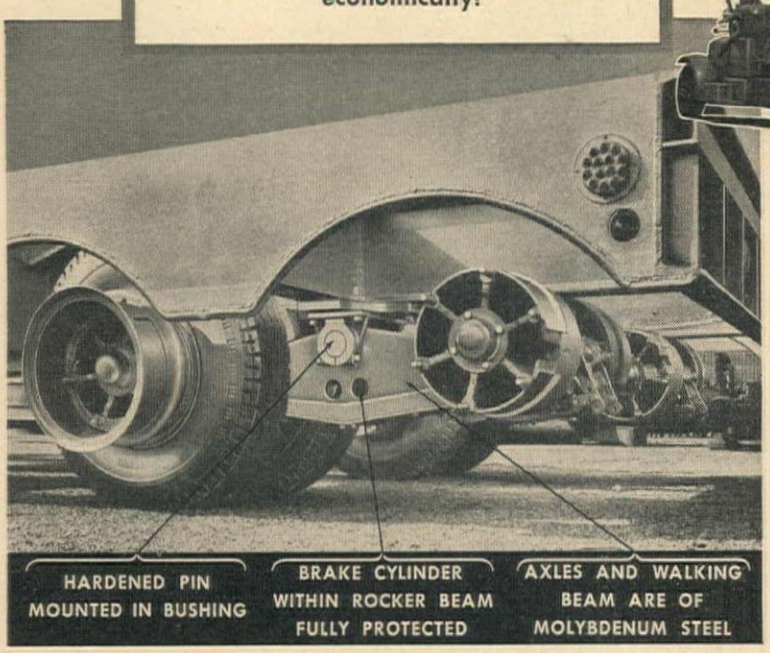
Light in weight, it is easily handled. The Simplex Coupling permits quick assembly . . . forms tight yet flexible joints. Highly corrosion-resistant, this modern pipe withstands aggressive soils. Because Transite's high carrying capacity (C=140) can never be reduced by tuberculation, pressures are higher, pumping costs lower . . . an added margin is provided for future water needs.

For details, write for Brochure TR-11A. Address Johns-Manville, Box 290, New York 16, N. Y.

Johns-Manville TRANSITE PIPE

FEATURES OF THE NEW FRUEHAUF CARRYALL

Pioneer in the Carryall field, Fruehauf leads in design, engineering and production of large capacity, low-bed Trailers—built to move heavy machinery and construction equipment easily, safely and economically!



Fruehauf Carryall used by Basich Bros. Construction Co., Alhambra, California, to transport heavy machinery throughout California and Arizona.

NEW UNDERCONSTRUCTION—*15-Ton*—two trunnion axles with a single row of eight tires on pressed steel disc type or Fruehauf dual wheels. *25-Ton*—new design walking-beam tandem allows removal of tires from the outside. Compensates for uneven road surfaces. *40 to 65-Ton*—two double trunnion axle rocker beams permit oscillation of the wheels in all planes. This protects the frame against shock under heavy loads, maintains equal loads on all wheels with automatic contact with road contours.

NEW FRAME—All welded construction for maximum strength and rigidity with reinforcements where side forces enter.

NEW FLOOR—High quality seasoned Douglas fir is laid between the four longitudinal members of the frame. *Saves weight,* eliminates a fifth longitudinal beam; *lowers deck height* by 2¼ to 3¾ inches, *lasts longer* under the tough wear and tear of loading tractors and other self-propelled machines.

NEW BRAKE CONTROLS—Brake cylinders are mounted *within* rocker beam trunnion, eliminating the need for long cables or rods, assuring direct, positive braking, equal on all wheels.

NEW SKIDRAILS—Installed on both sides and across rear on all models, will support any load within the capacity of the Trailer. *Optional*—Swinging outrigger extensions on each side with skidrails on rear only.

NEW FRONT GEAR—Full-Trailer models are available for all units. Entire gear assembly easily removed for operation as Semi-Trailer.

There is a Fruehauf Carryall for *any* size load. For detail specifications or demonstration write or consult your nearest Fruehauf Factory Branch.

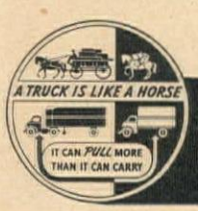
World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant—Los Angeles

SALES AND SERVICE BRANCHES

Los Angeles	Fresno	Portland
San Diego	Phoenix	Spokane
San Francisco	Seattle	Denver
Salt Lake City	Billings	El Paso



FRUEHAUF TRAILERS *"Engineered Transportation"*

MOTOR *Snuggles Up* TO COMPRESSOR

...AND A BIG JOB GETS *all the air it needs*

This story concerns an air compressor used indoors. It tells how a G-E motor enabled the compressor to fit into a very tight space. But it applies equally well to users of air compressors on outdoor construction jobs where portability and ease of handling are important.

Back in 1943, engineers of an eastern industrial concern found that unless they could increase their compressed-air capacity quickly, vital war production was going to fall behind schedule. The problem was—where to put an extra air compressor in a plant already jam-packed with machinery.

There was just one empty corner about 10 by 12 feet in area. A compact high-speed air compressor might be squeezed in. But that left no room for a belt- or shaft-connected drive-motor. The answer was a motor that could be mounted right on the compressor—an unusually compact, close-coupled synchronous motor.

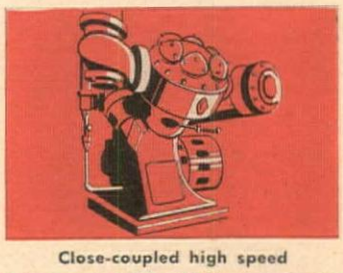
Today, both the compressor and its G-E motor can boast of a perfect three-year performance record, and the combination is still going strong. It has never failed to meet a sudden increase in compressed air demand, and has operated throughout every night shift with no more maintenance than routine inspection and lubrication.

Close-coupled for Economy

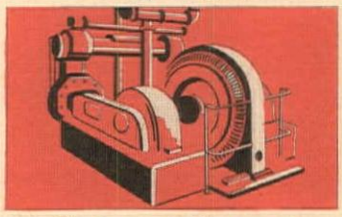
G-E close-coupled synchronous motors have won wide acceptance among compressor users in the construction field. Because the rotors are precision fitted directly to the compressor crankshaft, these motors need no outboard bearing or separate foundation. The motor air gap is uniformly and permanently maintained. Installation is simple, too—it is easy to align the motor flange with the compressor frame.

Whether you make compressors or use them, you will be interested in the design and maintenance savings made possible with compact G-E synchronous motors. Write or phone your nearest G-E office. *Apparatus Dept., General Electric Company, Schenectady 5, N. Y.*

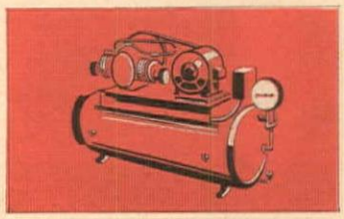
G-E SYNCHRONOUS MOTORS FOR COMPRESSORS



Close-coupled high speed



Direct-connected low speed

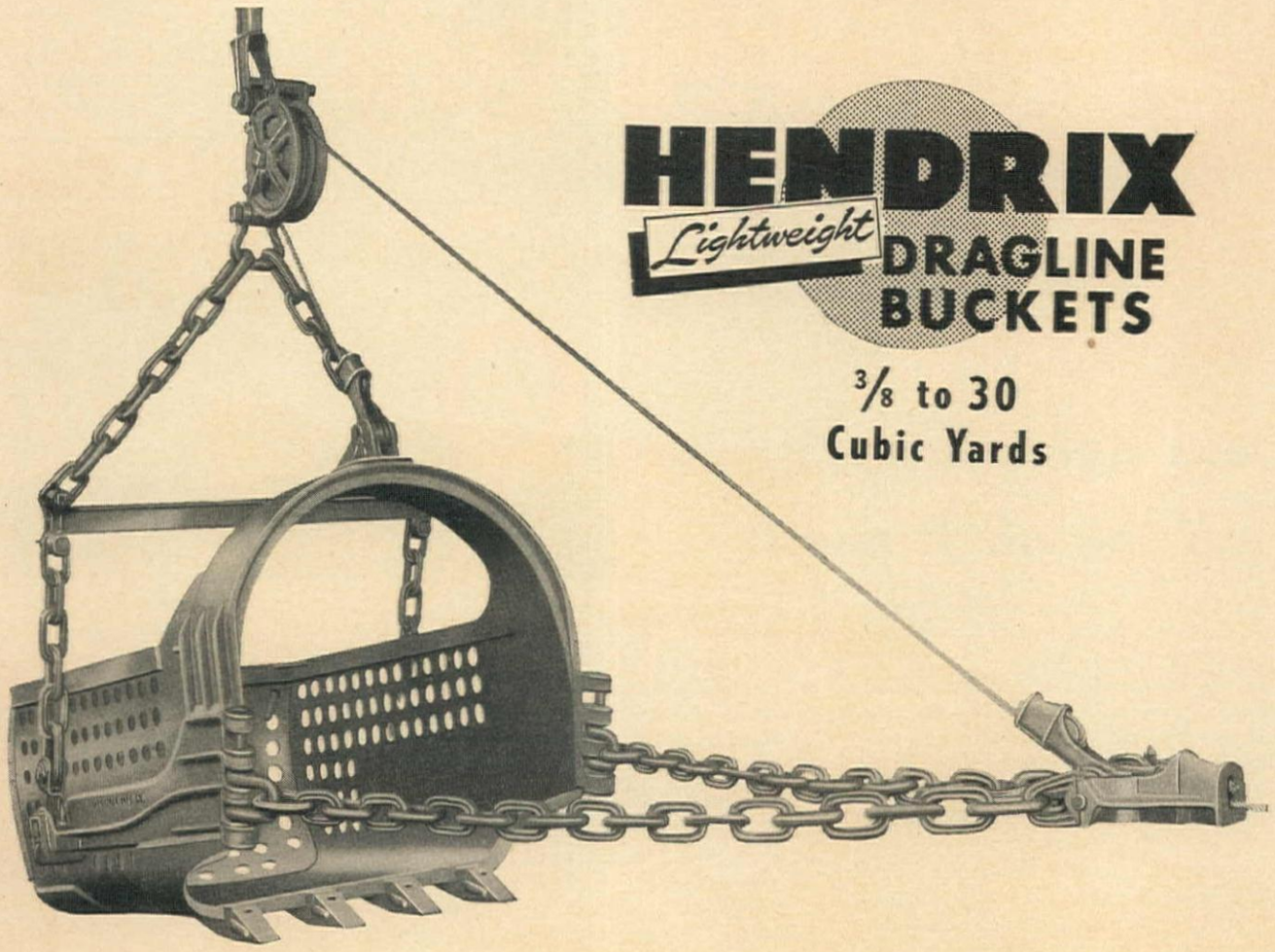


Belt-connected Tri-Clad

GENERAL ELECTRIC

750-272-8030

PEAK LOADS AT LOWER COSTS



HENDRIX *Lightweight* DRAGLINE BUCKETS

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 diggings.
- ★ Perfect Balance; handles easier, fills faster, dumps cleaner.
- ★ Three Types: light, medium, and heavy duty. With or without perforations.

WRITE OR ASK YOUR DEALER FOR DESCRIPTIVE LITERATURE

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

Not a penny is spared to  build into Autocar Trucks the extra power,

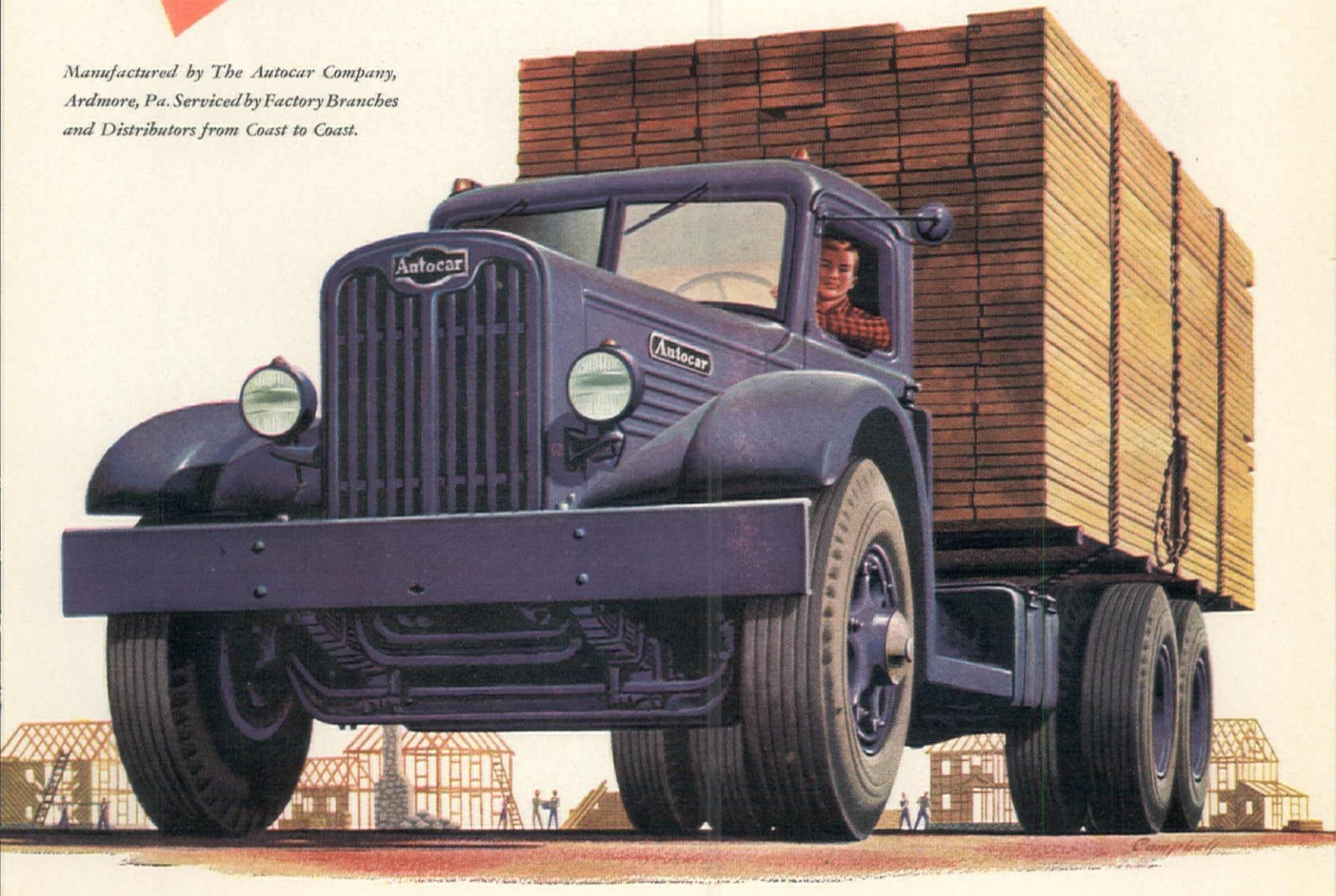
stamina, and strength that true, heavy-duty trucks must have. 

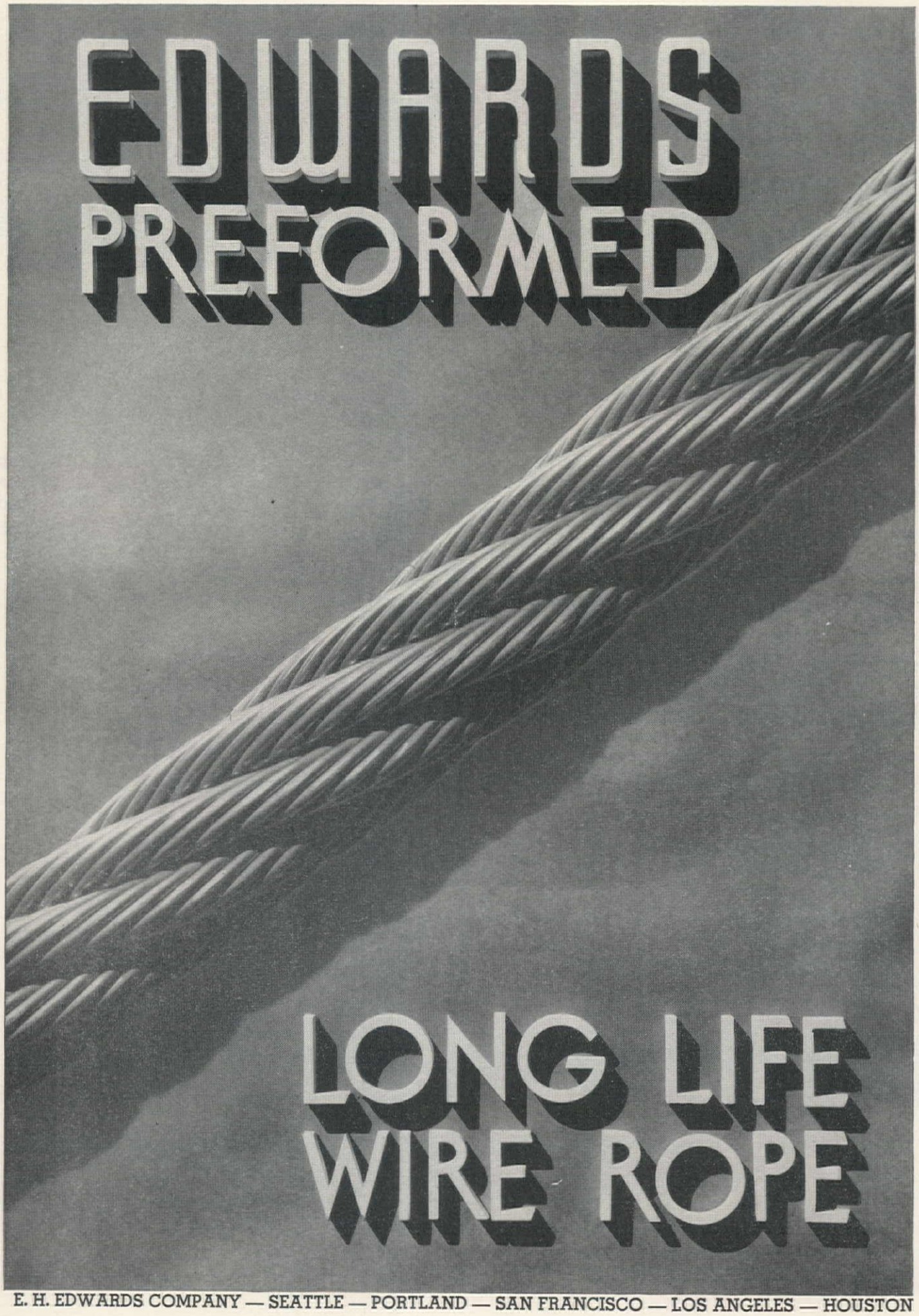
That is why Autocar Trucks, preeminent  for heavy duty, are

playing such a vital role in America's vast building program. 

Autocar

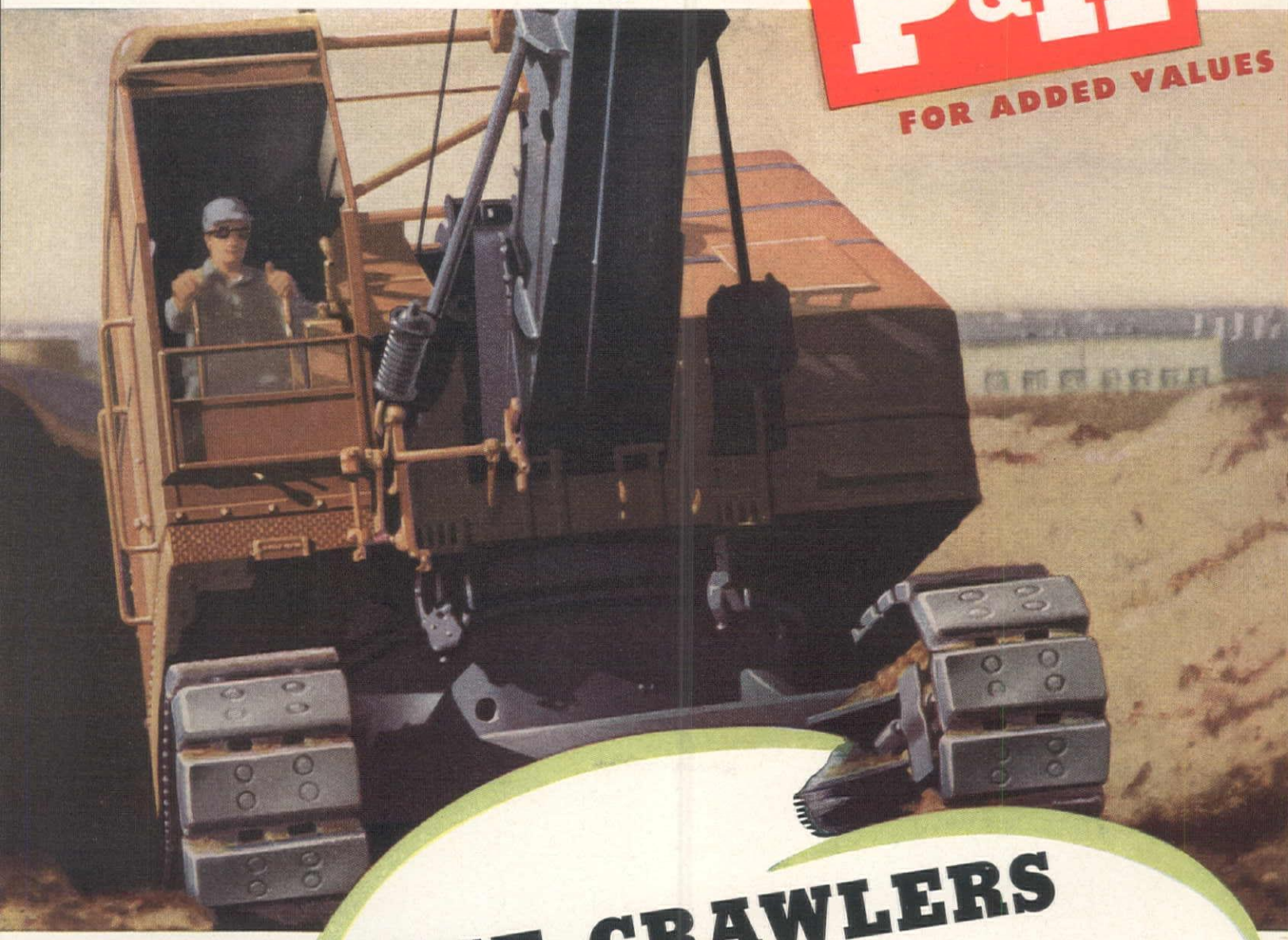
Manufactured by The Autocar Company, Ardmore, Pa. Serviced by Factory Branches and Distributors from Coast to Coast.





E. H. EDWARDS COMPANY — SEATTLE — PORTLAND — SAN FRANCISCO — LOS ANGELES — HOUSTON

LOOK TO **P&H** FOR ADDED VALUES



GREATEST CRAWLERS

ever put on an excavator!

• How much could you save each year if you could eliminate all your crawler troubles? How much waste time? How many repair bills? How much money?

For years, traction troubles have been a major source of lay-up and expense for excavator owners. Because traction mechanism is so important, P&H has gone the limit to provide the most practical and efficient assembly ever put on an excavator — *true tractor type crawlers!*

Their design and construction, proved in millions of miles of travel, brings you many new advantages—in smoother travel, easier maneuvering, easier steering, less lost time, lower maintenance. It's a P&H added value that will save you money every year—for the life of the machine.

P&H's husky crawler frames and axles are built of rolled alloy steels and welded integrally with the carbody. This rigid, "weave-proof" assembly withstands twists, strains and shocks from all directions. No bolts to wear loose, no holes to weaken the joints.

P&H EXCAVATORS
4490 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION
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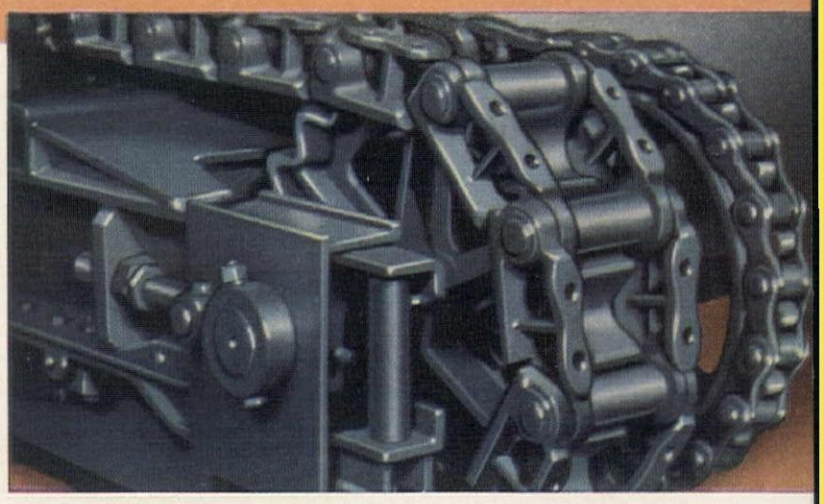
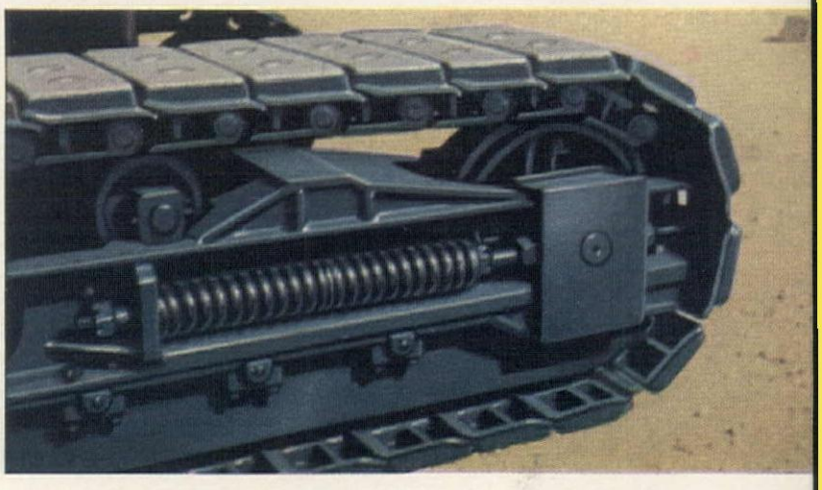
ANOTHER **P&H** ADDED VALUE

Trouble-Free Traction



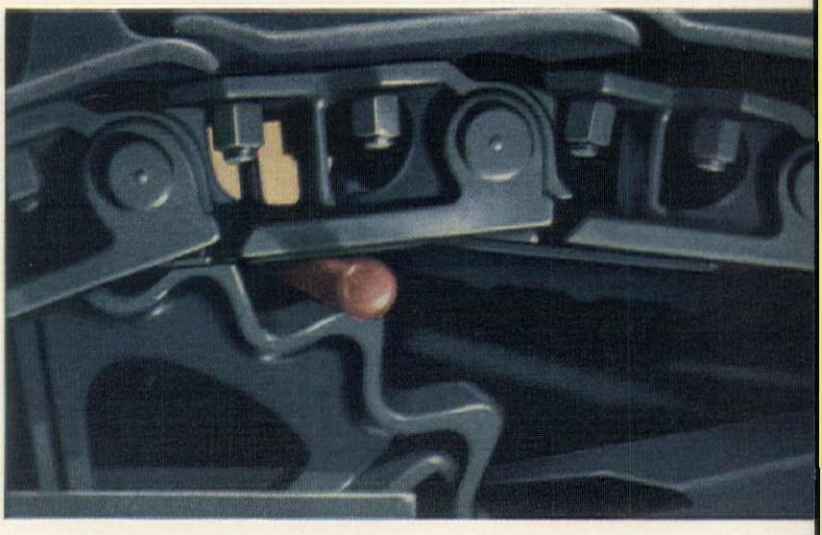
Crawlers Work on Roller Chain Principle

Shown with shoes removed. Note how driving force is exerted by *rolling on pins* instead of *sliding on lugs*. Operation is smoother, friction losses are lower, mechanical failures are fewer. Shoes, attached to rails by four bolts, can be removed without disturbing crawler belts. Hunting tooth design doubles sprocket life.



Maintains Proper Tension for All Ground Conditions

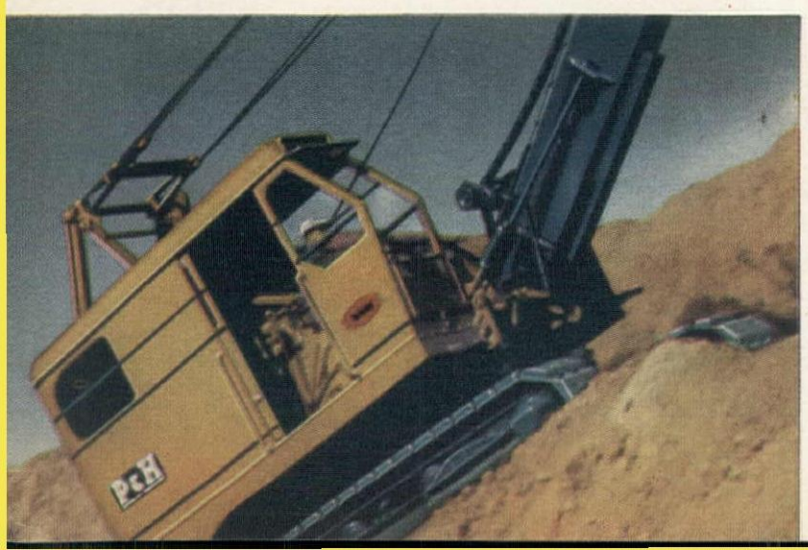
This compensator spring automatically assures and maintains tension of the crawler tracks under all ground conditions — in sand, gravel, quarry floors or deep mud. It prevents excess strains or "throwing" of the crawler belts. Sprocket can't slip on the tracks.



Protects You Against Breakage of Track Parts

In this actual test, a 2" steel bar (shown in red) is jammed between sprocket and track as sprocket makes complete revolution. No damage occurs. This illustrates what happens when stones or other obstructions are encountered. The compensator spring provides enough "give" to prevent possible breakage of track parts.

Ask for all the facts about these and other P&H added values. See your nearest P&H representative or write us for information.



Perfect Control on Steep Grades

When work requires up or down grade travel, hydraulic propel brakes assure operating safety. Even in case of accidental breakage or disengagement of jaw clutches, P&H hydraulic propel brakes are sufficiently powerful to prevent a rolling away of the machine on the steepest grades.

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SPOKANE, WASHINGTON	F. M. Viles & Co.
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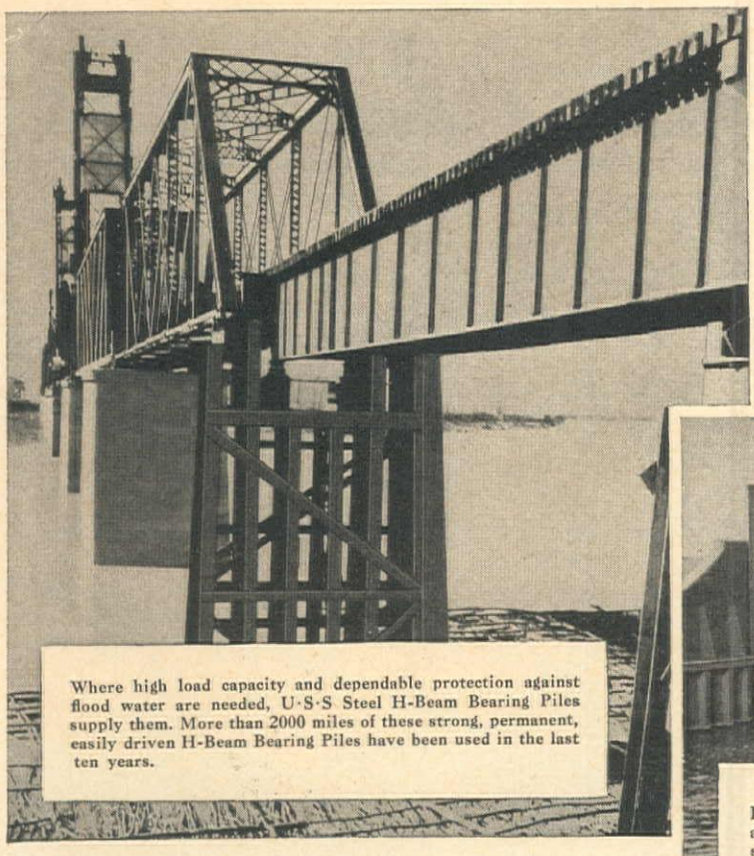
NEVADA	Dennison Tractor & Supply Company
[illegible]INGTON	Glenn Carrington & Co.

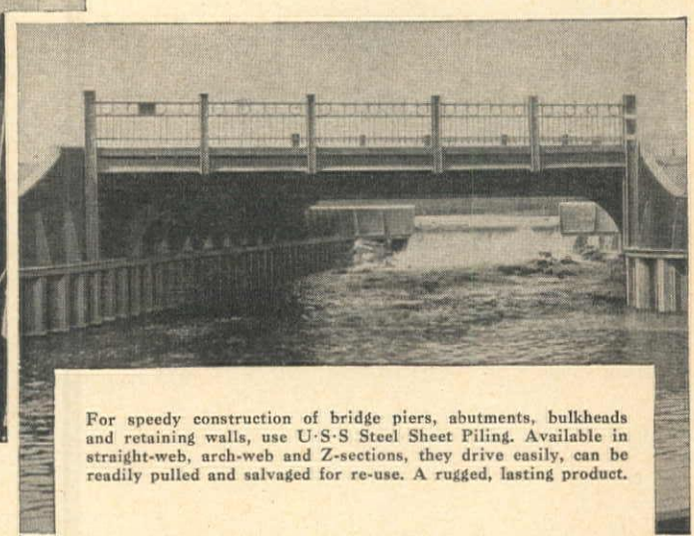
To build better bridges... *build with Steel!*



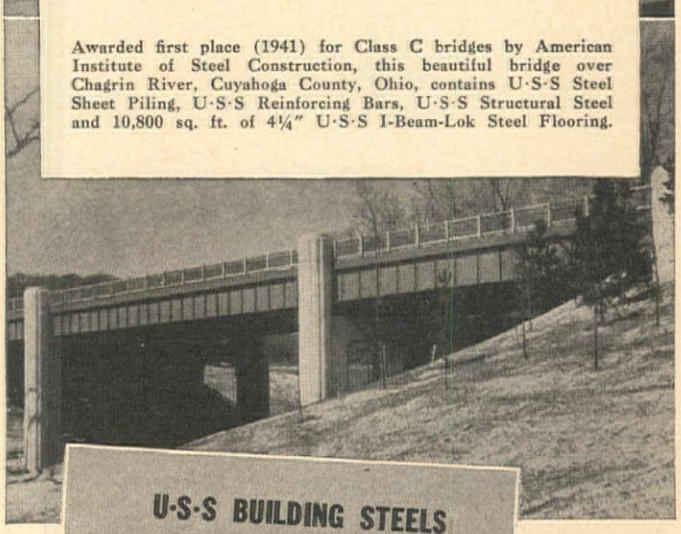
Where high load capacity and dependable protection against flood water are needed, U·S·S Steel H-Beam Bearing Piles supply them. More than 2000 miles of these strong, permanent, easily driven H-Beam Bearing Piles have been used in the last ten years.

Only *Steel* Can Give You All Of These Six Structural Advantages:

- ★ High Strength-Weight Ratio
- ★ Highest Modulus of Elasticity
- ★ Extra Toughness and Shock Resistance
- ★ Versatility of Application
- ★ Great Durability
- ★ Ultimate Economy



For speedy construction of bridge piers, abutments, bulkheads and retaining walls, use U·S·S Steel Sheet Piling. Available in straight-web, arch-web and Z-sections, they drive easily, can be readily pulled and salvaged for re-use. A rugged, lasting product.



Awarded first place (1941) for Class C bridges by American Institute of Steel Construction, this beautiful bridge over Chagrin River, Cuyahoga County, Ohio, contains U·S·S Steel Sheet Piling, U·S·S Reinforcing Bars, U·S·S Structural Steel and 10,800 sq. ft. of 4¼" U·S·S I-Beam-Lok Steel Flooring.

ONE of the most impressive lessons learned from the war is that you don't need a lot of time to turn out a first class job.

For instance, consider the construction miracle that made possible the atomic bomb—a three billion dollar venture that involved the erection of stupendous and intricate plants, complete new towns, many miles of streets, highways and heavy-duty bridges.

Prefabricated, easier-to-handle steel—such as piling, concrete reinforcing bars, bridge flooring and culverts—played an important role in the speedy, sound and safe construction of practically all of these highly important projects . . . just as it will help you establish time and money saving records on the many peacetime jobs coming up.

An inquiry will promptly bring descriptive literature on the U·S·S Engineering Products listed in the column at the right. Just address the office nearest you.

U·S·S BUILDING STEELS

Plates	Hot Rolled Strip
Wire Rods	Cold Rolled Sheets
Structural Shapes	Electrical Wires
Hot Rolled Sheets	Wire and Wire Products
Reinforcing Bars	Sheet Piling
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Pipe and Tubing	Nails
Castings	Fabricated Structural Shapes

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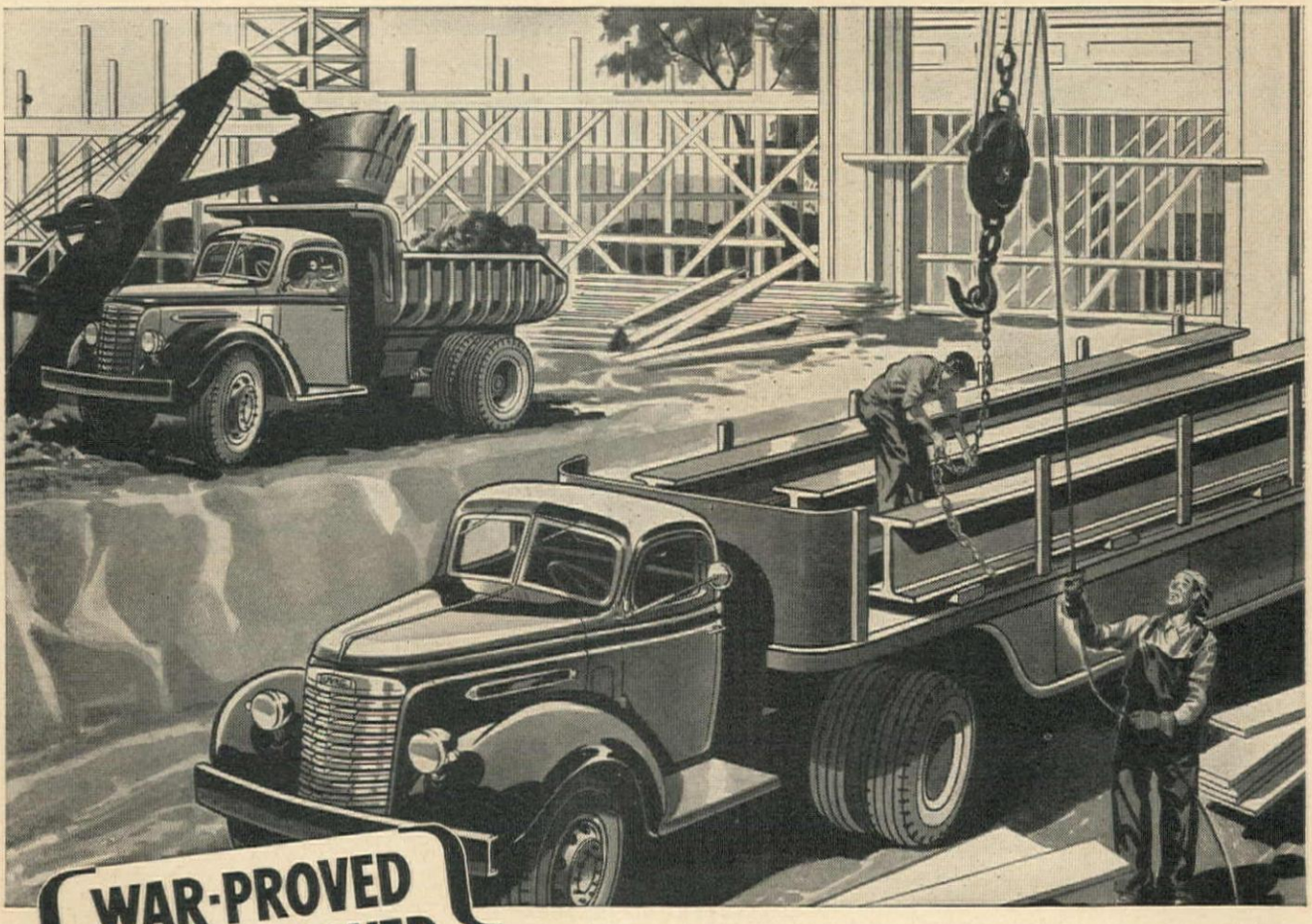
USS STEEL — UNITED STATES STEEL

UNITED STATES STEEL

NEW GMCs for Heaviest Hauling



WAR-PROVED and IMPROVED FOR 1946

- Powerful, economical "Army Workhorse" engines of Valve-in-Head design with Tocco-hardened Crankshafts, Airplane type "Durex" Main Bearings, Heat-resisting Exhaust Valves with Improved Valve Seat Inserts, Positive Crankcase Ventilation, Turbo-Top Pistons and Full Pressure Lubrication through Rifle Drilled Connecting Rods.
- Rugged, built-for-the-job chassis with extra strong Frames, Springs and Axles, heavy duty Transmissions and Clutches, Needle Bearing Universal Joints, Recirculating Ball-Bearing Steering and powerful, easy-action Brakes.
- Rider Ease Cabs with Cradle-Coil Cushions, Wide Visibility "V" Windshields, Quick-vision Instrument Panels, All-Weather Insulation and Controlled Ventilation.

New GMCs offer you the most in heavy duty truck value in a most complete selection of models. There are tractor units, dump models, four-wheelers and six-wheelers in tonnage ranges to fit every requirement . . . and with equipment options which include worm, double reduction and dual drive axles, 5-speed underdrive and overdrive transmissions, gasoline and diesel engines, heavy duty clutches and air brakes. It will pay you to investigate GMC. For, whatever you haul . . . sand and gravel, cement, ore, steelwork, heavy construction equipment and many more . . . you'll find a war-proved, improved GMC truck ideally suited to the job.

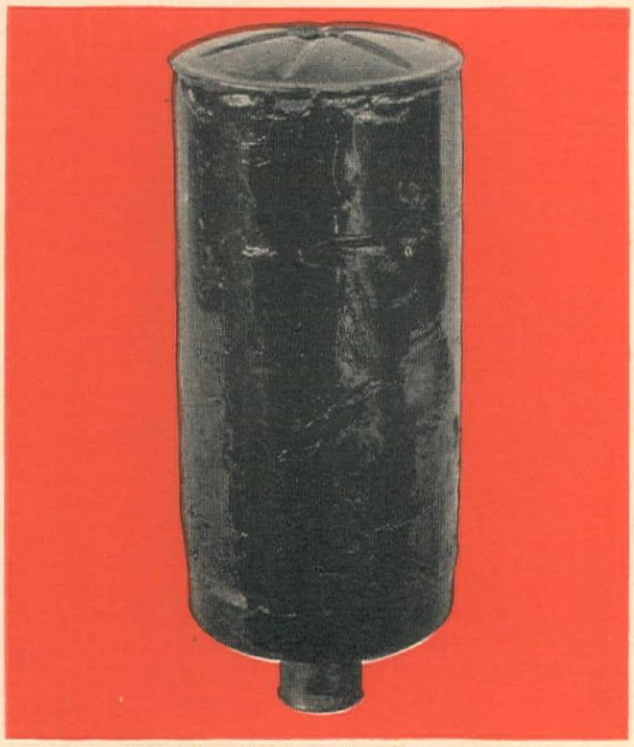
THE TRUCK OF VALUE

GMC TRUCKS

GASOLINE DIESEL

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

Diesel Engine DANGER points

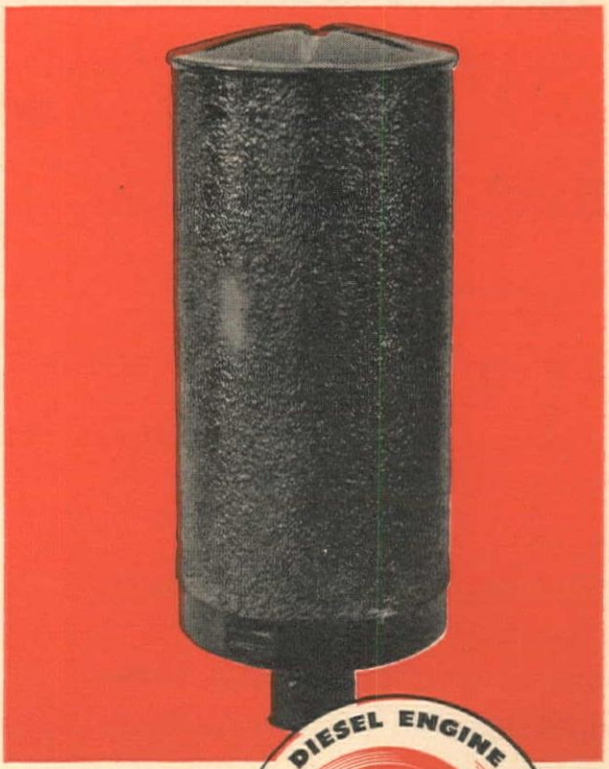


Filter deposits formed in 204 hours with best uncompounded mineral oil.

Clogged Oil Filters Cause Frequent Shutdowns

One cause of frequent costly and time-wasting Diesel shutdowns is filter clogging. The condition can become dangerous since a clogged filter may stop circulation of oil to the engine if the warning of a drop in oil pressure is not heeded. Analysis of filter deposits prove them to be composed of products resulting from incomplete burning of the fuel and oxidation of oil plus iron, silica and water.

Filter Deposit formed in 1230 hours with RPM DELO Oil.



RPM DELO Oil Reduces Filter Clogging Two Ways

As the two filters illustrated show, RPM DELO Diesel Engine Lubricating Oil greatly lengthens the time between shutdowns for filter servicing. This is accomplished in two ways:

1. A detergent in RPM DELO Oil prevents the stuck piston rings which, through blow-by, permit dust, unburned fuel and carbon to mix with oil.

2. Another compound in RPM DELO Oil fortifies it against oxidation.

Other additives in RPM DELO Oil protect Diesel Engines against corrosion, excessive wear on upper cylinder walls, and foaming.

To match the fine performance of RPM DELO OIL, use these equally efficient companion products from the same famous "RPM" line – RPM HEAVY DUTY MOTOR OIL – RPM COMPOUNDED MOTOR OIL – RPM GEAR OILS AND LUBRICANTS – RPM GREASES.

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert help – make your maintenance job easier. Call your local Standard Representative or write STANDARD OF CALIFORNIA, 225 Bush St., San Francisco 20, Calif.

DIESEL ENGINE RPM DELO LUBRICATING OIL

HERE IS YOUR *FREE* COPY

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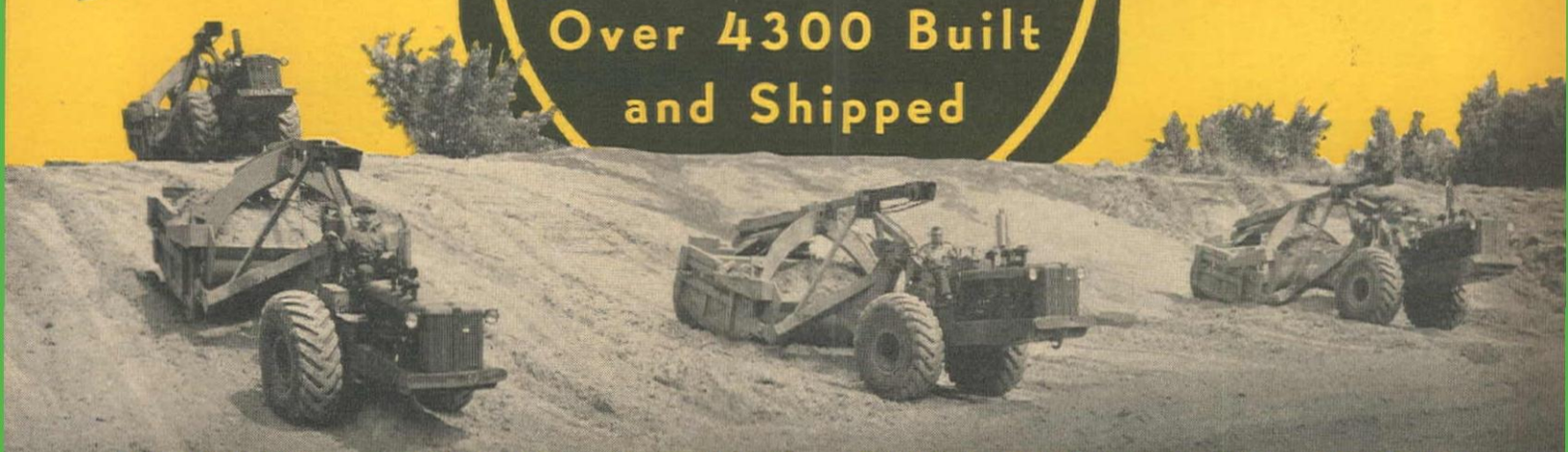

WHAT THIS SEAL MEANS TO YOU

You've seen this seal from month to month in the signature of LeTourneau ads . . . but perhaps you haven't noticed the significance of the ever-growing numbers. The Tournapull Job-Proved Seal has consistently recorded jumps of a hundred or more each month, will grow faster as more material becomes available. This means, not only that Tournapulls have already been tested, perfected and proved on jobs like yours, but that profit-minded dirtmovers are convinced of Tournapull ability to deliver at lowest net cost per yard.

Remember, too, that behind all modern LeTourneau equipment is the greatest accumulation of scraper earth-moving experience the industry has to offer . . . over 130,000 LeTourneau units built and shipped in the last 10 years. And, as you know, this represents practical, mud-on-the-boots type of dirtmover engineering that lives with you, works for you, knows your problems and talks your language.

Come in and see us . . . let us give you facts and figures on these modern, job-proved rubber-tired earthmovers. We'll be glad to show you Tournapull jobs. See for yourself what Tournapulls can do.

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

Arizona
ARIZONA EQUIPMENT SALES, INC
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California
CROOK COMPANY
Los Angeles, Bakersfield
SOULÉ EQUIPMENT COMPANY
Oakland, Sacramento, Fresno

Colorado
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Denver, Colo., Scottsbluff, Neb.

Idaho
THE SAWTOOTH COMPANY
Boise, Twin Falls

Montana
MONTANA POWDER & EQUIPMENT CO.
Helena, Billings

Nevada
SIERRA MACHINERY COMPANY, Reno

New Mexico
CONTRACTORS EQUIPMENT & SUPPLY CO.
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Utah
J. K. WHEELER MACHINERY CO., Salt Lake City

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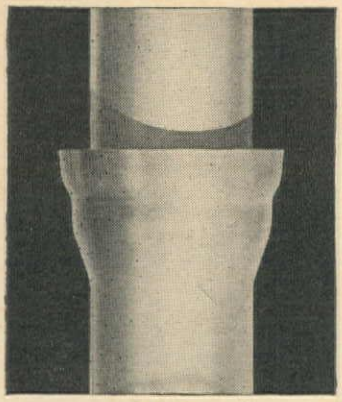
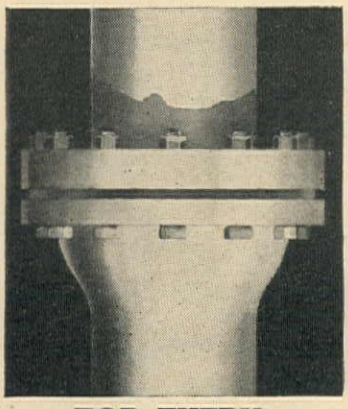
MODERN MACHINERY COMPANY, INC., Spokane
PACIFIC HOIST & DERRICK COMPANY, Seattle

Wyoming
COLORADO BUILDERS' SUPPLY CO.
Denver, Colo., Scottsbluff, Neb.



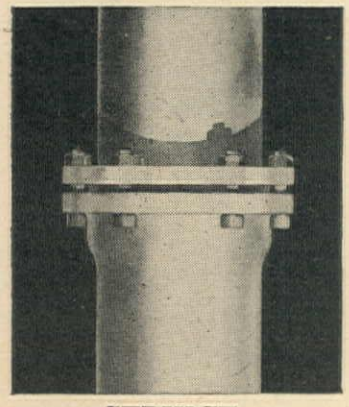
A JOINT

Bell-and-spigot Joint—the time-tried and standard for water and sewerage service.



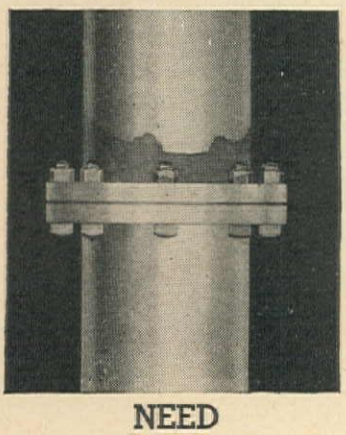
FOR EVERY

Flexible Joint—for river crossings and other sub-aqueous installations.



SERVICE

Mechanical Joint—now standardized with interchangeable parts.



NEED

Flanged Joint—for water, steam, oil or gas lines, generally used above ground.

Why Cast Iron Pipe

Reports from 43 of America's largest cities show that in 38 cities some or all of the original cast iron water mains are still in service—and they are from 60 to 124 years old!

In many ways, cast iron pipe, as represented by these old mains, is like "paid-up" life insurance.

A life insurance policy which is paid-up in 30 years, remains in force for life with no further payments—has a cash value at all times — and at age 96, is automatically payable in full.

A cast iron water main, in 30 years or less, can be amortized—or any bonds issued to finance its cost can be retired — out of revenue; then it owes the community nothing and continues in service. A cast iron main, no longer needed, has a cash salvage value — can be, and has been, sold by one municipality to another for re-use, or can be sold as scrap. And at age 96, a cast iron water main has not only paid for itself in heaping measure, but goes blithely on its way for a century or more of additional service.

It's a grand and glorious feeling to know that you are insured for life without any more premiums to pay. And it must be equally satisfying, to the water works superintendent who buys cast iron pipe, to know that it offers his community the best possible insurance of dependable and economical service. Cast Iron Pipe Research Association, T. F. Wolfe, Research Engineer, Peoples Gas Bldg., Chicago 3.

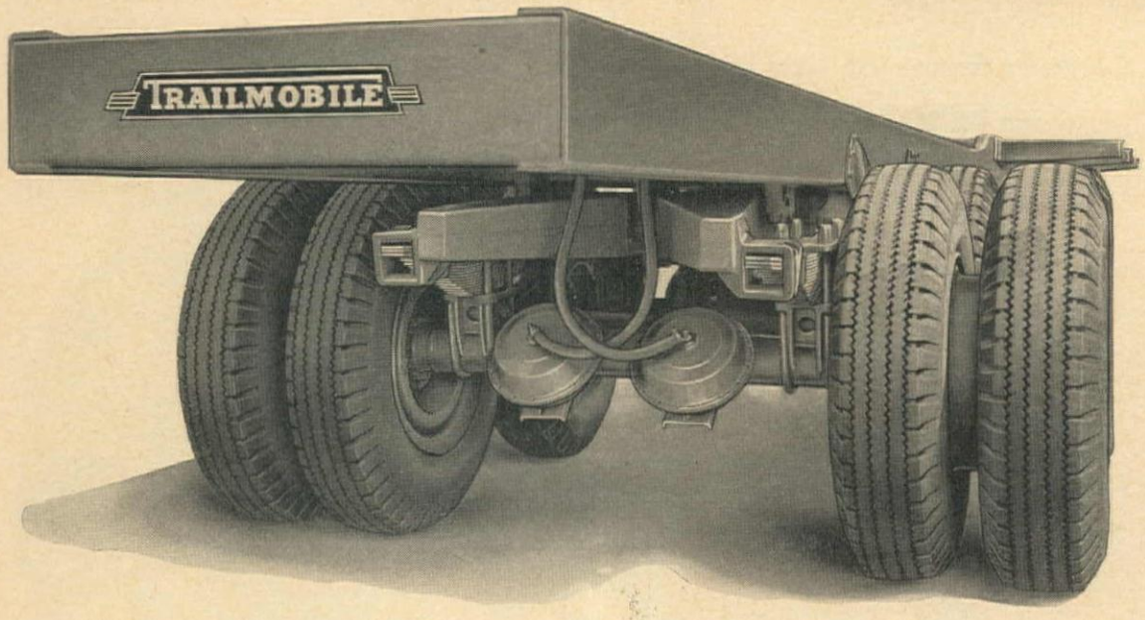
CAST IRON PIPE

is like "paid-up Insurance"

Certain forms of life insurance become paid-up in 30 years and remain in force for life with no further payments.

Serves for Centuries

SIMPLICITY ITSELF!



The outstanding feature of the new TRAILMOBILE Tandem rear suspension is its utter simplicity. Instead of numerous parts fighting each other, TRAILMOBILE employs two rugged "rocking beams" which ride with each shocking force, pick up the road shocks and distribute them evenly throughout the entire tandem structure. Regardless of shock or sudden braking, they maintain an absolute balance of the load between both axles.

Because of even load distribution, tire scuffing is eliminated. The only moving parts are the rocking beams, and these are fitted with big, oversize bearings to minimize wear. Only two points to lubricate—one under each rocker arm. Two Alemite fittings are used to fill 30 day grease reservoirs.

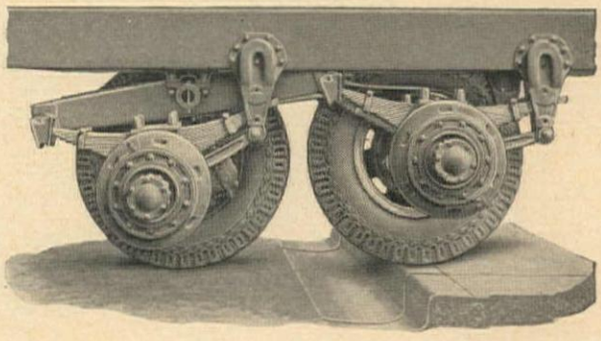
If you haven't seen it, investigate the TRAILMOBILE TANDEM.

★

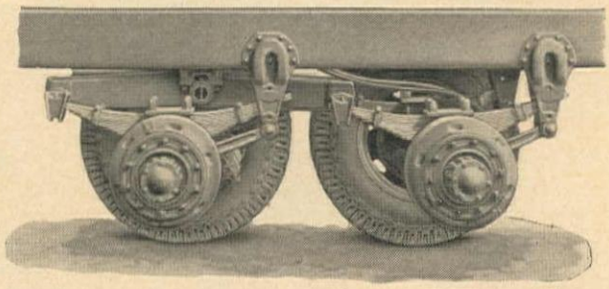
THE TRAILMOBILE COMPANY

BERKELEY, CALIFORNIA

Rear view, showing the relationship of the rocking beams to the spring suspension.



Note the minimum spring action—all high arcing eliminated—as the rocking beams absorb the shocks of the uneven roads, yet keep the load level and evenly balanced between two axles.



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EVERY TIME WITH ADAMS MOTOR GRADERS

● It is no accident that Adams Motor Graders are predominantly preferred by contractors and city and highway officials. They have learned through long experience that Adams Motor Graders are outstanding in design and performance—*unequaled for smooth, accurate work on roads, streets and airports.*

For example, Adams' *Positive-Acting Mechanical Controls* assure fast, accurate blade and scarifier adjustments; *Built-in Rigidity* eliminates lost motion in controls, holds blade and scarifier solidly in place; *Balanced Weight Distribution* provides always-ample pressures for forcing blade and scarifier into hard materials; *8 Overlapping Forward Speeds* assure exactly the right speed to do any given operation at the fastest practical rate.

Discover how these and other Adams features will do all grading jobs *better, faster,* more economically. For the complete performance facts, see your near-by Adams dealer.

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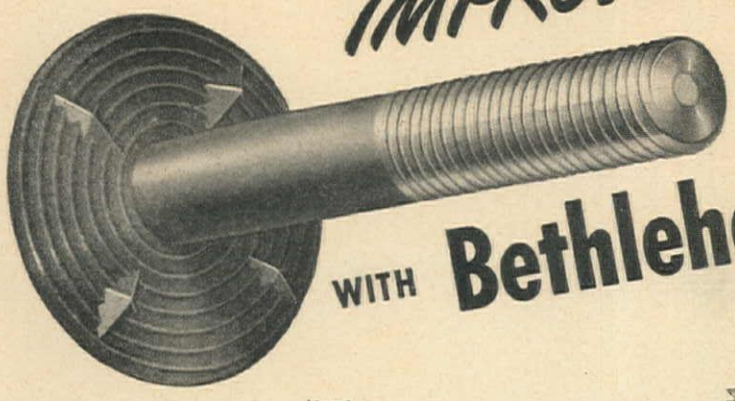
MONTANA—Industrial Equip. Co., Billings, Missoula
NEVADA—Brown Motors, Reno

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



IMPROVED TIMBER CONSTRUCTION WITH Bethlehem Timber Bolts

Fastenings in this timber-constructed highway bridge in King County, Wash., were made with Bethlehem Improved Timber Bolts.

In bridge construction like this or in fabrication of timber trusses these bolts offer worth-while advantages.

Low cost installation. One man can make the fastening. The underside of the head has four lugs that prevent the bolt from turning.

Weight savings. The large shallow head eliminates one washer and permits the use of a shorter bolt body.

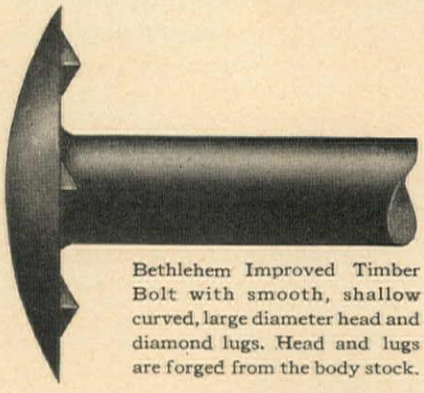
Safety. The shallow curved head offers no dangerous obstruction to traffic along bridge decks, guard rails and hand rails.

Improved appearance. The head is so nearly flush with the timber there is no unsightly projection to mar the looks of the finished job.

These bolts are available in a range of sizes suitable for any type of timber construction.

Bethlehem Pacific is the largest bolt and nut manufacturer in the West, with plants at Seattle, South San Francisco, Los Angeles.

Close-up of Bethlehem Improved Timber Bolts installed. Note the smooth clean appearance.



Bethlehem Improved Timber Bolt with smooth, shallow curved, large diameter head and diamond lugs. Head and lugs are forged from the body stock.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

General Offices: San Francisco

Sales Offices: Los Angeles, Portland, Seattle, Salt Lake City, Honolulu

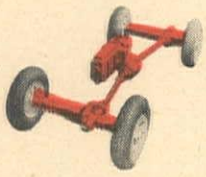
BETHLEHEM PACIFIC

★ BETHLEHEM STEEL ★

FWD... THE One TRUCK FOR Many JOBS IN All SEASONS

FOUR-WHEEL-DRIVE

A "Plus" that Pays in Many Ways



Road Construction... Patrolling Maintenance... Material Hauling... Earth Moving, Heavy-Duty Hauling... Snow Clearing

In all seasons, FWDs are dependable all-purpose trucks... rugged and able on scores of heavy-duty jobs in highway construction and maintenance. Whether it's new highway construction or seasonal maintenance work, grade blading, heavy hauling, snow clearing or emergency jobs demanding better than usual truck performance, rely on FWDs to do the work with speed, safety, economy.

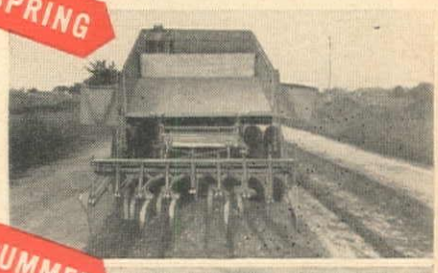
FWDs are a great "buy" for highway service because they are engineered to make the most of the advantages of four-wheel-drive power and traction on all wheels... engineered with center differential to provide the highest development of the true four-wheel-drive principle... engineered to equalize working-strains over two driving axles... engineered to balance power and load distribution. Through 36 years of reliable, proved performance, FWDs have become the first choice of highway authorities.

See your FWD dealer, or write for information on FWD trucks now available.

THE FOUR WHEEL DRIVE AUTO CO., Clintonville, Wisconsin

Canadian Factory: KITCHENER, ONTARIO

SPRING

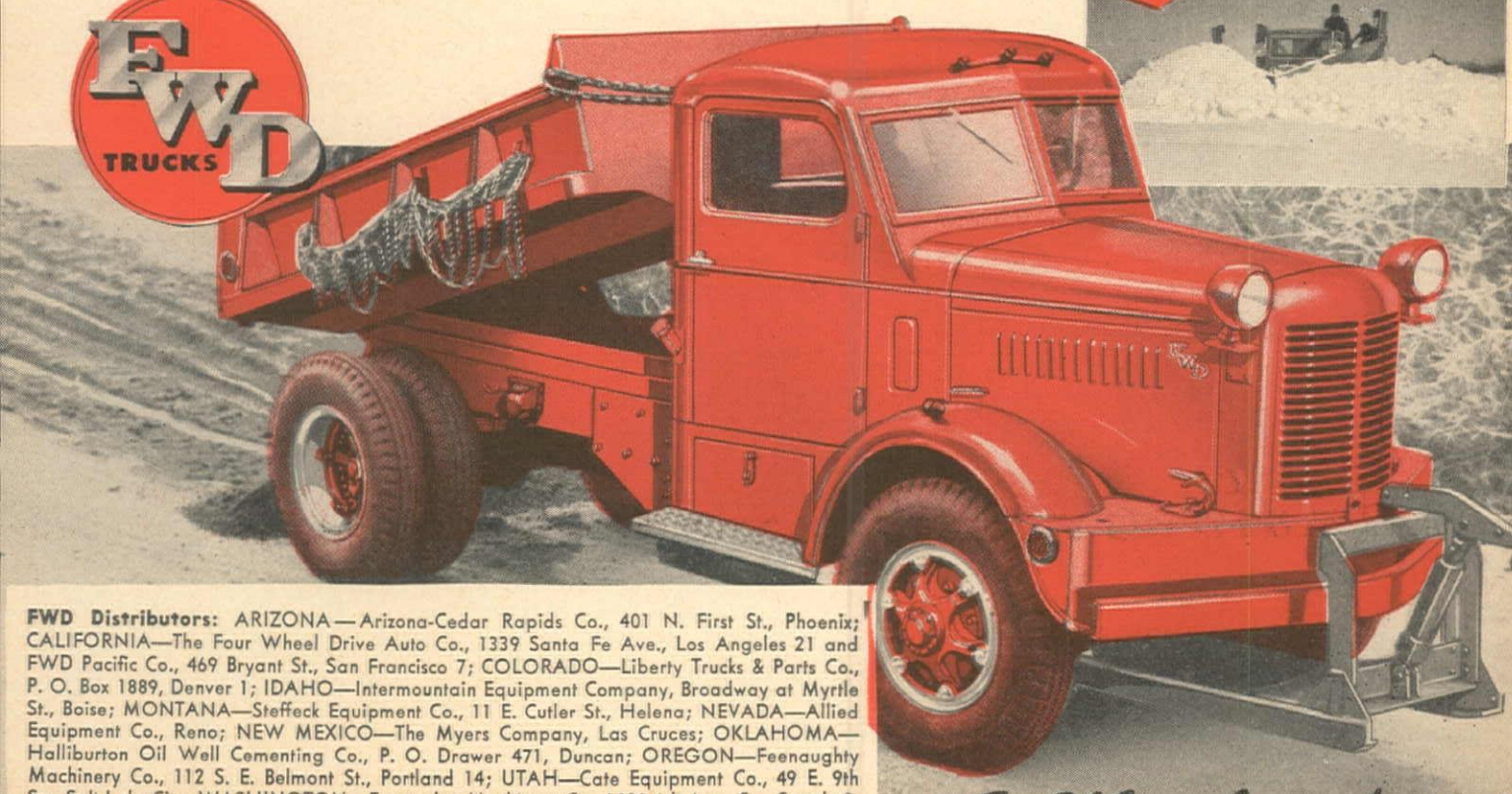


SUMMER

FALL

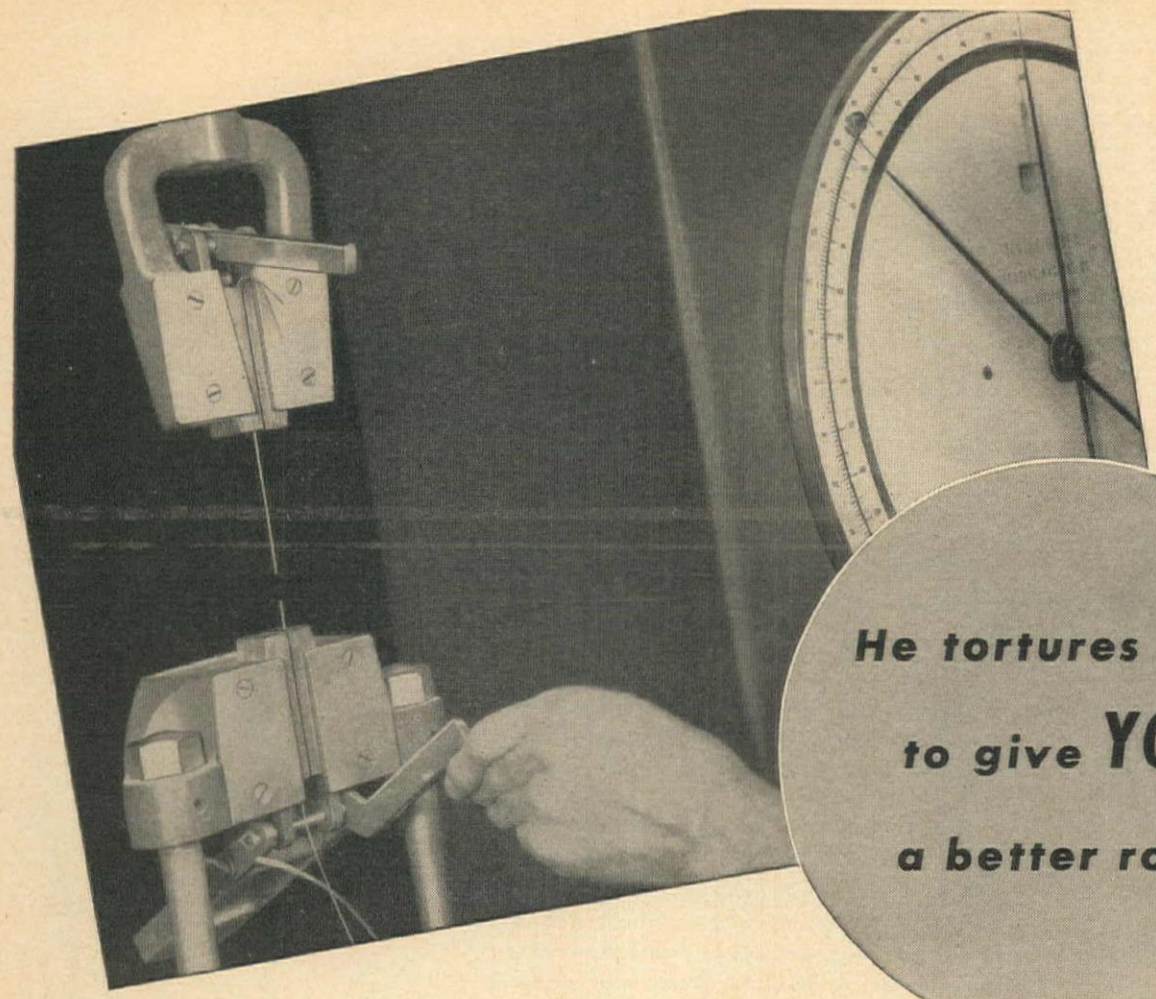
WINTER

FWD 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. Cutler 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—Fenaughty 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.

For 36 Years Owners have said:
"FWDs - The Best Trucks Built"



He tortures wire to give YOU a better rope

This Macwhyte laboratory technician is working in *your* interest. He gives the strength test to samples from each end of every coil of wire we make. Each sample is stretched to the breaking point. If it passes the test, the coil is tagged OK and used for Macwhyte Wire Rope. If not up to standard, the wire is rejected.

To make sure Macwhyte Rope will give you maximum service, the finished wire is also given a torsion or twist test to check its stamina. Granular structure is analyzed by a microscopic camera. Wire samples are rotated in an arc by a special machine that checks their ability to withstand fatigue.

Strict metallurgical control is another reason you can always depend on Macwhyte Wire Rope for long, economical life.

Make MACWHYTE your headquarters for WIRE ROPE and SLINGS

Macwhyte Wire Rope Catalog, G-15. 170 pages. Lists Macwhyte's full line, gives complete manufacturing story. Ask any Macwhyte representative or write Macwhyte Company.

MACWHYTE COMPANY

Wire Rope Manufacturers

2909 Fourteenth Avenue, Kenosha, Wisconsin

Mill Depots: New York · Pittsburgh · Chicago ; Minneapolis · Fort Worth
Portland · Seattle · San Francisco · Los Angeles
Distributors throughout the U. S. A. and other countries

★ ★ ★ ★

MACWHYTE PREformed and Non-PREformed Wire Ropes—Internally Lubricated . . . MONARCH WHYTE STRAND Wire Rope . . . Special Traction Elevator Rope . . . Braided Wire Rope Slings . . . Aircraft Cables, Assemblies and Tie-Rods . . . Stainless Steel Wire Rope, Monel Metal Wire Rope, Galvanized Wire Rope.

MACWHYTE COMPANY 50th Year 1896 – 1946

NO. 859

Meet the "IRON QUINTS"

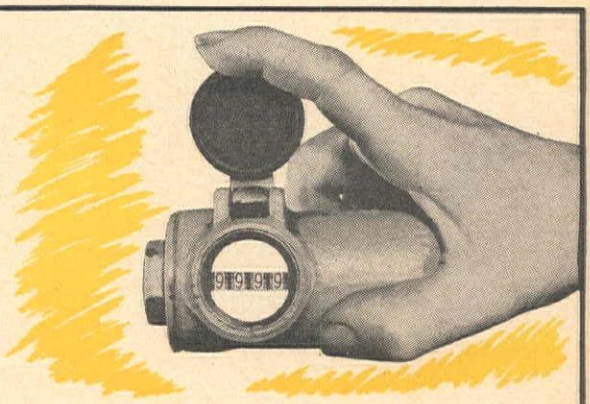
FIVE "Caterpillar" Diesel D8 Tractors started stripping anthracite coal at Plymouth, Pa., in the fall and winter of 1941. Up to March 15, 1946, the work records of the five machines, taken direct from their hour-meters, were as follows:

D8	1H9384	21,159 hours
D8	1H9236	21,733 hours
D8	1H9930	20,936 hours
D8	8R134	20,717 hours
D8	1H9730	22,485 hours

That adds up to a total of 107,030 hours of the toughest kind of work—ripping and bulldozing rocky overburden—loading and hauling 30-yard scrapers—climbing stiff grades—running in gritty mud and on slippery shale. Together, at a low estimate, the five units have moved 5,000,000 yards of earth and rock!

In the words of Paul Goddard, General Superintendent for Carey, Baxter & Kennedy, Inc., the owners—*"There's just nothing to compare a D8 with!"*

CATERPILLAR TRACTOR CO., San Leandro, Calif.; Peoria, Ill.



Why does "Caterpillar" put an hour-meter on all its engines? Because the men who build those "Caterpillar" Diesels are willing to back the long life of their product against all comers.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

Announcing the Appointment of

WESTERN MACHINERY COMPANY

Phoenix, Arizona and Salt Lake City, Utah

as Distributor for

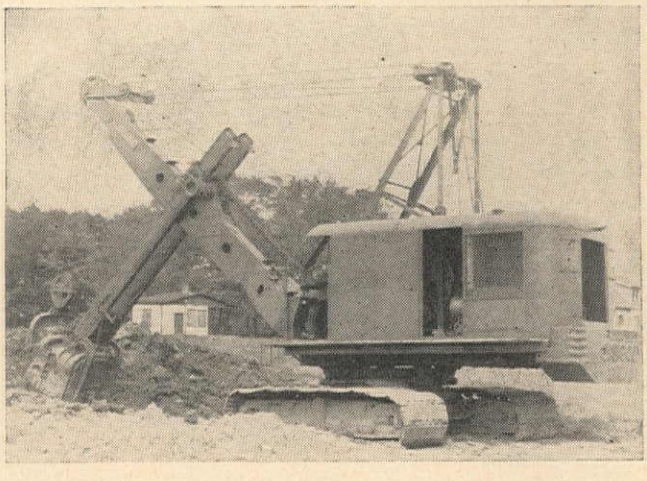
The OSGOOD Company *and* The GENERAL Excavator Co.

in

Arizona, Utah, Eastern Idaho and Western Wyoming

We take particular pride in announcing the appointment of Western Machinery Company, Phoenix, Arizona, and Salt Lake City, Utah, as distributors of OSGOOD and GENERAL construction, excavating and materials handling equipment. This latest addition to the list of OSGOOD-GENERAL distributors will provide users of OSGOOD and GENERAL equipment with convenient sales and service facilities in this territory.

Both of these distributors carry a full staff of trained servicemen and sales engineers. Enlargement of present warehouse facilities is now underway and the personnel at both branches is being increased to assure prompt, efficient service. Complete information on the many new models of power shovels, cranes, draglines, backhoes and allied equipment now being developed and produced by The OSGOOD Company and The GENERAL EXCAVATOR Company may be obtained at both the Phoenix and Salt Lake City offices of Western Machinery Company.



CRANES • SHOVELS • DRAGLINES • CRAWLER AND PNEUMATIC-TIRE MOUNTED

ONE-MAN CONTROLLED • ONE-ENGINE OPERATED • RUBBER-TIRED

THE OSGOOD CO. MOBILCRANES

CRANES - SHOVELS MARION, OHIO OSGOOD GENERAL

THE GENERAL EXCAVATOR CO. SUPERCRANES

MARION, OHIO

FOR DETAILS, CONTACT General Machinery Co., Spokane 1, Washington; Wood Tractor Co., Portland 14, Oregon; M. M. McDowell & Sons, Seattle 5, Washington; Power Equipment Co., Denver 5, Colorado; Hyman-Michaels Co., Los Angeles-San Francisco, California

GENERAL ELECTRIC

Announces . . .

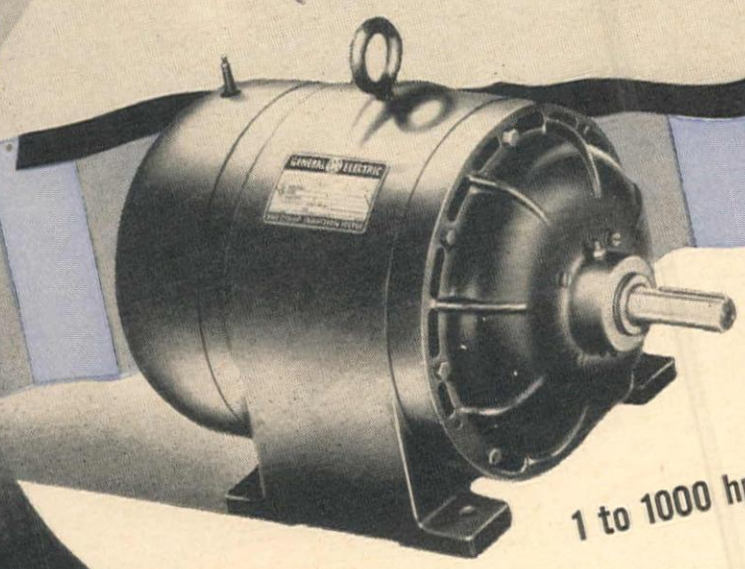
NEW

Totally Enclosed TRI-CLAD MOTORS

In 1940, G.E. introduced the Tri-Clad open motor—with emphasis on the feature that industry wanted most in a motor, *protection.* Since then, more Tri-Clads have gone into service than any other integral-horsepower motor.

Today, we are ready with a new line of Tri-Clad motors—*totally enclosed, fan-cooled motors*—built on Tri-Clad design principles in both standard and explosion-proof types.

We believe that these are industry's most dependable motors. They are designed specifically for use in many adverse atmospheres—in iron dust, outdoors, in hazardous areas, and chemical atmospheres. Their scope of application is as wide as the field of industrial motor use. Safe-guarded against most sources of motor damage, their longer life and lower maintenance will make them economical motors for use on almost every job. *General Electric Company, Schenectady, N. Y.*



1 to 1000 hp

COMPLETE ENCLOSURE FOR PROTECTION AGAINST DIRT, DUST, AND WEATHER

SPEED TO SPARE!

ON LONG & SHORTER HAULS

One of a fleet of TERRA-COBRAS operating on a Trans-Pacific air base on the West Coast

Wooldridge Terra-Cobra self-propelled earthmovers consistently maintain speed up to 21 m.p.h. fully loaded. Positive two-wheel steering control eliminates the necessity of slowing down for rough travel, sharp turns, passing on narrow strips, or spreading on soft fills. Faster round trips from cut to the fill result in greater total yardages at a higher profit and lower yardage cost. *Investigate fully, today.* Write for complete Bulletin TA-425.

WOOLDRIDGE
EARTHMOVING EQUIPMENT
Includes

★ **SCRAPERS**
Tractor-drawn for handling heaping yardages from 6 to 28 cu. yds.

★ **POWER CONTROL UNITS**
Single and multiple drum with universal or roller fairleads.

★ **BULLDOZERS**
Tough and rugged design for standard makes of tractors.

★ **TRAILBUILDERS**
Adjustable angle blades for standard tractor mounting.

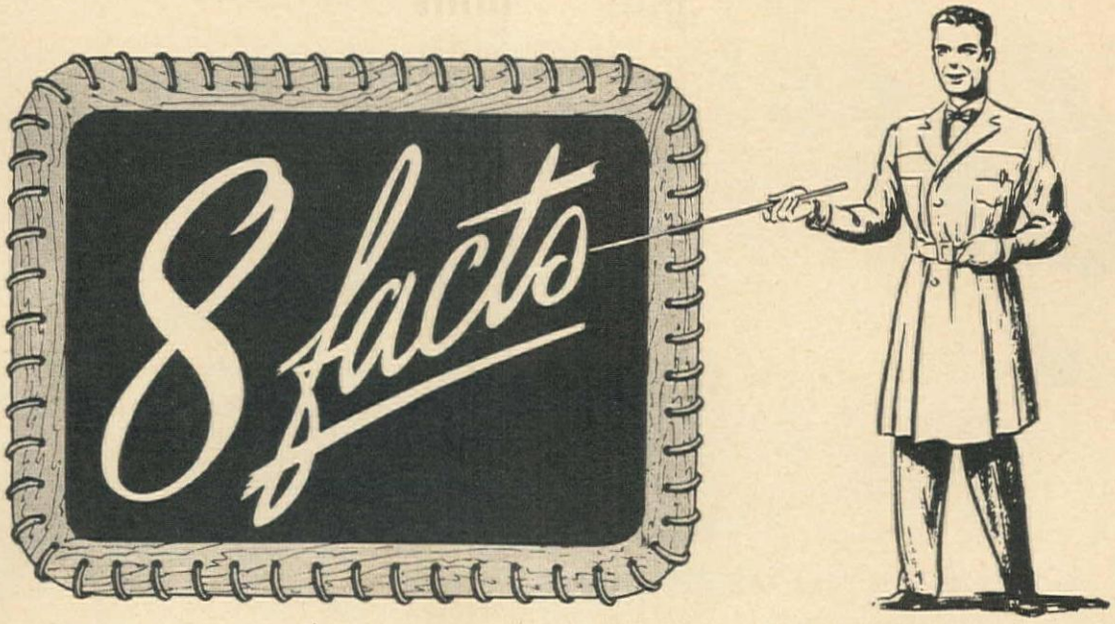
★ **RIPPERS**
Available in light, medium and heavy duty models with two sizes to each model.

DISTRIBUTOR SALES & SERVICE FACILITIES IN ALL PRINCIPAL AREAS & FOREIGN TERRITORIES

WOOLDRIDGE
MANUFACTURING COMPANY
SUNNYVALE · CALIFORNIA · U. S. A.

TERRA COBRA

Hi-Speed Self-Propelled EARTHMOVERS



about TENOL 800, Richfield's *NEW*, HEAVY DUTY, ALL PURPOSE MOTOR OIL

1. Strong protective film prevents seizure at high temperatures and speeds.
2. Perfect piston "seal" provides greater engine load-carrying capacity.
3. Stands up under high temperatures, flows easily in cold weather.
4. Resists formation of gums, sludge, and carbon on vital engine parts.
5. Resists foaming in crankcase and air cleaner insuring constant oil supply.
6. Non-corrosive to bearings, resists acid formation caused by blow-by.
7. Prevents ring sticking, no scoring of cylinder walls and pistons.
8. Provides cleaner engines, insuring maximum motor performance.

For gasoline—diesel—propane—butane—and natural gas engines.

THERE IS A SCIENTIFIC RICHFIELD LUBRICANT FOR EVERY MACHINE IN EVERY TYPE OF SERVICE

RICHFIELD

J&L Wire Rope is made with precision by skilled men with the same patient attention to detail, the same insistence upon quality material, as the best hand-made match piece.

J&L Permaset Wire Rope is pre-formed to give it longer life. It hits the target on service. Write for more information.

J&L STEEL

JONES & LAUGHLIN STEEL CORPORATION

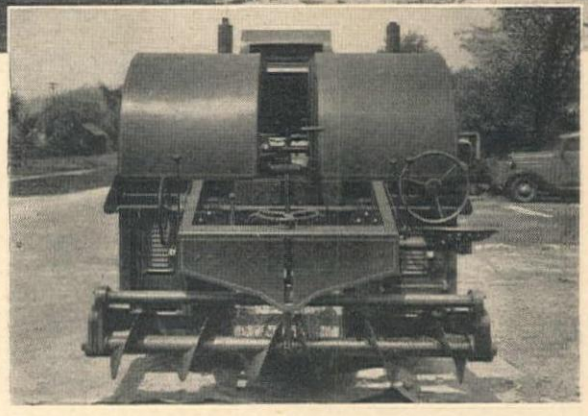
GILMORE WIRE ROPE DIVISION

PITTSBURGH 30, PENNSYLVANIA

J&L *Precisionbilt* PERMASET PRE-FORMED WIRE ROPE

MOTO-PAVER

The Last Word in Asphalt Mixing and Paving



A Complete Traveling Asphalt Mixer and Paver

Engineered and built by America's oldest manufacturers of asphalt mixing equipment, the H & B MOTO-PAVER has been designed to meet the present day need for a highly flexible, mobile and efficient traveling mixer and paver in one self-contained, self-propelled unit.

The MOTO-PAVER mixes, spreads and lays any type of mixed-in-place bituminous material to any road width, thickness and crown condition. No separate loader, spreader or other paving equipment is required—no trailer to haul it from one job to another. The MOTO-PAVER does the *complete mixing and paving job,* and travels from one job to another under its own power.

Mounted on pneumatic tires, the MOTO-PAVER is powered by two gasoline engines—one driving the mixer and related units, the other driving the machine along the road. Paving speed is from 4 to 50 feet per minute, road speed up to 18 miles per hour. Mixing capacity is 100 to 120 tons per hour. The MOTO-PAVER will handle all but the highest types of bituminous concrete.

Especially suitable for resurfacing trunk roads and streets of smaller municipalities, the MOTO-PAVER is also an efficient unit for new construction work on roads, streets, airports, parking lots, driveways, etc. Bulletin MP-46, giving complete information and specifications, will be sent on request.

HETHERINGTON & BERNER INC.
739 Kentucky Ave., Indianapolis 7, Indiana

Hetherington & Berner

BUILDERS OF PORTABLE AND STATIONARY ASPHALT PLANTS OF ALL TYPES AND CAPACITIES

THE TRUTH ABOUT

UNTIL now, you've heard about Aquella from everybody but us. First...there was Kurt Steel's absorbing article ("Dry Cellars") in the December 15, 1945 issue of Forbes Magazine.

Second...there was the condensation of this same article which appeared under the caption "Water Stay Away from My Wall" in the January issue of the Reader's Digest.

Third...there was a flood of anonymous letters containing garbled references to a Federal Trade Commission complaint, as well as a copy of a letter dated December 29th, 1945, which purported to have come from the Director of the United States Bureau of Standards.

Why you've not heard from us until now...

In the first place, we were far too busy getting out production to meet the nationwide demand for Aquella. Thousands wanted to be Aquella distributors. Thousands wanted to be Aquella dealers and contractors. And many, many thousands more wanted to buy Aquella for homes, institutions, and factories. Aquella had captured the public's imagination overnight.

Furthermore, at first we thought that this anonymous attack was just the work of some small, misguided competitor. Then, when the vast extent of the campaign became apparent, we conducted an investigation into the source and motives behind the attack.

The complete details and documentary evidence are to be found in our brochure "The Truth About Aquella."

The Bureau of Standards never intended to discredit Aquella

On December 29, 1945, an unsigned letter came from the office of the United States Bureau of Standards written to Forbes Magazine and the Reader's Digest, protesting the publication of Mr. Steel's article.

After the Director of the Bureau was informed this letter was being reproduced and circulated by the hundreds of thousands for the purpose of disparaging Aquella, the Bureau refused to permit further public distribution of copies.

What the Bureau then did was to write *other letters* stating that the communication of December 29, 1945 was not intended to discredit Aquella.

Nevertheless, thousands of copies of that early letter still continued to be circulated through "mysterious sources."

The complete details and documentary evidence are to be found in our brochure "The Truth About Aquella."

AQUELLA...

The Controversy over "Waterproofing" before the Federal Trade Commission

For sometime back there has been a controversy between the Federal Trade Commission and the waterproofing-industry-at-large concerning the use of the word "waterproof" in advertising. What it boils down to is a definition of the word "waterproof" and not any misstatement of fact. Members of the Commission have their definition; those in the waterproofing industry have theirs. The maker of Aquella was only one of many firms that were cited on the issue.

This issue was raised almost a year ago and a complete answer was promptly filed. No further action was taken.

In the meantime, however, there emanated from the same "mysterious sources," thousands of notices of the Commission's citation—with the dateline conspicuously omitted.

The complete details and documentary evidence are to be found in our brochure "The Truth About Aquella."

Now about AQUELLA itself!

From the time it proved itself on the French Maginot Line, Aquella has demonstrated its effectiveness against moisture and seepage in thousands of instances, in various types of masonry construction. There is no single instance where Aquella has ever failed *when properly applied!*

Further, we are continuing permeability tests under hydrostatic pressures which far exceed any that were ever used on Aquella by the Bureau of Standards.

Complete Documentary Evidence for you!

We have prepared a fully documented brochure which contains the complete story of Aquella.

If you are in the waterproofing industry...if you sell waterproofing...if you are counseling customers or clients on waterproofing...or if you are a buyer of waterproofing materials, you owe it to yourself to know the truth!

A copy of this brochure is yours for the asking. Simply write us on your letterhead.

PRIMA PRODUCTS, INC.

NATIONAL DISTRIBUTORS

Dept. M, 10 East 40th Street, New York 16, New York

WARCO
HYDRAULIC CONTROL MOTOR GRADER

DISTRIBUTED BY

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Sorensen Equipment Co. ..... Oakland 1, California
Contractors Equipment & Supply Co., Albuquerque, N. M.
Smoot Machinery & Supply Co. .... Salt Lake City 5, Utah
Feenaughty Machinery Co. ..... Boise, Idaho; Portland, Oregon; Seattle and Spokane, Washington

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ROAD ROLLERS

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MANUFACTURED BY

W. A. RIDDELL CORP.

BUCYRUS · · · OHIO

"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.

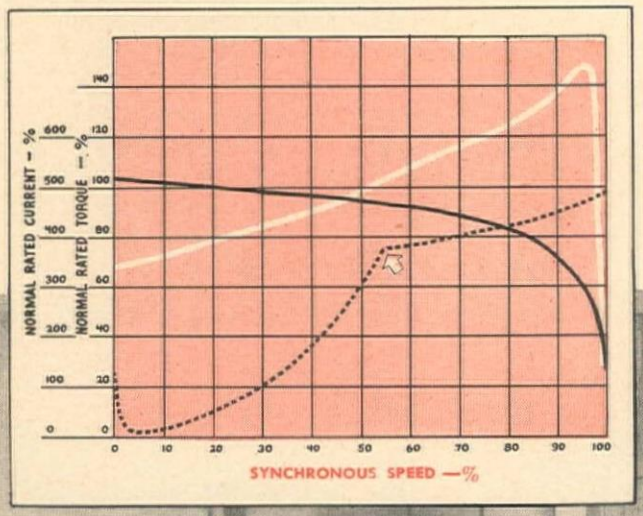
G.E. finds the answer

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.

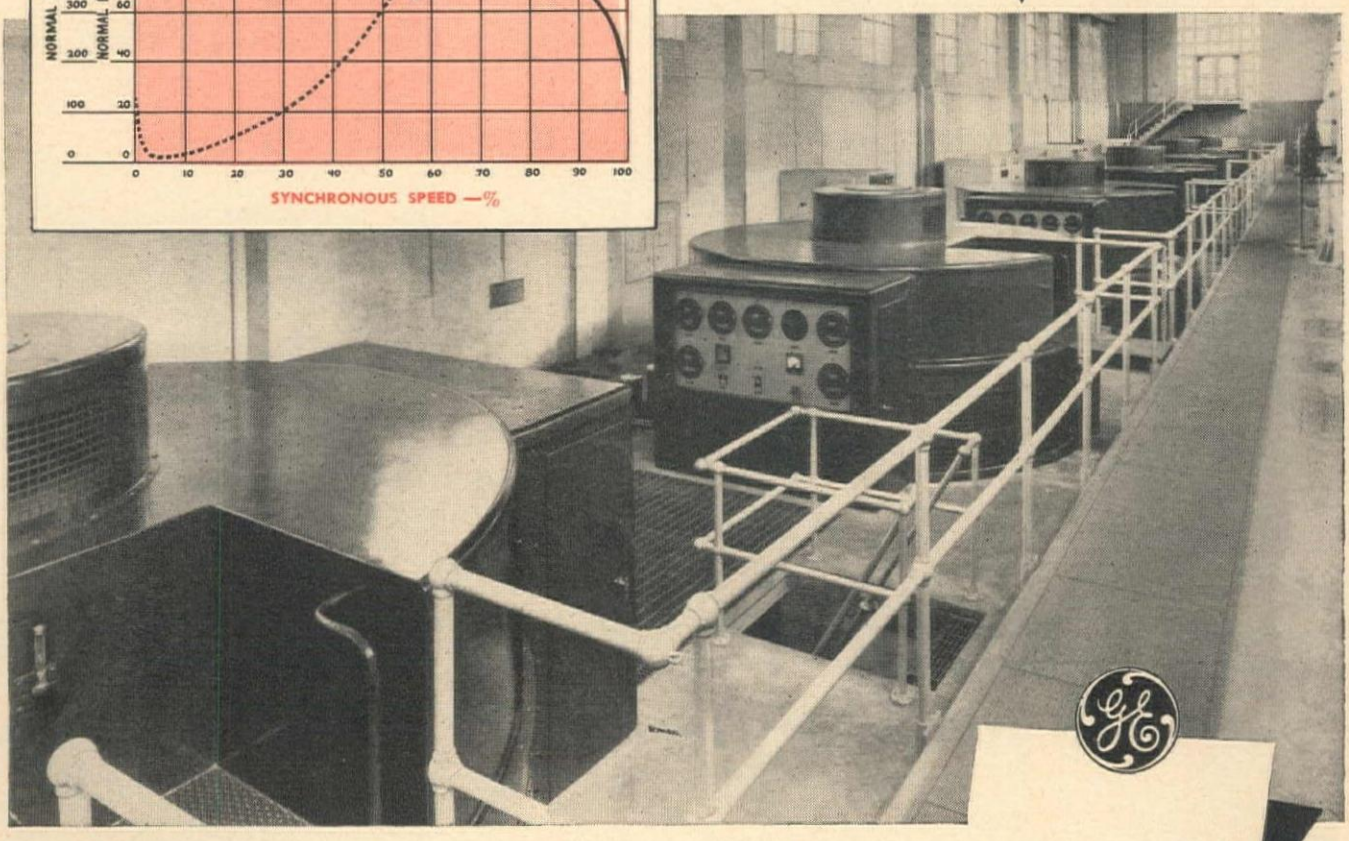
For jobs of every size

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.*



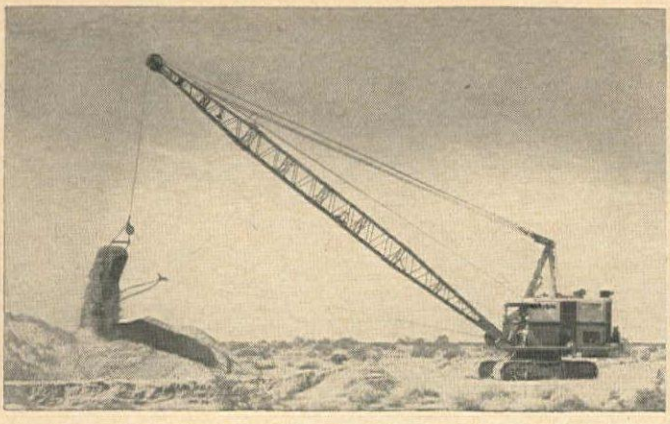
◀ ***TEST RESULTS,*** showing how motor-torque and -current characteristics matched pump requirements and the characteristics of the power supply.

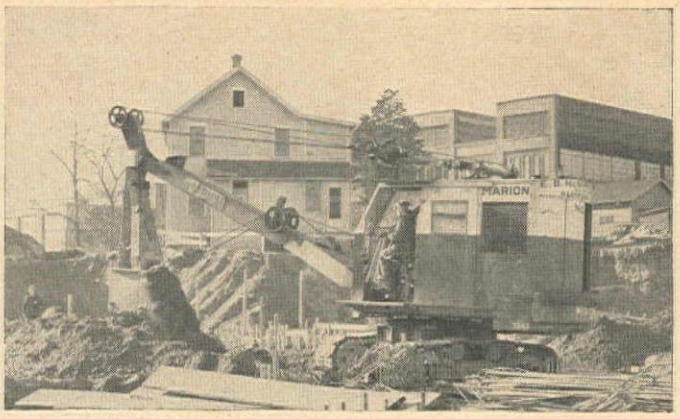
THE MODERN GOOD LOOKS of G-E synchronous motors match their outstanding electrical behavior. A feature of this installation is the use of built-in gage boards with instruments for recording bearing, winding, and cooling-water temperatures. ▼



GENERAL ELECTRIC

750-252-8030

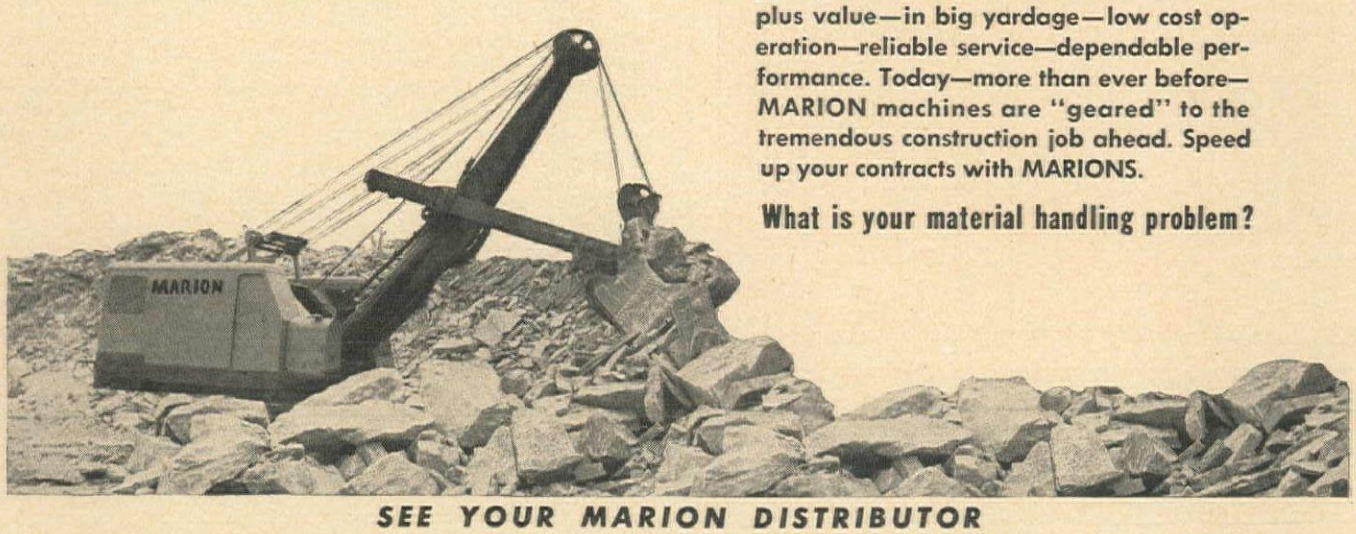




Tough Jobs Are Easy For MARIONS

Watch a MARION at work. See how it takes the toughest kind of digging in its stride. It has been doing this for 63 years—giving every buyer of MARION shovels plus value—in big yardage—low cost operation—reliable service—dependable performance. Today—more than ever before—MARION machines are "geared" to the tremendous construction job ahead. Speed up your contracts with MARIONS.

What is your material handling problem?



SEE YOUR MARION DISTRIBUTOR

Edward R. Daley, Marion Power Shovel Company, 571 Howard St., San Francisco 5, Calif.; Joseph O. Reed, Marion Power Shovel Company, 2504 N. E. Hoyt Street, Portland 12, Ore.; Star Machinery Co., 1741 First Ave., South, Seattle 4, Wash.; Shaw Sales & Service Co., 5100 Anaheim Telegraph Road, Los Angeles, Calif.; H. H. Nielson, 541 W. 2nd South St., Salt Lake City, Utah.

MARION

POWER SHOVEL COMPANY

MARION, OHIO, U. S. A.

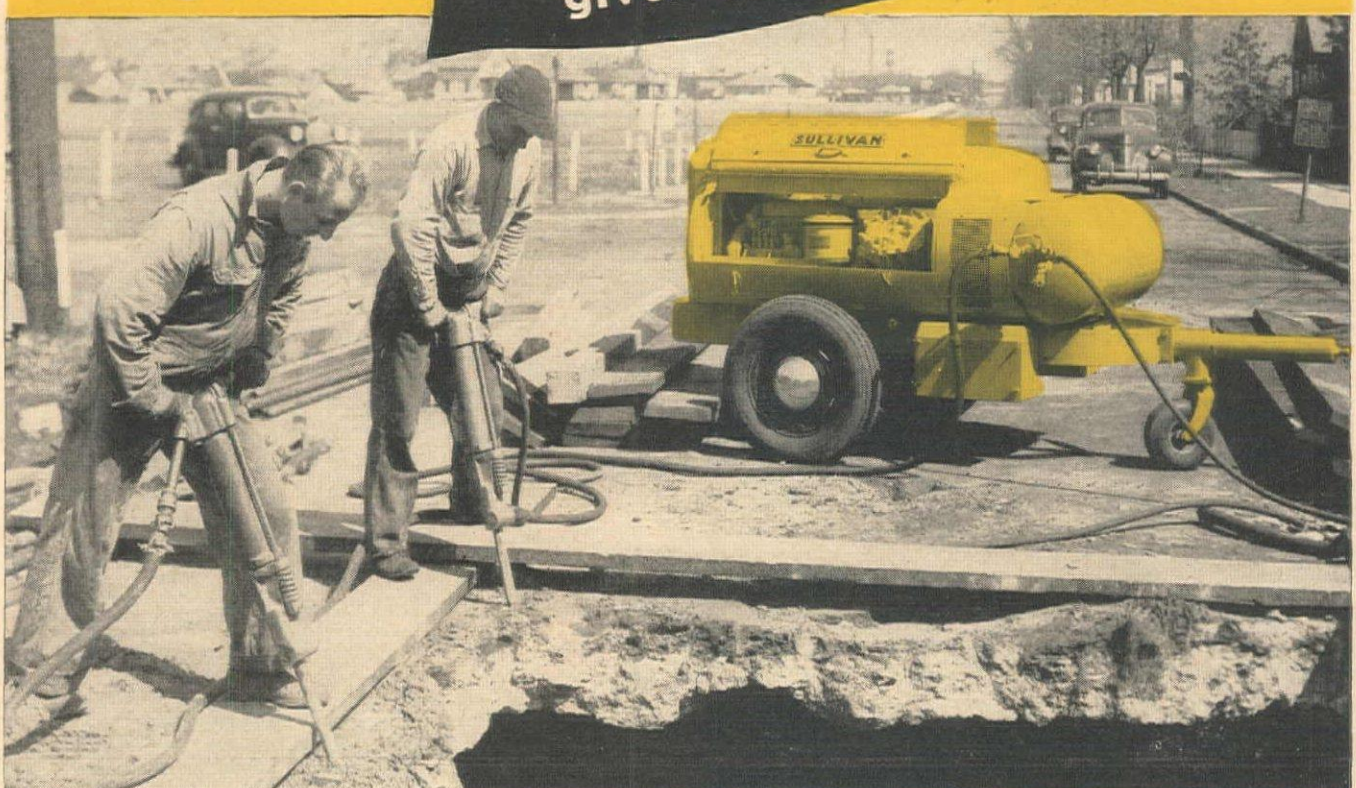
Offices and Warehouses in all Principal Cities from ¾ cu. yd. to 40 cu. yds.

Note: Marion Power Shovel Company—Formerly The Marion Steam Shovel Company—Established 1884.

portability
efficiency
low maintenance
reliability
pride of ownership

the NEW SULLIVAN Series 80 Portable Air Compressor

gives you all FIVE!



FINER ENGINEERING

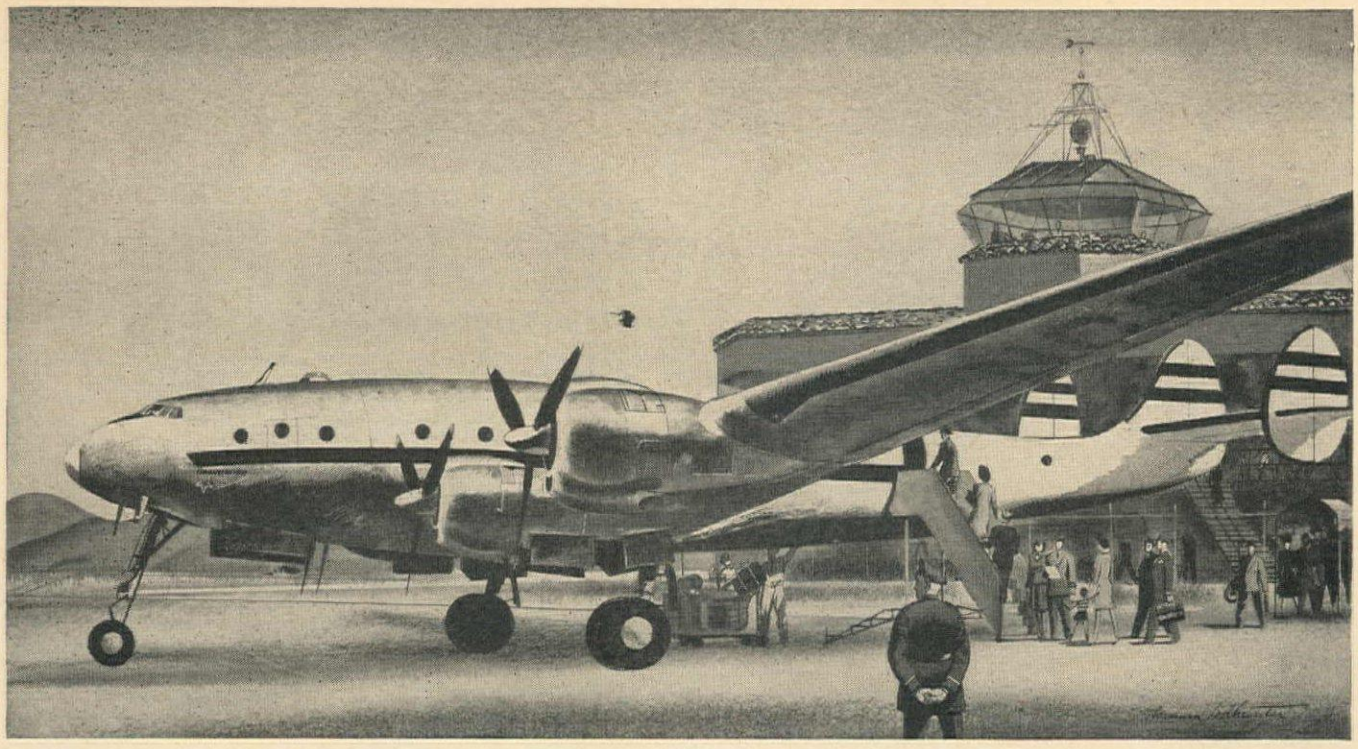
Matched engine • Direct-concentric valves • Two-stage compression • "Econo-Miser" load control • Improved air cooling • Drop center axle • "Flexi-plane" drawbar • Liberal bearing surfaces • Cross-flow intercooler • Full force-feed lubrication • "Cascade" oil cooling • Electric starters • "Bulkhead" body construction • Slow piston speeds • Lightweight pistons • Oil bath air cleaners • Oversize air receiver.

From the moment you push the starter button of a new Sullivan Series 80 you'll know that here at last is everything you've always wanted in a portable air compressor—efficiency that keeps your costs down, portability that makes it easy to move on the job, low maintenance that means more profits, reliability that keeps it on the job, and pride of ownership that you get from having the world's most modern air compressor.

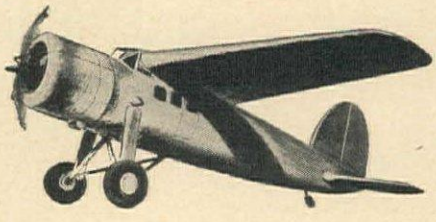
The new Sullivan Series 80 is offered with gasoline or diesel engines in 105, 160, 210, 315, 500 and 630 C.F.M. capacities and with gasoline engine only in 60 C.F.M. capacity. See your nearest Sullivan distributor for more details or send for Bulletin A-55. **Sullivan Division, Joy Manufacturing Company, Michigan City, Indiana. In Canada: Canadian Sullivan Machinery Co., Ltd., Dundas, Ont.**

SULLIVAN

THE WORLD'S MOST MODERN PORTABLE COMPRESSED-AIR PLANT



We made our record IN THE AIR by keeping our feet ON THE GROUND...



In the late 20's we shared Lockheed's thrill in their new Vega—our Finishes were on that ship. Today, Lockheed's Constellation is another air-world sensation. She, too, flies with Fuller Aircraft Finishes!

There's more. Fuller Finishes are on the Douglas DC-6, on Consolidated Vultee's Convair and on the Boeing Stratocruiser.

Our continuing leadership in Aircraft Finishes comes directly from our strict laboratory and field procedure on ALL industrial products. This: "Know the *whole* problem to get the *complete* answer."

All Fuller Aircraft Products now are available in any quantity for private use. Inventories on other Industrial Finishes are being increased as rapidly as materials permit. W. P. Fuller & Co. Factories in San Francisco, Los Angeles, Portland; Branches, Warehouses in principal Western cities.

FULLER *Industrial* FINISHES

FULLER PAINTS they Last

THE WEST— AMERICA'S NEW INDUSTRIAL FRONTIER

FULLER pioneered in '49; became West's largest, most skilled paint makers. We're still pioneering in '46—with NEW products for our Western Industrial frontier!

MAINTENANCE FINISHES

In the field of factory maintenance, Fuller Color Engineering *puts color to work* . . . increases production profit through better employee safety, morale. Write for new, up-to-minute book, or have Fuller representative call with data.

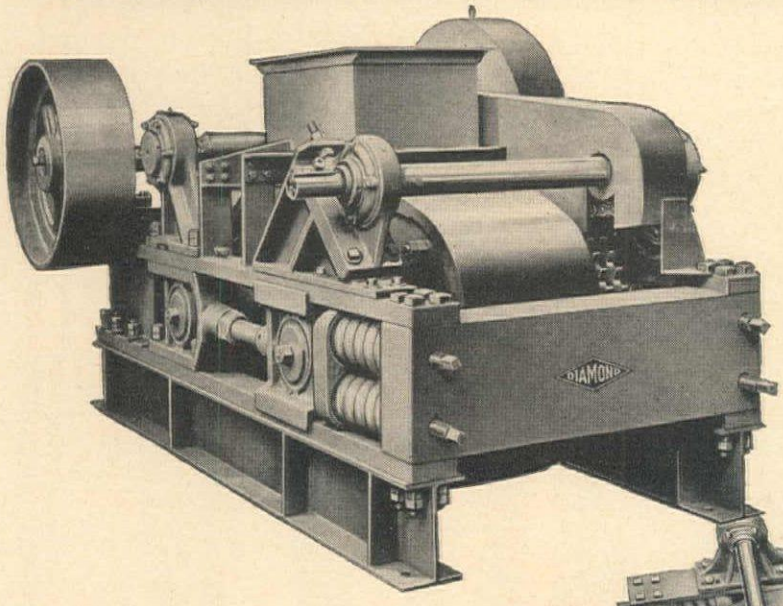
PRODUCTION FINISHES

Under the pressure of war needs, we telescoped years of research on the problems of Plywood finishing. Today, we feel we lead the field. Whether you're interested in sealing Plywood at a mill or in working out a finishing system in the shop, Fuller can give you the right answers.

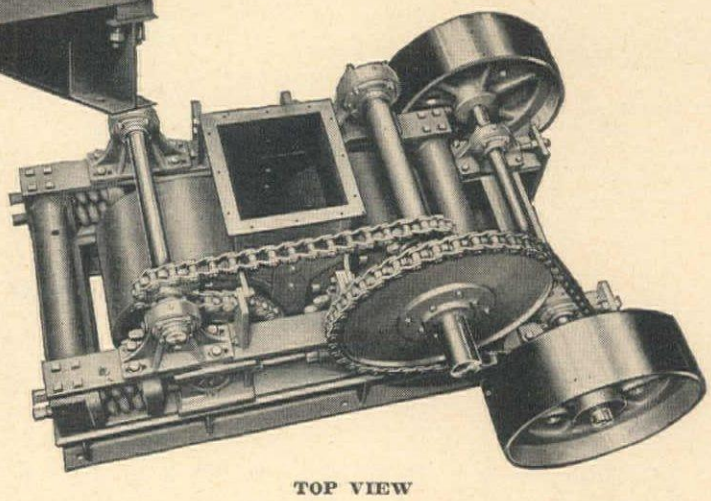
MARINE FINISHES

Mr. Boatbuilder: See Fuller! From a plastic laminated hull down to the lowly dory, we've got a finish for every purpose. (For sea-going ships, too!)

For Profitable Secondary Crushing
SELECT THE RUGGED
DIAMOND ROLL CRUSHER



THERE'S NOTHING TOUGHER THAN A DIAMOND



TOP VIEW

Here's the "NO SHUT-DOWN" Staying Power You Want— Ask any DIAMOND OWNER

With a DIAMOND Roll Crusher you can often double or triple your net profits on finely crushed aggregate. DIAMOND Roll Crushers are brutes for punishment—they stay on the job and roll out high tonnage month after month, year after year. There isn't a weak spot in the whole crusher—every part is extra strong. Each size has ample margin over its rated capacity. We repeat—ask any DIAMOND Owner! Six sizes roller bearing—four sizes plain bearing. Ask your DIAMOND Dealer, or write us for Bulletin D-45C.

OTHER DIAMOND PRODUCTS

Portable Crushing & Screening Plants
Portable Primary Crushing Plants
Portable Screening & Washing Plants
"DUAL-ACTION" Crushers
Jaw Crushers
Hammermills
Conveyors
Vibrating Screens
Scalping Screens
Drag Washers
Feeders
Bins—Hoppers
Grizzlies

DIAMOND DEALERS

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

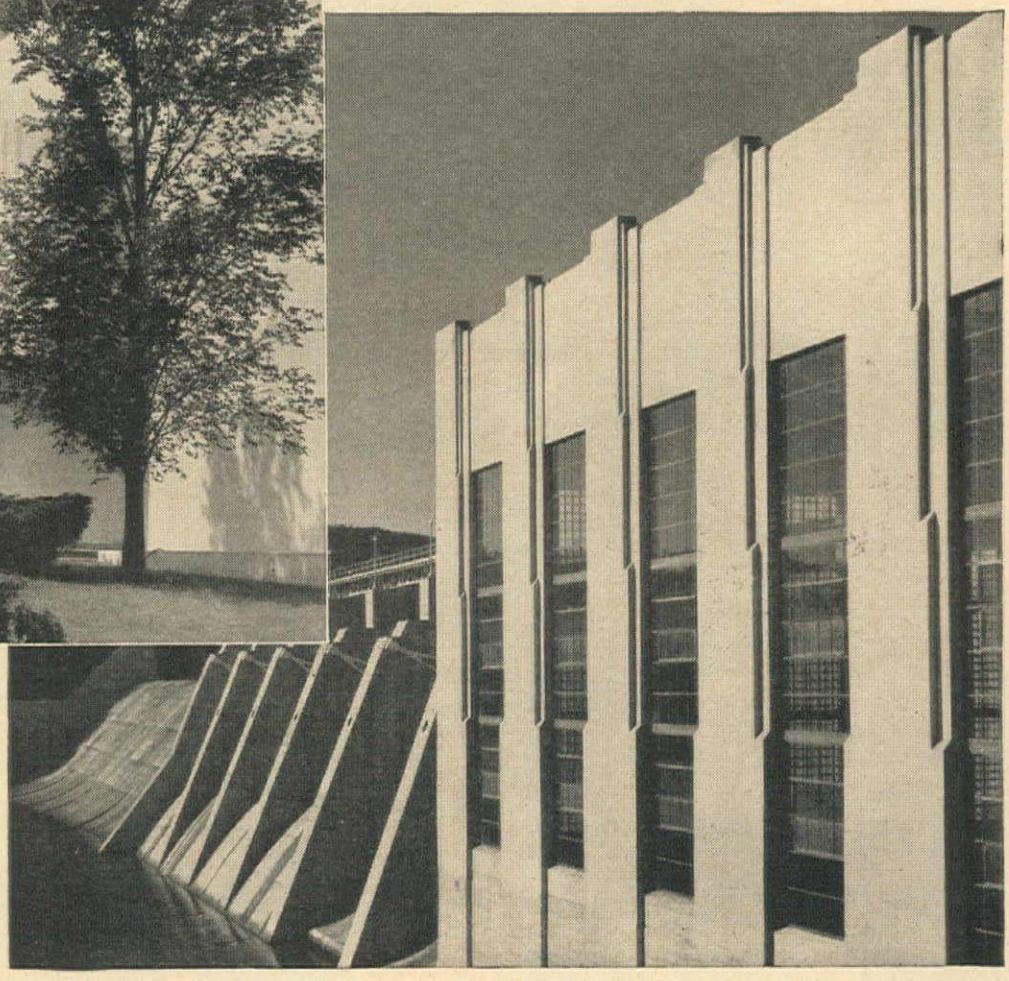
DIAMOND

DIAMOND IRON WORKS, INC.
AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINNESOTA

Architectural concrete radio transmitter building at Wheaton, Md., E. Burton Corning, architect, and George C. Martin, contractor, both of Washington, D.C.

Dam and power house at Austin, Texas, built by Lower Colorado River Authority.



ARCHITECTURAL CONCRETE

for communications and power

Architectural concrete is especially well suited for utility buildings. Such concrete structures retain fine appearance through years of hard service.

Architectural concrete meets the most exacting design and service requirements at reasonable cost. It combines both architectural and structural functions in one firesafe, economical material.

Maintenance cost is low because concrete provides the strength and durability for hard service and the most severe weather exposure.

In addition to the advantages of strength, firesafety, long life and distinguished appearance **—concrete gives owners *low annual cost*, the true measure of construction economy.**

Literature on recent design and construction practice with architectural concrete mailed free in United States and Canada. See Sweet's Catalogue 4F/3.

•

PORTLAND CEMENT ASSOCIATION

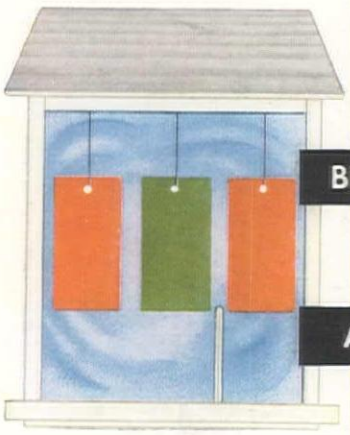
Dept. I 6-3, 816 W. Fifth St., Los Angeles 13, Calif.

A national organization to improve and extend the uses of concrete ... through scientific research and engineering field work.

BUY U. S. SAVINGS BONDS

NOW PROOF

SYNCRO-GREEN VS. RED LEAD



BEFORE

Red Lead
Alkyd Vehicle

Syncro-Green
Metal Primer

Red Lead
Pure Linseed Oil

AFTER

250 HOURS IN SALT SPRAY CABINET

ACTUAL REPRODUCTIONS OF TEST PANELS

Red Lead
Alkyd Vehicle

Syncro-Green
Metal Primer

Red Lead
Pure Linseed Oil

Tests were performed according to standard procedure of the American Society of Testing Materials, using a 20% salt solution at a constant temperature of 95 degrees Fahrenheit.

The United States Navy and Maritime Commission changed from red lead to zinc chromate primer because of its greater rust-resistance, toughness and adhesive film, quick drying and lower cost.

Now, Syncro-Green, the outstanding zinc chromate primer, is available to industry. Write today for complete information.

SYNFLEX
SYNCRO-GREEN
METAL PRIMER

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

Name_____

Company_____

Address_____

City_____ Zone_____ State_____

MANUFACTURED BY

ANDREW BROWN COMPANY 5400 DISTRICT BOULEVARD, LOS ANGELES 22, CALIFORNIA

244 CALIFORNIA ST., SAN FRANCISCO 11, CALIFORNIA • 1106 TWELFTH AVE., SEATTLE 22, WASHINGTON

Original Woodcut by Lynd Ward

When this tree was a sapling, more than a century ago, foundrymen cast gray iron into pipe which is still in service. Their methods were primitive compared with the highly developed production techniques by which U. S. Pipe is made today. And yet, because of the service records of their product, the estimated useful life of cast iron pipe has been steadily revised upward. Cast iron pipe combines in one material all the qualities required for long-lived service—strength, toughness and inherent high resistance to corrosion.

U.S.
cast iron
PIPE

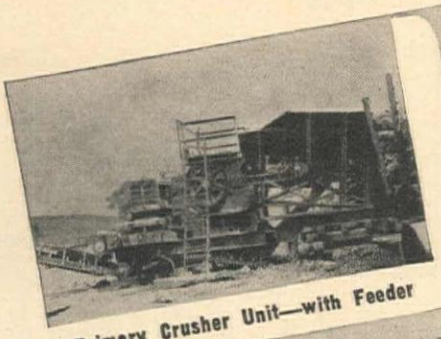
U. S. PIPE & FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices throughout the U. S. A.

ROCK or GRAVEL

crushed . . . sized . . . washed

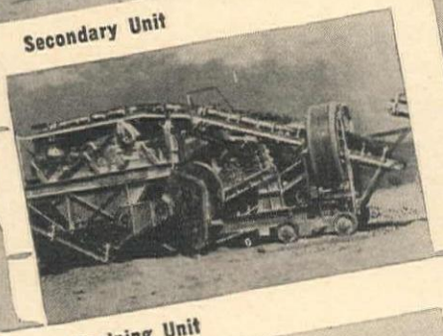
to fit any specification from rip rap stone to agstone

Cedarapids UNITIZED PLANT



Primary Crusher Unit—with Feeder

Secondary Unit



Scalping Unit

Washing & Sizing Unit

For crushed stone when medium sized stone has to be reduced to 1½" — and a certain size is to be scalped out. Use Units 2 and 3.

For crushed gravel. Use Unit 3 alone.

For washed gravel. Use Units 3 and 4.

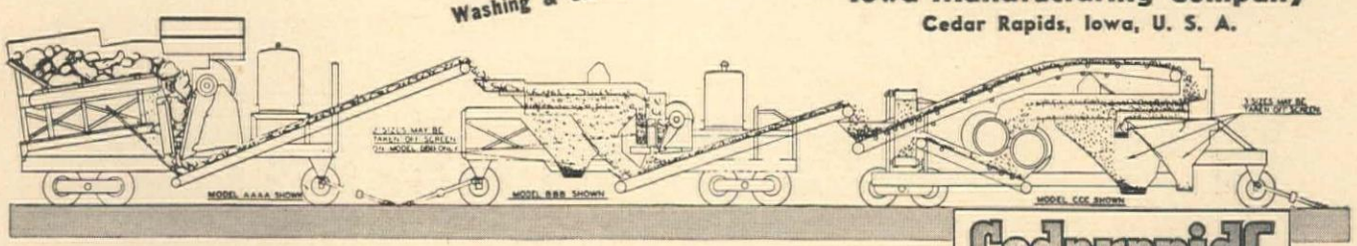
For crushed stone when big stone has to be reduced to 1½" — and a certain size is to be scalped out. Use Units 1, 2 and 3.

For crushed stone when finer sizes are not required — 25" rock down to 1½". Use Units 1 and 3.

Complete Crushing, Screening and Washing Plant. Use Units 1, 2, 3 and 4.

Each element of the Cedarapids Unitized Plant is a complete unit in itself balanced for high capacity and low cost, used alone or in any one of dozens of different combinations of matched units. You can start with a tandem straightline secondary plant and produce crushed gravel and add the other units as your demands increase. You can use a roll crusher, cone crusher, twin jaw crusher or Hammermill in the Secondary Unit. Each unit is portable so you can move just the equipment needed to do any particular job. Get the complete story from your nearest Cedarapids distributor. There's a size and type to fit every production requirement both as to volume and finished products. When buying a crushing plant—buy the best—buy Cedarapids.

Iowa Manufacturing Company
Cedar Rapids, Iowa, U. S. A.



Cedarapids

Built by IOWA

THE IOWA LINE *of Material Handling Equipment is Distributed by*

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

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

INTERMOUNTAIN EQUIPMENT CO.
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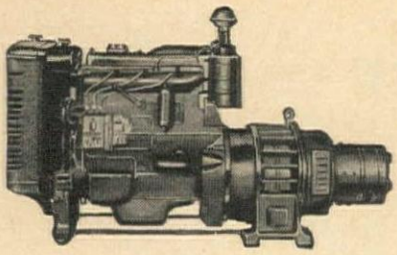
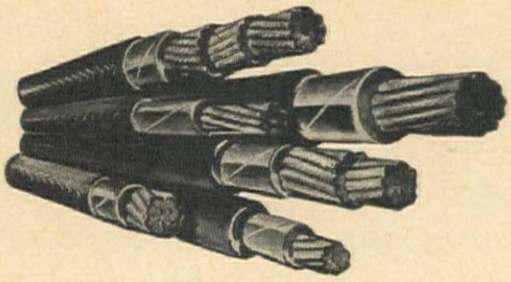


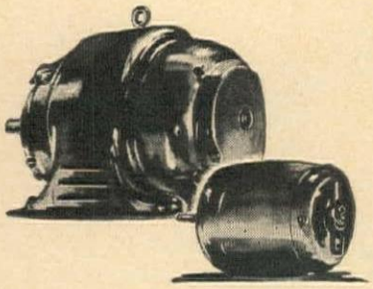
GENERATORS

If unit power generation is your problem, it will pay you to check our large lists of this type of equipment. We have gasoline, steam, Diesel and electric driven generators—(and generators without prime movers) in a wide range of load and voltage characteristics, in both a-c and d-c.



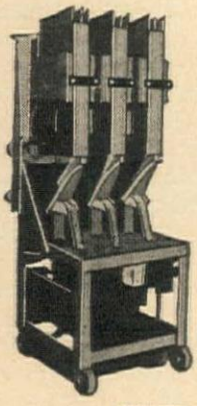
WIRE & CABLE

Our inventory includes an innumerable variety of wire and cable in sizes and insulations usable in industry. Many types conform to underwriters' specifications—others were made for special purposes but are adaptable to industrial and commercial applications.



MOTORS

We have a large supply of electric motors, both a-c and d-c, in unusual speeds, voltages and loads. If you have applications in which these motors can be adapted, inquire at your nearest Regional Office for full particulars and prices.



SWITCH GEAR

Special items in this category are now available if you can use them. Check your requirements and avail yourself of this opportunity to purchase switch gear at considerable savings. Consult your nearest W. A. A. office for description, location and prices.

STANDARD AND SPECIAL ELECTRICAL EQUIPMENT

FOR SALE

priced for immediate disposal

The War Assets Administration offers you government-owned surplus electrical machinery and equipment for your reconversion program at *substantially reduced prices.*

The offer includes wire and cable, generator sets, transformers, switch gear, wiring devices, sub-station power conversion and protective equipment. Much of it is special but adaptable to a large variety of uses.

It has been *priced to sell* and represents attractive bargains to the alert and resourceful industrialist engaging in speedy reconversion.

(Cut out and send to the nearest WAA office listed below)

War Assets Administration: I am interested in the following checked items:

- ☐ *WIRE & CABLE*
- ☐ *GENERATORS*
- ☐ *SWITCH GEAR*
- ☐ *SPECIAL ELECTRIC MOTORS*
- ☐ *WIRING DEVICES*
- ☐ *POWER CONVERSION EQUIPMENT*
- ☐ *SUB-STATION EQUIPMENT*
- ☐ *PROTECTIVE EQUIPMENT*

Name.....Tel. No.....

Firm.....

Address.....

City.....State..... 319-1

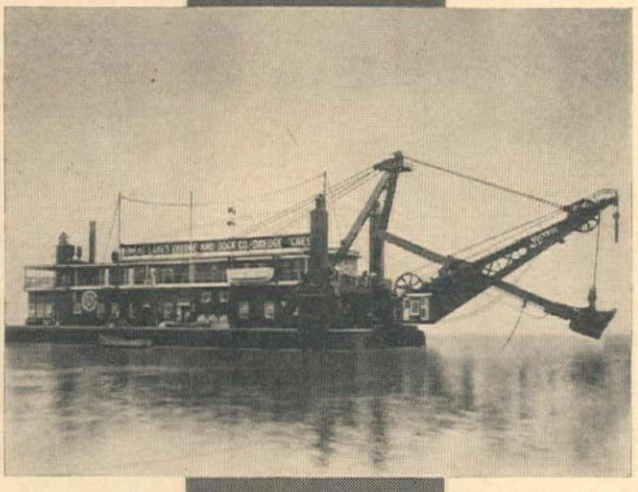
WAR ASSETS ADMINISTRATION

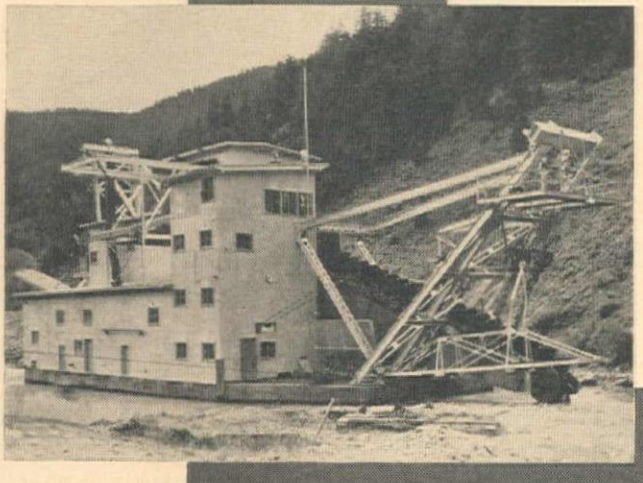
OFFICES LISTED BELOW ARE TEMPORARILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta • Birmingham • Boston • Charlotte • Chicago • Cleveland • Dallas • Denver Detroit • Helena • Houston • Jacksonville • Kansas City, Mo. • Little Rock • Los Angeles • Louisville Minneapolis • Nashville • New Orleans • New York • Oklahoma City • Omaha • Philadelphia Portland, Ore. • Richmond • St. Louis • Salt Lake City • San Antonio • San Francisco • Seattle • Spokane Cincinnati • Fort Worth (Telephone 3-5381)

VETERANS OF WORLD WAR II: To help you purchase surplus property, a veterans' unit has been established in each WAA office.

Use Bucyrus-Erie Experience in Equipping Your Dredging Operation





WHETHER your needs call for replacement of lost, damaged, or obsolete dredging equipment or for resumption of war-deferred equipping of new properties and projects, Bucyrus-Erie **experience** is ready, as always, to serve you to your advantage. More than 65 years of providing equipment for many of the world's underwater and dryland excavating and mining activities, large and small, have proved Bucyrus-Erie's ability to produce excavating and dredging equipment that is "years ahead" in output and operating economy — the two factors that mean the most to successful resumption of peacetime dredging activities.

Hydraulic
Dipper } **DREDGES**
Placer

5D45

BUCYRUS-ERIE CO.

SOUTH MILWAUKEE, WISCONSIN

WHAT'S YOUR JOB?

The Buckeye Line of Cost-Cutting Construction Equipment Will Help You Handle It With Greater Profit!

Trenching?

Buckeye Trenchers—digging wheel or boom types—a model for every trenching requirement — dig through any material short of solid rock. They have made cost cutting records on every major trenching job.

Material Spreading?

Buckeye Material Spreaders with spirally fluted feed rolls, spread evenly in measured quantities, from a trickle to a 6" base course. Handle all materials, wet, dry or sticky.

Road or Airport Construction?

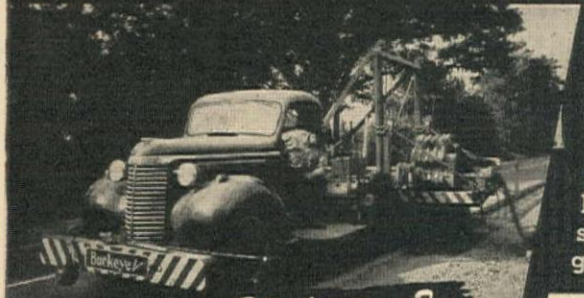
Buckeye R-B Finegraders save time and money in preparing subgrade. One operation provides a smooth, properly crowned, accurate, compact subgrade ready for the paver. Finegraders work faster than paver—keep it going all the time.

Dozing?

Buckeye Dozers and Trailbuilders have the "guts" for the big jobs—the balance and control for complete utilization of tractor's power. They dig in and move bigger loads with less effort.

Excavating? Material Handling?

Buckeye Clipper ½ and ¾ Yard Convertible Power Shovel for efficient, low cost work. Exclusive "Mevac" Metered Vacuum Power Control gives operator "real feel," quicker response.



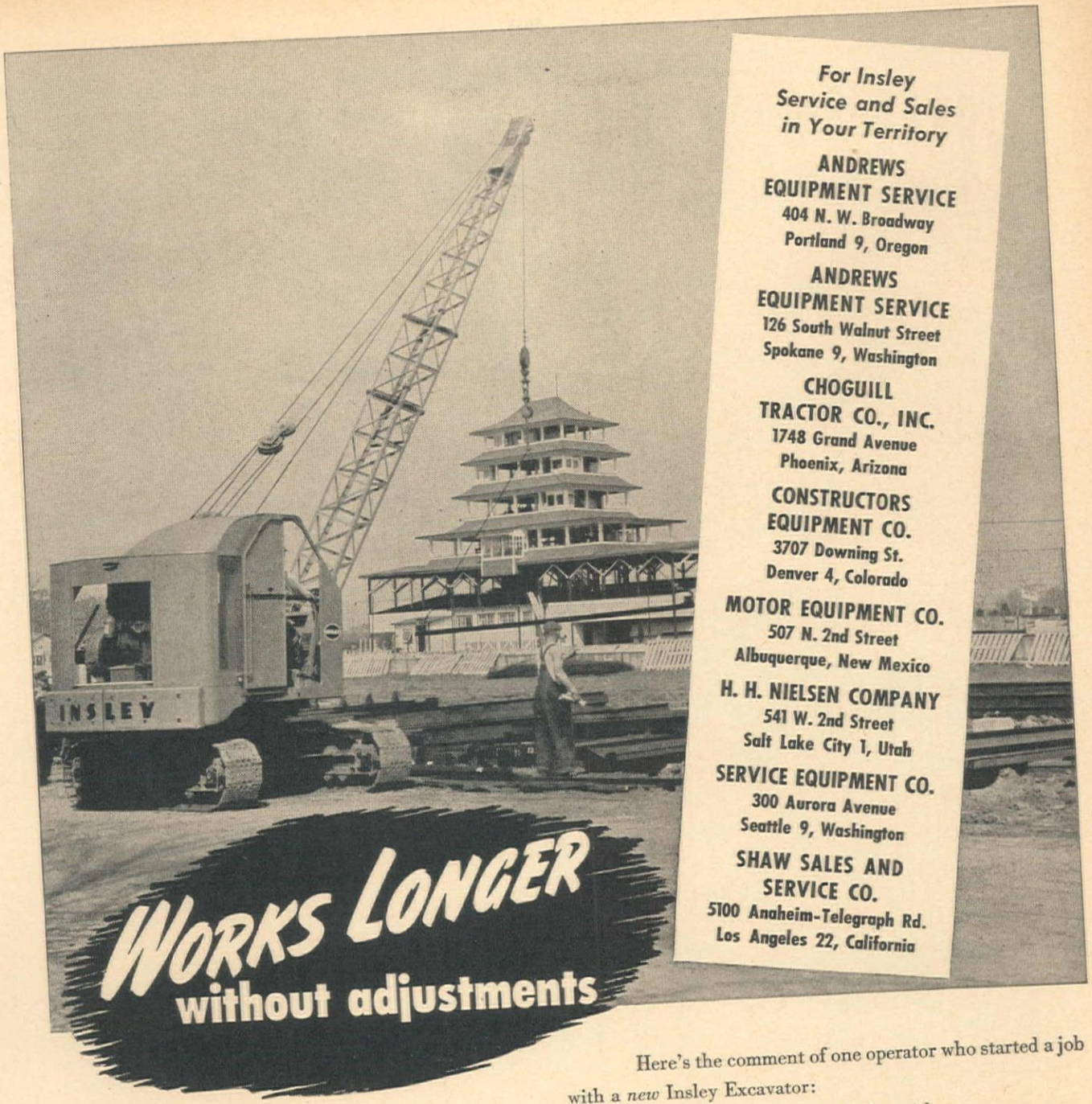
Highway Widening?

Buckeye Highway Wideners cut smooth, clean trench of uniform width and depth true to grade, leaving subgrade ready to receive material. Cut trench from 12" to 48" wide and up to 12" deep (24" depth extra), fast and economically.

BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO

built by **Buckeye**

CONVERTIBLE SHOVELS—BULLDOZERS—ROAD WIDENERS
TRENCHERS—MATERIAL SPREADERS—R-B FINEGRADERS



WORKS LONGER without adjustments

For Insley Service and Sales in Your Territory

ANDREWS EQUIPMENT SERVICE
404 N. W. Broadway
Portland 9, Oregon

ANDREWS EQUIPMENT SERVICE
126 South Walnut Street
Spokane 9, Washington

CHOGUILL TRACTOR CO., INC.
1748 Grand Avenue
Phoenix, Arizona

CONSTRUCTORS EQUIPMENT CO.
3707 Downing St.
Denver 4, Colorado

MOTOR EQUIPMENT CO.
507 N. 2nd Street
Albuquerque, New Mexico

H. H. NIELSEN COMPANY
541 W. 2nd Street
Salt Lake City 1, Utah

SERVICE EQUIPMENT CO.
300 Aurora Avenue
Seattle 9, Washington

SHAW SALES AND SERVICE CO.
5100 Anaheim-Telegraph Rd.
Los Angeles 22, California

Here's the comment of one operator who started a job with a *new* Insley Excavator:

"I've broken in 10 different machines. On no other machine was I able to work a full day without making adjustments. In fact, this Insley worked *five times longer* than any of the other nine without adjustment."

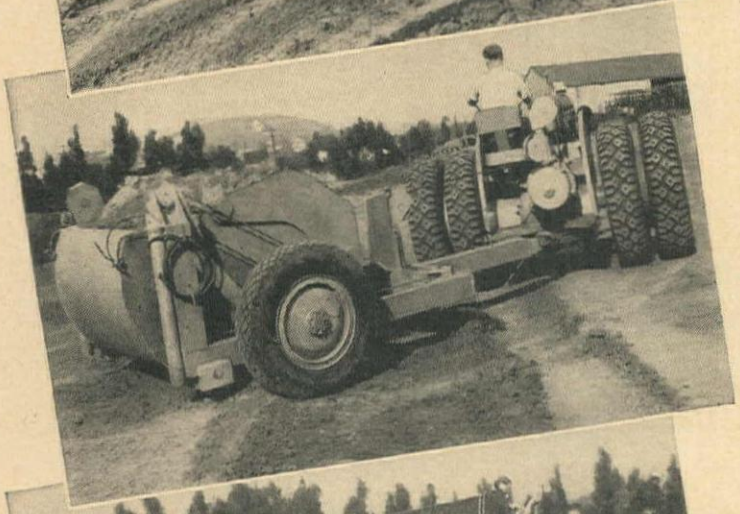
This *first* day performance pays the Insley owner dividends in trouble-free service throughout the entire work-life of the unit because every *new* Insley is fully tested at the factory . . . checked and double-checked while the unit operates . . . to assure that an Insley is ready for the tough going from the word go. That's one reason why so many leading contractors say "*buy Insley*—for lower cost yardage!"

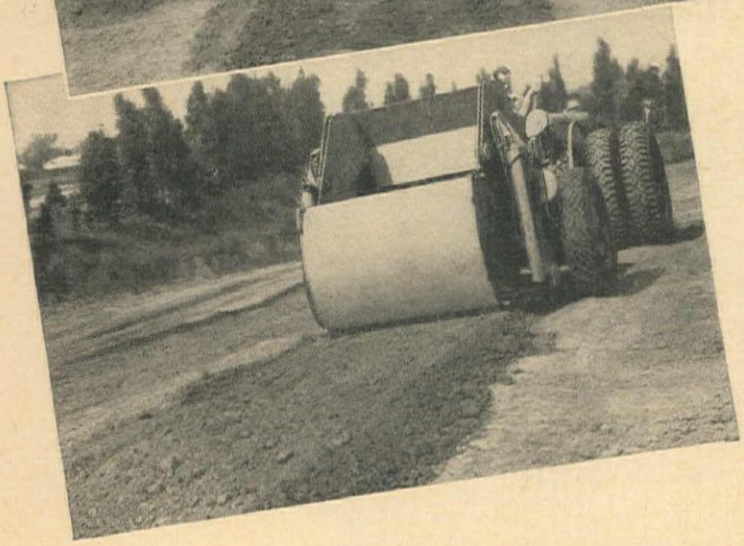
Built in ⅜ and ½-yd. sizes . . . five interchangeable attachments—shovel, crane, hoe, dragline and clamshell. Get in touch with your Insley dealer today.

EXCAVATORS ★ INSLEY ★ CONCRETE EQUIPMENT

INSLEY MANUFACTURING CORP., INDIANAPOLIS 6, IND.

SOUTHWEST *Hauling Scoop*





. . . With Standard Rubber Tired Tractor . . . Ideal Combination For Maintenance And Repair

Our Highways and rural roads, overtaxed by wartime traffic, are badly in need of repair. Maintenance equipment is being utilized to the fullest extent—but requirements are continually increasing.

Modern Earth Moving methods call for speedy, economical equipment—units with all-round efficiency on every job.

Southwest proudly presents this latest development in the use of its **Single Cable Controlled Rear Dump Hauling Scoop.** Equally desirable for both on and off-highway operation where the **material** (not confined merely to earth moving) must be loaded, transported, and dumped in a heap or spread evenly. Elimination of extra equipment — reduction in manpower requirements—and lower investment are just a few reasons why it will pay you to put this combination in your equipment set-up. Write for full details.

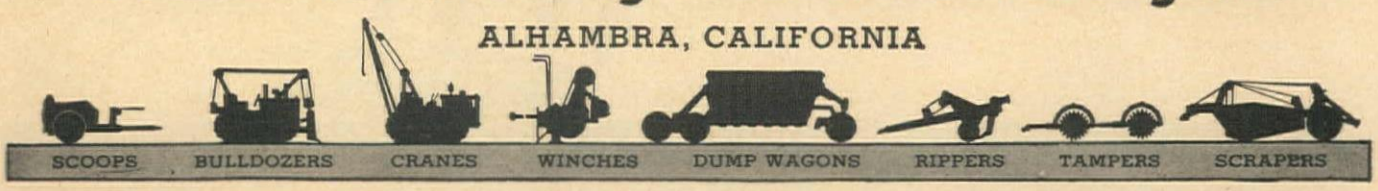
Four page bulletin available on request. Gives engineering data on the three standard sizes of Southwest Hauling Scoops. Write Department A293, Southwest Welding & Manufacturing Company, Alhambra, California.

. . . Easy Loading . . . Fast Hauling . . . Controlled Spreading . . .

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA



SCOOPS BULLDOZERS CRANES WINCHES DUMP WAGONS RIPPERS TAMPERS SCRAPERS

detergent dispersive inhibited

de·ter'gent: Cleansing; purging.
dis·per'sive: Tending to disperse, dissipate, or dispel.
in·hib'it·ed: Held in check; restrained.

Cadel A.P. Heavy Duty Lubricant

An all-purpose lubricant for all types of heavy duty equipment, both gasoline and diesel. Its three unique additives give engines more thorough lubrication, more efficiency, longer life.

• • •

Cadel A. P. Heavy Duty Lubricant made history the day it was created by Associated Lubrication Engineers. It is still making history on jobs throughout the West—tough jobs—where full engine efficiency is top requirement. Keep *your* equipment *clean*—keep it free from sludge and carbon, keep it in economical operation—with Cadel A. P., the *all-purpose* heavy duty lubricant.

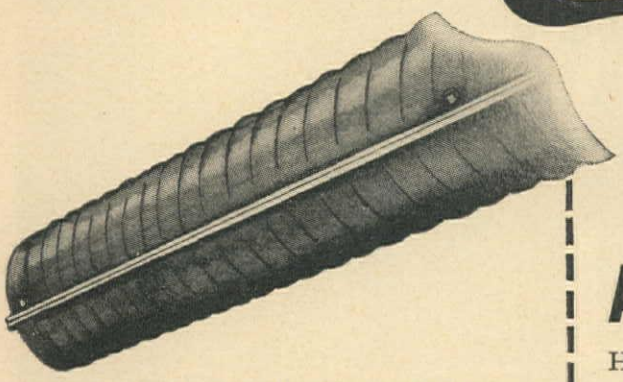
Tell Your Associated Dealer You Want a Credit Card

Correct Lubrication is Machinery's Most Vital Need

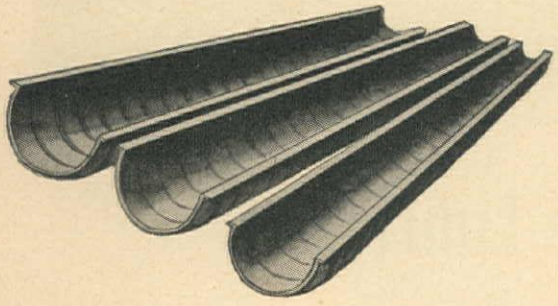
TIDE WATER ASSOCIATED OIL COMPANY

GOVERNMENT-OWNED SURPLUS

GALVANIZED CULVERT PIPE...

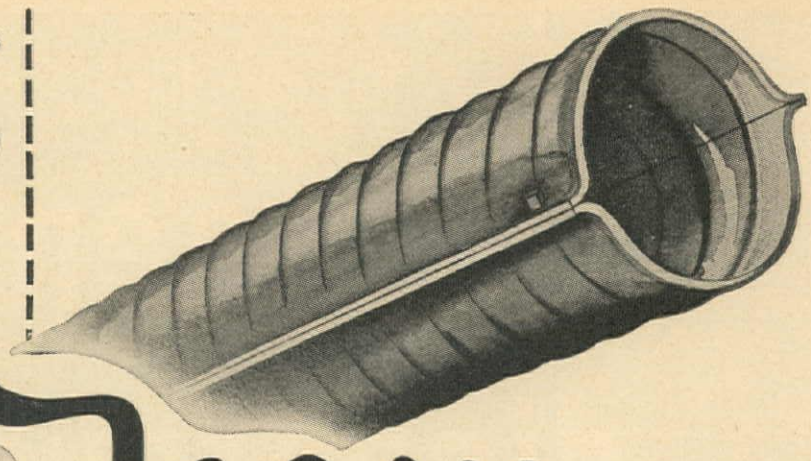


CORRUGATED . . IN HALF SECTIONS . . NESTED . . FLANGED TYPE FOR BOLTING



12"	.42 per ft.	36"	1.53 per ft.
18"	.45 per ft.	48"	2.04 per ft.
24"	.75 per ft.	60"	2.93 per ft.
30"	.93 per ft.	72"	3.59 per ft.

VETERANS OF WORLD WAR II: This surplus property is offered to priority claimants including Veterans of World War II. To help you in purchasing surplus property, a Veterans' Unit has been established in each of our Regional Offices.



Now AVAILABLE

Here is real opportunity to get a quantity of high quality culvert pipe without delay—for surface water disposal. Each section of pipe is fabricated in half sections, flanged and nested for ease of handling and shipping. When in use, the top half is fitted to the bottom half and bolted tight. All sizes from 12 inches to 72 inches in diameter. Over a million and a half dollars worth of this surplus piping is available and stored at War Assets Administration Regional Offices throughout the country. Check the price and size listing at left, then phone your order to your nearest War Assets Administration Regional Office listed below . . . or if you wish, clip the coupon—indicate sizes and quantity wanted—and *mail right now.*

This surplus property subject to prior sale.

ORDER FORM

To War Assets Administration:

.....

.....

.....

Name..... Tel. No.....

Firm.....

Address.....

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

MAIL TODAY

516

WAR ASSETS ADMINISTRATION

OFFICES LISTED BELOW ARE TEMPORARILY IN RECONSTRUCTION FINANCE CORPORATION AGENCIES

Offices located at: Atlanta · Birmingham · Boston · Charlotte · Chicago · Cleveland · Dallas · Denver Detroit · Helena · Houston · Jacksonville · Kansas City, Mo. · Little Rock · Los Angeles · Louisville Minneapolis · Nashville · New Orleans · New York · Oklahoma City · Omaha · Philadelphia Portland, Ore. · Richmond · St. Louis · Salt Lake City · San Antonio · San Francisco · Seattle · Spokane Cincinnati · Fort Worth (Telephone 3-5381)

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Whether your problem involves crushing, screening, or handling of rock or gravel, rugged profit-proved Universal equipment will solve it and provide highest output, at lowest cost for the most years.

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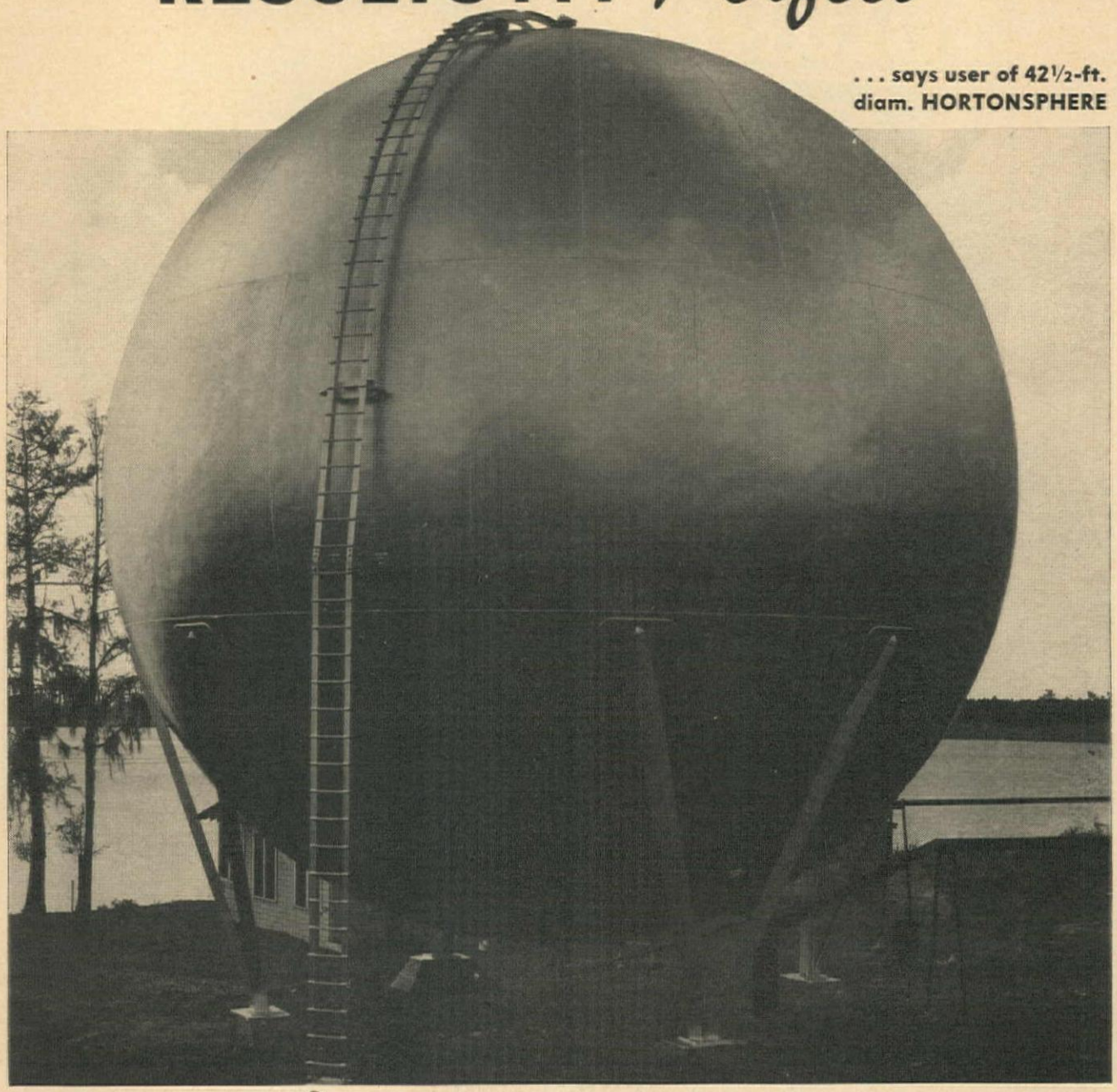

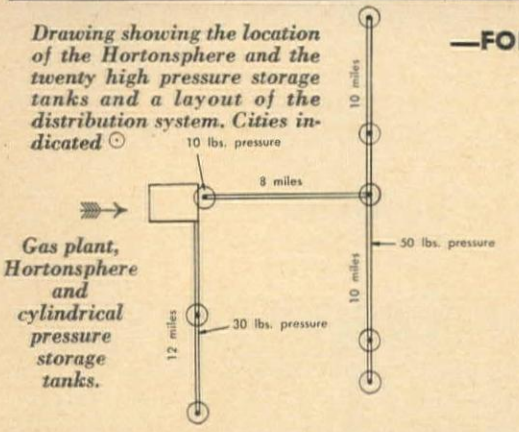

Drawing showing the location of the Hortonsphere and the twenty high pressure storage tanks and a layout of the distribution system. Cities indicated ⊙

Gas plant, Hortonsphere and cylindrical pressure storage tanks.

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The gas is purified and pumped directly into the high pressure storage holders. A recent report from this company indicates that the results of this type of high pressure storage are "perfect." Write our nearest office for quotations and complete information on Hortonspheres.

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WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

June, 1946 Vol. 21, No. 6

The Admiral's Opinion

ADMIRAL JOHN W. GREENSLADE, wartime commandant of the 12th Naval District, and later of the Western Sea Frontier, on the occasion of departing from San Francisco on retirement from the Navy expressed certain suggestions well worth heeding in regard to development of the San Francisco Bay Area. Among them were:

1. Adoption of the Reber plan, to provide the Bay with the added facilities required in years to come.

2. A political plan for the several cities of the area, based on New York's borough system.

3. A harbor commission unhampered by city lines.

Concerning the last two, it does not require the astute thinking of an admiral to arrive at similar conclusions. Bickering and jealousies among the cities which line the Bay are responsible for inexcusable delays in development; for the loss of uncounted millions of investment in industry, with attendant employment; for the stifling strangle-hold on the community by unscrupulous labor leaders; and for traffic, sewage disposal, and public transportation facilities that are a disgrace for modern American cities.

The unified development of this area, so richly endowed by Nature, is a **must.**

As to the Reber plan, the Admiral should know as much about the need for it as any man, and his opinion should carry a lot of weight. However, we point out that it is still "one man's opinion." About Aug. 1, a committee of Army and Navy officers, some of them engineers, is to conduct a "hearing" on the matter of a second bay crossing.

"Hearings" are not what is required. The board will hear from some people who'd like to have the Reber plan built, and from some who'd rather not. These testators will speak from the basis of their own desires or special interests.

Two months ago, *Western Construction News* called for an unbiased and thorough engineering examination of the bay crossing problem and the several possible solutions, with the purpose of arriving at the answer which provided the greatest good for the greatest number of the people. We again call for the institution of such an investigation, to start soon. Facts, not opinions, not even the opinion of such a great man as Adm. Greenslade, are the crying necessity in this dispute.

The West Loses a Citizen

WITH THE death of Conde B. McCullough, assistant highway engineer of Oregon, the West loses not only a top-ranking bridge engineer, but an outstanding citizen whose interests far exceeded the field of bridge design within which a lesser man would have been well content to remain. With his son, John R. McCullough as co-author, he had published just prior to his death a two-volume work, "The Engineer at Law." In introducing his subject, Mr. McCullough wrote "All fields of knowledge overlap. A profound understanding of any profession, therefore, requires a knowledge of many others. There is no narrower man than the specialist who knows naught outside his specialty."

Mr. McCullough not only wrote that belief, he lived it. He was not only a bridge engineer, he was an economist, a lawyer, a planner, and an author of fiction as well as non-fiction in all of the fields in which he was versed. He continually urged those under him to broaden their interests and knowledge as he did his own. A year before his death he was instrumental in reviving the Salem Planning Commission which is now, as a result, actively engaged in planning for the future growth problems of the city.

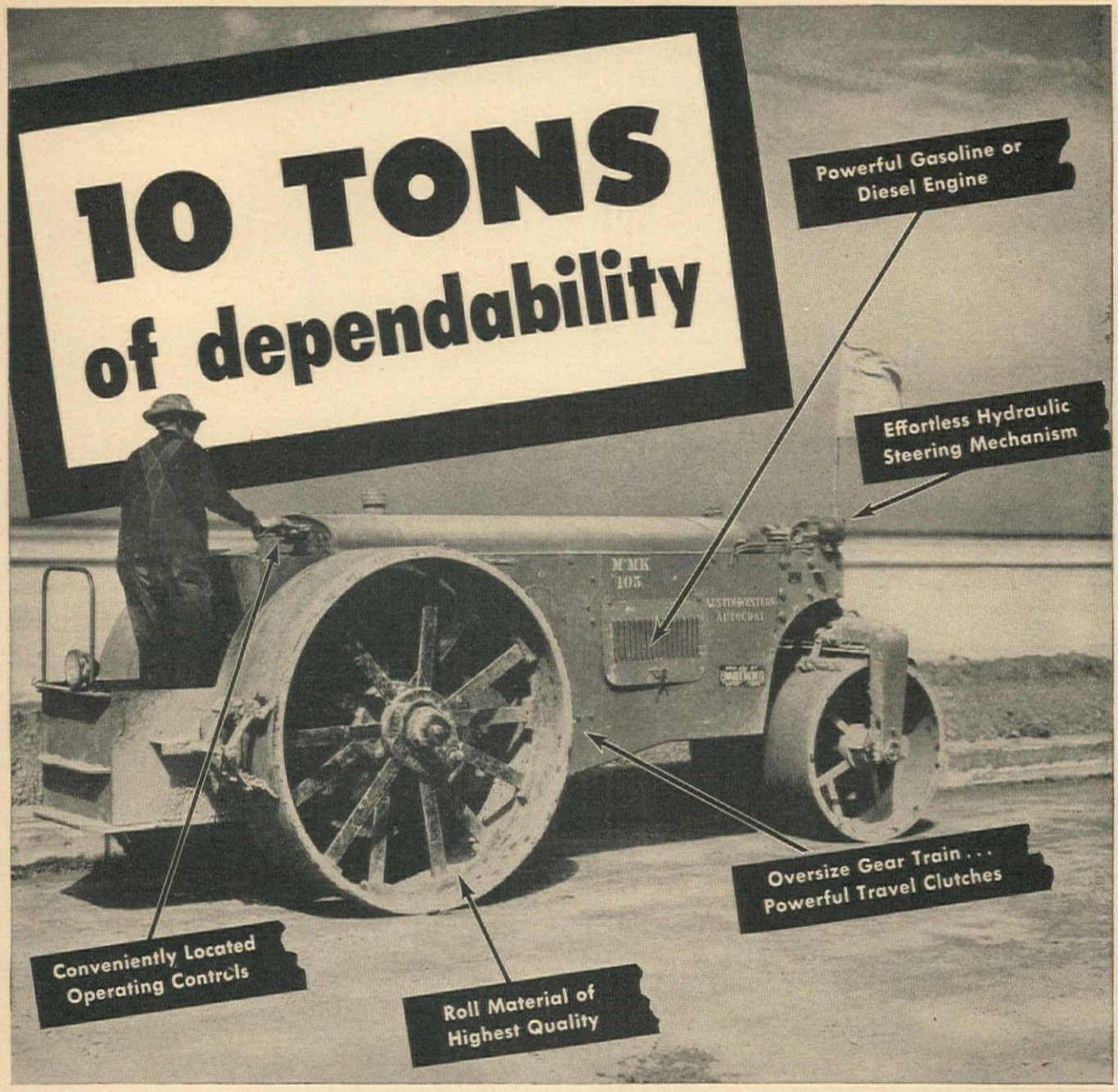
Monuments to the ability of McCullough, the bridge engineer, include the six Oregon Coast bridges: Rogue River, Coos Bay, Umpqua River, Siuslaw, Waldport and Newport; the McLaughlin bridge over the Clackamas River at Oregon City, the Crooked River bridge on The Dalles-California highway and others which will stand for many years. But they cannot begin to indicate the wide-flung interests of McCullough the citizen.

Design Nomographs Again

AFTER A LAPSE of four and a half years occasioned by the author's service in the United States Navy, James R. Griffith's Construction Design Charts will make their reappearance in the pages of *Western Construction News* on a monthly schedule beginning with the July issue. One of the oldest and most popular features of the magazine in past years, the re-instituted series of Construction Design Charts will be developed to assist the engineer and contractor in a varied assortment of design problems. Some of the older charts will be brought up to date to permit the use of larger stresses which have come into use since the earlier charts were prepared. Additional phases of problems previously dealt with will be explored to provide a more complete coverage, and new subjects will be brought in as interest of the readers requires.

In the July issue Mr. Griffith will take up the problem of bending moments in fixed end spans with uniform loading, and in August the design chart will deal with balanced tensile reinforcing in concrete beams using stresses of 2,000 and 20,000 lb. per sq. in. The September issue will see the return of hydraulics problems with a chart devoted to the flow of water in cast iron pipe. Beyond this point subject matter is not definitely planned for specific issues, but generally the structural field will include charts for concrete, timber and steel design. Additional charts will appear for the use of those engaged in design of concrete forms, and various hydraulic problems will receive consideration. It is the hope of both the author and the editors that the readers will offer their own suggestions for routine problems that might well be the subject of future design charts.

The author, James R. Griffith, was for a number of years professor of structural engineering at Oregon State College. From 1941 to 1945 he served as lieutenant commander and commander in the Civil Engineer Corps of the U. S. Navy, his last post being that of Public Works Officer at the U. S. Naval Drydocks, Terminal Island, Calif. He was released from the service late last year and since early this year has been office manager and structural engineer for James W. Carey and Associates, consulting engineers of Seattle, Wash. It is with a great deal of pleasure that we welcome back Mr. Griffith and his Construction Design Charts, and we commend them to our readers as being most worthy of their attention.



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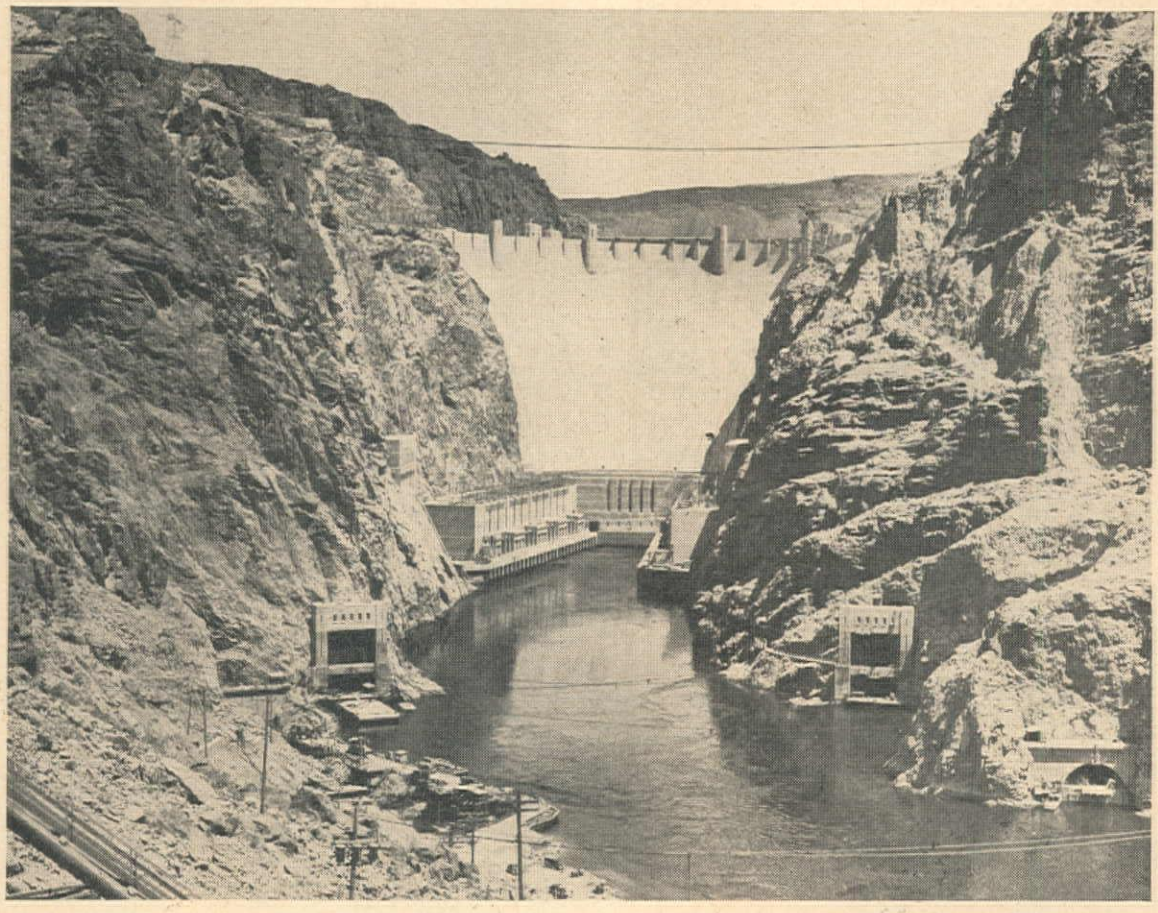
WESTERN CONSTRUCTION NEWS
JUNE • 1946



Boulder Dam—
Tailbay and Tunnel Portals Altered

Guy F. Atkinson Co. removing 825,000 cu. yd. of loose fill from river channel and banks to lower tailbay elevation and prevent canyon erosion—Tunnel discharge sections being changed to improve hydraulic characteristics—Alterations will cost more than two and a half million dollars

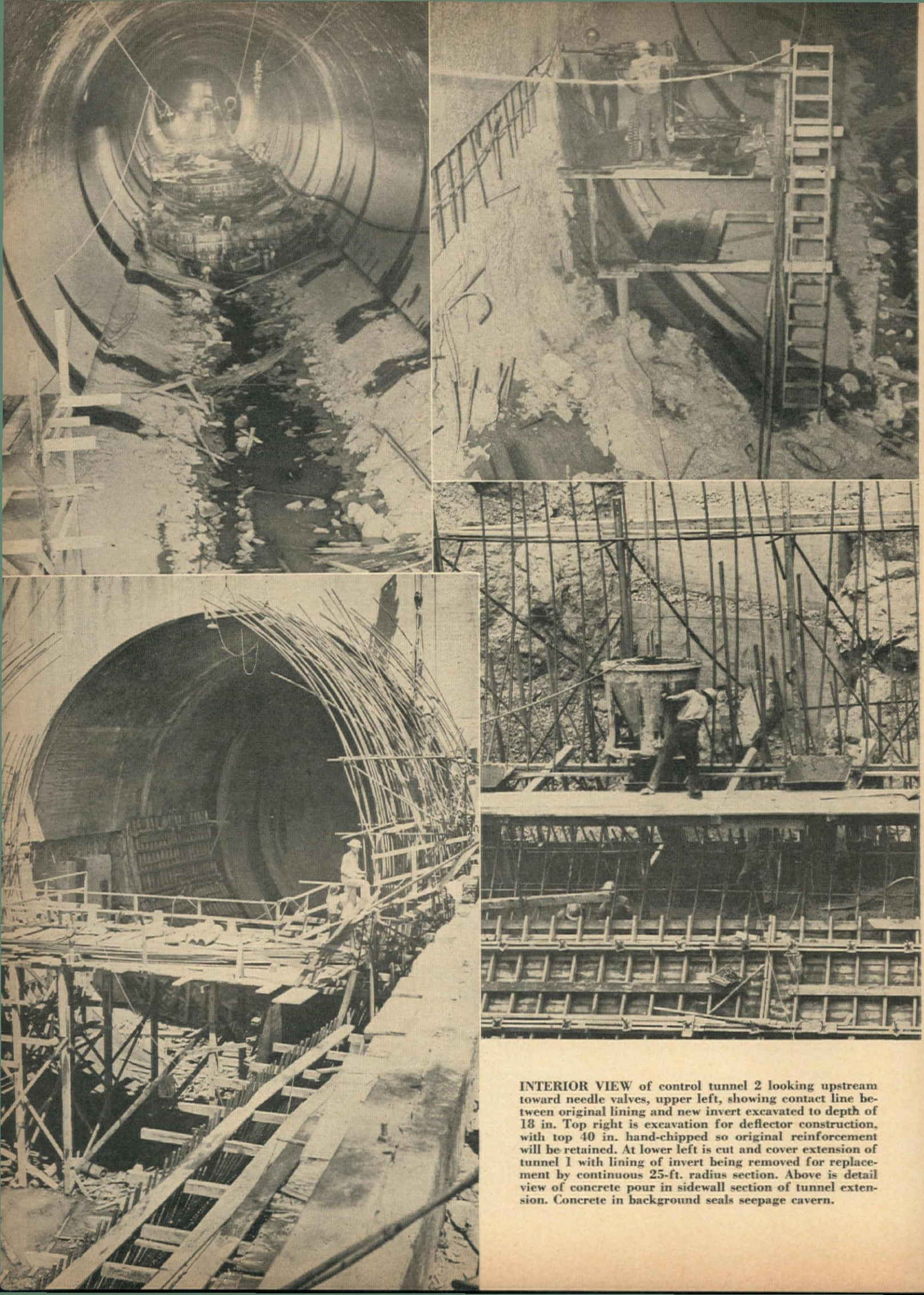
By V. B. UEHLING
Engineer, U. S. Bureau of Reclamation
Boulder City, Nevada

CONSTRUCTION EQUIPMENT is once again busy at the site of the world's highest dam. A contract involving over two and one-half million dollars worth of construction work which was awarded to Guy F. Atkinson Company of San Francisco, Calif., is well under way. The work consists of excavating loose fill from the river and canyon walls and altering the outlet appurtenances of the dam for the purpose of improving the hydraulic characteristics of flows through the spillway tunnels.

All work under this contract is to occur in the downstream end of the four tunnels used to control Colorado River water flows around the Boulder Dam structure and in the river gorge through a distance of about 2,500 feet. Removal of 825,000 cu. yd. of loose fill from the river channel and the banks was provided in the specifications for the dual purpose of lowering the tailbay elevation (to recover about four feet of head) and for preventing erosion of the canyon walls. Stipulations in the contract requiring the removal of the excavated fill out of the river gorge necessitated an average vertical lift of 550 ft. for every yard of material in the river and on the banks.

Canyon excavation

The contractor chose to install an inclined tramway on the Arizona canyon wall, about midway in the reach affected, for most economical handling of the problem. The tramway, constructed on a 60 per cent grade, employs two 20-cu. yd. cars mounted on standard railroad trucks with combined operation of hoist and dump assembly. It was placed in service in September, 1945, and the equipment has continued to operate to the present date. During this period three-fourths of the specified quantities have been removed from the canyon. At the top of the incline the material is dumped into trucks for transportation on a ¼-mi. road across the disposal area and dumped into a draw. Railroad equipment consisting of side dump, 40-cu. yd. cars, pulled by 150-hp. Diesel locomotives, was originally used at this loca-



INTERIOR VIEW of control tunnel 2 looking upstream toward needle valves, upper left, showing contact line between original lining and new invert excavated to depth of 18 in. Top right is excavation for deflector construction, with top 40 in. hand-chipped so original reinforcement will be retained. At lower left is cut and cover extension of tunnel 1 with lining of invert being removed for replacement by continuous 25-ft. radius section. Above is detail view of concrete pour in sidewall section of tunnel extension. Concrete in background seals seepage cavern.

tion, but was abandoned in favor of trucks for economical reasons.

Material on the Nevada canyon wall is being transported to the foot of the inclined tramway by means of a highline with an end-dump skip. Loose fill on the banks has been excavated with draglines or shovels loading into 20-cu. yd. trucks for transportation to the inclined tramway or, as on the Nevada bank, into the highline skip. The highline was so located that all material was dumped into a loading hopper constructed over the lower end of the inclined tramway.

Excavation in the river channel is being performed with the combined use of a dragline and a Sauerman slackline with a 7½-cu. yd. bucket operation from a berm along the Arizona bank. The Sauerman was rigged to move the river material transversely to the Arizona bank working from the upper reach of the area downstream in accordance with contract requirements. On the Arizona bank the material was subsequently transferred to trucks by the dragline and hauled to the tramway for removal out of the canyon. Material excavated from the river consisted of coarse gravel with occasional boulders of less than one cubic yard capacity. Excavation in the river averaged 15 ft. in depth and about 250 ft. in width through a reach of one-half mile. As the river channel excavation proceeded downstream to the tramway the operating berm of fill material was removed by the dragline, widening the river channel to the rock canyon wall. Final operations will consist of removal of the Nevada bank operating berm to obtain full channel width between the canyon walls.

Quantities for payment are based on cubic yardage excavated as determined from cross sections taken at 25-ft. intervals through the length of the designated area, before and following completion of the work. Elevation 647, which will be the normal tailbay elevation, was arbitrarily selected for differentiating between bank and river excavation.

Road relocation

Preliminary to excavation of the Nevada bank material was the relocation of the access road to the Boulder Power Plant. This road, originally constructed from material excavated from the foundation of the dam, was relocated by rock excavation in the canyon wall. Where side canyons were encountered a retaining wall was constructed to avoid excessive rock cuts and irregular alinement.

One canyon on the upper end of the Nevada bank where the road leads into the tunnel was found to be more economically bridged by a two-span single lane structure. Paving of the lower 1,500 feet of this highway will be a final operation in its permanent relocation.

Tunnel alterations

Proposed changes in the outlet control tunnels, tunnels 2 and 3, are being made to minimize canyon wall erosion and prevent damage to the outlet works through improved energy dissipation of water passing the dam. Results of tests on hydraulic laboratory models, performed in the Denver office of the Bureau of Reclamation, dictated the type of design adopted for revision in the tunnel outlets.

The two control tunnels (tunnel 2 on the Nevada side and tunnel 3 on the Arizona bank) which serve to bypass water around the dam, are to be revised, so as to divert the flow emerging from the outlet portals away from the canyon walls into the center of the river. The modified outlet tunnel design requires the construction of a transition through the end 100 ft. of each tunnel resembling an upturned elbow tilted at an angle of 45 deg.

The transition will result in a warped surface, changing the present 25-ft. radius invert section to a flat invert at the portal, raised 18 ft. above the original elevation at the outlet. An unsymmetrical sidewall section will deflect discharges toward the center of the river. The interior sections of these tunnels are to be changed from a point 52 ft. below the valve outlets to the beginning of the deflector by pouring concrete to a finished radius of 85 ft. The advantages of this change are: first, to provide a greater depth of concrete for wear; second, the surfaces can be special finished to give a smooth and more durable surface; and third, the wetted perimeter of the section will be increased thereby improving flow conditions.

The two control tunnels, limited in carrying capacity by the discharge through 6 needle valves in each tunnel, will continue to be capable of discharging 24,000 c.f.s.; but by proper operation of the valves, the hydraulic jump can be moved outside the tunnels, thus dissipating about 10 per cent of the energy resulting from a 500-ft. head, in the river channel where little damage can occur. The maximum capacity flows through tunnels 2 and 3 are deflected by the transition sections to a common point in the river reducing to a minimum canyon wall erosion caused by eddies.

SECTIONAL DRAWINGS of outlet tunnel show how last 100 ft. is being tilted at 45 deg. angle to give unsymmetrical sidewall section to deflect water toward center.

Spillway tunnels

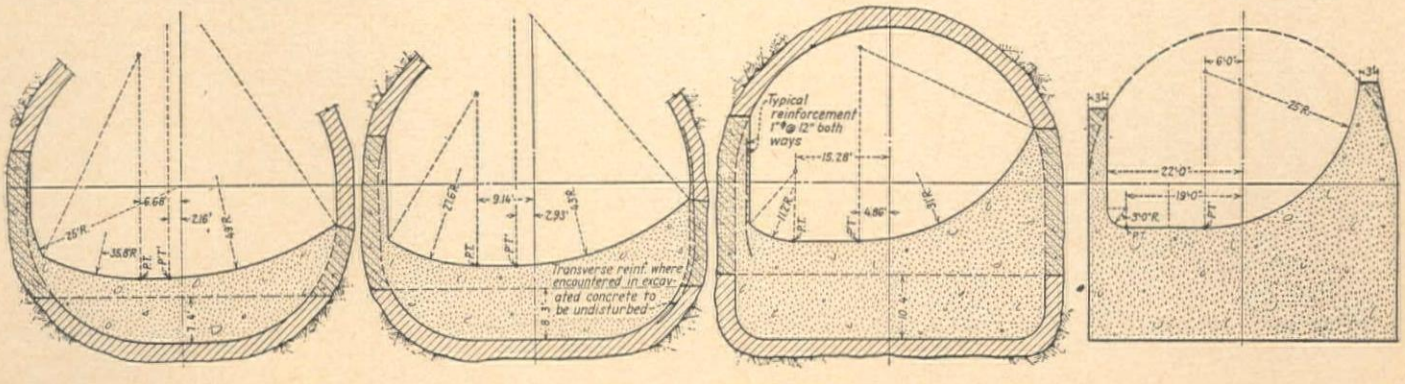
Operation of the spillway tunnel 4 on the Arizona side, is planned to be coordinated with the operation of spillway tunnel 1 in the Nevada canyon wall, in that during discharges the flows are directed toward one location in the center of the river. Since either tunnel is capable of discharging 100,000 c.f.s., if necessary, considerable attention was given to directing the flow by means of the deflector design. Correction of the alinement of tunnel 1 by the addition of 377 ft. to its length was imperative in the coordinated use of the two tunnels. The proposed cut and cover extension will also carry flows past a canyon wall fault zone in which considerable erosion has already occurred. During discharges through tunnel 1 in 1941, strata soluble in water undermined the adjacent bank causing a slide in the outlet channel.

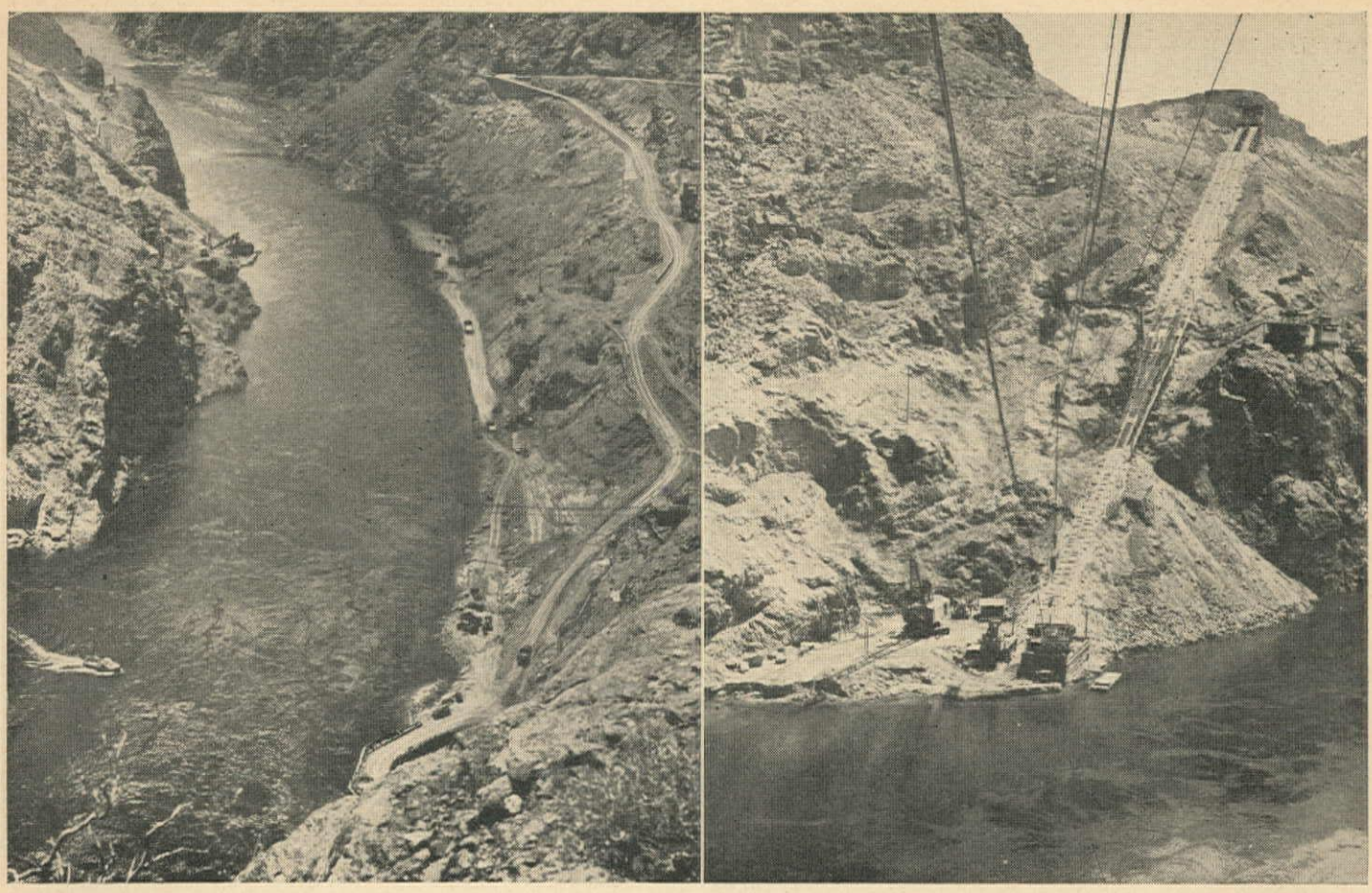
The cut and cover section will be extended on to the deflector with the same interior section as the existing portion of the tunnel. Approximately 24,000 cu. yd. of heavily reinforced concrete will be placed in this tunnel extension, designed to resist both earth fill pressures from the canyon wall and forces caused by full discharges through the tunnel.

Operation schedule

The contractor's present schedule involves work simultaneously in all four tunnels. Bulkheads of concrete poured by tremie methods have been placed in the outlet portals of tunnels 2, 3 and 4 to an elevation about 8 ft. below the high water mark in the tailbay. Since these cofferdams will be incorporated into the deflector concrete, the height of wall permitted was necessarily below the elevation of the deflector lip and a timber superstructure was constructed on the wall for completion of the bulkhead. Unwatering of tunnel 4 occurred in December, 1945; and tunnels 2 and 3 were unwatered in March, 1946.

Dewatering of the tunnel extension area at tunnel 1 was started Jan. 2, 1946, after completion of the timber crib cof-





LOOKING DOWNSTREAM, at left, excavation of Arizona bank is 95 per cent complete. At right is incline tramway used to transport all excavated material, that from Nevada side being carried across river by highline.

ferdam. The cofferdam closes the end of the spillway channel across a width of 150 ft. connecting with the natural rock barrier that exists between tunnels 1 and 2. The cribs were constructed outside of the canyon area from measurements taken in sounding the river bottom where they were to be placed. The fabricated cribs were then lowered into the tailbay by means of the 150-ton government cableway and were floated downstream to their respective positions on the Nevada bank.

After sinking the cribs by filling with rock and impervious material, a row of sheet piling was driven around the exterior edge of the cribwork. Due to the fact that the cofferdam was placed on a rock reef with little overburden, it was necessary to place considerable impervious material around the outer edge of the sheet piling to effect a seal. Seams in the rock barrier were closed by extensive grouting throughout the cofferdam area. After dewatering was completed, the cofferdam was further strengthened by construction of a concrete cutoff wall across the inside face of the cribwork to an elevation 20 ft. below the average tailbay elevation.

Seepage water entering the upper end of the spillway tunnel is retained by means of a low sandbag dam placed at the head of the construction area. This water is intermittently ejected by means of a pump.

Tunnel construction

Excavation for the tunnel extension substructure was carried to firm bed rock, which occurred at approximately elevation 620. A longitudinal cutoff wall paralleling the river and a transverse wall at the end of the structure were excavated to a minimum of 7½ ft. below the rock line. Concrete pours in the cut and cover section are made with the use of sectional forms and with horizontal joints occurring at variable lifts. Transverse construction joints are placed at 35-ft. intervals in accordance with the design. The concrete lining in the last 50 ft. of the existing tunnel invert, a circular to flat-bottomed transition, will be removed and replaced to give a continuous 25-ft. radius section into the extension.

Subsequent to the unwatering operations, work was initiated on removal of the existing inverts in the end 100 ft. of tunnels 2, 3 and 4. Lining removal in preparation for the pouring of deflector sections has been arbitrarily divided into four sections by the contractor to assist in removal of invert concrete lining and in construction of the deflector. The lengths of the sections are set according to location of reinforcement, construction joints and fractures in the arch concrete lining. Removal of concrete is confined to alternate sections.

All edges of contact between original concrete and that poured under the contract are cut by means of a carborundum saw to a depth of 1 to 2 in. This operation is followed by hand chipping the top 40 in. of concrete below the saw cut line to a depth of 30 in. All transverse reinforcement steel which exists in the 40-in. band is carefully excavated for lapping the reinforcement in the new work.

Excavation of concrete below the hand-chipped area consists of drilling 30-in. holes at 14-in. centers along level rows through the length of the section. A break line is then broached horizontally between the drill holes. A charge of ½ stick of 40 per cent gelatin powder is placed in each hole and by means of delays, series of charges are fired in sequence through the length of the section. Excavation of the lining by this method removes the concrete in most cases to the original rock line in clean, even breaks. Extracting the concrete in the sidewalls in horizontal layers is followed down around the invert in each section.

Some difficulty is being experienced by water emerging from springs and seepage through rock crevices where the concrete lining in tunnel 4 has been removed. Care is taken in replacing the lining to provide adequate drains for preventing contact between seepage water and concrete being placed. Invert pours in tunnel 4 have been successfully made without forms up to 1-to-1 side slopes. Sidewalls are poured in 6-ft. lifts without the use of mechanical means in placing.

Concrete pouring

Concrete for work in all the tunnels is mixed in a two cu. yd. dual drum paving mixer located on the cofferdam at the

end of tunnel 1 extension. For concrete pours in tunnel 1 and tunnel 2 the concrete is transported by buggies to points where handling is facilitated by a crane and one cubic yard bucket, as in the case of tunnel 1, or by the use of a highline strung along the tunnel roof. The concrete is transported to tunnels 3 and 4 across the river channel by highlines where it is dumped into hoppers for rehandling by buggies.

All aggregates for tunnel and river-channel improvement work were processed under a contract with Gibbons and Reed Company, Salt Lake City, Utah, which contract was completed August, 1945. The material was stockpiled in Las Vegas Wash approximately 13 mi. from the work. Trucking of the aggregate included in the contract for tunnel improvements was sublet by the contractor.

Storage bunkers were constructed at a high elevation on the canyon wall with access to the highway. From the storage bunkers the sand and aggregate flows by gravity through 16-in. thin wall steel pipes to the level of the batch plant. A short conveyor belt moves the material from the pipe chutes into the storage compartments in the batch plant.

All cement used is provided by the government under a 80,000-bbl. contract with the Monolith Cement Company, Monolith, Calif., and is shipped in bulk by rail to the government warehouse yard 3½ mi. from the construction site. Unloading, storage and transportation equipment is provided by Guy F. Atkinson Co. for care of the cement upon arrival at the yard. Closed trucks are used to move the cement to the batching plant where blower type unloaders transfer the cement to the 500-bbl. storage bin.

Tunnel and river-channel improvements at Boulder Dam are being made under the direction of the Bureau of Reclamation of which Commissioner Michael Straus is administrative head; Walker R. Young, Chief Engineer; E. A. Moritz, Regional Director; and C. P. Christensen, Director of Power of the Boulder Canyon Project. C. M. Jackson is Field Engineer for the improvement work. The designs were developed in the Denver office of the Bureau of Reclamation after considerable research. R. J. Jenks is project manager for Guy F. Atkinson & Company, contractor for the work.

Fluor Corp. of Los Angeles Second in Safety Contest

THE FLUOR CORP., LTD., Los Angeles, was awarded second place in the heavy construction division of the 1945 Accident Prevention Contest sponsored by the Associated General Contractors of America. This award was made at the national convention of the association, which was held in Chicago.

In compiling this outstanding safety record The Fluor Corporation had a .64 severity rate for 4,683,162 man-hours of exposure.

Plan Bid Call for Building At Seattle-Tacoma Airport

BIDS FOR CONSTRUCTION of a $2,000,000 administration building to be erected at the Seattle-Tacoma airport will probably be called during July or August by the Port of Seattle. Heavy increase of air traffic in the Northwest metropolitan area has considerably overloaded the facilties of Boeing Field, and it is hoped that commercial air traffic will be able to move to the Seattle-Tacoma field by the fall of 1947. The move can be made, contingent upon completion of the administration building and construction of hangars and maintenance facilities.

Four concrete runways 150 ft. wide and 5,000 to 6,100 ft. long have been constructed and are being used for emergency landings when Boeing Field is closed by fog. For future development three additional runways can be constructed parallel to the existing runways and the North-South runway can be extended to a 9,000-ft. length. The apron, with eight 150-ft. diameter plane spotting positions, is in place and can be extended for nine additional spotting positions. Construction of the runways and aprons was completed under the supervision of the Civil Aeronautics Administration.

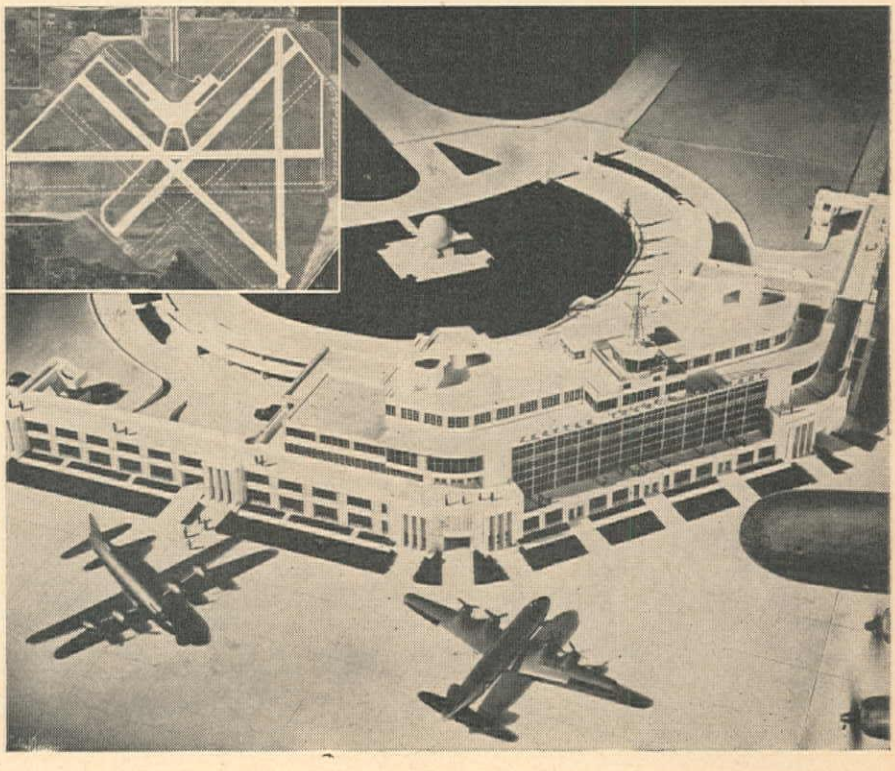
The administration building is designed as a four-story reinforced concrete structure 470 by 105 ft. with two 160 by 16-ft. two-story office wings with a total volume of 2,400,000 cu. ft. and 175,000 sq. ft. of floor space. Airline offices, customs facilities, heating equipment, food storage and preparation, baggage and waiting rooms and a post office will occupy the ground floor. The main floor will be occupied by a lobby for airline ticket offices and baggage room, public waiting room 40 by 180 ft., retail stores, and an observation deck along the entire field side of the building. The mezzanine will contain office space, waiting room, balcony, coffee shop and soda fountain. Dining facilities and offices will occupy the second floor. Design of the building has been completed and construction will be carried out by the Port of Seattle under the immediate direction of George T. Treadwell, chief engineer.

Export Restrictions Placed On Steel Housing Products

IN RESPONSE to a request from the Civilian Production Administration, the Office of International Trade, of the Department of Commerce, has placed restrictions on the export of several steel products essential to the housing program, it was announced today.

The list includes structural iron and steel buildings, prefabricated and portable houses, metal window frames and window sash, metal shutters, sheet culverts, prefabricated doors, copper wire, roof ventilators, sheet metal ducts and certain zinc products. Quantities of any of these items valued in excess of $100 may not be exported without an individual export license from OIT.

ARCHITECT'S DRAWING of proposed administration building at Seattle-Tacoma Airport. Insert is runway plan of the port, with building to be located in upper center.



Portland Water Supply—
4-mi. Line Laid Through City Streets

First post-war project will help supply increased demands in both residential and industrial sections—Opening street paving and testing individual welded joints are outstanding points

DESPITE THE DIFFICULTIES of construction through city streets including buried street car tracks, 22,350 ft. of new 36-in. steel pipe has been placed in service in Portland this month as one of the city's first post-war water supply projects. A testing system consisting of individual pneumatic tests of each field joint was successful in eliminating leaks prior to the standard hydrostatic tests of the line and permitted the contractor to backfill the line prior to making the hydrostatic tests without the danger of having to uncover the pipe.

During the war increased water demands in both commercial and residential sections of Portland west of the Willamette River led the city Water Bureau to undertake design of the new line from Mount Tabor reservoir in the southeastern section to the Washington Park reservoir in the southwestern section. The line actually consists of two sections, the one being on the east side of the Willamette River, and the other on the west. No new river crossing was required since sufficient capacity exists in present crossings.

Welded steel pipe

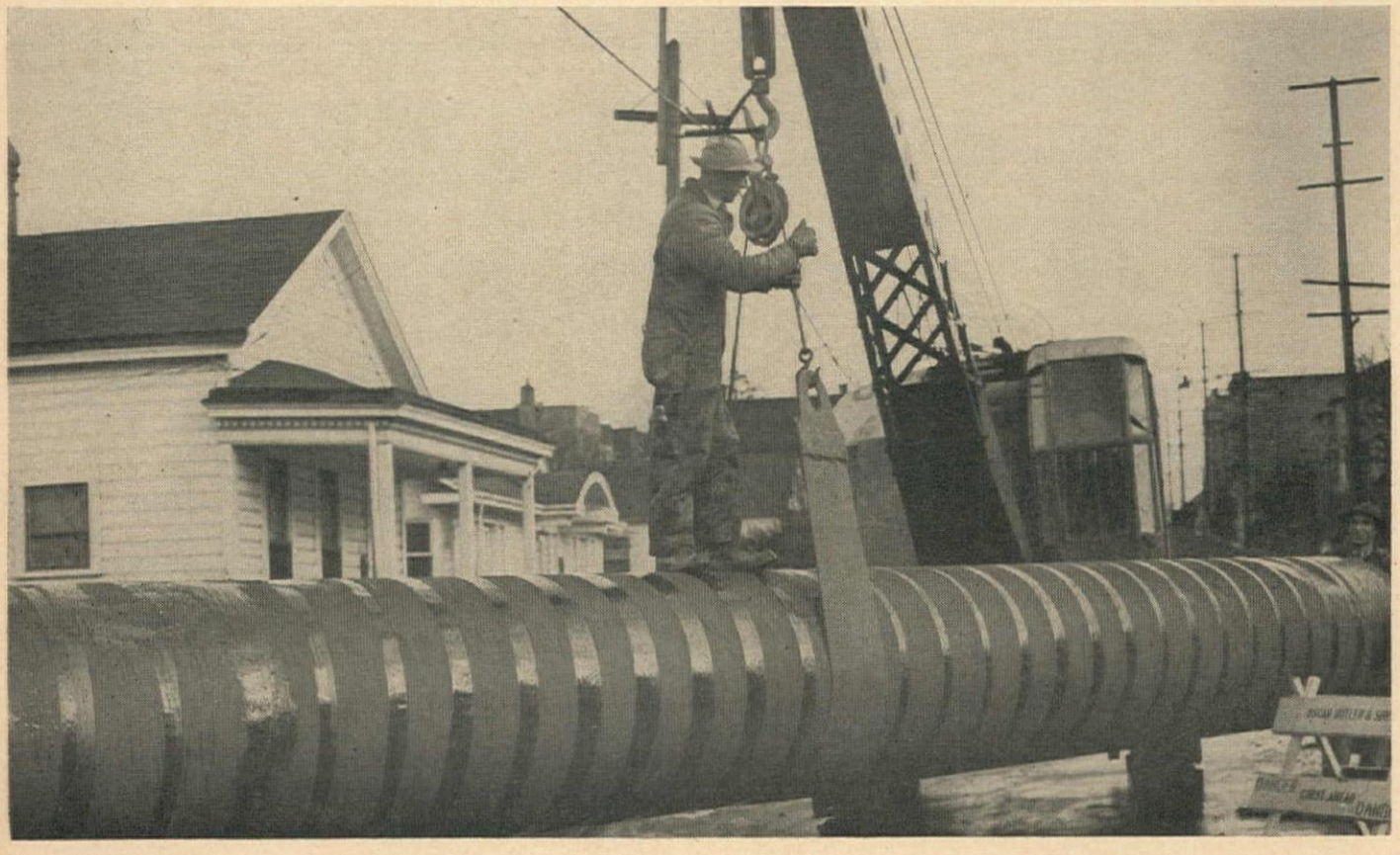
The new 36-in. line connects to a 32-in. feeder from the Mount Tabor reservoir at Southeast 10th and runs 13,908 ft. to a 30-in. line paralleling the river on the east bank at Southeast 60th. The second or western section begins with a connection to a 30-in. line paralleling the west bank of the river at Harbor Drive and runs 8,442 ft. to the Washington Park high gravity reservoir. Existing river crossings consist of 24 and 30-in. lines under the Willamette River channel and two 24-in. lines on the Ross Island bridge.

A contract for the work was awarded late in October last year calling for the use of ⅜-in. welded steel pipe coated with hot coal tar inside and out. Steel plates delivered to the Portland fabrication plant from the east and also from the Fontana steel plant in Southern California (marking the first use of Western steel in Portland mains) is rolled into 8-ft. cans. Four of these are then V-welded at the plant to form the 32-ft. sections complete with bell and spigot joint. The sections are then sand blasted and coated with hot coal tar enamel inside and out, and spiral wrapped before delivery to the job. Weight of the completed section is 2½ tons.

After placing each section, the bell and spigot joint is welded both inside and out. To permit the welders to work through the winter rains, canvas covers were placed over the joints during welding. Welders have been able to complete about 300 ft. per 8-hr. day. Upon completion of the field welding, joints are ready for the pneumatic test.

Test of field joints

Each field joint has a tap drilled through the bell to permit attachment of an air line and air gauge. Compressed air is then pumped into the joint to a pressure of 140 lb. per sq. in. If both inside and outside field welds are tight, the air pressure will remain constant. Where pressure drops are apparent the welds are smeared with a strong soap solution to detect the location of the leak which is then rewelded immediately, and the joint retested until the air pressure remains constant.



WELDED STEEL PIPE sections were made up in 32-ft. sections complete with bell and spigot joint at the plant. The coating is hot coal tar enamel inside and out with spiral wrapping outside.

Every 500 ft. along the line Dresser couplings are installed to provide for expansion and contraction of the line. Access manholes are installed every 600 ft., being built into the pipe at the plant. At ¼- to ½-mi. intervals test heads are welded into place, and as each section is completed it is given a hydrostatic test at 50 lb. per sq. in. above normal line pressure. No leaks were discovered during the hydrostatic tests, indicating that the tests of the individual joints had functioned satisfactorily.

Excavation for the pipe line proved to be one of the most difficult problems of the project since practically all of the 5-mi. line had to be placed beneath the existing concrete paving of city streets. There was the usual maze of sub-surface water, gas, sewer, and other utility lines, mostly charted but a few not. Toward the end of the project the excavation sub-contractor encountered an abandoned street railway line which slowed up the work somewhat. The rails had been embedded in concrete and left in place in resurfacing of the street after abandonment of the line.

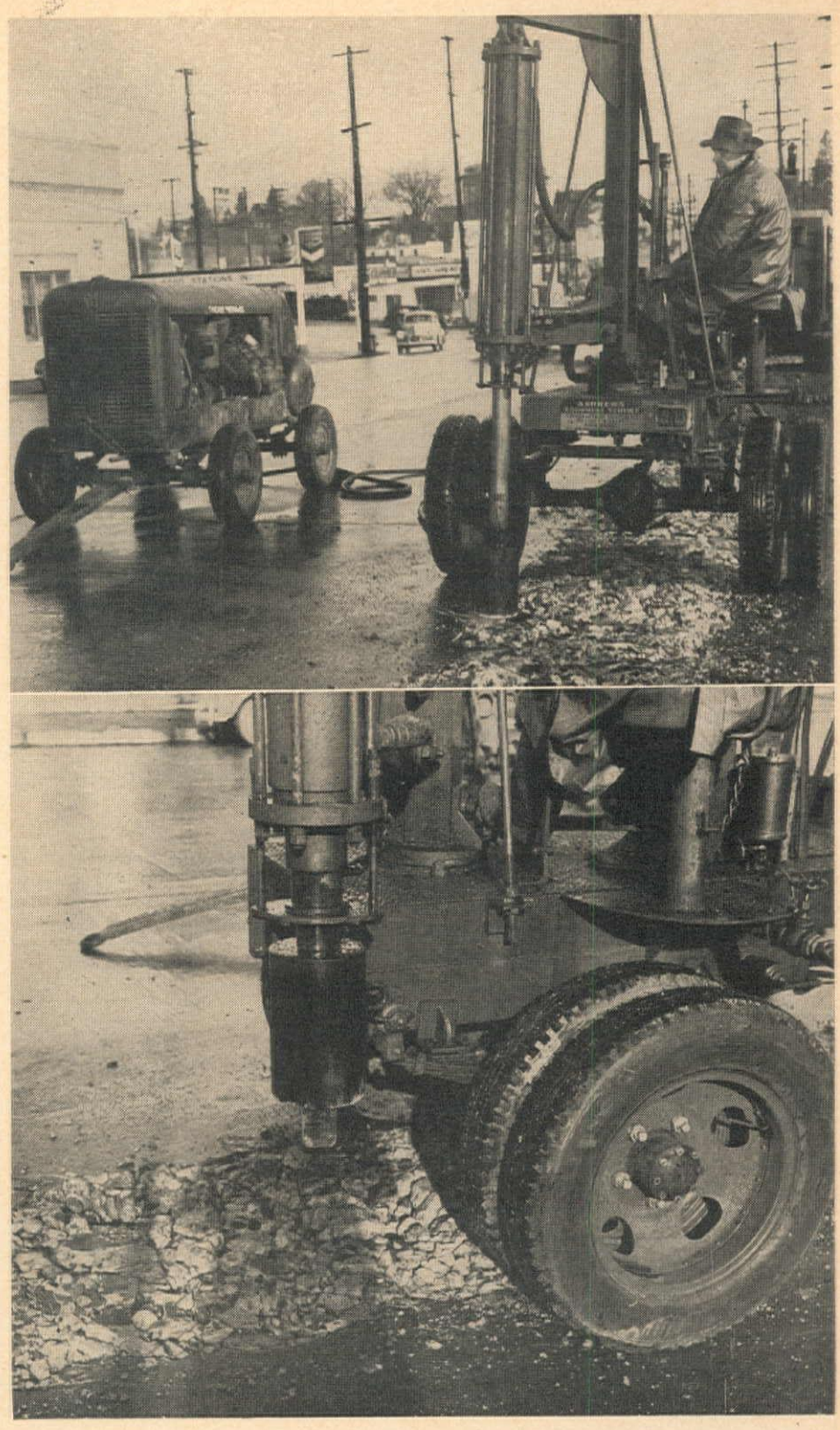
Pavement breaking

To open the excavation for the power shovel it was necessary to cut through 3 to 5 in. of bituminous surfacing and 8 to 10 in. of concrete base. This was accomplished with unexpected rapidity and ease by the use of a small size, carriage-mounted, pneumatic pavement breaker used in Portland for the first time.

Heart of the machine is a 6-in. piston with 40-in. stroke, operated by compressed air delivering 70 blows per minute. The piston is mounted vertically on a tricycle carriage (also equipped with a seat for the operator). At the lower end of the piston is mounted a 12-in. striking head 8 in. in diameter, and below it a 3 x 8-in. punch 5 in. long.

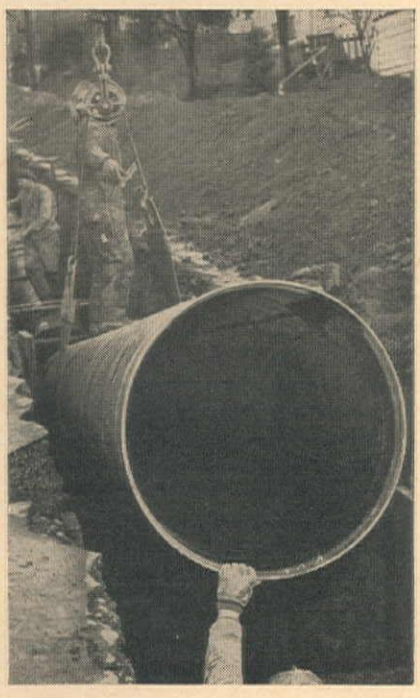
Delivering blows of 10,000 to 15,000 lb., the machine is first worked along the centerline of the excavation using heavy punches. The hammer is then worked progressively toward the edges of the cut. This application cracked and pulverized for easy removal the heavy street surfacing within the excavation lines without cracking the pavement outside the excavation limits. The breaking operation moved fast enough to keep ahead of the remainder of the trench excavation.

The bottom of the trench was carried at a uniform depth of 8 ft. below ground surface, excavation being completed by a power shovel. For backfill a trench hoe was used rather than a dragline. The hoe bucket was replaced by a blade



OPENING THE PAVING for the trench excavation was accomplished without great difficulty using this pneumatic pavement breaker mounted on a three-wheeled trailer carriage. Lower photograph shows the details of the 12-in. striking head and 3 x 8 x 5-in. punch. Delivering 70 blows per minute at a force of 10,000 to 15,000 lb. the machine opened the trench without cracking adjacent pavement slabs.

PIPE SECTIONS, weighing 2½ tons each were placed in the trench and joined by a field welded joint which was tested with 140 lb. of air pressure.



BACKFILLING the pipe trench after testing the individual joint welds was done by a backhoe with the bucket replaced by an open blade. Excavation of the 8-ft. trench was complicated by the maze of utility services underlying the city streets.

which moved the material back into the trench.

Organization

The $440,716 contract covering all phases of the work was awarded to the Steel Tank and Pipe Co. Division of the American Pipe and Construction Co. Fabrication of the pipe was carried out in the Portland plant and field joints including testing were completed by that organization. Excavation, including backfill, was done under subcontract by Oscar Butler and Son of Portland. Plant inspection of the pipe was made by the Hunt Co., and inspection of the fabrication and field joints by the Central Inspection Bureau of Portland.

For the City of Portland Ben S. Morrow is city engineer and general manager of the Water Bureau. Design and construction of the project was under the direction of Sidney J. Benedict, senior hydraulic engineer. James Morris and John Peters were in direct charge of the job for the Water Bureau.

Japanese War-Time Steel Production Was Less Than 11% of U. S. Capacity

PRODUCTION OF STEEL in the Japanese Empire during the war years reached a peak in 1943, according to the American Iron and Steel Institute. Thereafter, as a result of the naval blockade and of bombings, it declined steadily.

According to a report of non-military activities in Japan and Korea, prepared recently at General Headquarters of the Supreme Commander for the Allied Powers, the peak wartime production of steel ingots in the Japanese Empire was 9,656,000 net tons in 1943, which was less than 11 per cent of the maximum annual production in the United States during the war.

That 9,656,000 tons which Japan produced in the year 1943 could have been turned out by the steel mills of the United States in only 38 days, at the record rate of production which prevailed in the month of March, 1944, according to the Institute.

Of the total produced in Jap-controlled plants in 1943, about 8,616,000 tons, nine-tenths of the total was produced in plants on the home islands of Japan. The great steel works at Showa, in Manchuria, produced 921,000 tons and the remainder was produced at a plant at Keijiho in Korea.

The peak of steel production achieved in Japan during the war, although relatively small by American standards, nevertheless represents a substantial increase over prewar production. In 1930, for example, only 2,070,000 tons of steel were made in Japan. By 1937 output had risen to 6,991,000 tons and it rose steadily thereafter until 1943.

In 1944 steel production fell to 7,017,000 tons. A further, even sharper, drop was recorded after the start of intensive bombing of some of the major steel producing centers in Japan.

One of the important factors in the decline in production between 1943 and 1944 appears to have been the tightly-drawn naval blockade of the Japanese home islands. This was indicated by a sharp drop in the imports of iron ore from the Asiatic mainland, from the Philippines and elsewhere.

In 1941 a total of 4,136,000 tons of iron contained in iron ore were required by the Japanese steel industry. Only 20 per cent of that was produced in the Japanese home islands; the balance, 3,317,000 tons, was imported.

Another apparent factor resulting in lower steel production was the exhaustion of Japan's stockpile of imported scrap which had been built up in the ten years preceding the outbreak of war with the United States as a result of large purchases in this country.

Approximately 1,800,000 tons of Japan's annual steel capacity was put out of production during the war by bombings, the report indicated.

At the close of 1945, the steel industry of Japan was producing about 10,000 tons of steel a month.

U. S. Delivers Irrigation Water for Mexican Use

THOUSANDS OF ACRES of irrigated land in Mexico, lying west of the Colorado River and south of the California-Mexico border, are being benefited by emergency water releases from the All-American Canal via the Pilot Knob wasteway, according to E. A. Moritz, Director of the Bureau of Reclamation Region III office at Boulder City, Nev.

Approximately 225,000 ac. ft. had been delivered by April 30. Deliveries will continue through the current irrigation season. Under a similar arrangement made during the irrigation seasons of 1944 and 1945, approximately 400,000 and 715,000 acre-feet of water, respectively, were delivered.

The release of water from the All-American Canal to Mexico resulted from the lowering of the Colorado River below the border, making it impossible for Mexican irrigators to carry out normal diversions via the Alamo Canal.

The United States is not bound by the treaty with Mexico to deliver water to Mexico via the All-American Canal until Davis Dam has been placed in operation. Davis Dam is now under construction on the Colorado River 67 mi. downstream from Boulder Dam and is scheduled to be completed sometime in 1949. To promote the good neighbor policy, however, arrangements were made through the State Department to deliver as much of the Mexican demand as possible through the All-American Canal during the current irrigation season.

The treaty provides, however, that during the time Davis Dam is under construction, Mexico may construct and operate a temporary diversion structure for the purpose of diverting water from the Colorado River into the Alamo Canal. This temporary dam has not been started, although it has been requested that the Mexican Government build the structure in order that excessive deliveries via the All-American Canal will not be required.

River Dredge Home From War

By CLYDE J. GORMAN
U. S. Engineer Department
Sacramento, Calif.

TRAVELERS TO AND FROM Sacramento lined the bank of the river during a busy mid-May day to welcome home the dredge "Monarch." There was no place else they could go. With the "M" Street bridge up the old dredge made her way through what she probably considered a Victory Arch.

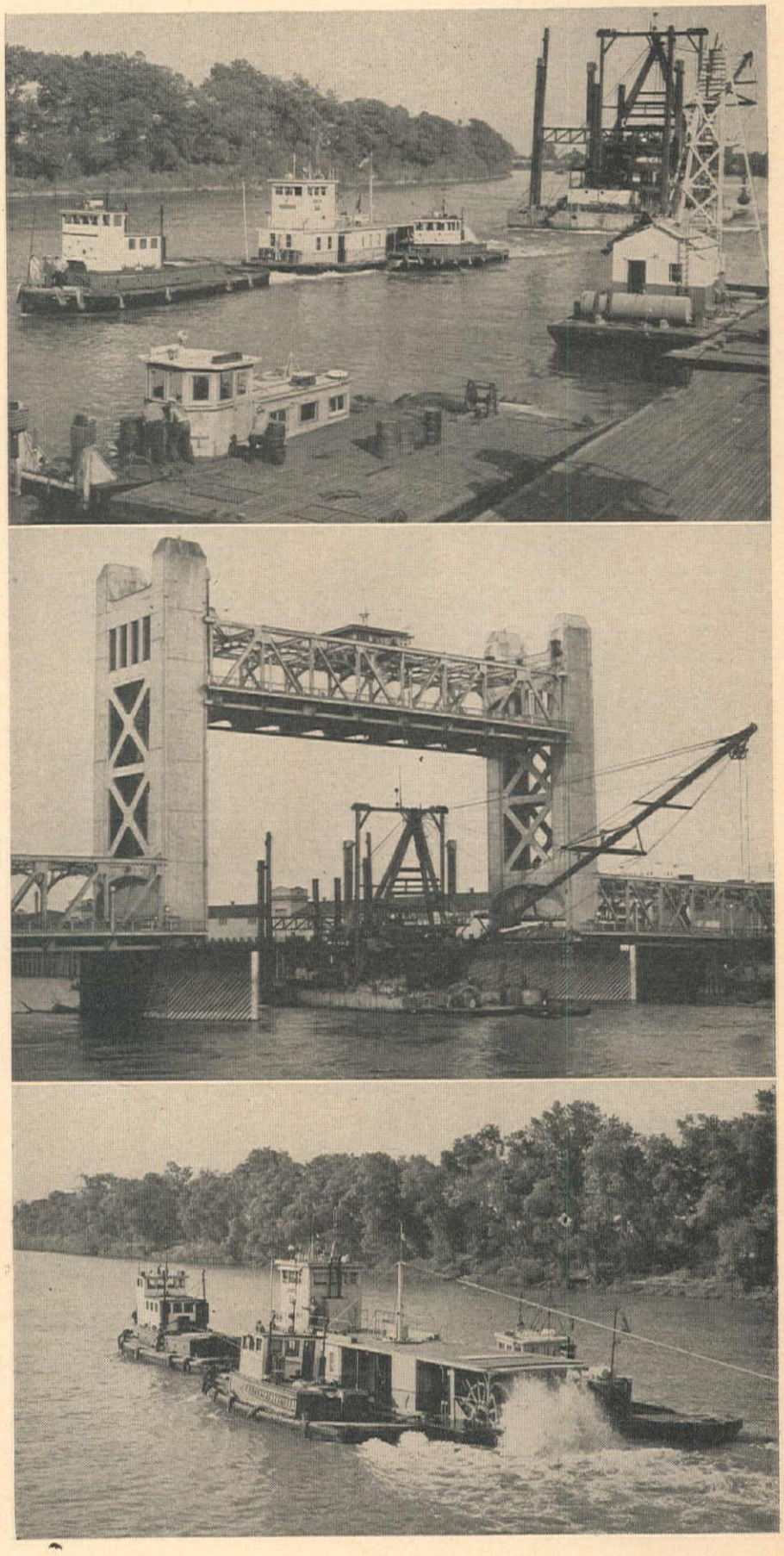
In any event, this marked the return of Army Engineers, dredge and all, from the Pacific campaign to their regular peacetime assignment on the Sacramento River. During the war, the "Monarch" had dipped her clam shell in South Sea waters, and she had labored off Hawaii, but now, restored to her owners, the Olympian Dredging Company of San Francisco, she was going home under contract to dig in where she left off.

The "Monarch" has a length of 140 ft., a beam of 61 ft. 7 in., and a draft of 13 ft. 2 in. The 115-ft. boom operates a 5¼-cu. yd. bucket.

She is headed for Meridian, a point about seven miles below Colusa. From there, she will work downstream enlarging and strengthening east bank levees as far as Knights Landing. By working from the river, the Engineers point out they can minimize trampling a lot of valuable acreage with land machinery, and also clean out the river at the same time.

Of navigation interest on the "Monarch's" upstream trip was the novel arrangement for getting her over high spots in the river bed, of which there are about three tough ones. Through cooperation of the Bureau of Reclamation, an extra release of water from Shasta Dam was timed so as to arrive just as the "Monarch" approached a normally shallow spot. The tugs took an extra bite at their tow lines, and up she went. Two tug boats from the Riverlines and two from the Engineers' yard at Rio Vista — including the famous stern wheeler "Putah"—were assigned to the job.

The levee work represents part of that to be financed under the recent $2,000,000 appropriation for resumption of the continuing Sacramento River program. Other river chores going on at the moment consist of clearing and snagging operations above Chico Landing with U. S. Engineer barges and draglines.



THE MONARCH, owned by the Olympian Dredging Co., San Francisco, moves up the Sacramento River toward her first peace-time job after spending the war in the South Pacific. Center, the M street bridge in Sacramento opens to form a victory arch, as the dredge is towed through (below) by four tugs including the stern wheeler Putah from the U. S. Engineers' yard at Rio Vista.

New Mexico Highway Problems

Annual Report of Materials Laboratory of State Highway Department for 1945 gives intimate review of varied problems which must be faced by highway engineers in road construction in the desert and mountain regions of the West—Specific examples show Department's activities

By E. B. BAIL
Materials Engineer
and
LINDSAY F. ROOT
Albuquerque, New Mexico

THE NEW MEXICO State Highway Department Materials Laboratory, located at the University of New Mexico, Albuquerque, began the calendar year 1945 with a force of 13. Besides these employees, there were at that time four men being trained in methods of field control in line with the Department's policy of having available at all times a reserve of trained inspectors to make good losses of personnel to the armed forces and the high-wage industrial centers of the Pacific Coast. With this force, seventy-two projects were examined during the year, and running tests taken on all projects under construction.

Typical roads

The farm-to-market road system had been emphasized by the Department in 1944, and during 1945 most of the field and laboratory work was done on this class of highway. Notable in this type was the Dora-Causey-Lingo-Texas Line highway, which leaves State Road 18 at Dora and goes east through Causey and Lingo to a connection with a paved Texas road. This was a badly-needed improvement. It serves a prosperous, diversified farming area southeast of Portales. The total length of this route is about 29 mi. The old road was widened and the existing surface strengthened with new caliche base and paved with a road oil surface 20 ft. wide.

The caliche deposits in this area are very irregular in shape with alternating good and poor material in the pits. For this reason the project engineer and his inspector had to be constantly on the alert to avoid getting material onto the road bed which might later have to be removed.

Another farm-to-market highway improvement was the paving of the road from Portales to Arch, through the rich peanut lands east of Portales. The existing road had a surface of good to poor caliche which had worn down irregularly.

Not a great deal of money was available for this improvement, which contemplated paving fifteen miles. The existing road was considered wide enough to permit placing a pavement 20 ft. wide. Where the existing caliche surface was of good quality and sufficient thickness to support the truck loads using it, no new material was added. On other sections the poor quality caliche was improved by the addition of blow sand. On a considerable length it was necessary to add new caliche.

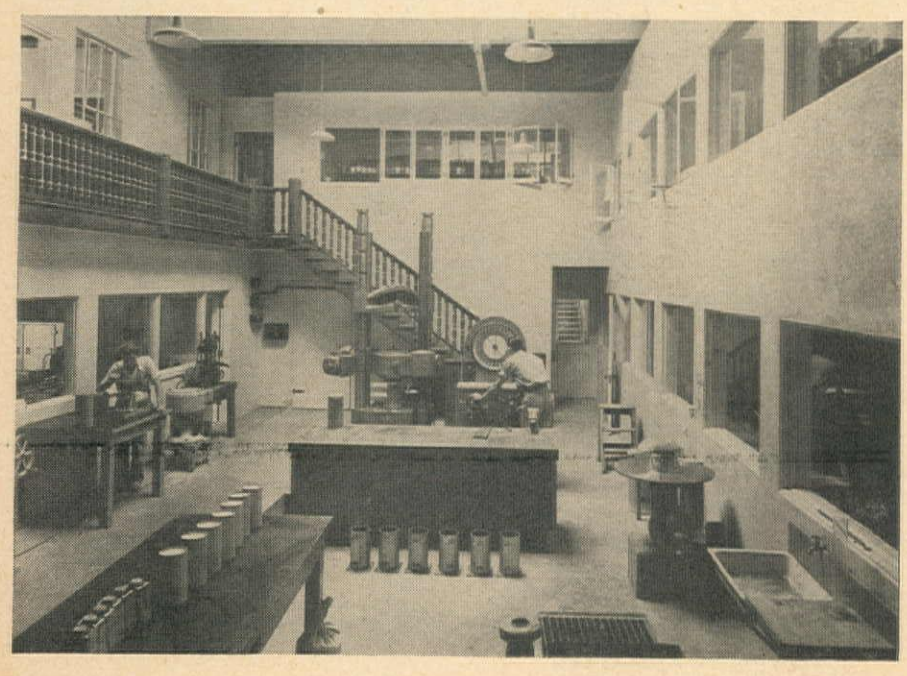
The only caliche deposit available within practicable hauling distance was of poor quality. It was fairly hard but contained sufficient clay to cause it to become unstable when covered by an impervious oiled pavement. In this condition it would be certain to give way under loaded trucks and cause failure of the surface. It became necessary to improve this poor material before mixing it with asphalt, and this was done by spreading the crushed caliche in a layer as it came from the crusher, then covering this layer with a predetermined amount of blow sand and mixing the two layers thoroughly before adding asphalt.

Of quite different character will be the improvement of a farm-to-market outlet for Virden, the farming community on the Gila River in Hidalgo County, about 3 mi. from the Arizona line. This road branches off U. S. Highway 70, some 23 mi. northwest of Lordsburg. From this point it is eight miles to Virden.

This country about Virden abounds in the materials needed for highway construction. The trouble is that they don't come mixed in just the right proportions. Not very long ago State maintenance forces nicely graded the section from U. S. 70 to Virden. They finished the riding surface off with the natural gravel-and-boulder desert surface and really had a hard-surface road. Too hard, the fine particles slipped down through the boulders, leaving these durable citizens for cars to travel on. The result was that traffic took to the ditches as being the best traveling. When the Department's construction plans are carried out in 1946 these boulders will be covered with similar boulders, but they will be crushed to fragments not more than an inch in diameter, and on this crushed surface will be placed a bituminous pavement.

This study in contrasts is presented to emphasize the fact an abundance of construction materials in the raw does not necessarily make for cheap highways. Everything depends on how much work must be done on the natural materials to put them in shape to use.

PHYSICAL TESTING ROOM in the Highway Department Materials Laboratory, located in the University of New Mexico engineering building, Albuquerque campus.



The place of the laboratory

At this point it is proper to explain just where, in the history of a road, the Testing Laboratory enters the picture, and the manner of its functioning.

When the Highway Commission orders the improvement of an existing road or the building of a new one, the first order of business is a survey to fix the location. On completion of this survey the Design Section translates the location engineer's notes into a map. This map is a picture of the country through which the road passes and shows a profile of the ground surface.

It is this ground surface that the Testing Laboratory has to deal with—the surface, and so far below as can be reached with the equipment on hand.

At present this equipment consists of spades, shovels, picks and soil augers operated by hand. Because of the presence of rock fragments in most of our soils it is seldom possible to get down more than four feet with hand augers. As an average, samples of the soil to a depth of eighteen inches are secured.

These samples are taken to the laboratory in Albuquerque and tested to determine their suitability for road construction. In many instances the natural soil in place is so poorly suited for use in embankments that it becomes necessary to use care in its manipulation or haul better soils a considerable distance to the spot where the embankment is being constructed. In some instances interested taxpayers have observed this hauling being done and have inquired concerning the necessity for such an operation. It can best be explained this way: Let us call the poor soil "A." This material is bad because it takes up water like a sponge, and for this reason cannot be properly packed down to make a firm surface on which to place the pavement. It can be made to serve by covering it to a great depth with crushed stone or gravel, but crushed stone costs so much that it will certainly be cheaper to use a better soil, "B," and thereby produce a better foundation for our pavement. Of course you have to balance the cost of hauling in good soil "B," which will require less stone base against the cost of the greater thickness of stone or gravel needed to cover the poor soil "A."

Now that is simply the first cost, the construction cost. Past bitter experience indicates that soil "A" is going to cost more for maintenance. This type of soil has what is called high capillarity. This means that water will rise through it clear up to the bottom of the pavement and will accumulate there sufficiently to soften the road bed. To counteract this bad characteristic it is necessary to cover this type of soil with a much greater thickness of crushed stone than would have been required for soil "B." But even then it gives trouble in the cuts and ditches for this soil turns sloppy when it rains or when snow melts on it. It flows into the road ditches and fills them and then works into the crushed gravel foundation under the pavements. When it works between the pieces of gravel or stone it acts exactly like grease. It lubricates the pieces of stone so that they slide on one another and when a loaded truck comes close to the edge of the pavement in a cut where this mud has worked into the stone base, the base gives way. Not much the first time. But when these loads are repeated a hundred or a thousand times the pavement is pushed down and squeezed out until it becomes necessary to replace it with a patch, and so the maintenance cost as well as the construction cost is higher because of having to deal with soil "A."

When tests have been completed on all the samples taken in the field the results are shown on a "soil profile," which is simply a description of the soil on which the proposed highway will be built. From the results of the laboratory tests, recommendations are made as to the thickness of foundation required to support the pavement.

CHIEF CHEMIST'S office in the bituminous materials testing room of the New Mexico Highway Department Laboratory. Laboratory staff is composed of thirteen men.

Locating material

The next step is to find deposits of gravel or stone for the foundation. To one not acquainted with the processes by which gravel deposits have been built up in New Mexico it would seem a very easy job to find plenty of such material. Gravel exists on the surface practically everywhere and there seems no good reason why it should require a lot of time and money to find enough for road building purposes. Nevertheless, this business of finding suitable deposits of foundation material takes up more time and money than all the other sampling and testing put together. To make plain why this is so, here are the qualities such a deposit must have:

1. It must have little or no clay, and clay is one of the commonest constituents of soils.
2. The rock of which the gravel is composed must be hard enough for the purposes for which it is intended.
3. It must be as close as possible to the proposed roadway, for it costs money to haul this material and it is well worth while to spend time and money in the attempt to locate the closest possible deposits.
4. It must be large enough to justify the cost of installing a crushing and screening plant. This means that there should be ten to twenty thousand cubic yards in the deposit, and it is surprising how few are the deposits of this size.

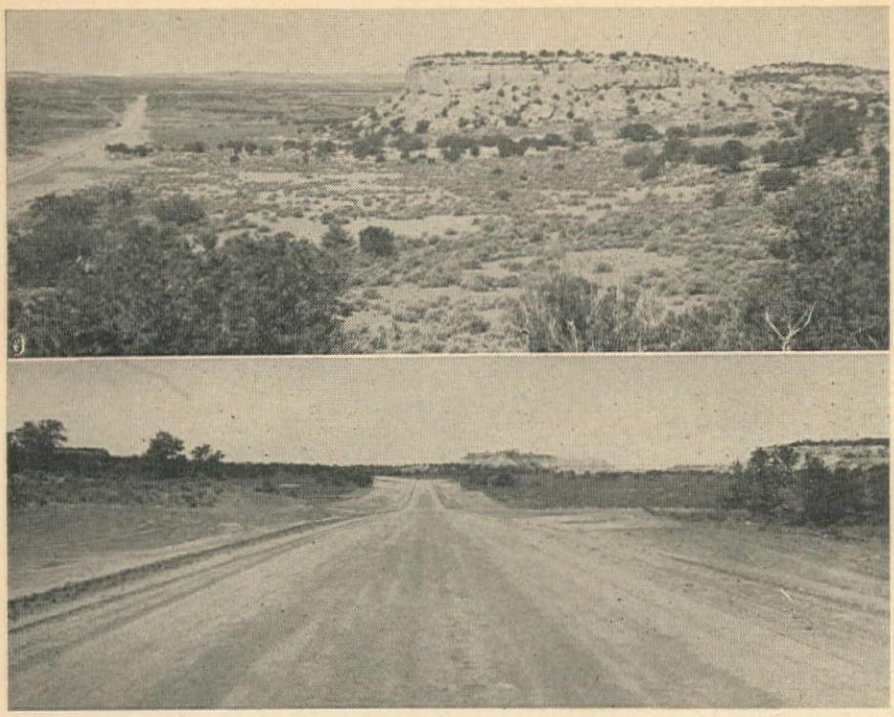
Since the cost of producing foundation material from deposits of solid rock is twice to three times the cost of producing good material from gravel deposits, it is evident that solid rock deposits will be used only as a last resort and every effort made to find gravel pits.

The process of developing a gravel deposit is simple but tedious and expensive. The first step is to locate all knolls, hills, arroyo beds, and the like which indicate the presence of weather-resistant materials such as gravel or caliche. Those which are obviously too small to be of practical use are marked off the list.

From the possibilities left, the testing engineer selects those nearest the proposed road and starts men to digging, generally six to eight men will be starting pits at the same time on the same prospect. As each hole gains depth the engineer samples it from top down.

The average test hole will show from six inches to three or four feet of soil only. The next foot or two is apt to be a mixture of soil, sand, and gravel, and from this depth to the bottom of the deposit it is generally sand and gravel mixed and a relatively small percentage of soil. A sample is taken, as the hole goes down, from each type of material.

The engineer can often tell by observation only that the material contains so much clay that it will be useless. But in most cases it will require a laboratory test to determine surely the quality. Too often one hole will be of good quality and the hole adjacent will prove useless. The net results for a deposit, then, is a hodge-podge of mixed good and bad pits, indicating a material so erratic in quality that no contractor would undertake to produce satisfactory foundation gravel from it. This deposit is then marked off the list and the same process repeated on another hill. In the end it may be that none of the nearby deposits will be usable and that suitable materials



CUBA-AZTEC highway (Projects 186-1 and 2). Above is a typical butte of soft sandstone, the only source of road surfacing material in the entire area, and one which requires careful handling. Below, section of sandstone surfacing before oiling.

can be had only at a great distance.

In the area north and south of Springer, on U. S. 85, as many as ten or twelve promising gravel deposits were thus tested and abandoned. The only good material was found in the bars of the Cimarron River below the town, and the cost of hauling foundation material from this deposit will be very high.

Having developed enough foundation material for the job, the next step is to locate and prove deposits of material suitable for making concrete.

A deposit developed for foundation material will seldom be suitable for the making of concrete. It will generally be necessary to get concrete material from commercial sources. Invariably these commercial sources are located in the valleys of the Pecos or the Rio Grande. For concrete work in the northeast corner of New Mexico, sand and gravel has been imported from commercial pits in Texas which have their supply in the Red River near Amarillo. Sand and gravel from Colorado has also been used, taken in one case from the Arkansas River near Pueblo.

Finally, the laboratory must locate and develop material suitable for mixing with asphalt to form the pavement. In general, a first class foundation gravel can be made into a good pavement stone with not a great deal of added expense, hence the main part of the field exploration has been done when ample foundation material has been proven.

The foregoing outline describes the preparatory field and laboratory work. Once the job has been let to contract a whole new series of soil tests is carried on by the engineer in charge of construction as the grading progresses.

Cement, for instance, the commonest of construction materials, requires six different tests before it can be accepted for use. Road asphalt requires not less than twenty-two different tests on the same sample, and four additional tests on the mixture of rock and asphalt.

Some idea of the complexity of modern construction may be given by the fact that the latest requirements of the American Association of State Highway Officials involve not less than one hundred tests for all of which a certificate of acceptance or rejection must be issued by the Testing Laboratory.

Typical road problems

Space does not permit detailed description of each and every project on which tests were performed. Seventy-two projects were examined during the year 1945.

From the point of size and mileage involved, projects 186(1) and 186(2) were easily the most important. From the standpoint of difficulty in locating materials suitable for foundation construction, the area between Cuba and Bloomfield is by far the worst. In a distance of 90 mi. only three gravel deposits are available and these do not have sufficient material to provide the foundation course required over this great distance.

It was necessary literally to make something of nothing. Scattered along the highway are soft sandstone buttes, a material not ordinarily considered. When crushed it has a tendency to break down into very fine sand. However, this type of material has one redeeming feature. In most cases it will cement itself together into a fairly compact mass. Some of the buttes lacked this cementing material and it was necessary to provide the binding element by mixing into the crushed sandstone a previously determined amount of sand-clay. By utilizing this soft sandstone it was possible to construct the foundation layer on the above two projects. In the spring of 1946, a low-grade gravel deposit will be utilized to provide the road oil pavement over this 30-mi. stretch.

Immediately beyond the north end of project 186(2) there will be constructed another project 10 mi. in length, for which similar buttes of soft sandstone will be available for the major part of the foundation course. About 4 mi. north of this proposed section lies another gravel deposit carrying a good grade of material and this will furnish the aggregate for the road oil pavement. Beyond this next proposed 10-mi. section lies nothing but sand and the problem of providing a foundation course for this long section has not yet been solved.

Project 186(4) extends from Bloomfield to Aztec in San Juan County. No great difficulty was experienced in securing material for this project since it was possible to find gravel bars in the San Juan River at the south end and in the Animas at the north end.

Project 186(3) extends from the town of Cuba in a northwesterly direction 12 mi. to the top of the Continental Divide where it joins project 186(1) discussed above. Project 186(3) involves the improving of an already gravel-surfaced road. Sight distances will be improved and the existing roadway is to be widened. The design can be made in such a way as to conserve all of the existing gravel which is of good quality and worth a considerable sum to the State. If this is done there will be sufficient gravel of good quality in an existing pit to surface the entire project. There will also be available certain soft sandstone deposits which can be utilized in the same way as discussed above.

Alkali protection

FAS - 22, Isleta - Albuquerque. This project serves a double purpose. It is classed as a farm-to-market road, but because of its superior alignment it will serve as an alternate to U. S. 85, and will undoubtedly absorb practically all the through traffic now using the congested South 4th Street section of U. S. 85.

This project is, in general, located above the valley floor except for about 4 mi. which cross newly-developed farm lands on the extreme west side of the Rio Grande Valley west of Pajarito.

A great deal of the embankment necessary to raise the road bed above the valley floor north of Pajarito will be secured from the spoil bank of the Isleta Drain. The spoil bank in this area is generally a very good sandy loam ideal for embankment construction. Material suitable for foundation course and pavement is found widely distributed throughout the length of the project.

Numerous drainage and irrigation structures will be needed. Laboratory tests indicate the presence of alkali at the location of many of these structures and it will be necessary to use protective measures to insure a reasonable life for the concrete structures.

In general these precautions consist of using a very dense impervious concrete and painting the exposed surfaces of these structures with tar or asphalt to insure against the penetration of sulphate-carrying water.

FAP-78, Las Vegas-Watrous, U. S. 85. The testing laboratory did a great deal of soil and material investigation on this proposed new highway.

In general, the first section immediately north of Las Vegas will lie to the west of the present highway, at some places as far as 2,000 ft. away. At a point about 10 mi. north of Las Vegas, the new location and the present highway are about 100 ft. apart and generally maintain this relation.

The soil available for embankment construction is of a very poor grade and will require a very heavy foundation course to support the pavement. The thickness of the combined foundation course and pavement will be 14 in. throughout the length of the project, making this a very expensive piece of work. Material suitable for foundation courses is very scarce indeed. For the Las Vegas end of the work material must be secured from a gravel deposit about 3 mi. northwest of the city and almost 2 mi. away from the proposed highway. For the north end the nearest material available is 3 mi. away from the new roadway and consists of bars scattered along the Sapello River.

Suitable material for the construction of concrete bridges and culverts will have to come from the Gallinas River within the city limits of Las Vegas where there is a small deposit of satisfactory material a little way below the Prince Street Bridge, and from the above-mentioned bars in the Sapello River. All water courses and irrigation canals show a high per cent of alkali, and protective measures must be taken to insure the safety of concrete structures.

Irrigated land

FAP-110-139, Deming-south toward Columbus. In the latter part of 1945 the Highway Department let to contract approximately 7 mi. of the road between Deming and Columbus, passing through a very productive farming section, irrigated with water from comparatively shallow wells.

The possibility of irrigating from the Mimbres shallow water belt is recognized as extending as far south as Waterloo, about 20 mi. south of Deming, and pumping rights have been granted by the State Engineer as far as Waterloo.

It is recognized that in an irrigated section, or a section which may come under irrigation, it will be necessary to provide maximum support for the proposed oil pavement, and testing laboratory recommendations take this into account.

In general, the natural soil between Deming and Waterloo is a mixture of clay and sand; over some areas the sand predominates, but over all sections where flood waters cross the highway the natural soil is predominately clay and, of course, requires considerably heavier foundation course.

An excellent roadway could have been built up by securing soil within the right-of-way fences and this, in most cases, without creating unsightly excavations. However, this was not permitted because of the regulations imposed by Federal participation and it became necessary to secure the material for raising the roadway from certain designated pits located at intervals parallel to the axis of the roadway and not closer than 500 ft. from center line. These borrow pits were located by the District Engineer wherever he could make suitable arrangements with the property owners. Consequently, the thickness of the foundation course will vary with the type of material secured from these borrow pits.

Material for the foundation course and for bituminous pavement was fortunately available within a very reasonable haul distance, and this feature of the proposed construction will not be unduly expensive. Material for concrete structures will also be available from the gravel pits used for the roadway.

FAS-7, which will connect the highly-developed Virden farming community with paved U. S. 70, was partially discussed earlier.

Alkali in concrete

In the Gila River proper, every foot of arable land is being utilized. Drainage ditches are numerous and the water level is pretty close to the top of the ground. All these factors added together call for very heavy foundations to insure that the bituminous pavement will not fail, and this makes for a high cost per mile of road.

As in all other areas where irrigation is practiced, alkali was found in sufficient amounts to damage concrete structures.

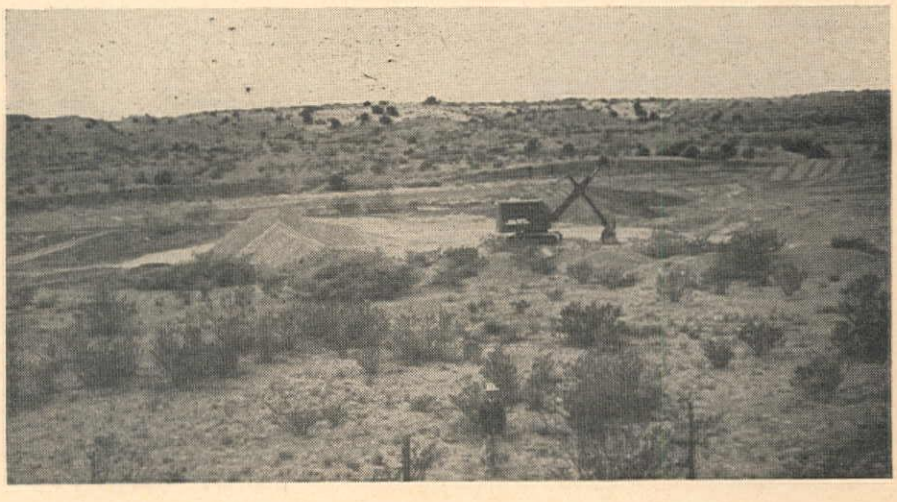
It should be clearly understood that excellent crops can be grown on land which holds enough alkali to eventually destroy a structure built of concrete. This apparent contradiction is explained in this way: In the course of an irrigation season the farmer applies water to his land many times. This fresh water not only furnishes the moisture necessary for the proper growth of his crops, it also acts as a cleansing process, washing out the excess alkalies by carrying them deeper into the ground and eventually out of the fields into drains provided for that purpose and thus the land is kept in a condition favorable to the growth of vegetation. But when this water comes in contact with the surface of a structure built of concrete, it will penetrate any pore or fine cracks in the surface. A process of alternate wetting and drying is going on continually. When the water which has penetrated the concrete evaporates, it leaves minute quantities of sulphate crystals. These are sulphates of sodium or magnesium and even when present in relatively small quantities, the residue from the evaporating water will leave a white coating on the surface and it is this coating which is called alkali. In expanding, these crystals develop a considerable force, enough to break off fragments of the concrete near the surface of the structure. When this process is repeated thousands and thousands of times, eventually the pores and cracks will be enlarged to the extent that the concrete will be completely eaten away and failure must result.

It is therefore very necessary that the concrete must be made as impervious as it is possible to make it. Even with the very best methods in use it is impossible to avoid a certain amount of cracking in the surface due to the nature of concrete itself. At best, a few of these shrinkage cracks are going to appear, and, to further protect the concrete the surface is painted with a thin tar which penetrates the pores and cracks as readily as does water and seals up the channels through which alkaline water might gain entrance. After this material has penetrated and dried, a second coat of heavy tar or asphalt is applied as double insurance.

It has been found that steel culverts in waterways where alkali is present are also attacked by the alkali and that they, too, must be protected by some sort of bituminous or alkali-resisting cover.

Of a very different nature was the improvement of SP-10, a State project for

TYPICAL GRAVEL deposit in New Mexico. These deposits are apt to be too small for adequate supply of material, and are often impregnated with various alkali salts.



the betterment of the existing road between Miera and Chilili, in the eastern edge of Bernalillo County. This section is a part of State Road 10 and is on the secondary system which extends from Tijeras, in Tijeras Canyon by way of Cedro Canyon, Chilili, Tajique, and Manzano to Mountainair. From Tijeras to Miera the Forest Service has built a paved road and between Chilili and Tajique, project 214-A was constructed in 1934. From Tajique to Mountainair the State has at different times improved the road by addition of gravel and these improvements, plus the fairly good quality of the natural soil, have enabled maintenance forces to keep the road between Chilili and Mountainair in reasonably good condition throughout most of the year.

The section between Miera and Chilili is rugged. The natural soil is of poor quality. Without gravel or crushed rock surfacing, this section became virtually impassable during periods of melting snow or continued rainfall, even for wagons. The cost of improving this section to standard grades and widths would be very great. Nevertheless, it was necessary that something be done to get these people out of the mud. In the fall of 1945, the laboratory was instructed to locate material suitable for gravel or crushed rock surfacing. Limestone deposits of good grade are abundant in this area and it was not difficult to locate deposits reasonably close to the proposed improvement. A crushed rock surface of excellent quality, and averaging about 6 in. in compacted thickness, was placed and a good year-round roadway has been secured. This will take care of this area's present needs and as more funds become available this road will be constructed on standard alignments and grades and then paved.

FAP-197-A, Hobbs to Lovington, Lea County. The improvement proposed for this highway consisted of widening and bringing to uniform grade an existing road. Caliche of good quality is abundant in this section. Both the foundation course and the crushed material for the bituminous pavement are being made from this material. In a length of 19 mi. no less than fourteen separate caliche deposits were sampled and tested.

Roads of gypsum

FAP-99. This section extends from Tularosa to a point about 4 mi. south of Corona. The Department's plans for improvement during the year 1946 provide for the completion of the section between Tularosa and Carrizozo. In the natural soil of this area there is a great deal of gypsum. The effect of appreciable amounts of gypsum on the supporting characteristics of highway embankments has been given a good deal of attention by this laboratory.

Plaster of paris is gypsum which has been subjected to a high temperature and reduced to a white powder. This powder, when mixed with water, hardens very rapidly, and, because of this property it has many industrial uses.

Research indicates that some similar sort of hardening takes place in a soil containing as much as fifty per cent gypsum when it is subjected to the water and compaction employed in the construction of roadway embankments. A study of many miles of bituminous surfaces has shown that these surfaces are invariably in better condition where the natural soil on which they rest carries gypsum amounting to as much as 30 per cent of the total soil.

On the other hand, a gypsum-bearing soil unprotected by some sort of wearing surface is one of the worst possible problems from the maintenance standpoint. Soils of this nature are very friable and, unless kept damp, will quickly break up into pot-holes and bumps. Where unprotected by gravel or bituminous pavement, roads in soil containing a large amount of gypsum have proven the most difficult to maintain and were avoided by the driving public whenever possible. The Department's maintenance forces found it simply impossible to maintain a smooth surface except for a day or two after the infrequent rains.

When highway embankments are constructed of a soil of which gypsum forms a greater part, the soil is watered and compacted in the course of construction and present practice is to cover these embankments with a foundation course of gravel which in turn is covered by a bituminous pavement. This pavement so reduces the amount of evaporation that sufficient moisture remains in the embankment to keep the gypsum-bearing soil in a stable condition.

Gypsum in airports

The stability of gypsum-bearing soils is strikingly demonstrated at the Alamogordo airport. This airport was hurriedly built, with the thought that it would be used for nothing heavier than Flying Fortresses or Liberator Bombers, planes having a loading on each main wheel of 24,000 and 30,000 lb., respectively. In 1943, this laboratory secured permission to go on the field and examine the soil underlying the airport paving. In the course of this examination data were also secured concerning the thickness of foundation courses and pavement.

One of the results of the research was the finding that this hastily constructed field had a load-carrying capacity far beyond what was anticipated at the time of construction. Application of a formula developed at this laboratory indicated that the field could safely carry planes having a main wheel loading of 60,000 lb. per wheel.

Information obtained from this research has resulted in a saving of many thousand dollars to the Highway Department, since it has been proven that lesser foundation thicknesses are required on the gypsum-bearing soils. It is probable that the ultimate dollar value of the saving due to this research will be not less than one-half million dollars.

In hard rock

Between Silver City and Bayard, proposed construction will mean the building of a new road replacing one of the most dangerous sections on the highway system. The present road has probably the worst curves and its record of fatal accidents is undoubtedly the most impressive in the State. Automobile traffic is tremendously heavy due to the fact that many employees of the Chino Copper Mines live in Silver City and commute to and from their work.

It is proposed to replace this existing obsolete road with a more direct line lying south of the present route and having very few curves.

The new construction will involve removal of a tremendous amount of rock—hard rock. The laboratory's problem on this route, known as FAP-28, was to determine the location of ample supplies of foundation material and material suitable for the making of concrete and for bituminous pavement construction. This is another case where the presence of enormous amounts of hard, durable material does not necessarily make for low construction cost. The cost of providing foundation material will be very high if constructors are obliged to blast and crush the solid rock deposits abundant in that region. As always, the laboratory endeavored to find deposits where nature had done most of the crushing already. This it was able to do and thereby diminished probable cost of construction as far as it is possible to do so in country of this rugged character.

Santa Fe Erecting New Steel Arch in Arizona

THE SANTA FE Railway started the construction of a new double-track, two-hinged, steel arch over Canyon Diablo, Ariz., on May 15. This bridge is located about midway between Flagstaff and Winslow.

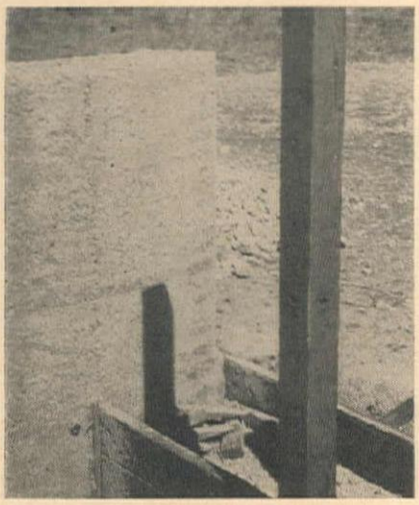
The present single track steel trestle was erected in 1900—15 months were required to complete it — was 560 ft. long, 225.5 ft. above the canyon bed.

In 1912 double track was laid between Winslow and Flagstaff, at which time it was necessary to lay gauntlet track over this old single track structure, and properly protect with adequate block signals. This slows up the movement of trains.

The use of heavier locomotives and necessity for renewal of the old single track bridge with double track, were the contributing factors in carrying out this construction project. When the new steel arch is in service, it will be possible to make a speed of one hundred miles per hour.

There will be approximately five thousand tons of structural steel in the structure. Contract for fabrication and erection has been awarded to the Kansas City Bridge Co. of 215 Pershing Road, Kansas City. Sub-contract for fabrication has been let to the Kansas City Structural Steel Co. Delivery of new steel is expected in September, and the new bridge should be in service about February, 1947.

Walls of Rammed Earth in New House



By NELSON R. LOVE
Chief Engineer
The Denver Tramway Corporation
Denver, Colorado

RAMMED EARTH wall construction for single story dwelling units, using modern equipment, methods and material control is an excellent example of the economic utilization of materials at hand to accomplish old things in new and better ways. Work along this line is being conducted by J. Palmer Boggs of Denver, Colo., engineer and designer of a number of such houses in a new subdivision southwest of Greeley, Colo., owned by David J. Miller of that city.

The type of construction should properly be termed "monolithic stabilized gravel," utilizing adjacent soil which has a rather high clay content, diluted with sand and gravel or pit-run gravel to secure a mixture of approximately 70 per cent sand and gravel, 15 per cent silt and 15 per cent clay and clay colloids. The proportions are varied with the immediate conditions encountered in order to secure maximum density, and the water content requires careful control at around 12 to 15 per cent to secure maximum compaction.

Six-inch layers of material are compacted to approximately four inches with pneumatic backfill tampers. A wall thickness of 16 in. has been found to be most satisfactory. Forms are constructed of two-inch tongue and groove material with a liner of hard pressedwood, and placed in 30-in. lifts, set between 4 x 4-in. vertical risers to avoid trouble with alignment and to secure smooth junctures. Forms are separated by pipe spreaders and tied by stud-bolts through the pipes. After completion and curing of the wall and removal of the sectional forms, the bolts and pipes are removed and salvaged. Open ends of holes are plugged with wall material.

This type of construction is being used only for houses of single story height without basements. Walls are placed on concrete footings poured in neat excavations and reinforced with a few rods to secure beam action. Footings are carried 6 to 12 in. above ground level to avoid splash. Exterior surfaces of walls are not finished except for a coating of cement base paint finish. Interior surfaces may be finished as desired with plaster or painted without further treatment to take advantage of the unusual texture of the surface for decorative purposes.

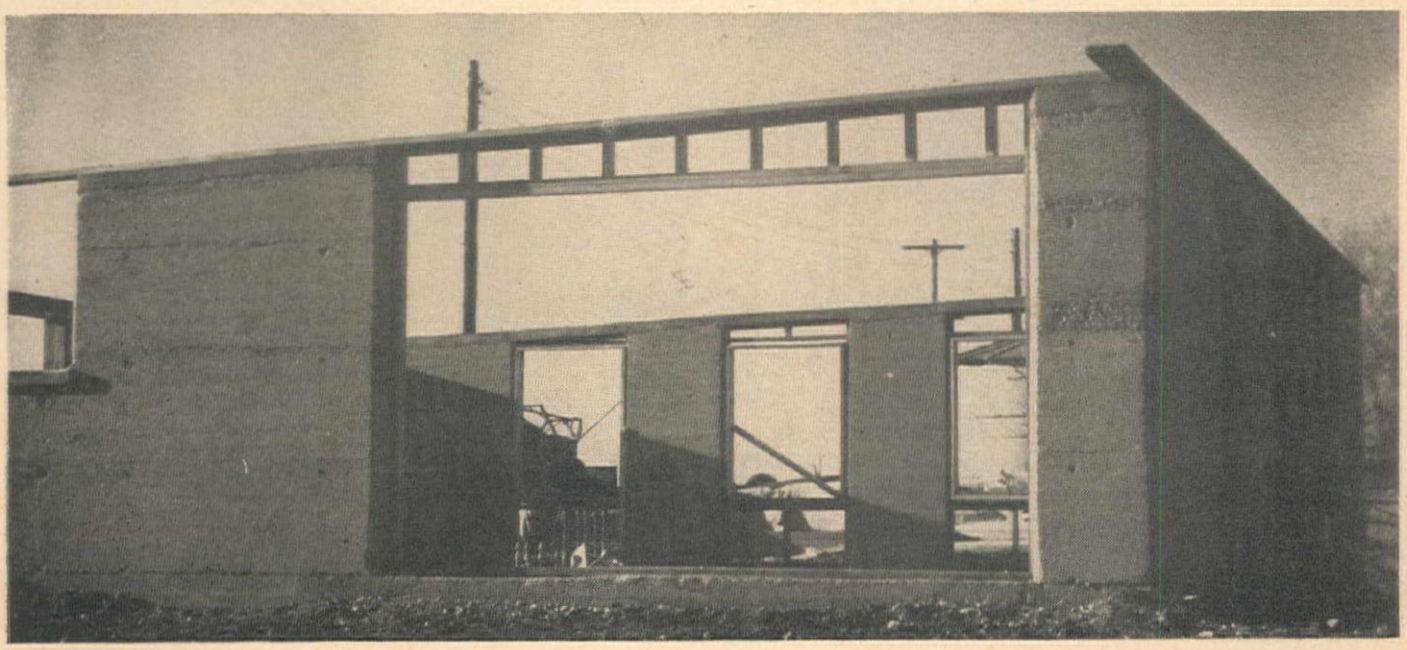
Houses are finished with concrete floors with imbedded pipe for radiant heating and covered with linoleum in kitchen and bath. Floors in other rooms

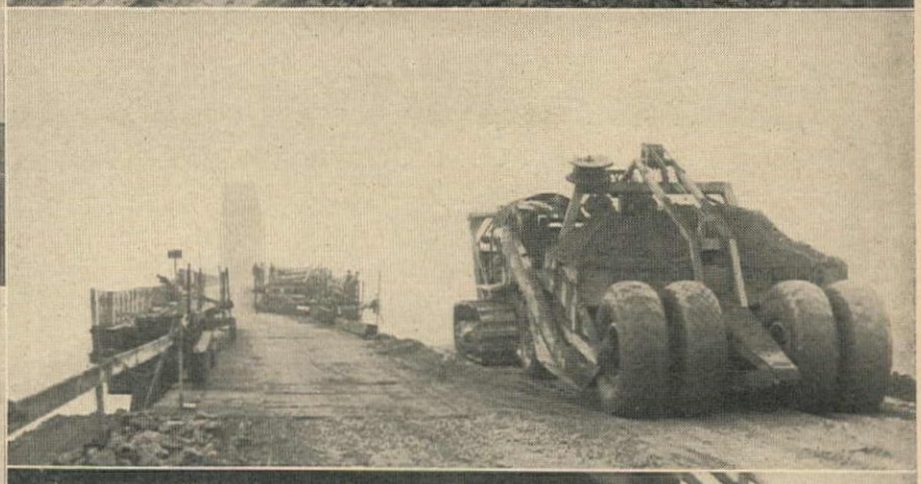
are finished with concrete dye and protected by transparent wax. Ordinary roof construction is employed.

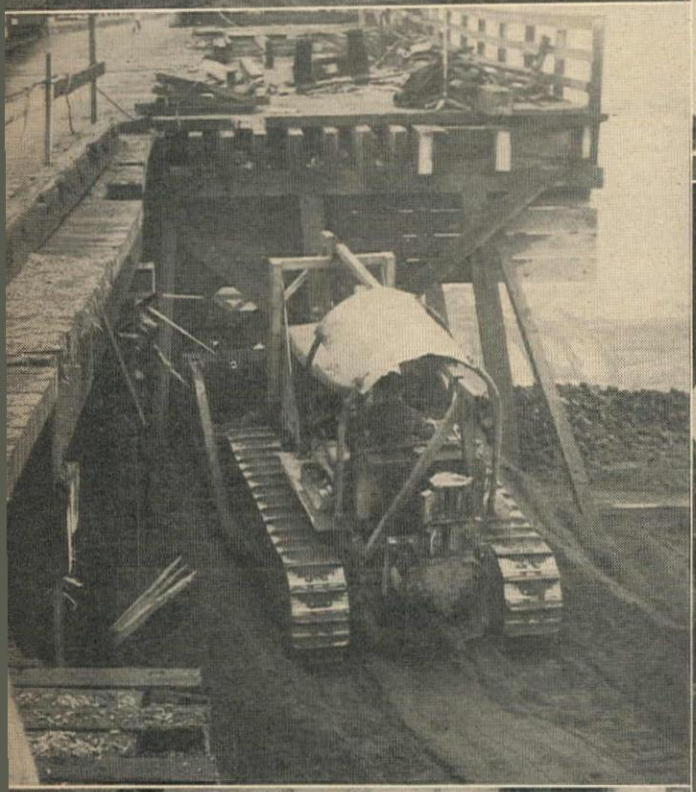
The houses are modern in design and detail, so much so that much of the interest in the earthen wall construction is superceded by the interest in design. All window and door openings are carried to the roof to avoid the use of lintels, with frame construction above the actual opening. Low window openings are carried from foundation to sill with inset frame louvre construction; higher window openings such as bathroom windows have a section of earth wall underneath surmounted by a concrete sill.

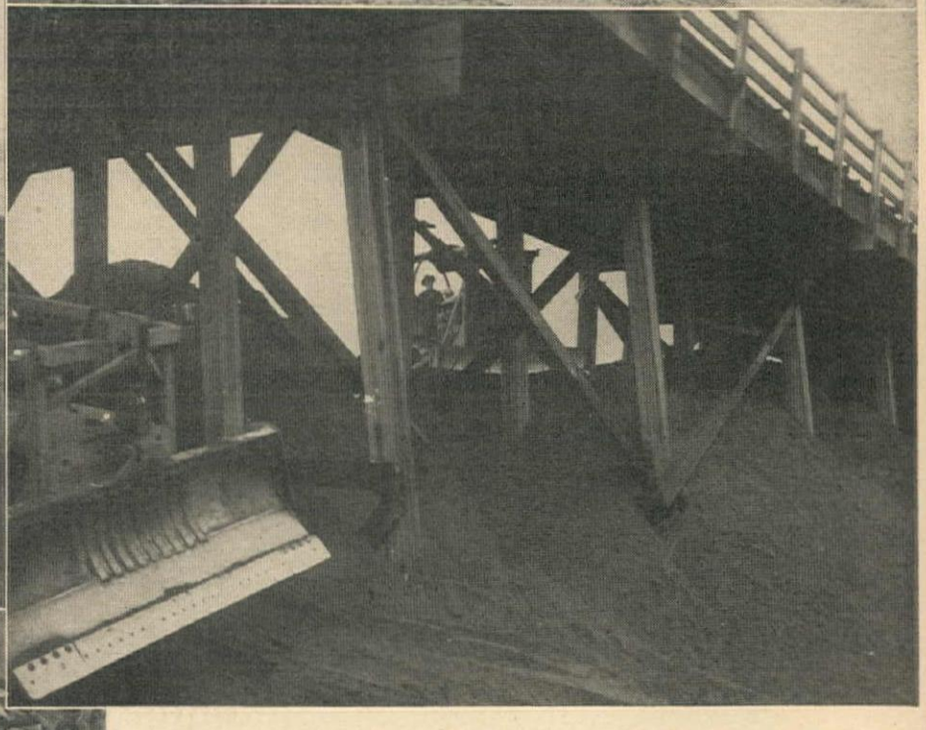
Proportioning, mixing and moisture content are sufficiently critical to be considered a technical job if uniformly good and reliable results are to be expected. As work has been carried along on a small scale to date, hand labor has been employed for mixing and tempering. Even under such conditions costs are as low as cinder-block masonry.

SECTION OF finished wall at top left. David Miller, left, and Engineer Boggs right, inspect form. Below, finished walls.



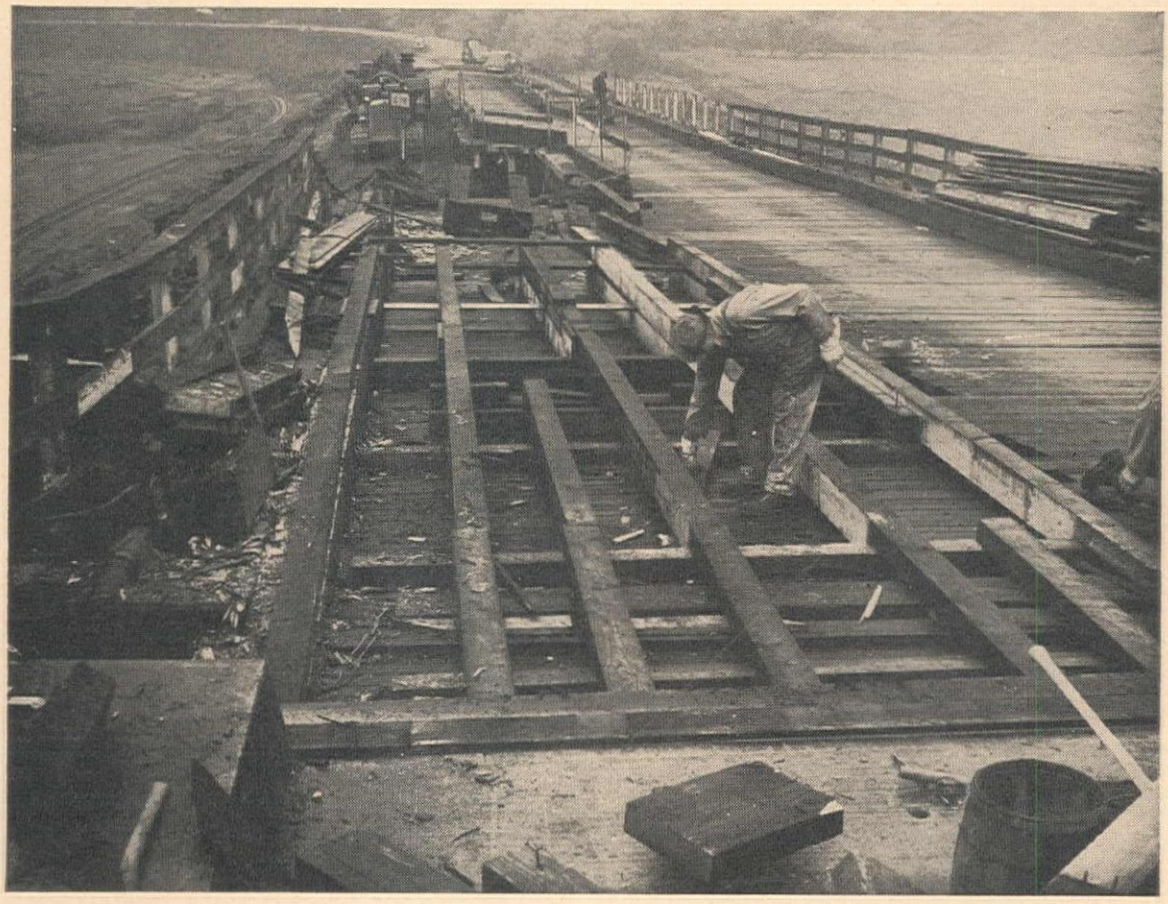






CONSTRUCTION VIEWS during replacement of Longview Bridge approach trestles by fills. Top left, loaded carrier scrapers start up ramp from river sand deposit under bridge to fill area; center left, after fill reaches height where insufficient headroom is available for heavy equipment, the sand is pushed around the old piling by a bulldozer; bottom left, personnel for R. A. Heintz Construction Co. l. to r.: FRED BOYER, shovel operator, JOE BEGLEY, cat mechanic, L. L. SAUERS, superintendent; top right, moving sand up ramp to top of fill; center right, scraper load of sand moving over section where fill has reached final height; bottom right, sand being pushed around old bridge timbers by bulldozers.

Longview Bridge—
Approach Trestles Replaced by Fill



BRIDGE DECKING being removed by half-sections in order to maintain traffic while earthmoving equipment constructed fill. When bolts were loosened, the bridge deck was lifted off anchors by dozer blade and entire section removed by tractor.

TIMBER APPROACH trestles to the toll bridge between Longview, Wash., and Rainier, Ore., were replaced last fall with earth-fill embankments by R. A. Heintz Construction Co. of Portland, Ore., for the Longview Bridge Co., owner of the span. The difficulties of the nearly $90,000 job were increased by the requirement that traffic be kept moving over the bridge during construction.

The project was undertaken in order to keep the structure in good condition for handling the heavy trucking between Washington and Oregon, much of which uses the Longview bridge to by-pass the congestion in the vicinity of Portland. The original approaches, built about 1930, were set on bents of timber piling, 20 ft. on center, with five sets of 12 x 12-in. posts to each bent. The bents were braced with 3 x 10 and 6 x 8 untreated timbers. The traffic surface was of 4 x 6 timbers set on edge. No serious disintegration was discovered, although some of the posts showed water rot near their tops.

Traffic permitted to flow across span at all times during construction by removing half of decking at a time and completing fill on that side before interfering with second side—Total of 2,130 ft. of trestle replaced

Half deck removed

In order to place the new fill, and still keep traffic flowing, only one-half the decking and structure was removed at a time, and that in 200-ft. sections longitudinally. Demolition of the timber work was mostly accomplished by a tractor. After bolts connecting the stringers to the bent frames were loosened, the outer stringer was pulled off by a tractor. Then the remainder of the deck assembly was lifted off its anchor bolts by a dozer blade and the whole section of decking hauled away by tractor. Most of the piling was left in place.

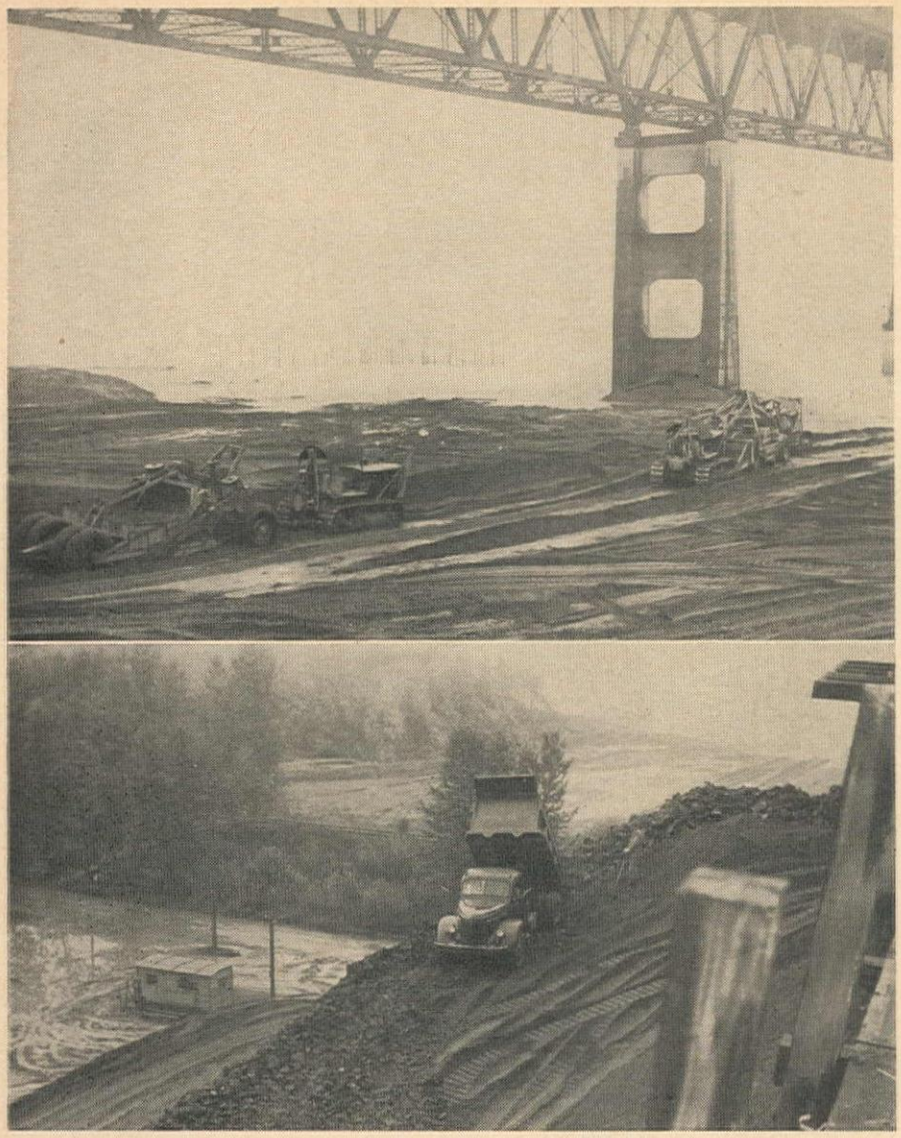
Filling operations followed immediately behind the deck removal, and as soon as the fill was placed and sufficiently compacted for the first half of the road, traffic was diverted over it and a similar removal program started on the other half of the old deck.

On the north, or Washington end of the bridge, which was completed first, 605 ft. of timber approach trestle was replaced with fill. On the south, or Oregon approach, 1,525 ft. was replaced. Plans call for an extension of another 400 ft. of fill at some later date on the north end.

Filling

On the south approach, the original contract called for 177,000 cu. yd. of sand fill in place, and 52,000 cu. yd. of rock in place. The fill is 30 ft. high at the abutment end of the section, and increases to about 90 ft. at the river end. On the north approach, the fill varies in depth from 20 ft. to approximately 35 ft. and required a total of 46,000 cu. yd. of material.

The finished roadway surface of the new fills is 40 ft. wide. The body of the fill is sand and dirt secured from a 1,000 x 600-ft. borrow area immediately under the main bridge structure, having been originally dredged from the Columbia



LOADING SAND for fill on Longview Bridge approach, at dredging deposit underneath the structure, top. Spreading rock for blanket on the fill slopes; the rock blanket is 10 ft. thick. Blanket rock was secured from quarry at Oregon end.

River bar by the U. S. Engineers. It was placed so as to give a crown 30 ft. wide, and the sand was compacted hydraulically with water pumped from the river and conveyed in a 4-in. steel pipe laid on the deck of the bridge.

A rock blanket on the sides and top of the sand fill brought the top width to the specified 40 ft. The final surfacing is a 4-in. layer of rock crushed to minus, covered with a 3-in. layer of bituminous surfacing.

The sand fill was placed with heavy earthmoving equipment on ramps until it reached such height that the machinery could no longer operate under the deck of the bridge. After that point, it was brought to the areas from which the decking had been removed, dumped and then shoved under the trestle by bulldozers. Finally, when they could no longer maneuver, the deck ahead was removed and the final dirt and rock moved into place in the open.

Personnel

L. L. Sauers was superintendent for the R. A. Heintz Construction Co., and Joe Bagley was master mechanic. For the bridge corporation, Wesley Vandercook is engineer manager, and C. Clarke, maintenance foreman, was in direct charge of the work.

All rock for the surface of the fill was produced at the quarries of the Goodat-Rainier Sand & Gravel Co., near the south end of the bridge.

Plan New Construction On Ogden River Project

A NEW OGDEN RIVER project construction program costing $102,951 is contemplated by Region 4, Bureau of Reclamation, for late summer and 1947, according to Regional Director E. O. Larson.

President Truman requested $62,000 for the project in his budget message to Congress, the remaining $40,951 being a carry-over of funds appropriated prior to 1944.

Anticipated construction includes the building of two wasteway reservoirs on the Ogden-Brigham Canal and two equalizing reservoirs on the South Ogden Highline Canal.

The new wasteway reservoirs, similar to the three already constructed on the Ogden-Brigham Canal, are to provide basins to catch the canal waters in the event of emergency such as a break or obstruction in the canal. They also are to allow for the release of the water in small quantities to existing channels below as needed.

The equalizing reservoirs on the South Ogden Highline Canal are planned as part of the South Ogden Distribution System. They are designed to maintain an even water supply by holding a reserve to meet heavy demands during peak irrigation periods.

Accomplishments of REA Lauded on Anniversary

IN A MESSAGE marking the eleventh anniversary of the Rural Electrification Administration, Administrator Claude R. Wickard commended rural electric cooperatives and public power districts for their past accomplishments and called upon them to "move as rapidly as possible toward our goal of electric power for every American farmer."

New consumers are now being connected to REA-financed power lines at the rate of 18,000 to 20,000 a month, approaching the rate in the peak prewar year, 1940, when more than 256,000 new consumers were connected.

Pointing out that more than 45 per cent of America's farms are electrified today in contrast with less than 11 per cent at the time REA was established on May 11, 1935, Administrator Wickard said that more than half of the farms electrified in the last 11 years and about two-thirds of those electrified since 1939 are on REA-financed lines.

"Imposing as that record is," he said, "approximately six million American farmers and other rural people who want electricity are still without it. Many of them are in sparsely-settled territory. We are obligated to see that all of those areas receive electric service, however remote and inaccessible they may be."

REA-financed construction of power lines is being retarded at present by materials shortage, Administrator Wickard said. New sources of poles have been developed since last fall, when REA established a special unit to work on the pole supply problem. Creosote needed for treating poles is a by-product of steel production, and the supply is affected by the current industrial situation. The supply of wire, meters, transformers and line hardware has not caught up with the demand since the war.

Latest REA statistics covering the entire period of operation of the agency show that rural electrification loan funds totaling $695,125,450 have been allocated to 974 borrowers—897 cooperatives, 38 public power districts, 20 other public bodies, and 19 private power companies. As of March 31, the 851 of these borrowers with power systems in operation were operating 460,000 mi. of power distribution lines.

Dry April Reduces Run-off Forecast

Despite deficient April precipitation, Soil Conservation Service surveys made in May indicate Northwest and Pacific states will still have sufficient summer water supply — But near-drought conditions are expected for Southwest, where even reservoir storage will not care for necessary irrigation

DEFICIENT PRECIPITATION during April throughout the Western States has resulted in a general reduction of previous estimates of summer water supplies, according to the Soil Conservation Service. Forecasts based on final seasonal snow surveys made early in May still indicate either ample or sufficient supplies in the Northwestern and Pacific Coast States, but sharp reductions expected for Southern Colorado, Southern Utah, Nevada, Arizona, New Mexico, and Western Texas.

A summary of conditions, State by State, follows:

Arizona

The precarious drought conditions previously reported have not been relieved. Reservoir storage is being depleted in order to make up for the subnormal stream flow. (San Carlos reservoir, capacity 1,200,000 ac. ft., held only 17,800 ac. ft. on May 1—an all-time low for this period.)

California

April was the driest in 13 years, and the flow from melting snow will be about 10 per cent less than had been expected. However, enough water for ordinary demands is indicated, and prospects still are good that most of the Sierra reservoirs will fill before the snow run-off ends.

Northern ranges are better off than those to the south, the Sacramento Basin having an expectancy of snowmelt run-off 92 per cent of normal, as against 87 expectancy for the San Joaquin. From the snow-fields tributary to Tulare Lake Basin, the April-July runoff is expected to be 76 per cent of normal. Water has already run into the lake, but there is little likelihood of flooding additional leveed areas.

It is expected that Lake Tahoe will fill to the maximum elevation of 6229.1 ft.

Colorado

The situation has deteriorated, and can now be considered as generally only fair.

In South Platte drainage, peak flow is expected to be early because of favorable melting temperatures. Throughout the basin a shortage of irrigation water may be expected after the middle of July, except from Greeley to the Nebraska line, where storage facilities are good and the reservoirs are expected to fill.

Runoff in Arkansas Valley will be disappointing, there being no snow below about 9,000 ft. However, because of more than 300,000 ac. ft. in storage in the mountains and plains reservoirs, no water shortage is anticipated in the valley.

On the western slope, in Colorado, the outlook for irrigation water is less favorable than a month ago. Snow conditions in the San Juan and Dolores drainages, southwestern Colorado, are much below normal and a shortage of water for irrigation may be expected after mid-summer.

The outlook for irrigation water in San Luis Valley is poor. Snow cover is light, and storage generally will not reach 50 per cent of reservoir capacity. Pumping for irrigation started early this season because of deficient stream flow.

Idaho

April precipitation in the valleys was much below normal, but the heavy snow pack at higher elevations is melting about as usual. More snow than normal still lies at these elevations except for the Snake River country where conditions are about normal. The over-all prospect continues favorable.

Montana

The general outlook continues good. West of Continental Divide the April precipitation was scanty. Melting of high-altitude snow has been at a normal rate. In southern and eastern sections no shortages of water are expected. Yellowstone River is at the highest stage for this period that has been reported for the past 30 years. Reservoir storage is about the same as last year.

Nevada

Snow is melting rapidly in the eastern Sierra and the Humboldt River basin where April precipitation was subnormal. If these conditions continue throughout the irrigation season local water shortages will occur in the later part of the season.

New Mexico

Prospects for water supplies from Rio Grande and Pecos and Canadian rivers are very poor, although some reservoirs accumulated substantial storage during April and may be expected to fill to about three-fourths capacity. Red Bluff reservoir on Pecos River, just below the Texas state line, holds about enough water for one irrigation, and heavy pumping from recently drilled wells will be necessary if crops are matured in the Texas portion of the valley.

Oregon

A state-wide deficiency in precipitation during April will reduce total expected water supplies from some streams by about 10 per cent. However, no water shortages are expected if normal conditions of precipitation and temperature prevail during the balance of the runoff season. Total water stored in all important Oregon reservoirs is 6 per cent greater than of similar date last year, 8 per cent greater than in 1944, and 2 per cent greater than the 10 year average, 1936-45.

Utah

April precipitation was deficient but not enough so to change previous forecasts significantly. Runoff of Uintah Basin streams and Beaver River will be slightly increased, but Price River will be reduced. Virgin and Sevier rivers and Coal Creek will experience serious water shortages.

Streams in Northern Utah reached an unseasonable peak in April owing to rapid melting of low-elevation snow, but this high early runoff is not expected to affect April-September supplies materially.

In Southeastern Utah, streams tributary to Colorado River will show a slight improvement over April expectations, though not enough to prevent entirely an expected shortage.

Washington

The snow pack is still about twice the normal at the higher elevations, and the outlook is still toward ample water supplies.

Wyoming

Despite deficient April precipitation, the runoff prospects are still generally favorable. On the watershed of the Bighorn River and tributaries, the runoff will be less than normal, with a possible shortage of water late in the summer. Reservoir storage on this drainage is better than last year at this time. For the North Platte and Laramie rivers the runoff from snow cover will not be up to normal, but reservoir storage is excellent and adequate water supplies are assured.

British Columbia

Above normal stream flow is still expected, with possible floods on low lands. By May 1 only the low snow had melted, leaving still to come nearly half the melt from medium levels up to about elevation 4,500 ft., and all the melt above that height. This residue represents the greater part of the snow pack.

Aluminum Used in Irrigation Systems

Light weight aluminum alloy tubing finds high place in surface pipe irrigation systems that won't erode soil and are portable and easy to install—Important factors to producers of high-quality foodstuffs in all sections of the country, even heavy rainfall areas which have short periods of dryness

By R. B. WHIDDEN
Aluminum Company of America

A FAST-GROWING development is the new use of aluminum tubing employed in surface pipe irrigation systems. It is used by farmers to stimulate crop growth artificially, particularly in the semi-arid regions of the West and South. Prolonged periods of drought in these areas must be guarded against by means of an arrangement of water lines, designed to distribute water scientifically to all parts of the food grower's field. Moreover, this system must possess the important characteristics of light weight and portability coupled with the natural ability to withstand corrosion and rough handling.

The system often referred to as "overhead irrigation," involves a structural framework of water-carrying, laterally-arranged pipes which are fed from a main pipe line, usually a semi-permanent steel installation. These portable, lateral pipes are joined to the main stem in such a manner that they can be easily "broken" and moved to another location. The lateral, portable sections are dispersed at regular intervals with risers supporting sprinkler heads of various forms which makes it possible to spray the surrounding area with water.

The prime function of these systems is to irrigate the land without eroding or encrusting the soil. Surface pipe irrigation, through the development of light, portable pipe line sections, has become practicable on a large and economical scale. It serves not only the great dairy, fruit and vegetable farming regions of the West Coast, but has found high favor with food producers in the mid-western and eastern seaboard states as well. Contrary to popular belief, areas of heavy rainfall are not without their dry periods, which range from a few days in some sections to several weeks in others. The producer of high-quality foodstuffs, therefore, is dependent in large measure on some form of artificial crop stimulation during the rainless days.

Light-weight tubing

Aluminum alloy tubing has helped considerably in the job of providing irrigation systems that are light in weight, portable, and easy to install.

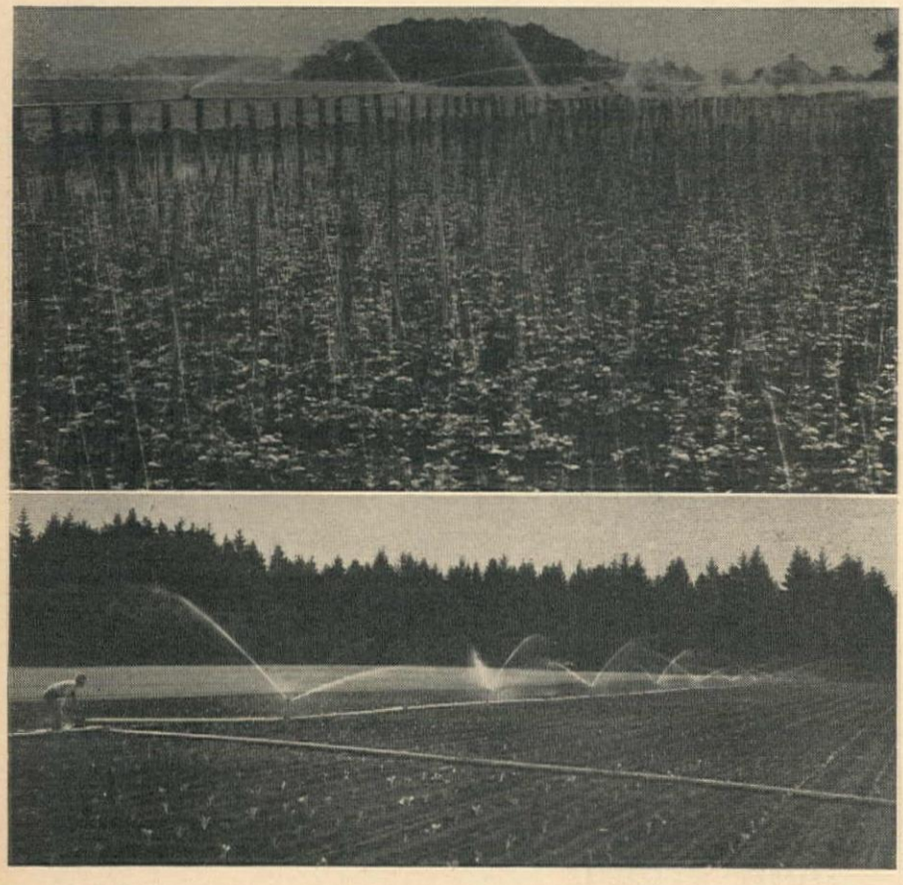
The feature of light weight is particularly important. Aluminum alloy tubing, usually supplied in extruded 20-ft. lengths, is attached by couplings or other devices into sections ranging from 100 to several hundred feet in length. The cultivation specifications of the individual areas to be irrigated dictate the number of times these portable pipe lines must be moved during the day.

It becomes readily apparent that light weight aluminum piping is a major labor benefit to a farmer employing the services of several field hands, who must be progressively shifting pipe lines from one field to another, or from one end of the farm to the other, over a period of several weeks or months. These fields may be flat, but often, to utilize all available acreage with surface irrigation piping, the grower may plant on hilly or rolling land to eliminate the expenses of grading and leveling.

In this case, the savings in time and effort involved when two instead of four men could accomplish this transportation task, are extremely important. No part of the field is inaccessible to scientific farming, with better planning and cultivation, and the time element involved in moving the sections is minimized.

Further savings are offered the food grower through this desirable light weight advantage, since unproductive, previously-uncultivated areas can now be brought under the hoe. No additional expense is involved in constructing trenches or ditches, which make for water loss in seepage, evaporation and inadequate distribution.

Generally, surface irrigation pipe is manufactured in 20-ft. lengths, from 2 to 6 in. in diameter. Aluminum extruded tubing, possessing high physical properties and weighing approximately one-third as much as competitive metals, will, in the future, make it possible to manufacture these lines in a minimum of 40-ft. lengths—longer in some cases. This means less couplings, less joining or assembling operations per field, and the useful ability of being able to transport these longer sections with less manpower. A 40-ft. length of 4-in. aluminum alloy tubing, for example, can be handily carried by one man.



TYPICAL INSTALLATIONS of so-called "overhead irrigation." Semi-permanent main pipe line feeds water into framework of laterally-arranged pipes, which are easily moved. The aluminum distribution pipes are manufactured in 20-ft. lengths, can be joined by simple couplings into any desired length.

Hard usage

Equally significant to the proponents of surface pipe irrigation is the durability of aluminum alloy tubing under rough usage, and the correspondingly high corrosion-resistant qualities of the metal. Prior to the war, Aluminum Company of America had received orders from the Pacific Northwest for large quantities of tubing in diameters ranging from 2 to 5 in. and in wall thicknesses from .049 to .058 in. The bulk of these orders were destined for portable irrigation system manufacturers, who fitted the pipe to their requirements, attaching various couplings, sprinkling devices and special locking equipment. When aluminum in war industries became so vital, however, the War Production Board subsequently canceled the major part of these orders, but a substantial quantity had been delivered to several firms, enabling them to utilize aluminum tubing to a limited extent in conjunction with their irrigation equipment.

In the summer of 1944, several hundred feet of aluminum tubing was placed in typical farming vicinities in the Sacramento Valley in California, for purposes of experimentation. This tubing was subjected to average West Coast agricultural atmospheres, and a normal amount of rough handling. Examinations of the tubing more than a year later failed to reveal a single evidence of corrosion, nor had prolonged and constant usage damaged or reduced the efficiency of the pipe in any respect.

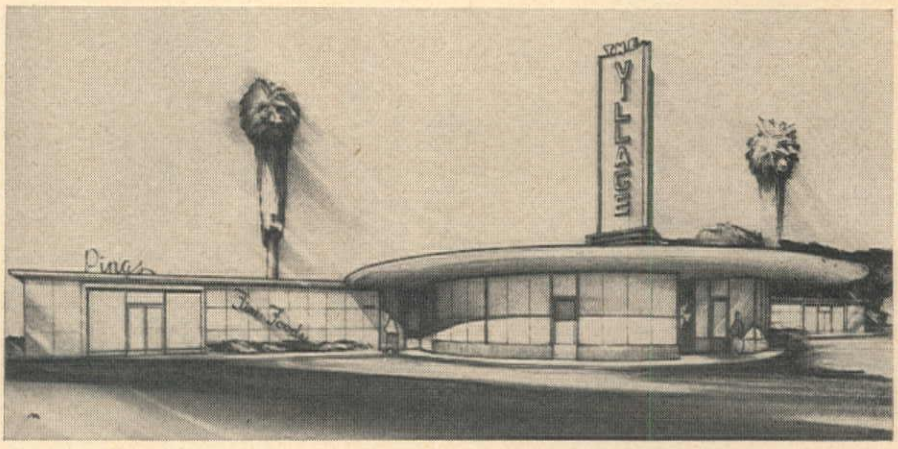
No corrosion

Another irrigation project, developed at the Fairview Farms, located near Portland, Oregon, using aluminum equipment was initiated early in the spring of 1944, and examined by Alcoa representatives a year later. The aluminum tubing showed no evidence of corrosion. In another installation at Cloverdale, Oregon, no corrosion could be observed, despite its proximity to the coast, where pronounced corrosive attacks on other metals was clearly evident.

Aluminum tubing, such as that employed in modern irrigation practice, does not depend alone on its virtues of light weight. Its high resistance to corrosion is a quality which the farmer must weigh in providing his fields with a low-cost system of irrigation, reckoned in many seasons. Experience has shown that pipe, constructed of the heavier metals, especially if not galvanized, will rust, and in time so badly corrode that frictional losses will develop in the line. Accompanying reduced head pressure results. No single evidence can point to a similar limitation where aluminum tubing is employed.

From the formula of the successful crop grower—whose troubles lie not only in combating nature's vicissitudes, but a highly competitive market as well—aluminum's impressive lack of maintenance costs, its light, yet durable, properties, and its now competitive price, make it a choice worth careful investigation.

Odd Saucer-Roofed Drive-in Nearly Finished in Phoenix



THE DEL E. WEBB Construction Company is rushing to completion one of the most unusual concrete structures in the Southwest—the new refreshment service center and shop units of the Arizona Drive-In, Inc., in Phoenix.

The building, reported to have the widest expanse of concrete cantilever canopy of any structure in the Southwest, is being erected by the Webb firm at Central Ave. and Merrill St. for Horace Comer. The novel building, which will be known as "The Village," will cost in excess of $100,000.

The outstanding feature of the structure is a giant "saucer" roof 80 ft. in diameter. It is carried on six steel columns, each six inches square, set in a circle 48 ft. in diameter. The roof extends as a canopy 16 ft. outside of the supports.

Eight inches thick in the center, the "saucer" roof tapers to a thickness of 2½ in. at the edge. The perimeter of this concrete slab curves up—just as a hat is turned up at the edge—to guard against sag. It contains 179 cu. yd. of concrete and weighs 345 tons.

A seven-inch slab of pearlite has been placed on top of it for insulation. The outer section of the roof will be used as a shelter for some of the cars being served at the drive-in.

The central portion, which is a circle 48 ft. in diameter, is walled off with plate glass. In this exceptionally well-lighted room will be booths for customers. The rear section will be occupied by the kitchen and the catering equipment.

Wings extend in each direction from the circular drive-in, and will house two shops on each side. The north wing is 63 ft. long and 27 ft. wide, and the south wing is 66 ft. long and 27 ft. in width.

The building will have unusual lighting arrangements and modern service fixtures, heating and cooling systems.

The property on which the structure is built extends 191 ft. on Central Ave., on which it faces, and 142 ft. on Merrill St. All space not occupied by the building will be surfaced for automobile parking.

Plans for the structure, which has been an object of much attention since forms were removed, were drawn by Gilmore and Varney, with Fred P. Weaver, Associate, Phoenix Architects.

Jack McPhee of the Webb firm was the general superintendent who started the work, and it is being completed by Bud Ames.

FWA Advances Less Than Half of Funds by 1946

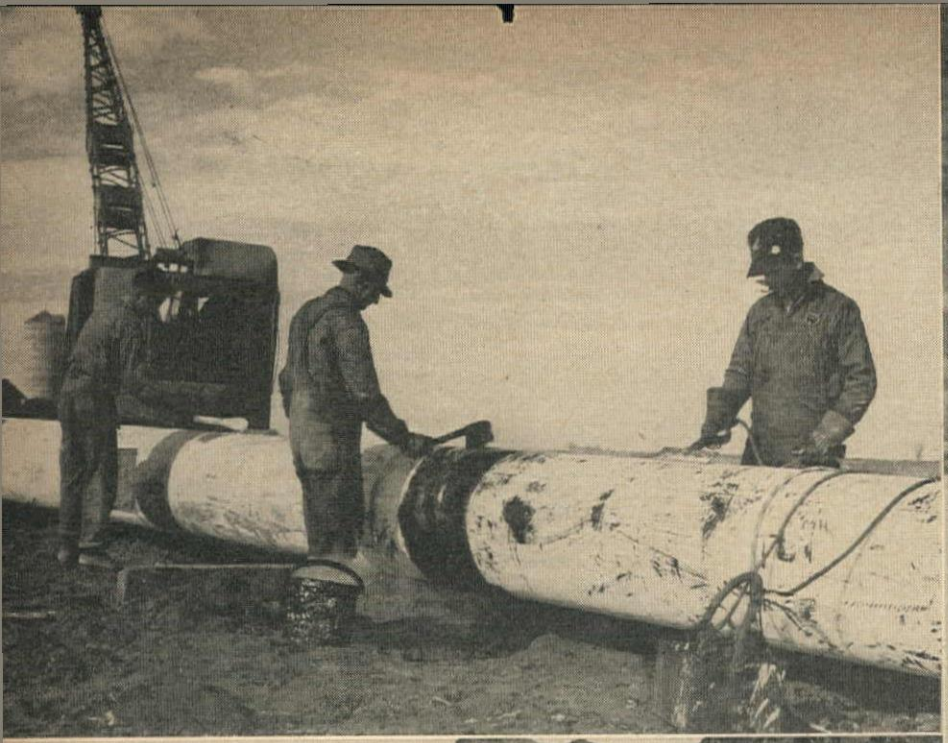
LESS THAN HALF of the $30,000,000 appropriated for advances to state and local governments for public works planning had been disbursed as of Dec. 31, 1945, it is revealed in a report on the status of advance planning for non-federal public works issued by the Federal Works Agency.

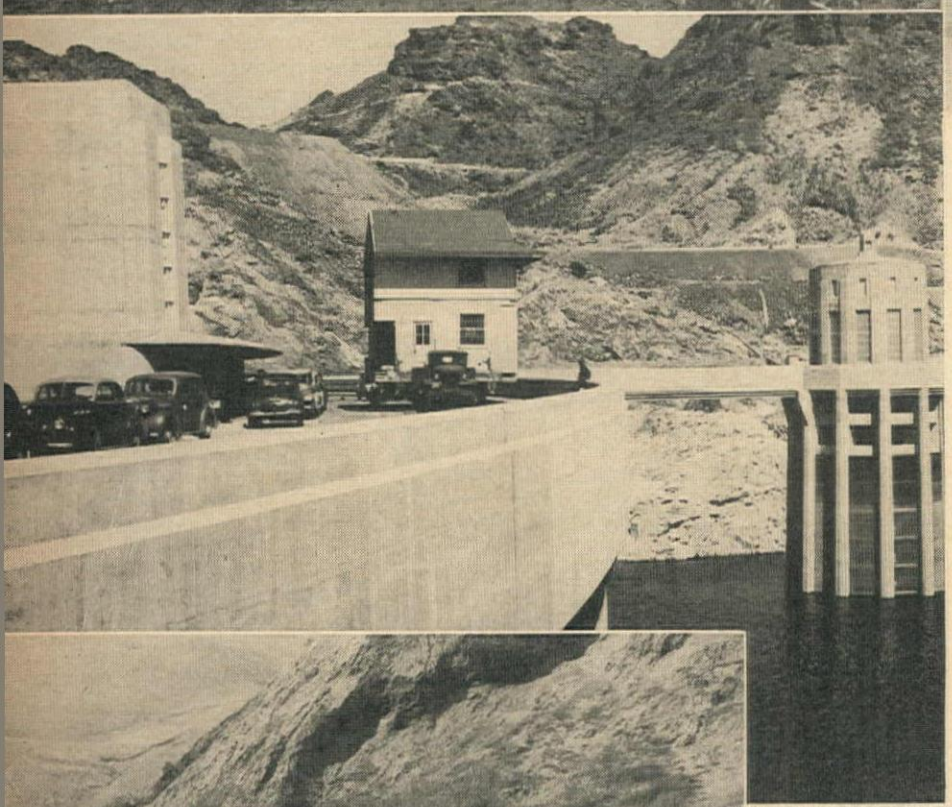
Title V of the War Mobilization and Reconversion Act of 1944 provided for a program of advance planning for public works to be administered by the Federal Works Agency. Public Law 296 of the 79th Congress authorized the Federal Works Administrator to advance funds for non-federal public agencies to aid in the preparation of plans for their postwar public works.

The report shows that as of the end of 1945, plans have been completed by the states and their political subdivisions for public works in the estimated amount of $961,144,000.

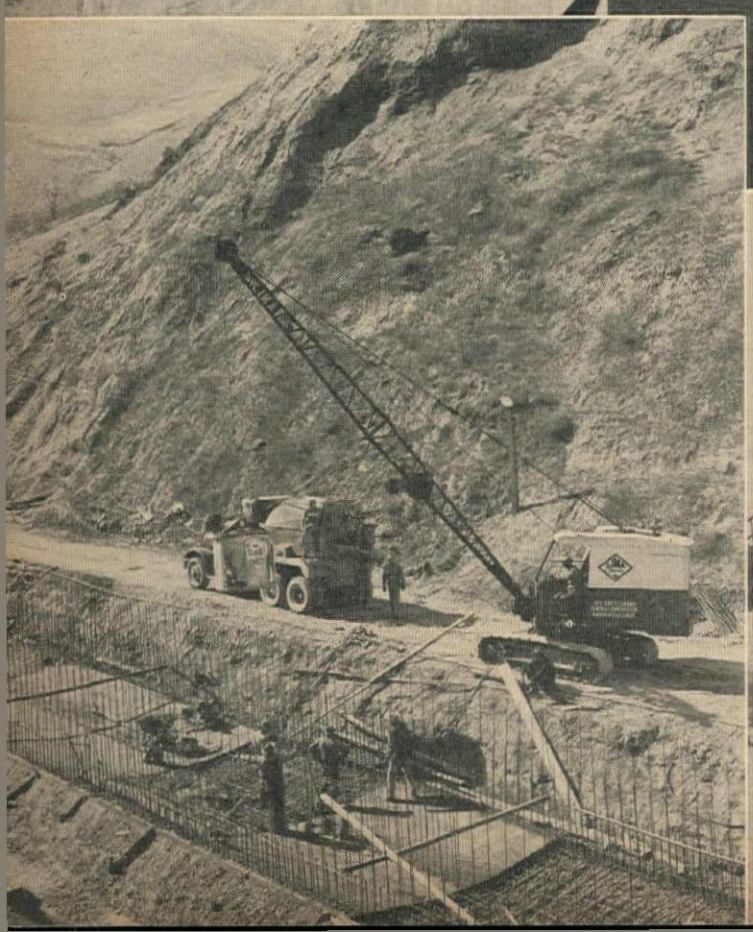
The survey covered a total of 33,990 governmental units; only 8,272 of which submitted detailed reports. Of the units reporting, 4,883 had no plans for public works projects in preparation. Of 2,911 counties surveyed, 1,292 reported no plans. Sixty-six per cent of the cities and towns of less than 50,000 population reported no plans.

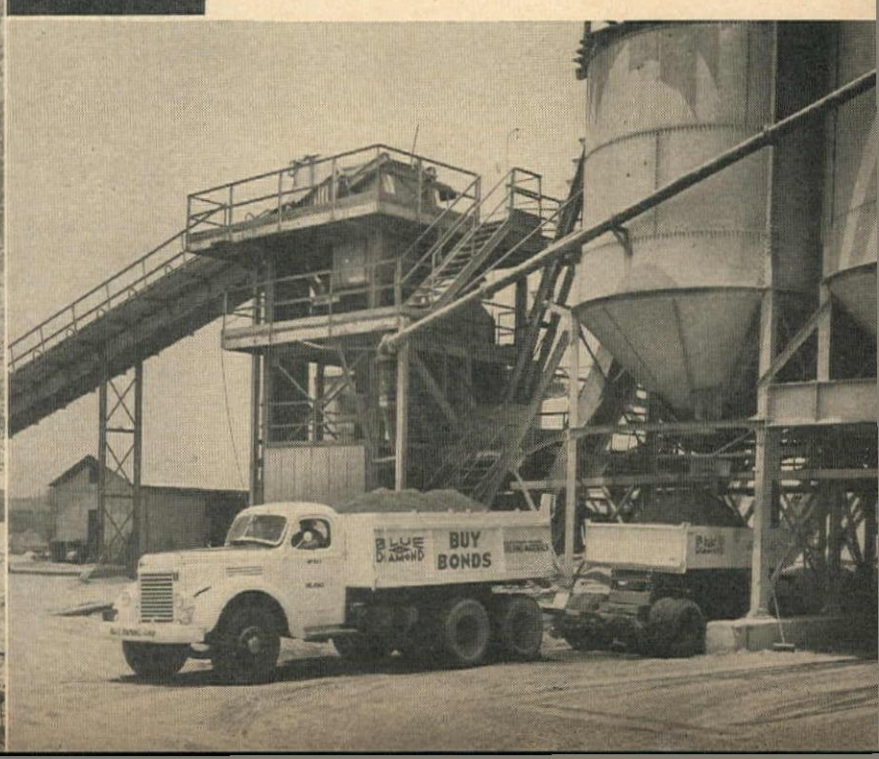
One of the difficulties encountered thus far, the report indicates, has been the legal objection to the acceptance of advances from the federal government as loans, even though the loans bear no interest and do not fall due until and unless construction of the project has commenced.

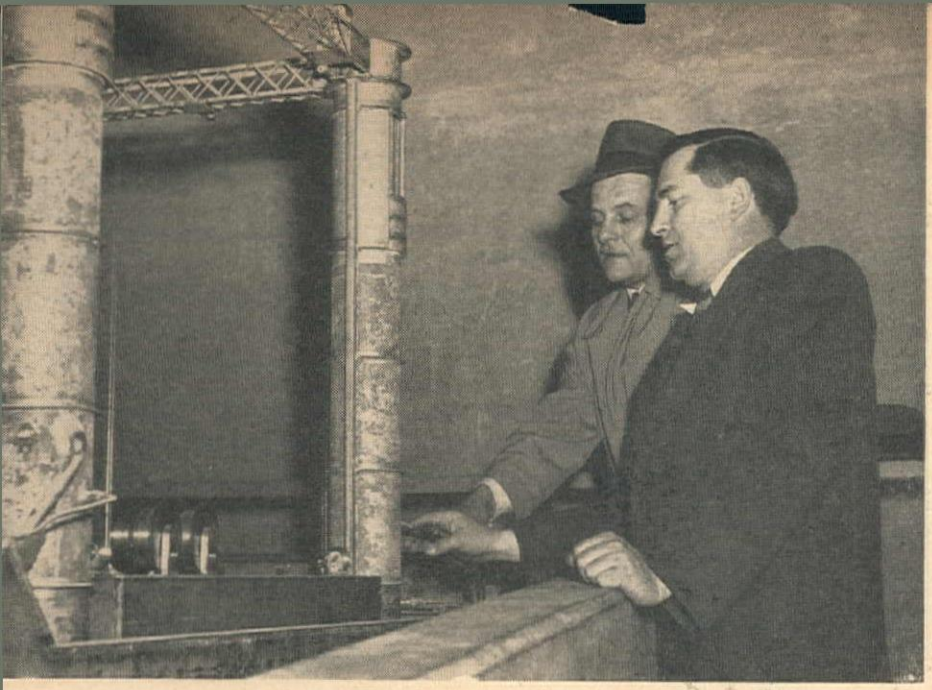




KEN WILLIAMS, CAA surveyor, indicates line at Idaho Falls Airport, during winter survey, top; Telescopic trailer, below—truck first dumps its load, then trailer body is slid into truck body and dumped by truck mechanism—outfit operated by Blue Diamond Corp., Los Angeles, Calif.; cleaning and creosoting supply line for Greeley, Colo., water system improvements, top left; section of former Army barracks is moved across Boulder Dam from Camp Williston, en route to Davis Dam, where it will house workers, center; concrete placing by transit mix, crane and bucket on California's Ridge Route by George Von Kleinsmid, Bakersfield contractor, constructing drainage conduit near Grapevine, bottom left. Opposite page, bottom left, is a drawing of the new highway marking system of the California Division of Highways, which is to conform to the uniform system suggested by the Highway Act of 1944. The former yellow "No Passing" lines are eliminated; a double line will indicate no passing, a single white line will be no barrier to passing, and a broken line on the driver's side will indicate limited passing is permitted.







E. N. TORBERT, Reclamation Bureau planning engineer, left, and WM. M. WARNE, assistant commissioner, inspect a model of the Grand Coulee spillway repair caisson, above; Indian trails worn into solid granite by countless thousands of bare feet, only a few miles from the atomic bomb laboratories at Los Alamos, N. Mex., right; placing trash racks on steep slope of outlet works at Anderson Ranch Dam in Idaho, during a snowstorm, bottom right; largest refrigerated warehouse in West at Army Quartermaster Depot, San Francisco, below.

WESTERN CONSTRUCTION NEWS

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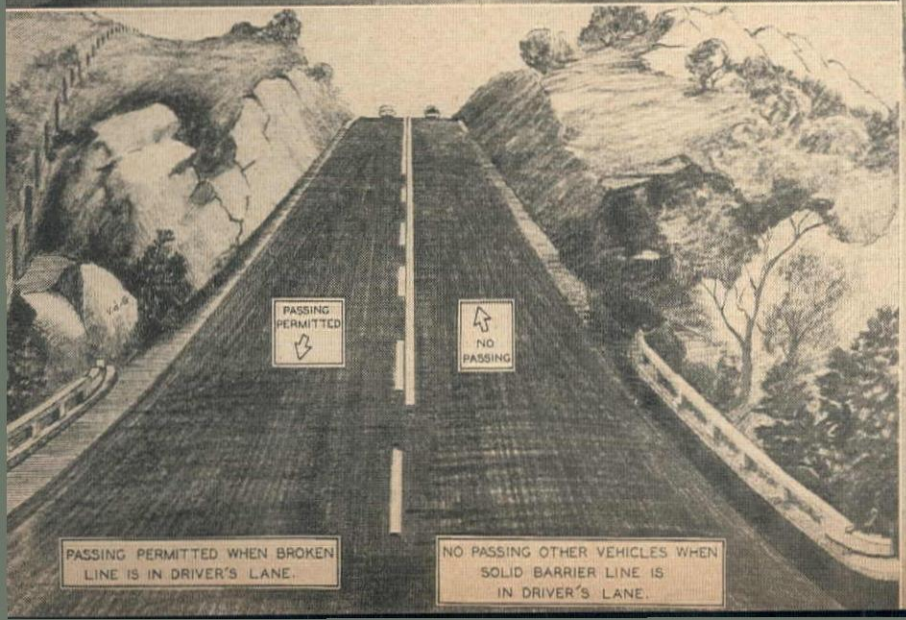


Highlights of Recent Conventions

Concrete Pipe

THE AMERICAN CONCRETE Pipe Association affected a complete reorganization plus a revision of its constitution and by-laws, during its 38th Annual Convention held in Chicago in April. O. H. Miller, retiring president, told the members that the new and strengthened organization was more in keeping with the size of the industry.

The recently appointed managing director, Howard F. Peckworth, told the group that concrete pipe was used almost exclusively in the construction of Army camps and airfields with no apparent failures and no reported complaints as to service and durability. In his report he discussed the services of the Association which include the development of trade advertising and special promotions, research, and technical services. He reported that the Association, working in conjunction with several universities, had maintained research projects in California and Texas. Main subjects were irrigation and highway drainage, with the Texas Highway Department and the National Highway Research Board cooperating.

The nominating committee report was accepted as presented, with Elmer L. Johnson, president of the Concrete Conduit Co., Colton, Calif., chosen as president. Johnson has been in the concrete pipe industry for the past 14 years, and previously served as vice president and a member of the board of directors of the Association. He is a graduate from Whitman College, Walla Walla, Wash., and is a member of the American Society of Civil Engineers.

C. H. Bullen, president of the Mid-West Concrete Pipe Co., Chicago, was re-elected treasurer. New officers are: Vice presidents: H. Eschenbrenner, M. C. Kelly and George B. Denham; secretary, E. H. Fox; and directors, O. H. Miller; John B. Jardine, Concrete Sectional Culvert Co., Fargo, N. Dak.; E. R. Brainard; D. A. Dunkle, American Pipe and Construction Co., Los Angeles, Calif.; George R. Jessen, Utah Concrete Pipe Co., Salt Lake City, Utah; H. H. Dickehut, Austin Concrete Works, Inc., Austin, Tex.; and J. C. Helms.

One entire day was given over to the presentation of technical papers. T. J. Kauer, managing director of the Wire Reinforcement Institute, Washington, D. C., reported that there is great need for standardization of wire sizes for pipe reinforcement.

A response from 100 firms in the industry was reported by Mr. Kauer, who discovered that manufacturers use some 311 different combinations of gages and spacing, with 87 different combinations in the circumferential steel alone. He reported that these 311 styles can be reduced to a basic 32 styles, with a minimum of difficulty for all concerned. It was pointed out, however, that this figure would be an absolute minimum, when it was realized that there are three separate methods of manufacturing pipe, and that the styles apply to the two standard specifications; and that the style must cover pipe ranging from 12 to 108 in. diameter.

ELMER H. JOHNSON

The afternoon meeting opened with a presentation by Fred D. Bowlus, Office Engineer, County Sanitation Districts of Los Angeles County, Calif. He discussed the findings of his research on the "Design of Sewage to Eliminate the Apparent Sulphide Generation." Following a review of current practices designed to eliminate generation of hydrogen sulphide in sewage which protects the interior surfaces of concrete pipe from the destructive action of oxidized hydrogen sulphide, the speaker set forth conclusions resulting from 20 years' investigation and research.

"From this research we are now able to predict, with considerable accuracy, when and where sulphides will be generated. It may be found that the house connection and street lateral sewer systems collecting fresh sewage will not generate sulphides, and cement pipes may be used with perfect confidence," the speaker said.

Mr. Bowlus then pointed out that where conditions are right for the generation of sulphide in larger collecting and trunk line sewers that the most economical and practical pipe is clay pipe, since, "in most instances, odors will not create a nuisance if the sewage is permitted to carry a few parts per million of dissolved sulphides." He then said that after the sewage has passed into main pipes, too large for clay manufacturer, it is necessary to eliminate dissolved sulphides in order to preserve the large concrete pipe.

Mr. Bowlus concluded by saying, "As an illustration of the use to which the results of this extensive research have been placed, the Los Angeles County Sanitation Districts will save several hundred thousands of dollars in the construction of the $12,000,000 program of expansion under way."

A. S. C. E.

POLITICS AS CONCURRENT careers for more engineers, was urged as a means of "avoiding waste, advancing the most useful ideas, quashing rash and hair-brained ideas, and swaying public opinion toward good works."

Rep. Carl Hinshaw, Pasadena, Calif., congressman and a civil engineer, urged members of the American Society of Civil Engineers to shed their aloofness toward public affairs and to serve the people directly, rather than continue as "servants of the servants of the people" which, he said, they are now doing by providing the technical knowledge in various governmental undertakings. The only member of congress in the Society, Rep. Hinshaw spoke at the spring meeting of the Society in Philadelphia.

"Too often the engineer, like other good citizens, will cuss the politicians, and yet accept service under them," Rep. Hinshaw said. "Why cuss the politician? He is only a man who was willing and able to stand the gaff to achieve public office. The reason why the ordinary garden variety of politician achieves public office is because better equipped men shirk their responsibilities as citizens and do not offer themselves."

Urging engineers to "stop sitting back and waiting to be consulted," and "to take the initiative, to speak out for good government and sound principles and ideas," Rep. Hinshaw said:

"When an important public project is completed, a big dedication ceremony is held. The governor, the mayor and the board of public works, and prominent citizens of other degrees gather, and the wind instruments of a brass band cause the bunting and the banners to stream out proudly. A fine bronze tablet is then unveiled to an astonished multitude, proclaiming the names of the public officials under whose regimes the project was nurtured into reality. In relatively small letters, the plaque may, perhaps, mention the name of the chief engineer of the board of public works.

"Some of the engineers who stewed and fretted and refigured and redrew the plans for the project which was their brain-child, may be found standing modestly in the background, wistfully enjoying the evidence of public pride, but wistful, nevertheless, because the politicians have appeared to claim fatherhood of their brain-child. So the engineer goes away from there, back to his cloistered precincts and conceives an-

other brain-child. That is his appointed mission in life, so he thinks.

"But this conception, design and execution of projects need not be the limit of his mission in life. To achieve his highest usefulness to our society, the engineer should himself achieve authority in the affairs of society. His highly trained hand, resourceful mind and inherent integrity are needed in positions of authority, to direct the collective efforts of society, to avoid waste, to advance the most useful ideas, to quash the rash and hair-brained ideas, to sway public opinion toward good works, and to run interference for the advancement of the welfare of society."

Wood Treaters

OVER 400 MEMBERS of the American Wood-Preservers' Association, including Western engineers and operators of the 33 wood-treating plants in the 11 Western states, assembled in Cincinnati April 23-25 for the 42nd annual meeting of the Association. It was the first full-scale convention of the AWPA in four years due to production demands during the war.

R. H. Rawson, consulting timber engineer, Portland, Ore., was elected president for the coming year. Mr. Rawson succeeds J. H. Bremicker, Philadelphia. Portland was chosen as the site for the 1947 convention.

A national shortage of creosote, expected to become very acute on the Pacific Coast, will continue unless England permits creosote to be exported to the United States. Attention was focused on this shortage in the face of REA needs for three million electrical transmission poles a year during the next five years, increased highway bridge construction programs, and a backlog of maintenance accumulated by industry and the war-weary railroads.

The wood-preserving industry of this nation faces a shortage of at least 20 million gallons of creosote oil in 1946 because no creosote is being shipped from England, J. F. Linthicum, president of the American Lumber and Treating Co., announced.

An adequate supply is absolutely essential to the national economy for maintaining railroad, utility, and communications systems, he stated, as "there is no comparable substitute for creosote in the preservation of ties, electrical transmission poles and piling."

Releasing the text of a letter he had addressed to John D. Small, head of the Civilian Production Administration, Mr. Linthicum pointed out that coincidental with the passage of the Lend-Lease bill England stopped shipping creosote to this country.

Creosote requirements of the United States have been partially supplied from foreign sources for many years, he explained, and normal imports from 1931 through 1940 averaged 39,668,062 gal. annually or 27.7 per cent of total consumption, the greatest part coming from England.

"With the termination of hostilities, it was anticipated that England would resume the exportation of creosote but to date export licenses have been unobtainable," he declared. "We believe that England is fully aware of the important part tht creosote plays in our domestic economy and of their own strategic position, so the problem then becomes one for our State Department to solve."

Navy construction

When applied to wharves, piers, quay walls, etc., composite timber-concrete construction has certain specific advantages, Harris Epstein, Navy Department designing engineer, pointed out in a paper on the subject. These include:

1. The utilization of the two materials in such a way as to capitalize on the most desirable properties of each.

2. The timber sub-base may be used in place of false-work to support cranes and pile drivers in order to advance construction from shore enabling land equipment to compete successfully with water equipment in deep water construction.

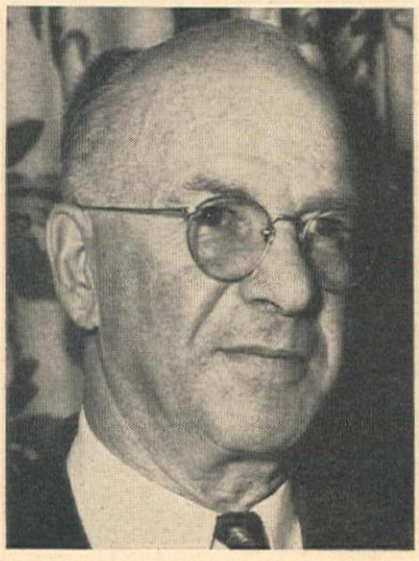
3. The stiffness and the strength of the deck is greatly increased to resist horizontal force from shock and wind.

4. The considerable reduction in the dead load which results in a saving in the cost of the supporting piles.

Some of the difficulties encountered with the composite construction were outlined by Epstein to emphasize the need for introducing improvements which will obviate them. "Basically, the construction should be of the simplest nature," he declared.

"There is no reason why every one of the difficulties including cutting of slots and placing of shear developers should not be readily overcome. Construction of test slabs at the Bureau of Standards where a recently designed shear developer grooving tool was used, demonstrated that the work of placing shear developers can be reduced to a simple, rapid, routine operation. The recent development of prefabricated panels about a foot in width very definitely effects a great improvement which should simplify and speed up the construction materially. It would also permit most of the grooves to be cut and shear developers to be placed in the shop."

R. H. RAWSON



Paul M. Dunn, dean, school of forestry, and director, Oregon Forest Products Laboratory, Oregon State College, described recent developments in wood utilization. Pointing out that U. S. forest utilization at present leaves approximately 65 per cent of the mature forest crop in the woods or at the sawmill as waste, Dean Dunn outlined a program of cooperative research being conducted at the Laboratory.

Among examples of new uses developed for wood waste, he cited building and insulating board made from sawdust mixed with synthetic resins, hardboard material produced in sheets from shredded slab wood, high quality domestic and industrial charcoal with low ash and satisfactory carbon content suitable for use by electro-metallurgical industries, ethyl alcohol made from wood sugar with several resulting by-products including lignin, calcium sulphate, still-bottom liquor, and carbon dioxide.

Rural Electrification Administration cooperatives will need three million poles in 1946 to extend power lines to farmers and substantially the same number of poles each year for the next five years, E. R. Smith, chief, pole requirements staff, REA, stated. After 1950 the need will be reduced only slightly.

Wood preservation has become an active factor in the development of glued-laminated construction, for in many types of service structural members cannot be used safely without preservative treatment, a special committee on preservative and fire-retardant treatments of laminated members reported.

"Many glued-up items have been pressure treated with practically every preservative and fire retardant, and the process has been found to be entirely feasible, provided, of course, that waterproof resin glues are used," the committee declared.

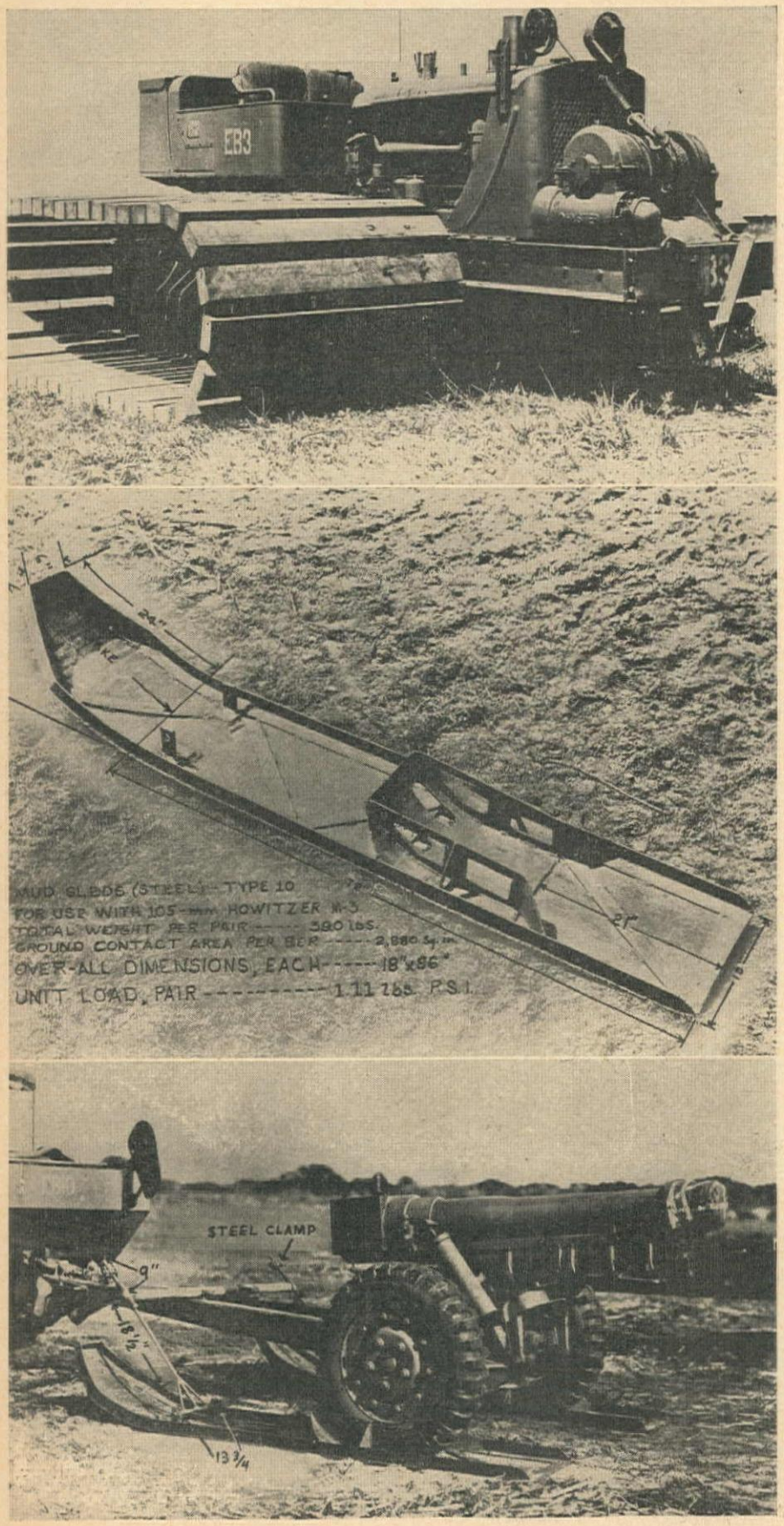
Officers

In addition to electing Rawson to head the Association for the coming year, members named A. J. Loom, general superintendent of timber preservation and tie-treating plants, Northern Pacific Ry., first vice president, and G. B. McGough, superintendent, Bond Bros., Louisville, second vice president. H. L. Dawson, Washington, D. C., was re-elected secretary-treasurer.

Directors selected include R. H. White, Jr., president, Southern Wood-Preserving Co., Atlanta; W. R. Yeager, inspection engineer, Western Electric Co.; W. P. Arnold, technical director, Wood-Preserving Division, Koppers Co.; H. A. Haenseler, engineer, Western Union Telegraph Co.; F. W. Gottschalk, technical director, American Lumber and Treating Co.; L. W. Kistler, superintendent of treating plant, Atchison, Topeka & Santa Fe Railway, National City, Calif.; and Mr. Bremicker, retiring president.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK



Equipment Hauled Over Soft Terrain On Widened Tracks

JAPANESE RICE paddies provided the setting for development of a wide track to enable U. S. Army Engineers to haul heavy artillery over marshy regions. Wooden side extensions were bolted to track plates of a tractor to increase the ground contact area and the device was able to tow a 105-mm. sled-mounted howitzer over soil that no other vehicle could cross.

The U. S. Engineer Board first tested their equipment at Fort Belvoir, Va., to determine the material best suited for the track extensions. Various types of steel and wood were studied and the latter was found most satisfactory because it is lighter than steel and the extensions of wood can be manufactured and attached right in the field.

Early extensions, on the basis of field tests, were of wood 4 in. thick, 6 in. wide and 60 in. long, giving an overall width of 176 in. to the D6 tractor which was used. The dimensions were varied later to obtain the best distribution of weight. Recent experiments, using a tractor equipped with a continuous track 32 in. wide, compared with the standard width of 22 in., fitted with the 60-in. wood extensions (spaced some inches apart), indicate that the former has about the same amount of ground contact area as the latter, but improved balance enables it to tow much larger loads with less strain.

When first used on the rice paddies of Japan, the 4x6x60-in. wood extensions bolted to each plate of D6 tracks provided ground contact area of 10,275 sq. in. and reduced ground pressure to 2.38 psi.

The steel sled pictured is clamped to the tractor and is fitted under the rubber-tired wheels of the howitzer so that the gun may be hauled safely over the soft soil. The same principle may be applied to construction equipment which is to be used in marshy areas.

These are two of the many interesting developments pioneered or tested at the Army's Engineer Corps camp at Fort Belvoir. Many of the devices which played major parts in winning the war grew from Engineer studies at the Virginia fort. The Bailey bridge is another outstanding example, and advance pontoon bridge design is still another.

WOODEN SIDE extension, 4 x 6 x 60 in., attached to each plate of D6 tracks is pictured at top. Beneath it is a sled used under the wheel of 105-mm. howitzer, and bottom is the gun placed on its sleds and clamped to the wide-tracked tractor.

Color Chart Aid for Alloy Users

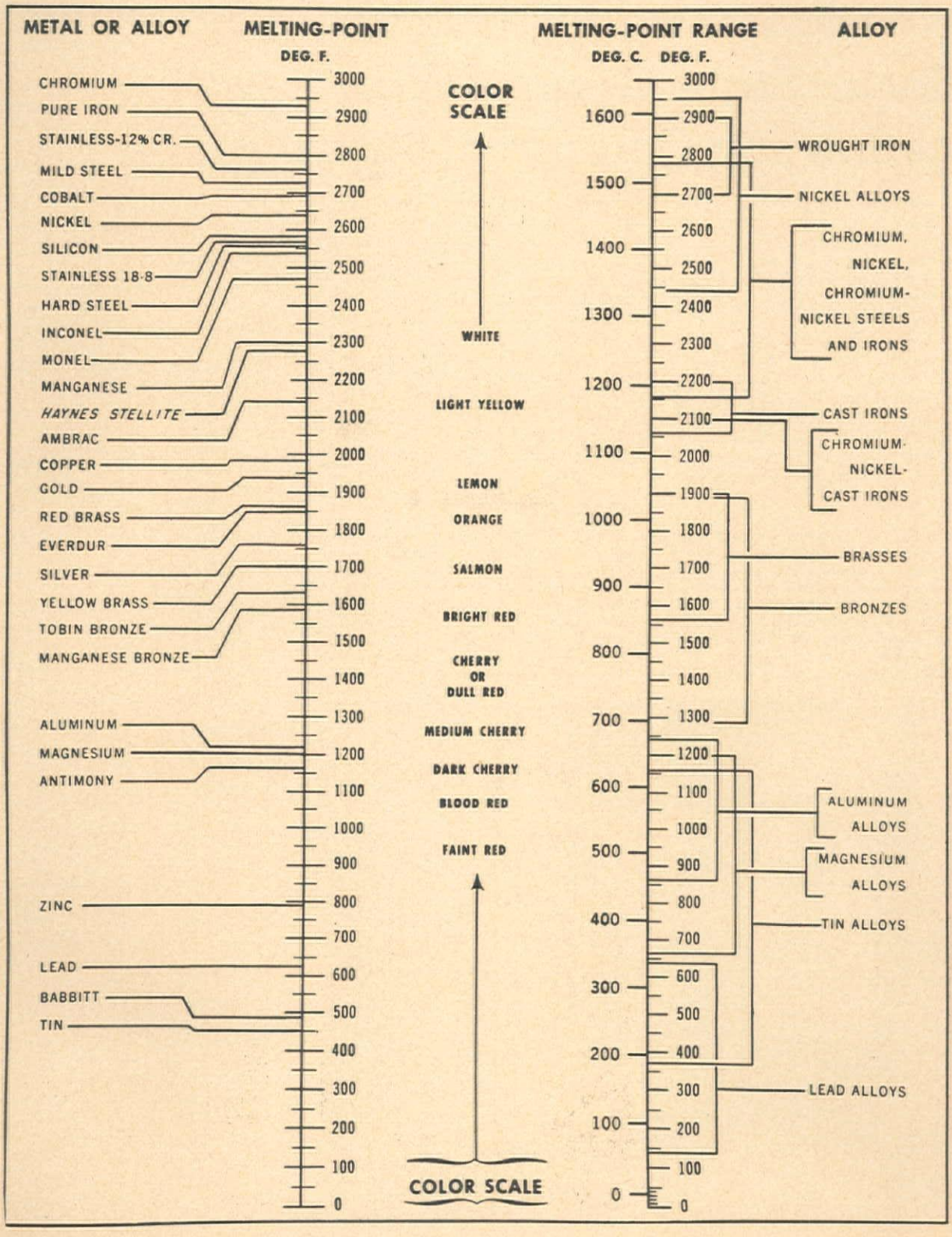
THE MELTING POINT and color chart, below, is a handy reference developed by Linde Air Products Company, for welders, cutters and shopmen who are welding or cutting many of the various alloys in use today. Metals or alloys having a melting point range narrow enough to be considered a single temperature are given in the left-hand column of the chart. The melting points of the various alloys having a wider range appear in the right-hand column. The scale in the center shows the approximate temperature at which color changes appear. The right-hand column with both Centigrade and Fahrenheit scales can be used as a general conversion table between these scales. The color scale is purposely indefinite as to the border lines between the colors, because of the difference of opinion as to color nomenclature and the effect varying amounts of light have on the appearance of color. The temperatures indicated by the colors on this chart can be seen only in a dark location.

If more accurate conversion of the common temperature scales is required use the formulas:

$$\text{Deg. F.} = (9/5 \times \text{Deg. C.}) + 32,$$

$$\text{Deg. C.} = 5/9 \times (\text{Deg. F.} - 32).$$

A quick approximation for converting Centigrade to Fahrenheit is, multiply Deg. C. × 2, subtract 10 per cent and add 32.



NEWS OF WESTERN CONSTRUCTION

JUNE, 1946

Federal, State Groups Work Together for Columbia Basin

CLOSE COORDINATION of the plans of federal and state agencies for the integrated development of the Columbia river basin was assured at the initial meeting of the recently-organized Columbia Basin Inter-Agency Committee in Portland.

Committee sessions are planned for the second Wednesday of each month with field trips preceding some of the meetings so that members of the group may inspect projects in the vicinity.

Col. Theron D. Weaver, division engineer of the North Pacific Division of the Army Engineers, committee chairman, declared that the logical development of the Columbia river resources called for closer coordination of federal and state planning. He cited friendly feeling among federal agencies and states interested in the region's future development as one of the advantages to be derived by closer association.

Members of the committee include one representative each from the Corps of Engineers, Bureau of Reclamation, Federal Power Commission, Bonneville Power Administration and Department of Agriculture. The Governors of Washington, Oregon, Idaho, Montana, Wyoming, Nevada and Utah or their designated representatives are invited to participate in the committee meetings. Cooperating federal agencies include the Fish and Wildlife Service, Coast and Geodetic Survey, Geological Survey, Forest Service, Soil Conservation Service, Army Air Corps, Public Health Service, Weather Bureau, National Park Service and Federal Housing Authority.

Gov. Earl Snell of Oregon and R. H. Baldock, Oregon state highway engineer, attended the meeting. Mark C. Kulp, Idaho state reclamation engineer, represented Idaho, and Al F. Winkler, chairman of the Montana highway commission, represented Montana.

Baldock outlined the program of the Northwest States Development Association, adopted by the governors of the northwest states in Dec., 1943. He said the essential power, irrigation and drainage projects in the region, which originally had been estimated to cost about $500,000,000 might now cost almost twice that figure.

The Bureau of Mines report by A. H. Lorain revealed that field examination of promising deposits of critical minerals was intensified during the war. Drilling operations for high alumina clays for the new alumina plants in the region were greatly increased and new sources of raw materials developed.

Leo L. Laythe, regional director of the Fish and Wildlife Service, said that a conservative estimate of wildlife resources in the Columbia basin, including waterfowl and upland game birds and animals, but exclusive of furbearers and fish, is $48,750,000. He said there were 17 national refuges, totaling about 161,000 ac. within the basin for protection of this wildlife.

He also cited the importance of the Columbia river salmon industry and the steelhead trout fisheries, both sport and commercial, estimating their value as $8,800,000 annually. Pointing out that any development of the Columbia river for irrigation, power or navigation will affect migratory fish, as well as wildlife refuges, he asked that any program designed for water utilization take into consideration the preservation of fish and wildlife resources.

Horace J. Andrews, of the Forest Service, discussed the program of the Department of Agriculture in supervis-

OFFICERS OF THE TACOMA CHAPTER Associated General Contractors opened the new headquarters of the chapter on May 1, when J. Alden Woodworth, vice president (hand on door) opened the door in the presence of Sam Bergesen, president, Ray R. Kelley, treasurer, and W. A. Osborne (left), executive secretary and manager. The West's newest AGC chapter (will be a year old July 1) now has a three-room suite consisting of office and reception room, board room, and lounge at 452 St. Helens. Office and board room are finished in white and fluorescent lighted with sound-absorbent ceiling, while the lounge is finished in striated plywood with indirect lighting and leather-covered furniture to ease the members' more restful moments.

ing the up-stream phases of flood control, agricultural research, soil conservation, and other activities.

The program of the Federal Power Commission was presented by Lesher S. Wing, regional engineer of the commission. He said the commission had conducted two power market studies in the Northwest in the last ten years. In recent years the organization has been working in close cooperation with Bonneville Power Administration, Wing declared.

Dr. Paul J. Raver, Bonneville Power Administrator, in discussing his organization's activities, said a new era of power development was opening in the immediate future which would reap an economic harvest for the Pacific Northwest.

S. C. Schultz, chief engineer of BPA, said the demand for power in the postwar era was far greater than had been anticipated and that a power shortage was more than a future possibility. He declared, "The demand for power has grown in spite of war cutbacks but the scarcity of manufactured materials is slowing our construction program." He said all of the proposed Columbia and Willamette valley dams would fit into the Bonneville power program and that there would be no surplus of power if all authorized and proposed projects are carried out as planned.

Col. O. E. Walsh, Portland District Engineer, outlined his district's program, including such recently authorized projects as McNary dam on the Columbia river near Umatilla, for which over $2,000,000 has been appropriated for starting preliminary work, and Detroit, Dorena and Meridian dams in the Willamette valley, all of which have preliminary appropriations. Work will be started on Dorena, on the Row river, and on Detroit, on the North Santiam river, this summer, he stated.

Roads Through U. S. Forests First Order in Housing Plan

FIFTEEN MILLION dollars will be spent on access roads through government forest so that an extra 600,000,000 board feet of lumber can be cut, under a recent order by Housing Expediter Wilson W. Wyatt.

First to be authorized under the Veterans' Emergency Housing Act, the road expenditure was revealed as industrial consultants helped housing officials lay plans to make "premium payments" for extra production of scarcest materials.

Other steps announced by Wyatt to boost lagging lumber output are: agreement by the U. S. Forest Service to allow an "overcut" of timber on government lands in the South and West, and agreement by the Service to give preference to producers of materials when bidders on government timber submit tie bids at ceiling prices. Together the moves will produce an extra 250,000,000 to 300,000,000 ft. of lumber in 1946 and more than twice that in 1947.

Famed Bridge Engineer, Conde McCullough, Dies

CONDE B. McCULLOUGH, 58, assistant state highway engineer of Oregon, died at his home in Salem, Ore., May 6. A native of South Dakota, McCullough was a graduate of Iowa State College and received the honorary degree of doctor of engineering from Oregon State College in 1934, as well as an LLB degree from Willamette University in 1928.

McCullough began his engineering career in 1910 with the Marsh Engineering Co., Des Moines, Ia. From 1910 to 1916 he was designing engineer and bridge engineer for the Iowa State Highway Commission. He came to Oregon in 1916 as assistant professor at Oregon State College and later became head of the civil engineering department.

In 1919 McCullough joined the Oregon State Highway Commission as bridge engineer and served until 1932, during which time he was in charge of design and construction of an extensive bridge program including the well-known Oregon Coast bridge. In 1932 he was appointed assistant state highway engineer. During 1917-18 he was a captain in the Army Corps of Engineers, and in 1936 he took a leave of absence to be in charge of design and construction of bridges on the Inter American Highway through Costa Rica.

At the time of his death, Mr. McCullough was serving also as chairman of the Salem Planning Commission. He was a member of the American Society of Civil Engineers and of Tau Beta Pi. In addition to his fame as a bridge designer and builder, he was well known as a highway economist, lawyer and author. His latest work, "The Engineer at Law," in two volumes, with his son John R. as co-author, appeared only a few weeks before his death.

U. S. Engineers Decide Time Not Ripe For Escalator Clause in Contracts

FOLLOWING A MEETING in Washington with representatives of Associated General Contractors, the chief of U. S. Engineers and his staff decided that the present is not the appropriate time to use the escalator or adjustment clause in contracts performed under the supervision of the Corps of Engineers for both military and civil works programs.

Numerous individuals and the Western chapters of A.G.C. urged the Chief of Engineers to adopt immediately the escalator clause covering labor, materials and freight increases in all future contracts offered for bids by the U. S. Engineers. But because there exists a difference of opinion as to the operation of the clauses, Lt. Gen. Wheeler, Chief of Engineers, felt that this was not the time for adoption.

The escalator clause is employed in Bureau of Reclamation contracts and has been found satisfactory by contractors. The A.G.C. has been advised by General Wheeler that he is interested in having an escalator price adjustment clause for both labor and materials developed so that it is workable and simple and ready for use when the U. S. Engineers may find it necessary. The Engineers' staff are revising their own drafts of the clauses and will submit them to the A.G.C. for reaction.

Another reason believed to be responsible for the decision not to utilize the clause for the present was the record of recent bids on the civil works program which included projects from several hundred thousand dollars to more than 10 million. In only one case did the bid exceed the Engineers' estimate by more than 25 per cent, the limit set by law above which contracts may not be awarded. In many cases the bid on which the award was made was lower than the Engineers' estimate.

New Route Will Replace Obsolete Colorado Road

THE LIME CREEK "shelf road," an old, obsolete, one-way road that skirts the mountainside high above the creek bed and which is the bugbear of motorists who travel U. S. Highway 550 between Durango and Silverton, Colo., is to be replaced with a new route from Cascade Creek over Coalbank Hill.

Construction of the long-awaited improvement received the "go ahead" signal when State Highway Engineer Mark U. Watrous announced that the Highway Department and the Public Roads Administration had approved a contract for $705,228.50 with the Colo-

rado Constructors Inc., of Denver, to build 8.1 mi. of new highway through the rugged mountain of that area.

Back in 1941 the State Highway Department attempted to get this improvement under way. A contract was let for a five-mile section of the road. However, before the work was well started the war came, the work was stopped and the contract was cancelled.

Three times this year the job was advertised for bids and twice the bids were rejected as too high. Finally, when bids were called for May 1, only one bid was received, although three bids had been submitted at an earlier date.

Colorado Constructors, Inc., submitted the lone bid on May 1. The same firm had submitted the lowest of the three bids on March 12, all of which had been rejected at that time. When representatives of the firm agreed to do the work at the price bid on March 12, which price was $10,000 below the firm's bid of May 1, an agreement was reached to approve a contract.

"This improvement is so badly needed that we must get construction started as soon as possible," Highway Engineer Watrous stated. "It will take two seasons to build the new route and further delay is impracticable."

Idaho Power Firm to Build Additional Installations at Lower Salmon Plant

THE IDAHO POWER Company, currently engaged in the largest expansion program in its history, has announced plans for the immediate construction of additional hydroelectric installations at the Lower Salmon plant on the Snake River and on the Malad River to complete its existing facilities at those sites.

This is in addition to the construction of a generating plant at the Upper Salmon site, work on which is now about half completed. (See *Western Construction News*, May, 1946.)

The company will invest approximately $6,500,000 to provide the additional generating capacity. Contracts have been awarded to Morrison-Knudsen Co., Inc., of Boise, which firm also is constructing the Upper Salmon plant.

Engineering surveys are now under way and final planning of the projects is being pushed, according to C. J. Strike, president of the company. It is thought construction will extend through 1948.

On Malad River an upper generating plant of probably 7,000 kw. will be constructed a mile and a quarter above the existing plant, whose capacity now is 12,000 kw.

At the Lower Salmon site another new plant will be constructed either to supplement the old one or to replace it. Present plans call for installation of three generators to provide 45,000 kw. of generating capacity. The present plant has a capacity of 7,200 kw. only.

The Lower Salmon project will call for the construction of a new dam, 22 ft. high and 700 ft. long, to replace the present cofferdam structure.

The output of the new installations will feed into the 138,000-volt transmission line.

The power plant at Lower Salmon Falls was built in 1910 and the Malad River installation in 1912. Strike emphasized that the "constantly increasing demand for electrical service necessitates the provision for additional generating facilities and full utilization of the power potentialities at these sites."

Construction of the new installations comes under an over-all $7,500,000 program to supplement the company's system.

Already under construction:

1. A 16,500-kw. addition to the Upper Salmon power development on the Snake River, where Units 3 and 4 are being installed in a new power plant to augment Units 1 and 2 constructed in 1937.

2. A new 138,000-volt, 120-mi. transmission line from the plants in Hagerman Valley to Boise and Emmett.

3. A 69,000-volt line from Vale to Harper, Ore., a distance of 25 mi.

4. A 45-mi. 69,000-volt transmission line from Juntura to Van, Ore.

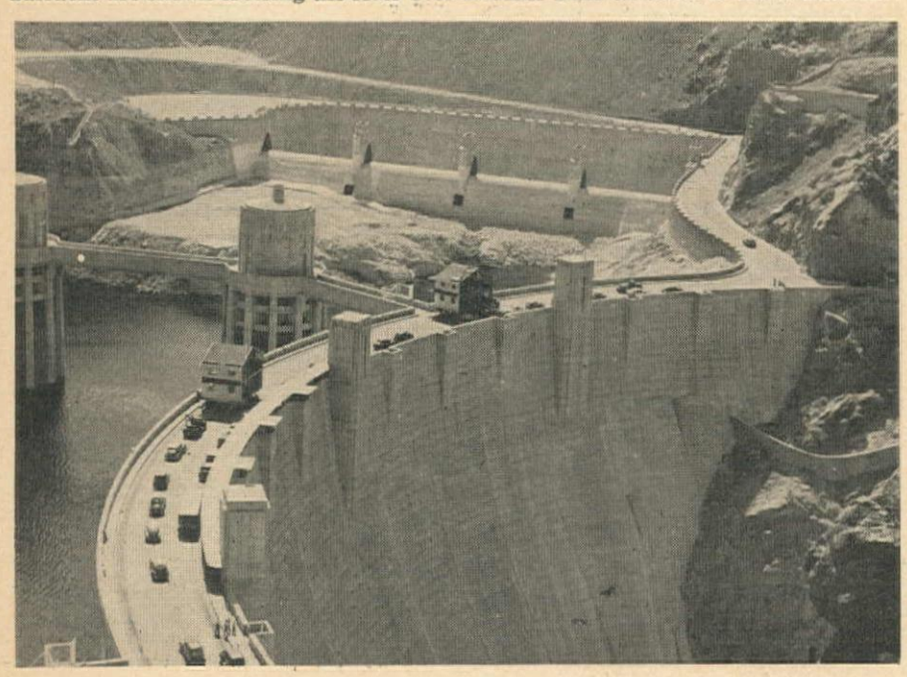
5. A 46,000-volt, 44-mi. extension into Jordan Valley, Ore., as a portion of 75 mi. of new distribution lines to be constructed as agreed when Idaho Power purchased the Jordan Valley REA recently.

6. A 69,000-volt, 33-mi. transmission line from Weiser to Cambridge, Ida.

A new terminal station will be constructed near Boise in the near future.

ARMY BARRACKS FOR DAVIS DAM SITE MOVED ACROSS BOULDER DAM

SHORTAGE OF HOUSING for construction workers on the Bureau of Reclamation's Davis Dam project on the Colorado River is partially alleviated by the purchase from Camp Williston in Boulder City of ten Army barracks, which are being moved across the river and 108 mi. to the Davis site where they will cross back to the Nevada side and be reassembled in the Utah Construction Co. camp. Two 20-ft. sections of one barracks are shown crossing the river over Boulder Dam en route to Davis Dam site.



Survey Will Determine Seattle Roadway Design

FINAL DESIGN of the projected $3,450,000 elevated roadway on Alaskan Way in Seattle will depend to a large extent upon a traffic origin and destination survey now in progress in Seattle. Being undertaken jointly by the Public Roads Administration, the Washington State Highway Department, and the City of Seattle, the survey will be a 5 per cent sampling of all homes in the metropolitan area. Interviewers are visiting every twentieth home to enquire as to the number of cars in the family, when each starts its daily trip, when and where the trip ended, and where the car was parked at the end of the trip. From the results of the survey, which is expected to be completed in about three months, final location of the Alaskan Way viaduct will be determined and detailed design of the structure (see *Western Construction News*, May, 1946, page 106) begun. Construction is expected to begin on the project during 1947.

Director of the survey project is W. H. Carsten of the Washington State Highway Department staff, and E. E. Lewarch of the Seattle traffic engineer's staff is assistant director. D. L. Trueblood of the Public Roads Administration is technical advisor for the survey.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—It was inevitable that Congress should make a special example of the Department of the Interior, with particular emphasis on the Bureau of Reclamation. Under the previous President there was a tacit understanding in some agencies that it was unnecessary to bother much with Congress: the President could always make it come to heel. The contempt of Ickes, as Secretary, for the Congress became so marked that it was embarrassing to bystanders.

There is complete truth in the old saw, like master like man. Most of the subordinate parts of the Department of Interior naturally adopted the Master's attitude. During the war the Congress could do very little about it without doing something it did not wish to do to the war. Unhappily, immediately after the war the unlamented Ickes proceeded to override the law by pushing through the Southwest Power Administration as a $200,000,000 enterprise, lacking any color of Congressional authority, and he proceeded to formulate a national power policy under the cloak of various presumed authorities in numerous Acts and Executive Orders; and his legal loudspeaker interpreted a law, devised to collect principal and interest for power over a 50-year period, as meaning that the interest only should be collected perpetually for use in connection with pet Ickian theories but that the principal should never be retired. There were other reasons for the Congressional ire, but the showdown came over the brazen effort to tell Congress it did not mean what it said in its laws.

The issue was clearly defined on the floor of the House on May 14 by Congressman Henry C. Dworshak of Idaho. He said:

"When the supplemental appropriation bill came before the House last December, several members of this subcommittee (Interior Appropriations) stated very definitely they would be opposed to making additional appropriations for the construction of reclamation projects until such time as the House Committee on Irrigation, and the Bureau of Reclamation, were willing to cooperate in formulating a policy involving the repayment of construction charges in accordance with the Reclamation Act of 1939. On Jan. 14, 1946, the gentleman from Utah, Mr. J. Will Robinson, introduced H. R. 5124, which has for four months been before that House Committee." (This is the Bill designed specifically to make clear the intent of the Congress.) "I believe that before we can proceed with the full knowledge that the various statutes, and particularly the Reclamation Project Act of 1939, are being adhered to scrupulously, it will require the cooperation of the House Committee on Irrigation and Reclamation, and the Interior Appropriations subcommittee, to force the Bureau of Reclamation and the Department of the Interior to comply with the mandates of this Congress.

"There should be early determination of some of these fundamental policies so that the Government will be justified in making these investments. **When proper cooperation is displayed by interested Congressional committees and the Interior Department, development of the West will continue according to the pattern which has been outlined by the Congress."**

This clearly says to the Department of the Interior and its Bureau of Reclamation (subordinate parts, under Congress, of the Federal Government), that when they come back to their proper relationship to Congress and function under the laws made for their guidance by Congress, then Congress will provide funds for the planned development of the West. The cut in the Reclamation appropriation, roughly 50 per cent, proclaims that Congress does not trust the agency under existing circumstances, and will not trust it to spend the funds for future developments. Never in the history of the United States has the Congress so sharply and publicly taken a great Department to the woodshed and administered correction. Neither, probably, has a Department of the Federal Government ever before so openly flaunted the laws of Congress. The sorry spectacle may have drama and arresting interest to the East and the South, but it means creeping paralysis to irrigation and to the industries and communities which are part of the great reclamation development of the West. It stops the works.

Extent of cuts

Here is the extent to which the works will be stopped if the cut stands. General investigations are reduced to one-fourth the sum required; construction appropriations are cut: San Luis, Colo., from $1,500,000 to $650,000; Boise-Payette, Ida., $2,573,000 to $1,115,660; Boise-Anderson Ranch, $2,847,000 to $1,234,475; Minidoka, Ida., $1,000,000 to $433,000; Palisades, Ida., $1,500,000 to $650,410; Sun River, Mont., $96,000 to $41,625; Deschutes, Ore., $1,300,000 to $563,685; Klamath, Ore., $500,000 to $216,800; Provo River, Utah, $3,102,000 to $1,345,040; Ogden River, Utah, $62,000 to $26,885; Yakima-Roza, Wash., $1,440,600 to $624,650; Kendrick, Wyo., $500,000 to $216,800; Riverton, Wyo., $1,500,000 to $650,410; Shoshone - Heart Mountain, Wyo., $800,000 to $346,885; Shoshone-Willwood, Wyo., $136,000 to $58,970; Gila, Ariz., $2,000,000 to $867,210; Davis Dam, Ariz.-Nev., $15,000,000 to $6,504,070; Central Valley, Calif, $25,000,000 to $10,840,120; **Kings River, Calif., $200,000 to nothing**; Colorado-Big Thompson, Colo., $15,000,000 to $6,504,075; Hungry Horse, Mont., $2,000,000 to $867,210; Columbia Basin, Wash., $30,000,000 to $13,008,145; Fort Peck, Mont., $1,000,000 to $433,605; Missouri River Basin, $23,783,600 to $10,312,685; Boulder Canyon, $2,357,000 to $1,685,135; All-American Canal, $5,500,000 to $2,384,825; Colorado River, $600,000 to $375,000. The Bonneville Power Administration was cut from $19,791,000 to $9,000,000; the Geological Survey, for gaging streams and cooperative work, from $3,400,000 to $2,509,345. There is hope the Senate may increase some of the reductions.

The Southwestern Power Administration was cut from $23,323,000 to $3,298,000 in the original bill; but after Speaker Rayburn made an address, almost purely as a compliment to the Speaker's prestige, the sum was increased by $4,000,000, a total of $7,298,000, on the plea that it is urgently needed to tie-in the three dams located in Oklahoma and Texas, the Grand River, the Denison and Norfork Dams. The discussion on the floor of the House left no doubt, however, that the social, economic and political ideologies presumably reflected in the $200,000,000 Southwest Power Administration program are under suspicion, and that this Congress will scrutinize microscopically the need for every dollar it is asked to supply.

The Interior Department

Congressman Dworshak placed in the Congressional Record a copy of the letter written by the Director of the Budget, at the White House, to Interior Secretary Krug, requesting him to define his position in regard to the Department's previous effort to void the 50-year repayment law. The Budget Director made quite clear that he held the law should be obeyed. The Budget Director wrote his query on March 29. Late in May he had not received a reply.

Krug apparently is moving slowly. It is reported his present efforts are aimed at crystallizing a steady policy for the Department and for the various parts of the Department. Also, that he is working to create a team spirit among the various bureaus and services which employ the 38,000 persons who are on the Interior payroll. If the Department had received approximately the funds it justified to the Bureau of the Budget it would increase its payroll to roughly 50,000 persons on or after July 1. Krug apparently sees many, but talks to few.

He regards the M. V. A. as washed up. On the other hand he has an idea that the broad pattern of T. V. A. is sound basis for regional development through inter-agency cooperation, as the Missouri Valley job is now being accomplished and as recently undertaken in the Columbia Valley.

Hagie's new job

Secretary-Manager Floyd O. Hagie, of the National Reclamation Association, who came here over 9 years ago from Wenatchee, Wash., to stay three months, resigned in April to take over

the post of executive vice president of the Seattle Chamber of Commerce in June. He succeeds Christy Thomas, who comes here in the fall as a vice president of the Seattle Chamber to take over the job Jack Underwood resigned on Jan. 1.

Hagie's going was a bombshell, wholly unexpected, and is genuinely regretted on the Hill as well as elsewhere in the Capital. Hagie has force, personality, and knows the West; he has been in the confidence of the members of the Senate as well as the House, and has been a standby for them in almost all matters affecting the irrigation and reclamation matters of the West. His resignation was reluctantly accepted by a meeting of almost the entire Board of Directors of the Association in Salt Lake City on May 13. No successor was chosen. Until a permanent choice is made, the affairs of the office will temporarily be conducted by E. W. Rising, of Idaho, who has long cooperated with Hagie in affairs of the association.

It is the general opinion of the directors of the association that the going of Hagie at this critical time is a minor catastrophe in the cause of western reclamation. He is expected to have a major influence in the future development of the Northwest which focuses on Seattle. The Hill regards him as a man of national stature, with sound knowledge of national affairs as well as particular understanding of the Northwest and the whole Pacific slope. He will be missed here.

Geneva steel plant

U. S. Steel is expected to receive the award of the contract to buy the Geneva steel plant. The assumption here is that War Assets Administration officials, during preliminary maneuvers, sounded out the Department of Justice and arrived at the conclusion that decisions of the Supreme Court, on record, made it reasonably certain the Attorney General would approve the sale. We get the impression the U. S. Steel very genuinely wishes to set a real steel industry in operation in the West, both at Geneva and on the Coast.

The proposal to apply for a basing point for shipments from Geneva is regarded here as fully as important as the operation of the plants themselves. Under the present system the Geneva basing point would govern the freight rates from other steel mills, no matter where they are located. Under present OPA ceilings a mill which accepts an order must ship the steel on the freight rate of the basing point nearest to the customer. Thus, steel shipped from Sparrows Point, Maryland, would come under the potential Geneva basing point.

Highways

Apportionment of the second $500,000,000 of the Federal Aid fund of $1,500,000,000 was announced on May 16. Federal-aid highways were allocated $225,000,000; secondary or feeder roads, $150,000,000; urban Federal-aid highways, in proportion to population in places of 5,000 or more, $125,000,000. For highways apportioned to Arizona, $3,240,289; secondary, $2,240,966; urban, $262,168; total $5,743,423. California, highways, $9,017,519; secondary, $5,161,445; urban, $8,122,233; total, $22,301,197. Colorado, highways, $4,033,468; secondary, $2,714,271; urban $933,647; total, $7,681,386. Idaho, highways, $2,798,389; secondary, $1,956,701; urban, $211,799; total, $4,966,889. Montana, highways, $4,543,707; secondary, $3,104,425; urban, $307,665; total, $7,955,797. Nevada, highways, $2,868,649; secondary, $1,922,269; urban $60,613; total, $4,851,323. New Mexico, highways, $3,644,292; secondary, $2,522,486; urban, $257,261; total, $6,424,039. Oregon, highways, $3,728,403; secondary, $2,544,245; urban, $810,873; total, $7,083,521. Utah, highways, $2,535,953; secondary, $1,688,869; urban, $433,731; total, $4,658,553. Washington, highways, $3,533,693; secondary, $2,392,694; urban, $1,467,429; total, $7,393,816. Wyoming, highways, $2,794,242; secondary, $1,896,157; urban, $133,049; total, $4,823,448. Hawaii, highways, $1,096,875; secondary, $731,250; urban, $393,496; total, $2,221,541.

Public Roads Administration reported the State highway departments in April let 392 contracts for Federal-aid work that will cost $55,932,506, roughly equal to the total of contracts let the previous three months. State highway departments reported they had rejected 201 bids since Jan. 1 because the low bid was far above the estimated cost of construction. Public Roads Administration refused to concur in the award of 36 bids in the same period.

Aeronautics

Somewhere in the United States, probably in the West where there is abundant electrical power generated by water, the National Advisory Committee for Aeronautics plans to build a stupendous wind-tunnel and laboratory which it is estimated will cost $500,000,000 or more. Discussions that designate the Ephrata and Moses Lake area, between Wenatchee and Spokane, Wash., are premature, to say the least. Discussion which would make it appear the enterprise is all primed and ready to go, at any place, at this time might do more harm to the whole program than good to the localities. There is such a plan, it has been explored and thoroughly considered, and it is possible it will come to fruition if no one upsets the applecart; but before anything can be done, Congress must authorize the program, and before that it must be submitted to the President so he may submit it to Congress. None of these steps has been taken. Until they are taken, the plan is purely a hope, albeit a well-based hope. But any identification of a location for the undertaking at this time, when no identification has remotely been crystalized, is apt to defeat the proposal when it reaches Congress.

When Congress makes the necessary appropriations of the funds authorized in the Federal airport bill recently enacted and signed by the President, it is estimated allocations for airport construction on the West slope will be: Arizona, $7,388,661; California, $18,697,066; Colorado, $7,663,436; Idaho, $5,634,509; Montana, $9,428,452; Nevada, $6,663,841; New Mexico, $7,889,865; Oregon, $7,189,743; Utah, $5,749,013; Washington, $6,367,666; Wyoming, $6,108,791.

Housing activity

The Veterans' Housing Act, as enacted, provides $15,000,000 to be spent on access roads to standing timber on Government lands. The Act terminates Dec. 31, 1947. Top limit on mortgages per room on rental housing under Title 6, NHA, was fixed at $1,500; the Administrator might increase the amount to $1,800. Subsidies were limited to $400,000,000. Not more than 200,000 prefabricated houses may be guaranteed by RFC at one time, and each guarantee may not exceed 90 per cent of the standard prices. The office of Housing Expediter is created, who may set ceilings on prices of new houses, allocate and give priorities to materials with special preferences for veterans; and the Expediter may forbid exportation of lumber to foreign countries.

It still is not clear when Wyatt may throw into gear. It is generally understood here that he and his organization have been so busy fighting for the enactment of the law they have not been able to make plans. It is reported they are now asking CPA people to help them choose the industries which should be subsidized. It is said the word went around at CPA not long ago to let the Wyatt group solve their own problems.

It is generally held less than 300,000 houses may be built this year. CPA reports building materials continue short, and that there is no immediate hope of an increase. Pig and scrap iron and sheet steel are particularly short. CPA forcasts new homes in 1946 will total a value of about $3,900,000,000, and $6,600,000,000 in 1947. Non-residential in 1946 is estimated at $5,000,000,000; maintenance and repair in excess of $5,000,000,000.

Miscellaneous

H. J. Resolution 346, introduced early in May, would legally make Boulder Dam, Herbert Hoover Dam. Congressman Augustus W. Bennet, New York, in introducing the Bill told Congress: "I am today introducing a Joint Resolution providing, in substance, that Boulder Dam shall be renamed Herbert Hoover Dam in recognition of the fact that former President Hoover was the prime factor in the planning and construction of this dam and also as some form of tribute to the exceptional services which Herbert Hoover rendered to his country in World War I, in the office of President, and in the present food crisis, all of which services were performed without compensation. I sincerely hope that there will be unanimous, nonpartisan support for this resolution which does belated justice to a great American who was forced to serve his country at a time of desperate economic crisis and who, as a result, endured abuse and ridicule to a degree

unequalled since the days of Abraham Lincoln." The bill was referred to Arizona Congressman Murdock's House Irrigation and Reclamation Committee. There is live interest here whether or not the Bill will be buried until after the election.

The Navy has brought approximately 93 shiploads of construction machinery back to the United States, mostly via the Pacific Coast. This equals over 80,000 measurement tons of machinery. Over 100 ships loaded with Army construction surplus items are now arriving in the United States. Under the new law, veterans have priority on most equipment.

Late in April, Congress enacted the law giving the following funds for expenditure by the U. S. Army Engineers: Los Angeles River, $3,000,000; Detroit Reservoir, Ore., $1,700,000; Dorena Reservoir, Ore., $2,018,000; Lookout Point Reservoir, Ore., $1,000,000; Kings River and Tulare Lake, Calif., $1,000,000; Crescent City Harbor, Calif., $1,000,000; Columbia River, Umatilla Dam, $2,600,000; Missouri River, $4,000,000.

Scattergood Amplifies May Water Remarks by Kruckman

May 31, 1946

Mr. J. M. Server, Jr., Editor
Western Construction News
Dear Mr. Server:

The generally excellent and constructive statement, "Washington News," by Associate Editor Arnold Kruckman of the *Western Construction News*, May 1946 issue, seems to require comment respecting the first paragraph under "Late Wire." Though my work over the years has related primarily to power development and utilization, these comments necessarily relate more directly to water, and are presented by me as a member of the Colorado River Board of California.

Institutions of Southern California in conformity with the provisions and requirements of the Boulder Canyon Project Act—including the covenant imposed on California limiting the amount of water it might have from the Colorado River, which was agreed to through its Legislature in 1929, and the reciprocally related declarations by the Congress in the nature of a covenant that the project shall be made fully self-liquidating through firm contracts entered into prior to its construction and that the Boulder conserved waters shall be for use exclusively within the United States—have long since entered into such firm contracts for water and for power with the United States through the Secretary of the Interior under which they, in good faith, have assumed definite financial responsibilities or already expended a total of more than $500,000,000.

Through these firm contracts the Boulder Canyon Project is wholly underwritten, as required, providing for repayment with an equivalent of interest at 3% on the total Federal investment.

California's Colorado River water contracts are within the limitations of the covenant referred to and its Colorado River Board and the institutions of Southern California are simply endeavoring to protect those contracts and are not seeking "more water" from the Colorado River, nor have they any desire to interfere with projects in Texas but are asking that Texas refrain from interfering with the administration of the Mexican Water Treaty as affecting the Colorado River. Indeed, it seems natural to suppose that such an attitude might be understood and lead to a mutually helpful accord.

Factual matter developed over years of research by the Bureau of Reclamation, as indicated in the article referred to, enumerates far more inventoried projects, present and potential, than the shown available reliable water during recurring drought periods in the Colorado River system, including feasible storage. There are, in fact, sufficient reasonably financial feasible potential Reclamation Projects, together with supplemental water for existing projects, which would require all of the reliable water available for additional irrigation in excess of requirements for domestic and industrial purposes in the various states in the Basin—hence the lack of any necessity for overburdening power revenues in support of economically unjustifiable irrigation projects. Surely every effort should be made to proceed with the orderly development of economically feasible Reclamation projects consistent with the assured availability of adequate water.

It was, logically it seems, the general consensus of opinion in conferences in Washington that the development of new projects—prior to the determination of water division between the states and of allocations to projects within each state as previously required of California by the Secretary of the Interior—can only lead to ultimate confusion and great sorrow on the part of thousands of families expending their funds and efforts only to find ultimately their lands without sufficient or possibly without any water.

The blocks of potential, that is undeveloped, low-cost water-power in conjunction with auxiliary steam power may be made available for diversified and decentralized industrial developments in every state of the Basin; and thus provide thrift and happiness for a total of possibly ten times more families than irrigation development alone would provide for as has been proven in Southern California and in some other formerly principally agricultural areas.

For many years I have sought, and encouraged, harmonious accord throughout the Colorado River Basin, and elsewhere, through recommending the development of manufacturing and other industry in centers throughout such agricultural areas that there might be a balanced economy and great thrift and happiness for a multitude of people—surely such is the exact opposite of encouraging dissension or procedure that would tend to create dissension.

The question arises as to where the United States may secure the additional water—over and above 750,000 ac. ft. a year, the maximum Mexico ever used from the unregulated river—which it has pledged to Mexico under the treaty contrary to declarations on the floor of the United States Senate as to what could possibly happen in this regard, when the Boulder Canyon Project Act was debated just prior to its approval in December, 1928. These declarations were to the effect that under no circumstances could the Senate be expected to approve more than 750,000 ac. ft. yearly to Mexico and that amount on the basis of amity and not legal right.

It appears to one not versed in law that the Federal treaty powers might transcend provisions of a compact between states though it has received the necessary permissive approval by the Federal Government, but it is not clear how, consistent with integrity, the Federal Government, in the administration of a treaty deliberately entered into under such circumstances, could violate either and much less both of the covenants initiated by the United States Congress through the Boulder Canyon Project Act under which the contracts for water and power referred to have been entered into by institutions of Southern California in complete fulfillment of those covenants involving the limitation of Colorado River water which California may have, the complete repayment with interest equivalent on the total cost of the Boulder Canyon Project, and a reservation for exclusive use within the United States of the conserved waters.

Perhaps California's liberal attitude toward development and harmony in the whole Pacific Southwest may be better understood from the fact that prior to Boulder the waters of the Colorado River system were wholly appropriated and utilized to the extent of economic possibilities; and that conservation at Boulder made possible more than doubling the total consumptive use of water in the four Upper Basin States from the Colorado River system, and made possible fully doubling such uses in Arizona, while in California it made possible an increase in the consumptive use of water of only approximately one-third of its previous rights and uses as controlled by the limitation covenant.

Development trends being promoted in other sections of the Basin if financed through appropriations by the Congress, though in large part not financially justifiable, would result in the use of still greater amounts of water than those indicated in this statement as compared with water rights and uses in those sections prior to Boulder. Such procedure,

if successful, would leave California institutions with actually less water than their total water rights and uses prior to thus fully underwriting the Boulder Project while the uses in such other sections would be far more than doubled.

The additional water, as previously stated, which California has been allowed under the limitation provisions, being for domestic uses in the San Diego and Los Angeles metropolitan areas, the seriousness, both nationally and locally, of any such curtailment where it would support ten times more families, and also the injustice must be apparent. California is not seeking more water but is endeavoring to protect its existing contractual rights under the limitation provisions of the Boulder Canyon Project Act.

Very truly yours,
E. F. SCATTERGOOD.

A.S.C.E. to Hold Summer Convention in Spokane

SPOKANE, WASHINGTON, has been awarded the 1946 summer convention of the American Society of Civil Engineers, it has been announced by Col. William N. Carey, Secretary and Executive Officer, at the Society's national headquarters in New York.

Dates of the convention are July 17-20, and some 500 members of the 93-year-old Society, oldest national engineering organization in the country, are expected to attend. Nine technical sessions, at which irrigation, power, hydraulics and other civil engineering matters will be discussed, will mark the session. At a general meeting opening day, W. W. Horner, St. Louis consulting engineer, national president, will make the principal address. Tours of engineering and historic interest are being arranged in the Spokane vicinity for the visiting engineers and their wives.

Harold J. Doolittle, district engineer, U. S. Indian Service, president of the Spokane section of the Society, which will be host to the convention, heads a committee arranging the sessions, which will be held in Spokane's Davenport Hotel. William D. Shannon, Seattle, is the national Society's director for the district in which the convention will be held, and is cooperating in making the arrangements.

Group Compiles Guide On Safe Building Loads

WHAT LOADS a building can carry with safety are recorded fully in a new American Standard just approved by the American Standards Association.

Under leadership of the National Bureau of Standards, a committee composed of representatives from important building organizations divided the work into four sections, each handled by a subcommittee. The sections studied were: (1) dead loads, (2) live loads, (3) wind loads, and (4) earthquake loads.

L. A. FIRM WINS SAFETY AWARD

G. E. ARBOGAST, right, president of Newberry Electric Co. of Los Angeles, Calif., receives the Swenson Trophy, Associated General Contractors of America Accident Prevention Award for 1945, from W. D. SHAW, manager of So. California Chapter of A. G. C.

"Dead loads" refers to the weight of building materials and the pressure of floors, walls and roof against each other, all of which reduce the load possible to the structure.

"Live loads" includes the weight of occupants—human and inanimate. Since humans and stored material shift and lump into little groups, a margin of safety must be allowed. The third section deals with wind loads, as wind creates a space of vacuum around a building and walls and roof may be forced apart into the vacuum by pressure of air within the structure. Formerly it was thought that direct action of the wind blew a house down or carried it away.

The subcommittee on earthquake loads, under the chairmanship of Henry D. Dewell of San Francisco, worked out two sets of building code requirements, one for general use since no region can claim immunity, and the other for regions in which major shocks may be expected.

OBITUARIES . . .

James L. Morse, 62, mechanical engineer in the Bureau of Reclamation branch of design and construction at Denver, Colo., died May 5 following an emergency operation. From 1917 to 1930, Morse was head of the department of mechanical engineering at the Colorado School of Mines, and he was a Reclamation engineer for the past ten years.

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Edward L. Greene, 48, recently appointed assistant irrigation engineer for the Bureau of Reclamation's Columbia Basin Project, was injured fatally in an automobile-train accident May 20 at Ephrata, Wash. Greene was assistant office engineer for the Bureau at Coulee Dam from 1934 to 1942, and during the war was an executive with Kaiser Co., Inc., at Vancouver, Wash.

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Timothy E. Treacy, 85, former California state senator and prominent contractor, died recently in San Francisco. As a member of the firm of Flynn & Treacy, he helped build a large proportion of San Francisco's early streets. In 1898 he was elected to the State Assembly and in 1931 became a senator.

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Daniel Boone Herring, "the poet laureate of Boulder Dam," died in Tucson, Ariz., a short time ago. Herring was a familiar figure around the city of Las Vegas, Nev., during the Boulder Dam construction period, and was known there and in Boulder City for his religious eccentricities.

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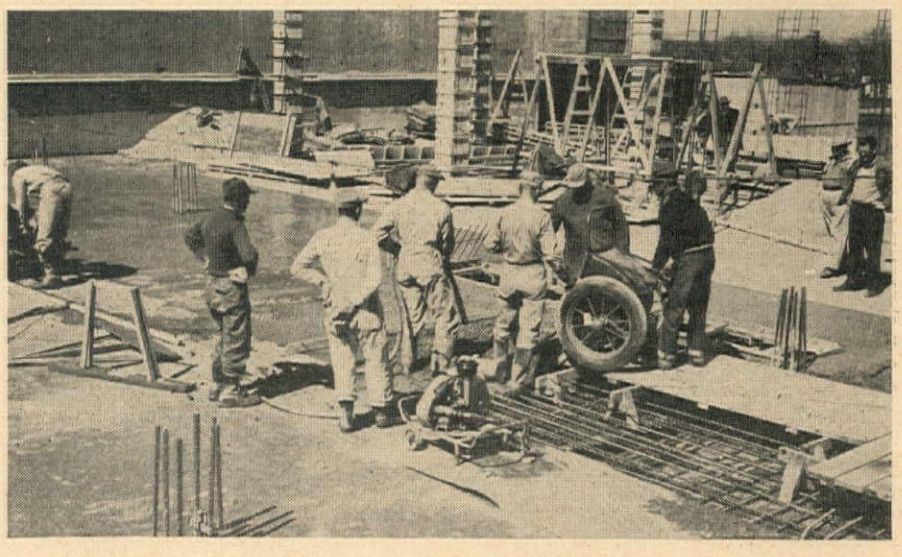
Charles Everett Ellis, 85, contractor of Draper, Utah, died recently in a

LAST STRIP OF CONCRETE ON SECOND FLOOR OF DENVER WAREHOUSE

NEWSTROM-DAVIS CO. workers pour the last strip on the second floor of the three-story concrete warehouse addition being built at a cost of $200,000 at Denver, Colo., for the Ralston Purina Mills. Standing at the extreme right are HARRY THOMAS, job superintendent for Newstrom-Davis, and JERRY BERGMAN, labor foreman.



Provo hospital. Ellis was prominent in the home construction field in Draper for more than 50 years.

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Samuel J. Cohn, 58, retired building contractor of Los Angeles, died last month at his home.

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Robert Simpson, 79, retired Beverly Hills, Calif., building contractor, died May 5 at his southland home.

Army Engineers Survey Veteran Hospital Sites

IN ACCORDANCE with a request from Veterans' Administration, Army Engineers will make field surveys preparatory to the development of plans for ten more Veterans' Hospitals, according to Lt. Gen. Raymond A. Wheeler, Chief of Engineers, the War Department has announced.

The latest list of hospitals on which field surveys have been requested includes nine general medical and surgical hospitals, and one for the treatment of tuberculosis.

Included among the surveys to be made are the following Western projects:

A 300-bed hospital at Seattle, Wash., for which Congress has appropriated $3,351,216; a 100-bed hospital at Miles City, Mont., for which Congress has appropriated $1,050,312; a 250-bed hospital at Big Springs, Tex., for which Congress has appropriated $2,570,753; a 250-bed hospital at Fresno, Calif., for which Congress has appropriated $2,634,676.

Previously the Engineers had been authorized to make surveys for a hospital at San Fernando, Calif.

The field surveys include taking of soil bearing tests and borings for foundations and the securing of other technical engineering data necessary before plans and specifications for the hospitals can be completed.

Oakland Firm Buys Oil Drums From Alaska, Hawaii Surplus

SALE OF SOME 410,000 used oil drums, comprising practically all the "empties" which have clogged storage facilities in Hawaii and Alaska, has been reported to Secretary of the Interior J. A. Krug.

J. M. Barringer, director of the Interior Department's Surplus Property Office, said that the Myers Barrel Co. of Oakland, Calif., is paying approximately $84,000 for the drums "as is and where is."

In short supply on the mainland, the 55-gal. capacity drums will be brought back to the States for cleaning and reuse.

Some 200,000 of them are at various points in the Hawaiian Islands and 210,000 have been stored at Adak, Amchitka, Attu and Whittier, in Alaska.

More Loans Granted by FWA For Future Project Planning

WESTERN CITIES, counties and engineering agencies were granted the following loans by the Federal Works Agency for planning construction of future projects. Made available through the Bureau of Community Facilities, the advances are repaid by the planners, without interest, when construction is begun.

California

Porterville School District, $13,170, elementary school and playground, $259,563; Salinas, $7,793, swimming pool and park, $237,694; Salinas High School District, $12,850, high school addition, $275,000; Santa Barbara, $11,850, storm drain system, $437,620; Vaca Valley School District, $6,660, complete school at Vacaville, $204,175; Woodlake, $1,000, sanitary sewers and disposal plant, $79,300; and Yreka School District, $4,800, elementary school at Yreka, $87,300.

Colorado

In Colorado, School District No. 1 of Las Animas Co. was granted $4,000 to plan a junior high school at Trinidad to cost about $356,800, and $460 for a $12,175 second-story addition to provide a band room above a swimming pool at Trinidad; School District No. 1, Delta Co., received $10,000 for high school additions at Delta estimated at $296,300.

Idaho

King Hill Irrigation District was advanced $16,500 to prepare plans and specifications for a hydroelectric power plant, transmission lines, pumping stations and other facilities to cost $550,000.

Kansas

Deerfield was given two advances, $1,200 to plan a water system which will cost $37,500, and $1,100 for a sewerage system estimated at $27,650; Goodland received $3,700 for street improvements, to cost $99,200; and Trego County High School District, $14,800, high school facilities at Wakeeney, $393,200.

Nebraska

Danbury received a federal grant of $1,203 to design a water supply system, estimated to cost $26,921.

New Mexico

Tularosa's municipal gas system got a $1,000 FWA boost to build two 8,000-gal. butane-propane storage tanks, vaporizing equipment and a distribution system.

Oklahoma

Temple was advanced $2,150 to plan water supply wells and supply line to cost an estimated $71,275; Nichols Hills, $1,575 for storm sewer extensions costing $51,450; Perry, $8,149 for $223,318 storm and sanitary sewer extensions and sewage treatment plant addition, $2,335 for $64,000 street lighting improvements, and $2,809 for a $77,010, 500,000-gal. elevated water tank and additional water mains.

Oregon

Three Oregon school districts were granted loans: School District No. 13, Washington Co., got $1,359 to plan a grade school at Banks to cost $40,500; School District No. 4, Jefferson Co., $1,242 for $35,000 high school at Culver; and School District No. 9, Jefferson Co., $1,665 for a $50,000 grade school addition at Madras.

South Dakota

Philip received a federal advance of $2,800 to design a water filtration and pipe line, estimated to cost $61,230.

Philip was also advanced $1,500 to plan street improvements to cost $35,400; Mobridge received two advances: $5,000 for a $120,000 storm sewer system, and $3,000 for a $66,500 outdoor swimming pool.

Texas

Planning advances in Texas, in brief form, follow: Azle School District, $2,200, 7-classroom high school and 4-room elementary school, $75,800; Alpine, $360, high school building, $12,770; Carrizo Springs, six advances totaling $13,318, six airport projects, total cost $375,650; Castleberry School District, $4,500, additions to elementary and high schools, $148,894; Decatur, $650, landing strips and runway surfacing, $30,440; Del Rio, $700, high school building, $21,400; Eden, $4,800, sanitary sewer system, $128,800; Fort Worth, $25,000, improvements to sewage treatment plant, $1,000,000; Fort Worth School District, $3,120, elementary school at Blue Bonnet Hills, $124,200, and $3,120, elementary school at Ridgela, $128,800; Itasca, $3,627, street improvements, $100,000; Schulenburg, $1,440, sewage treatment plant additions, $35,000, and $1,350, municipal building, $33,000; and Texas College of Arts & Industries, Kingville, $50,360, five new buildings, $1,638,360.

Buda Rural High School District, $1,925, gym, home economics laboratory and shop building, $60,300, and $1,050, high school addition, $33,600; Crosby Independent School District, $2,700, high school at Crosby, $79,900; Olney, seven advances, total $7,896, for street grading, drainage structures, curb and gutter and asphalt pavement, estimated at $291,000, all together; Weatherford, $2,900, water system extensions and improvements, $54,500, and $3,900, sanitary sewer collection system, $82,000.

Washington

Planning advances in Washington listed with the project follow: Aberdeen School District, $10,700, elemen-

tary school, $220,000; Bainbridge Island School District, $9,412, elementary school near Winslow, $247,700; Central Valley School District, $20,476, first unit of a high school near Spokane, $500,000; Ellensburg School District, $14,000, elementary school, $351,078; Kittitas, $6,657, complete sanitary sewer system, $125,113; Lake Washington School District, $15,000, high school near Kirkland, $310,000; Oroville School District, $11,795, additions to junior and senior high schools, $244,963; Pateros, $3,200, complete sanitary sewer system, $100,871; Renton School District, $4,908, elementary school addition, $103,000; Shoreline School District, $15,000, high school buildings near Seattle, $306,000; Toppenish, $14,000, storm and sanitary sewer improvements, $425,000; Union Gap, $12,400, complete sanitary sewer system, $238,245; and Waitsburg, $600, water supply line, $15,900.

NEW BOOKS...

DESIGN OF REINFORCED CONCRETE STRUCTURES — by Dean Peabody, Jr. Second edition published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. 532 pages, 5½ x 8¼. Price $5.50.

Originally prepared for use in a course in reinforced concrete design including both lecture and problems, the second edition has been enlarged with regard to shrinkage and plastic flow, and elastic frame analysis. A brief discussion of form design has been added. Illustrative designs and text discussions have been revised to conform with the 1941 Building Regulations for Reinforced Concrete of the American Concrete Institute or with the 1940 Joint Committee Recommended Practice for Concrete and Reinforced Concrete. A plastic theory of design is presented as an alternative to the straight-line variation of concrete stress.

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ARCHITECTURAL DRAWING AND DETAILING — by J. Ralph Dalzell and James McKinney. Published by the American Technical Society, Drexel Ave. at 58th St., Chicago 37, Ill. 212 pages, 5½ x 8¼. Price $2.50.

Fourth printing of a 10-year old elementary text designed primarily for home study, this volume is devoted almost exclusively to residential construction and the problems attendant upon the preparation of such plans. The book is divided into four sections of which the first two, architectural drawing and architectural detailing occupy about three-quarters of the space. Rendering is discussed at some length, and landscaping more briefly. Many of the older drawings have been replaced to bring the volume up to date.

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FLOW METER ENGINEERING HANDBOOK — by Louis Gess and R. D. Irwin. Published by The Brown Instrument Co. Division of the Minneapolis - Honeywell Regulator Co., Philadelphia, Penn. 151 pages, 7½ x 10¼. Price $2.50.

Second edition of the original volume has been written to expand the information and to include suggestions to improve its usefulness. Devoted exclusively to orifice-type meters, the book includes detailed discussions of the principle of orifice measurement and design details of flow meters. Fifty-five tables are presented throughout the book for use in the solution of flow measurements and related problems. Some of the chapter headings include flow approximation tables, derivations of working formulae, working equations, compressibility of gases, viscosity of fluids, and orifice calculations for steam, water, oil, and gas flow.

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SIMPLIFIED ARCHITECTURAL DRAWING—by Truman C. Buss, Jr. Published by the American Technical Society, Drexel Ave. at 58th St., Chicago 37, Ill. 258 pages, 8¼ x 11. Price $4.75.

Intended by the author to fill a gap between instruction pertaining to mechanical drawing and that pertaining to architectural design, the book opens with an elementary section, Technique, which covers drafting equipment, lettering, graphic procedures and problems, and history of architecture. The second section, Working Drawings and Construction, contains as well as types of sketching, plans, elevations, etc., discussions of the uses of manufactured materials and equipment, engineering, and specifications, contracts and estimating. Display Drawing discusses mechanical perspective and sketching as well as five types of rendering. A fourth section is devoted to outlining problems of increasing complexity.

Scarcity of Cement Laid to Shutdowns, Road Programs, Lumber and Steel Lack

CEMENT IS ANOTHER construction material that is getting scarce on the West Coast, according to its manufacturers.

Reasons given for the impending shortage are the shutdown, for various reasons, of a number of facilities at a time when requirements are rising rapidly, new requirements, including greater export, new road building programs and the substitution by builders of concrete for scarce lumber and steel.

Besides general rehabilitation in the Pacific area, government construction programs in Guam and Manila make heavy demands, and South America is very actively in the California market. The California Division of Highways does not want to retard its highway program, even though it may have to use other pavements than concrete on some jobs.

The cement industry judges expected demand by the fact that at wartime peaks California furnished 18.5 million barrels of cement in its biggest year (1943) and the Pacific Northwest furnished nearly six million (1942). Before the war, when coast capacity was smaller, the two regions were providing 16 to 17 million barrels a year.

Report on conditions at individual cement concerns follows:

Pacific Portland Cement Co., Redwood City, Calif., has put three of four kilns in operation after its 140-day shutdown because of the San Francisco Bay machinists' strike, and hopes to reach full capacity in about a month, which would indicate a production of 6,000 bbl. a day when all four kilns are in production. The company has a 2,000-bbl. plant at Gold Hill, Ore., and a higher cost plant at San Juan Bautista, Calif., with 2,000-bbl. capacity, which remains closed.

Santa Cruz Portland Cement Co. operates at about 4,000 bbl. daily since part of its facilities, including 6,000 bbl. additional production, were shut down last year by a dust damage injunction. Present plant changes are expected to bring a better operating level within a few months.

Permanente Cement Co. had the largest volume month in its history in March, with April close behind, with around 14,000 bbls. daily when all kilns are operating.

Calaveras Cement Co. is producing 5,000 bbl. a day at San Andreas, Calif., and expects to increase that figure.

Yosemite Portland Cement Co. in Merced Co., and the Cowell operation in the Concord area near Mt. Diablo are out of production. Henry Kaiser bought Yosemite in 1944 and sold its kilns and equipment to a Colombia, South America, company and kept the silos and pack house as a division of Permanente. Yosemite had a 3,000 bbl. capacity and Cowell a 2,000-bbl. capacity.

Santa Cruz, Calaveras and Monolith Portland Cement Co. are all installing new kilns, Monolith's in Southern California. California Portland Cement Co. is setting up new facilities in Arizona. Cement manufacturers say that the price of cement is up only five per cent, while the costs of other building materials have increased by perhaps one-third since 1940, so earnings can't be expected to show substantial gains.

GENERAL CONSTRUCTION CO., Seattle, has been awarded a $2,947,000 contract for construction of piers at the Puget Island Naval Shipyard, Bremerton, Wash. The facilities are intended for inactive vessels of the 19th Fleet. The contract award was made by the Thirteenth Naval District, Seattle. Capt. E. B. Keating CEC is the officer in charge of construction.

Utah Power Co. Pushes Idaho Line Extension

UTAH POWER COMPANY is pushing a line extension project in Idaho but has been forced to postpone a large renovation project because of inability to secure needed materials, company officials have announced.

Construction of 173 mi. of electric line will bring electricity for the first time to 255 rural users in Box Elder County in Utah and Oneida County, Idaho. R. R. Rowell, Ogden division manager, reports the construction is progressing and that the extension will probably be completed by late fall. Costing over $170,000, the project is one of the longest and most costly rural extensions in Utah Power's history.

Tapping the company's existing lines at the Doweyville substation, 31 mi. of 44,000-volt transmission line is being built to Blue Creek, where a new 100-kva. substation will be constructed. Here the voltage will be dropped to 7,200 volts and fed into an additional 142 mi. of distribution line.

About 500 poles had been set at this time. The entire project will require nearly 2,000 lodgepole pine poles, ranging from 30 to 50 ft. in height.

In the meanwhile, failure of lumber for staves, cement, and other items to arrive on schedule has made it necessary for the company to postpone a $235,000 construction job which contemplated rebuilding of eight-tenths of a mile of 11-ft. wood stave flowline serving the Grace, Ida., generating plant.

J. L. Jameson, who was to have been in charge of construction, announced that it is necessary to have all needed materials on hand before water is taken from the pipe and the line dismantled. He explained that original plans contemplated rushing the job so that it could be completed during May, inasmuch as three 11,000-kw. generators would be out of service.

PERSONALLY SPEAKING

Construction of the irrigation system of the Columbia Basin Project in south-central Washington will be under the direction of ten men, irrigation engineer **H. A. Parker** announced in disclosing that six subdistricts have been formed to accelerate the building program. The subdistricts and officials in charge are: No. 1—Main Canal, from South Coulee Dam to Long Lake, **Roger R. Robertson,** resident engineer, and **Elmer J. Nieman,** assistant; No. 2—Long Lake Dam and 6½ mi. of Main Canal extending southwesterly from the dam, **Philip M. Noble,** resident engineer, and **Walter W. Brenner,** assistant; No. 3—West Canal, from division works to Soap Lake Siphon, **Floyd S. Arnold,** resident engineer, and **H. M. Sheerer,** assistant; No. 4—Potholes Dam and Reservoir, **Raymond C. Pike,** assistant; No. 5—Pasco Pumping Unit, **Charles W. Seeholzer,** resident engineer, and **Arthur F. Swanson,** assistant; No. 6 — permanent improvements at Ephrata, **Clarence F. Burk,** resident engineer.

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Col. Frank L. Beadle was appointed last month as executive officer of the Portland District, U. S. Engineer Dept., succeeding **Col. G. J. Zimmerman** who is now executive officer of the North Pacific Division at Portland. Col. Beadle was engineering officer for the Second Air Force with headquarters at Fort George Wright, Spokane, at the outbreak of the war, and since has served 34 months in the South and Central Pacific. During part of the latter duty he was chief of staff to the commanding general of Tinian.

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James R. Patelle, Seattle, has been appointed field recruiter for Alaskan engineering construction projects of the Seattle District, U. S. Engineer Dept. With headquarters in Seattle, Patelle will recruit both engineering and construction personnel for Army Engineer projects at Fort Richardson, Ladd Field, Nome, Attu, Adak, Amchitka, Shemya, Fort Randall and Fort Glenn.

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Arnold M. Seiler, with the War Production Board during its entire existence, has been named director of the Salt Lake City office of the Civilian Production Administration, which will handle all non-housing building construction applications under the veterans' program in Utah.

HOMER M. HADLEY

Homer M. Hadley, regional structural engineer for the Portland Cement Association, Seattle, has resigned his position with that organization after 24 years' association to enter private practice. Well known throughout the West for his contributions to bridge design practice, Hadley plans to establish his own office in Seattle where he will specialize in bridge design.

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Three California national forests have had new supervisors since May 19. **Roswell Leavitt,** for the past two years a member of the regional office staff in the Division of Recreation and Lands, is supervisor of Trinity National Forest with his headquarters at Weaverville, succeeding **Andrew G. Brenneis** who was transferred to Los Padres National Forest at Santa Barbara. **Paul Stathem** has been moved from Mendocino National Forest at Willows to be supervisor of the Sequoia National Forest, Porterville, succeeding **J. E. Elliott,** who has retired. **James Kaiser** succeeds Stathem as supervisor of Mendocino Forest. Kaiser was staff assistant in charge of resource management at Lassen Forest, Susanville.

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Paul J. McKay, who recently returned from overseas service with the Seabees, has been appointed construction engineer for Vancouver district headquarters of the Washington department of highways, succeeding **Mathew P. Brislawn,** now office engineer of the Vancouver district. McKay was formerly construction engineer of the Seattle highway district.

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Charles Poppe has been appointed design engineer in the bridge department of California's Division of Highways in Sacramento, replacing **Norm Raab,** who is in charge of the study for the proposed San Francisco Bay Bridge No. 2. **Art Elliott** has taken Poppe's place as resident engineer for the North Sacramento Freeway structures.

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Three Washington highway engineers have received 25-year certificates of meritorious service: **George H. Shearer,** district engineer at Seattle, who started with the department in 1919 as location engineer; **R. H. Kenyon,** state engineer of plans and contracts, who began in 1919 as a rodman, and **Earl C. Simpson,** work control engineer, who entered as a draftsman in 1919.

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Neil F. Hein was discharged from the Army recently as a colonel after five years of service, many of them overseas, and has taken over his old job with Hendrie & Bolthoff of Denver, Colo. Hein is in charge of highway equipment and supply.

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R. B. (Dick) Ward, formerly with the Bureau of Reclamation at Escondido, Calif., has been made construction engineer for the Bureau on its Horsetooth Reservoir project in Colorado. Ward's headquarters will be located at Fort Collins, Colo.

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Joseph P. Collopy has been appointed to the Bureau of Reclamation as superintendent of operation and maintenance for the Gila Project near Yuma, Ariz. Collopy formerly was project engineer with the Department of Agriculture Soil Conservation Service at Hay Springs, Neb.

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Kar Jacobsen, who served as a captain with the air corps engineers in China, Burma and India, has returned to the heavy construction industry in Portland, Ore. Jacobsen, head of the former Jacobsen-Jensen Co., will work under the name of K. F. Jacobsen & Co.

COL. EDWIN H. MARKS is Division Engineer of the recently-created South Pacific Division, Corps of Engineers.

Lambert Cole has been appointed chief of the public works department of the Monrovia, Calif., municipal government. He will be in charge of the engineering, building and street departments, and will be assisted by **Albert Pedersen,** who is also in charge of public safety.

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Gail A. Hathaway, Oregon's assistant state engineer from 1924 to 1928, was elected vice president of the American Society of Civil Engineers. Hathaway is now with the Office of Chief of Engineers of the War Department.

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Max Bookman, formerly assistant hydraulic engineer for the State of California, has moved from Sacramento to Riverside, Calif., to be chief engineer of the Riverside Co. Flood Control and Water Conservation District.

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Adolph B. Harr and **Albert J. Horton,** both of Portland, Ore., have formed a general contracting firm to engage in heavy construction, specializing on roads and streets. The firm will be known as Harr & Horton.

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Alfred J. Ryan, civil engineer of Denver, Colo., was appointed a committee member of the American Society of Civil Engineers' Air Transport Division, which plans to promote sound engineering thought and practice in the air transportation field.

* * *

John E. Kitchen and **R. L. Osborne** have purchased the electrical and fixtures department of the Saviers Electrical Products Corp. of Reno, Nev. Kitchen was a senior engineer with the U. S. Engineers in Salt Lake City, Utah.

* * *

Kannaje Ramesh Rao, civil engineer from Madras, India, has joined the Bureau of Reclamation's office at Boulder City, Nev., where he will study techniques of water control for two years before returning to India.

* * *

Frank Lyons, brother of the late **J. A. Lyons,** has joined with **Harold Eder,** superintendent and head mechanic for the J. A. Lyons Co., Inc., Portland, Ore., for the past 20 years, to continue operations in the heavy construction business under the name of Frank Lyons & Co. They will specialize in grading work, in addition to renting out equipment. Lyons will be in charge of the front office and Eder will supervise field work.

* * *

R. L. Gerry is now a citrus and bean grower at Camarillo, Calif. Gerry, a registered civil engineer, was formerly assistant highway engineer in the California Division of Highways at San Diego.

* * *

Royden K. McCullough and his brother, **Maurice B. McCullough,** are now partners of the McCullough Construction Co. in Salt Lake City, Utah.

* * *

T. P. Tulloch is no longer associated with Daley-Tulloch Construction Co. of Phoenix, Ariz. **Jeanette E. Daley** is now sole owner of the firm, though no change has been made in the name yet.

D. A. RHOADES, formerly general superintendent of all sand and gravel operations of the Henry J. Kaiser Co., is now vice president and general manager of the new Kaiser-operated aluminum enterprise in Spokane, Wash.

Jack Claypool has just succeeded **J. R. Tillman,** who was sent to Spokane, as Washington highway engineer for the Olympic district which covers all state highways in counties of the Olympic peninsula with headquarters in Shelton. Claypool has been connected with the highway department for 30 years.

* * *

K. C. Danstrom is resident engineer of the central division of the Navy's San Diego Aqueduct job. **O. H. Lillard** is office engineer of the central division.

* * *

J. C. Compton, contractor of McMinnville, Ore., was re-elected president of the Pacific Northwest Development Association during the annual meeting of the organization on May 6-7 at Portland. **David B. Simpson,** Portland, was elected vice president and treasurer, and **Dan Noble** re-elected secretary of the organization.

* * *

Ernest W. Everly is back at heavy duty contracting in Albuquerque, N. Mex., after his discharge from the U. S. Engineers. Col. Everly was chief engineer officer in the China area during the war.

* * *

N. H. Tippets, Platte Co. agricultural agent in Wyoming for five years before entering the Army in 1944, has been named supervisor of the Bureau of Reclamation's Angostura unit at Hot Springs, S. Dak.

* * *

Lee L. Hansen has been appointed industrial analyst in construction for the Civilian Production Administration district office at Salt Lake City, Utah.

* * *

Walter H. Wheeler is engineer for General Mills, Inc., on the design of several buildings of a cereal plant to be constructed in the vicinity of Lodi, Calif.

* * *

William L. Baker, construction engineer of Provo, Utah, is seeking the Republican nomination for U. S. Senator from Utah.

* * *

J. W. Blean, formerly building inspector for the U. S. Engineers at Tonopah, Nev., is confined to the sanitarium at Weimar, Calif.

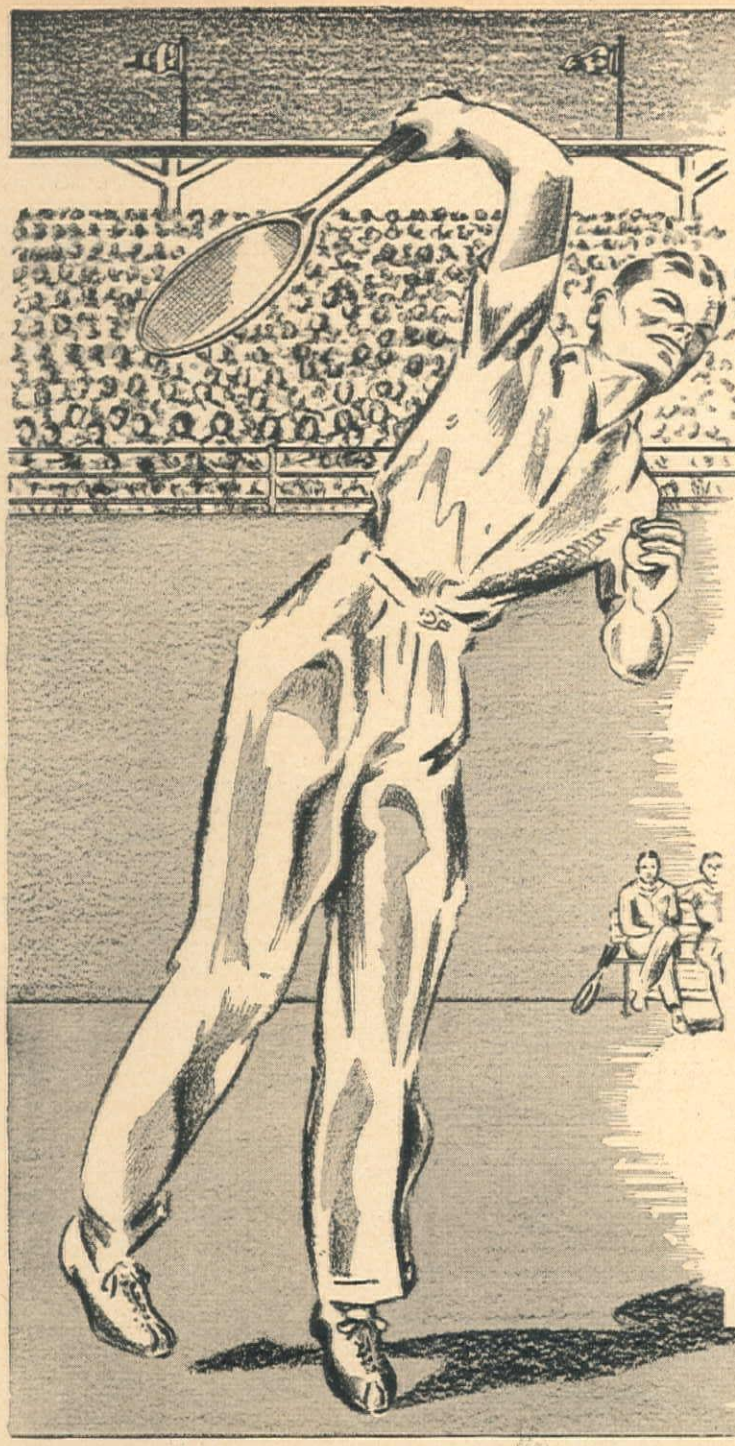
* * *

Louis H. Goss, former city manager and city engineer of Brawley, Calif., was recently made city administrator of Monterey Park, Calif.

* * *

W. B. Upton and **T. J. Wadsworth** are engineers with the U. S. Geologic Survey at the Snake River, Ida., project.

COL. CHARLES H. McNUTT is new Deputy District Engineer at the Sacramento Corps of Engineers office. He will assist COL. LESTER F. RHODES in the growing Army civil works program in Central California, Nevada, Utah and the southern part of Oregon, mainly flood control problems.



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SUPERVISING THE JOBS

Along with those men reported in *Western Construction News*, May, 1946, working on Rector Dam at Napa, Calif., for Parker & Ball are **Russel Webster,** shovel foreman; **Jimmy Lester,** drill foreman; **William Baety,** clearing foreman; **Carl Knutson,** labor foreman; **Art Burch** and **Claude Ramsey,** swing shift foremen; **"Slim" Story,** master mechanic; **J. A. Snowden,** shop foreman; **Bill Arnett,** job engineer; **H. L. Howell,** office manager, and **Doug Spencer,** timekeeper.

* * *

Arthur W. Vitus is job superintendent of construction on concrete overcrossings in Balboa Park, San Diego. M. H. Golden Construction Co., the contractor, is building the 11th St. freeway at Date, Quince, Upas and Richmond Sts. Foremen are **Jim C. Wilson, E. J. Allen, M. G. Choate** and **John W. Street;** state engineers are **H. R. Hineman** and **M. W. Gewertz,** and timekeeper is **O. J. Aufricht.**

* * *

J. Hermann is job superintendent for Long Beach's Ofcco Construction Co. on the installation of water, steam and air service at four new piers at the San Diego Naval Repair Base. **M. A. Nishkian** is project manager and chief engineer of the $1,000,000 job, **Guy Lewis** is estimating engineer, **R. Stewart** is process engineer and **C. B. English** is superintendent of Ofcco.

* * *

L. A. B. Walsh is general superintendent of P. J. Walker Co.'s Bullock's building going up in Palm Springs, Calif. **J. D. Timmons** is resident engineer on the $500,000 job, **C. L. Frejd** is labor foreman and **D. D. Brown** is carpenter foreman. Timekeeper is **P. E. Davis,** material clerk is **C. L. Lowrence** and job auditor is **R. C. Marr.**

* * *

V. I. Morris is construction superintendent of the Holly Sugar factory at Brawley, Calif., being built by the Holly company, whose chief engineer is **A. L. Cooper.** Foremen on this $4,000,000 job are **J. B. Owens, William H. Park, John King** and **T. C. Crawford,** and construction accountant is **Fred E. Pike.**

* * *

Ray W. Smith is general superintendent on three factories under construction in Los Angeles. Square D. Electric Products will be located on Valley Blvd., Jennings Refrigerator Co. on Olympic Blvd., and Sunset Grain & Milling Co. on **Clarence St. Norman Sterner** is general foreman on the projects.

* * *

Gerald H. Phipps is construction manager for Platt Rogers, Inc., of Pueblo, Colo., at their new offices in Denver. **Nat S. Kendall,** recently discharged from the Seabees, is general traveling superintendent for projects in the Denver area, including the veteran housing projects under construction by Platt Rogers for the University of Denver and for the City of Denver.

W. A. Rohrer is superintendent on the $5,700,000 Johnson, Drake & Piper, Inc., Navy job at Inyokern, Calif., and **Joe Hoff** is his assistant. Other key men on the large crew are **Glen C. Williams** and **Enok Olson,** general carpenter foremen; **Robert W. Hoggan,** cost engineer; **E. G. McLellan,** mechanical engineer; **L. S. Rathbone,** civil engineer, and **E. C. Thompson, Louis Cosentino, Frank Sidbeck, Joe Donahue, A. B. Cook, John Livingston, Willard Brunton, Ellis Breed, Ben Kraft, George L. Steffy, A. L. Johns, Paul Everly, Jack Bishop, James Patrick, Paul Downs, "Cat" Chambers, "Woody" Woodruff, "Boots" Sleeth, "Sailor" Gendron," Whitey" Pipkins, Roger Hackman** and **Jess Thompson.**

* * *

Keith Wasson of San Francisco's Peter Kiewit Sons Co. is acting as job superintendent on the latest $1,598,856 contract for earthwork, canal lining and structures on the Friant Division of the Friant-Kern Canal. The work is located 18 mi. east of Fresno, and **D. O. Kelly** and **L. E. Brown** also hold supervisory positions.

* * *

F. M. Limbaugh is general superintendent on a New Mexico road job for which he holds a $228,991 contract. He expects to have 7½ mi. of Aztec-Bloomfield highway completed by next Oct. 1. Engineer is **Ural Armstrong,** and other key men are **Ted Byrd, Marshall J. Wylie, T. A. Formhals** and **Thomas B. Mansfield.**

HARLEY McKNIGHT, who is job superintendent for Case Construction Co. of Alameda, Calif., on a 1000-ft. causeway of creosoted piles and a complete ferry slip at Richmond Terminal, extending into San Francisco Bay from Castro Point. JACK SHIRLEY is job engineer on the water project.

In addition to the men reported with Haddock-Engineers, Ltd., on the Naval ordnance test station at Inyokern, Calif., in the May issue of *Western Construction News*, the following are also employed on the project: **George M. Bronough** is assistant to the manager, **John D. Groves** is office manager, **Charles O. Cassada** is accountant, **James S. Bolton** is in charge of payroll, personnel and timekeeping; **Sam Crawford,** carpenter foreman; **Richard H. Hubbard,** master mechanic; **Raymond T. DeMotte,** mechanics foreman; **H. G. Epps,** transportation superintendent; **Leo A. Brummer,** labor foreman; **L. R. Schroeder,** electricians foreman, and **Everett L. Crom,** in charge of lubrication.

* * *

W. C. Smith is job superintendent on the $208,473 Spring Creek Hill section of The Dalles-California Highway construction job in Klamath Co., Ore. R. A. Heintz Co. of Portland has the contract and his equipment foreman is **George C. Ziegler** and purchasing and office manager is **E. D. Hews.**

* * *

Charles McCullough, who supervised construction of seaplane ramps at Salton Sea, is vice president and general manager of Shanahan Bros., Los Angeles, Calif., contractors and is building a two-story, 16-unit store and office building at 418 N. Glendale Ave., Glendale, Calif.

* * *

Harry Thomas is job superintendent for Newstrom-Davis Co. on construction of a three-story warehouse addition to Purina Mills at Denver, Colo. **Jim Norton** is general foreman, **Jerry Bergman** is labor foreman, **Bill Ponsford** is concrete foreman and **Kenny Hughes** is steel foreman.

* * *

Ray Ferguson is job superintendent for Gunnar Corp. of Los Angeles on 3.8 mi. of grading and paving and the construction of four bridges between Black Rascal Canal and Buhach Station in central California. **F. Gunner Gramatky** is project manager on the $415,297 job.

* * *

Ray Johnson is with Morrison-Knudsen Co., Inc., of Seattle, as superintendent on M-K's $619,000 contract for earthwork on the main canal, station 751 plus 94 to station 1100 plus 90.8 on the Columbia Basin Project near Stratford and Adrian in Washington. Office manager there is **O. O. Williams.**

* * *

E. D Mincey has the supervising position with The Austin Co. of Oakland, Calif, on the million dollar canning plant to be built for Campbell Soup Co. in Sacramento. **T. C. White** is the purchasing agent.

* * *

Matt Peterson is job superintendent on buildings Newstrom-Davis Co. is constructing for Colorado Woman's College in Denver, Colo. **William Heaberg** and **Horace Jones** are carpenter foremen, **Charles Gallagher** is labor foreman and **Fred Cassell** is engineer.

* * *

M. E. Apgar is supervising highway work at Shingle Springs, Calif., for Utah Construction Co. of San Francisco, and **Lawrence R. Hallaas,** formerly with Morrison-Knudsen Co., is grade foreman. **E. L. Calebrook** is labor foreman, **Ormond E.**

Cox is office manager and **Lewis H. Beal** is master mechanic.

* * *

Thomas F. O'Mara, with the electrical construction division of Morrison-Knudsen Co., Inc., Boise, Ida., is project superintendent on a $100,000 contract to build a transmission line between Vale, Juntura and Van, Ore., for Idaho Power Co.

* * *

Richard Murray is in Los Angeles as job superintendent on a one-story, plus basement, reinforced concrete factory building T-S Construction Engineers, Inc., Los Angeles, is putting up at Eastern Ave. and 61st St. for $175,000. **C. F. Malven** is engineer and timekeeper on the job.

* * *

R. W. Jones is supervising construction on the manufacture and placing of 32,000 ft. of steel-lined cylindrical concrete pipe for Lock Joint Pipe Co. of Denver, Colo. The $300,000 contract is for replacing a wood stave line from the southern limits of Denver to Littleton, Colo., for the city of Denver.

* * *

John Brust is job superintendent for Peter Kiewit Sons Co. of San Francisco at the San Francisco Naval Shipyard at Hunters Point on construction of a $1,904,500 six-story concrete and steel shop building. **Wayne Kellogg** is engineer and **W. G. Lowe** is accountant.

* * *

H. W. Poulton is project superintendent at Mines Field, Los Angeles, Calif., on construction of an administration building that The Austin Co. was contracted to build for Western Air Lines. **Mel Scherer** is assistant superintendent and **Charley Woods** is general labor foreman.

* * *

George Foster is located at the Big Thompson Project, Colo., as job superintendent of excavation and concrete lining for Rams Horn and Prospect Mountain tunnels under contract to Lowdermilk Bros. of Denver for $1,864,822. **Hoyle Lowdermilk** is project supervisor and **J. H. Johnson** is engineer.

* * *

Additional men on the Harms Bros. Construction Co. team on their highway job near Arbuckle, Calif., are **J. W. Henery,** assistant superintendent; **Howard Jones,** powder foreman, and **G. R. McFarland,** master mechanic.

* * *

M. Klinefelter is in San Pedro, Calif., with Pruitt Construction and Equipment Co. of Inglewood on construction of 95 frame and stucco houses at a cost of $494,000. **C. P. Pruitt** is in charge of purchasing, and **George Cann** is assistant superintendent.

* * *

Jim W. Clardy, partner in the J. B. Clardy Construction Co. of Fort Worth, Tex., is job superintendent on the $82,255 contract for 0.1 mi. of bridge and roadway approaches on Double Mountain Fork of Brazos River bridge, near Rule in Haskell Co., Texas.

* * *

John Bevanoa, with M. J. B. Construction Co. of Stockton, Calif., is acting as superintendent on a state highway grading and paving job between Grant Line Rd. and Mossdale in San Joaquin Co. His assistant is **Joe Piche,** general foreman is **Nick Bulum,** and office manager is **Dick Morrison.**

CMDR. JESSE H. KOPP, on terminal leave, is manager of the paving department of Clarke-Halawa Co. of Honolulu, Hawaii.

* * *

P. F. Huntington of S. J. Groves & Sons Co. of Minneapolis, Minn., is job superintendent on the $1,163,030 contract for grading and surfacing 13.5 mi. of East access road to Garrison Dam site, N. Dak. **F. A. Vogelsberg** will assist Huntington.

* * *

A. W. Poulton, formerly with Austin Co., Myers Bros. and George Fuller, is now with Waale-Camplan as general superintendent on building construction in Palm Springs, Los Angeles and other Southern California cities.

* * *

Paul Cross is superintendent for Henry Thygeson Co. on a road contract near Carrizozo, N. Mex. **Cliff L. Earsley** is in charge of crushing operations, **G. L. Dutton** is concrete superintendent, **George Perry** is grade foreman, **A. J. Gilbert** is company engineer and **John Davis** is office manager.

* * *

Charles Mason is project manager for Fred D. Kyle on the railroad highway overcrossing one mi. north of Oceanside, Calif. **W. V. Gryderman** is Kyle's resident engineer and **Jim Sodal** is his foreman. The pile driver foreman on the job is **V. D. Casey.**

* * *

A. A. Walther is superintending construction of 15.6 mi. of roadbed, drainage structures and a 119-ft. concrete arch bridge on North Side Highway between Bliss and Wendell in Gooding Co., Ida. **Roy Knight** is foreman for Morrison-Knudsen Co., Inc., Boise, who has the contract.

* * *

O. H. Tucker is project manager on the $4,107,731 contract for airport extension, fill and pavement at the San Francisco Airport jointly held by Morrison-Knudsen Co., Inc., and Macco Construction Co. **Mickey Daley** is superintendent, **E. R. Hargraces** is office manager, **"Whitey" Stanton, Andy Cathey, "Pappy" Schmidt** and **O. M. Paul** are foremen, and **Lex Hobson** is master mechanic.

Nisbet Marye is supervising construction and **J. C. Johnson** is job superintendent for Mead and Mount, of Denver, on the new Ford plant at Denver, Colo. **Hugh Whitworth** is superintendent for Robinson Construction Co. of St. Louis, Mo., who has the steel erection contract.

* * *

Ed R. Berrian, who spent three years in Pearl Harbor on construction work, is job superintendent for Los Angeles' McNeil Construction Co. on the Security First National Bank Building on 98th St. **Walter Corso** is foreman and **Frank Reiner** is general superintendent.

* * *

Mel Howard is in Shelton, Wash., as superintendent for Industrial Engineers & Contractors of Tacoma on the $941,000, three-story, wall board plant going up. **George Lief** is field engineer for the contractors.

* * *

J. A. Golden is in charge of construction for M. H. Golden Construction Co. of San Diego, Calif., on the $1,892,000 construction of four new piers at the San Diego Naval Repair Base.

* * *

Graeme McGowan, formerly a captain in the Engineers Corps, is now back on construction in New Mexico, serving as foreman for Robert E. McKee at Santa Fe.

* * *

W. H. Murphy is superintendent for Mercer-Fraser Co. of Eureka, Calif., on 3.4 mi. of surfacing and seal coat being applied between Patrick's Point and Big Lagoon in Humboldt Co., Calif.

* * *

Harvey Jones is personally supervising work for Jones Bros. of Albuquerque, N. Mex., on a reservoir being built for the city of Alamogordo. **Lyle J. Hartwig** is foreman and **Ashley G. Classen** of El Paso is engineering the project.

* * *

Frank Ahlgren is job superintendent for A. Teichert & Sons, Inc., of Sacramento, Calif., on a $176,938 contract for 11 mi. of highway construction near Almanor in Plumas National Forest, Calif.

* * *

Sam Bergstrom is supervising construction of Pacific Highway in Washington from Rocky Point to Ostrander. K. L. Goulter & Co. of Seattle has the $363,711 contract.

* * *

Ray Brigance is in charge of driving sheet piling at Naval Repair Base, National City, Calif., with **J. J. McCullough, Jack Davenport** and **W. E. Gregory** assisting. M. H. Golden is contractor.

* * *

Ed Jones is job superintendent on the $546,831 physics building Marwell Construction Co., Ltd., of Vancouver, B. C. is building at the University of British Columbia. **Art Thompson** is labor foreman on the project.

* * *

Joe L. Mulkey is general labor foreman and **Joe J. Garcia** is his assistant on the United Rexall Drug Co. job at La Cienega and Beverly Blvd., Los Angeles, being constructed by L. C. Dunn.

UNIT BID SUMMARY

Dam . . .

Idaho—Valley County—Bur. of Reclam.—Earthfill

Morrison-Knudsen Co., Inc., Boise, Idaho, submitted the low bid of $1,396,889 to the Bureau of Reclamation for construction of Cascade Dam on the Payette River, near the town of Cascade. Included in the contract are the earthwork, structures, track and telegraph line relocation of the Idaho Northern Branch of the Oregon Short Line R.R. between Cascade and Donnelly. The dam will be approximately 800 ft. long at the crest and will have a maximum height of 80 ft. above the riverbed. The main body of the dam will be of moistened, rolled clay, sand and gravel. The upstream slope will be covered by a 3-ft. layer of riprap and the downstream slope will be protected with a rock fill increasing in thickness from the crest to the toe. A concrete cut-off wall with the footing in bedrock will extend the full length of the foundation. The spillway will be an open channel on the right abutment of the dam, with a concrete gate structure and concrete lining in the channel downstream. Discharge through the spillway will be controlled by two 21 x 20-ft. radial gates. The outlet will be through a tunnel 12 ft. in diameter, ending in a plate steel manifold with two branches 84 in. in diameter leading to 5 x 5-ft. slide gates. The manifold and branches will be embedded in concrete. The following unit bids were submitted.

(1) Morrison-Knudsen Co., Inc.....$1,396,889
(2) J. A. Terteling & Sons 1,536,841
(3) Peter L. Ferry & Sons, etc.....$1,774,394
(4) Utah Construction Co..... 1,926,505

		(1)	(2)	(3)	(4)
Lump sum,	diversion and care of river and unwatering foundations	$45,000	$50,000	$70,650	$85,000
20,000	cu. yd. excav., stripping borrow pits	.30	.35	.20	.30
7,500	cu. yd. excav., common, for outlet works	1.35	.75	4.00	2.50
19,000	cu. yd. excav., rock, for outlet works	1.35	2.50	4.00	4.50
2,300	cu. yd. excav., all classes, in tunnel	24.00	20.00	10.00	20.00
8,000	lb. furnishing and placing steel tunnel supports	.36	.20	.125	.20
8,000	lb. furn. and place steel tunnel-liner plates and steel lagging	.36	.10	.125	.20
50,000	cu. yd. excav., all classes, for foundation of dam	2.00	1.80	3.00	4.00
400	cu. yd. excav. rock, for conc. cut-off wall	20.00	10.00	10.00	25.00
24,000	cu. yd. excav., common, for spillway	1.35	.75	3.00	1.80
33,000	cu. yd. excav., rock, for spillway	1.35	2.35	3.00	4.00
16,700	lin. ft. drilling line holes for rock excav. for spillway	.38	1.00	1.00	1.00
315,000	cu. yd. excav., com., in borrow pits and transport to dam	.55	.70	.50	.80
200	cu. yd. backfill	1.35	3.00	6.00	4.00
320,000	cu. yd. earth fill in embankment	.15	.20	.125	.30
3,500	cu. yd. tamping or puddling earth fill	1.10	3.00	5.00	1.00
55,000	cu. yd. rock fill on downstream slope of embankment	.45	.40	2.00	2.00
11,000	cu. yd. riprap on upstream slope of embankment	3.75	.60	3.00	3.00
60	cu. yd. porous conc. under spillway-gate struct.	25.00	30.00	40.00	50.00
1,000	lin. ft. 4-in. sewer-pipe drains with uncem. jts., in por. conc.	4.00	3.00	1.75	2.25
325	lin. ft. 4-in. sewer-pipe drains with uncem. jts., in gravel	1.00	1.20	1.75	2.00
750	lin. ft. 6-in. sewer-pipe drains with uncem. jts., in gravel	1.00	1.20	1.75	2.25
4,000	lin. ft. grout holes betw. depths of 0 and 35 ft.	2.35	1.50	1.00	2.50
2,000	lin. ft. grout holes betw. depths of 35 and 60 ft.	3.30	3.00	1.00	2.75
1,100	lin. ft. grout holes betw. depths of 60 and 100 ft.	4.00	4.00	1.00	3.00
1,000	lin. ft. grout holes less than 35 ft. depth with percus'n drills	.50	1.50	1.00	1.25
2,600	lb. placing grout pipe and fittings	.20	.20	.25	1.50
7,100	cu. ft. pressure grouting	1.20	2.00	1.75	2.00
800	cu. ft. pressure grouting with packers	1.75	2.50	2.00	2.50
4,400	lin. ft. holes for anchor bars and grouting bars in place	.85	1.00	1.00	2.00
400	cu. yd. conc. in footing of cut-off wall	31.00	25.00	30.00	40.00
350	cu. ft. conc. in cut-off wall, except in footing	50.00	40.00	40.00	40.00
750	cu. yd. conc. in tunnel lining except back of plate-steel-pipe	45.00	36.00	60.00	40.00
150	cu. yd. conc. in tunnel lining back of plate-steel-pipe	33.00	30.00	50.00	35.00
850	cu. yd. conc. in inlet struc. of outlet works	50.00	60.00	40.00	45.00
110	cu. yd. conc. in beams, cols., and roof of trashrack struc. and floor of access bridge	70.00	100.00	55.00	60.00
535	cu. yd. conc. in outlet to outlet works	37.50	40.00	40.00	50.00
90	cu. yd. conc. in central and engine houses	80.00	70.00	45.00	65.00
680	cu. yd. conc. in floor of spillway	24.00	40.00	35.00	30.00
1,220	cu. yd. conc. in spillway except floor and engine house	57.00	60.00	55.00	50.00
27,000	sq. ft. vacuum conc. proces'g for spillway floor, pier & walls	.55	.90	.20	.75
606,000	lbs. placing reinf. bars	.05	.045	.03	.05
320	lin. ft. placing metal sealing strips	1.45	.30	1.00	1.00
Lump sum,	control and engine houses, except conc.	550.00	$1,500	$5,000	$1,250
10	MFBM erecting timber in bridge	110.00	100.00	100.00	100.00
650	sq. ft. asphalt plank on bridge floor	.55	.70	.40	.20
22,500	lb. installing fixed-wheel gate frame, seats, tr. bases & tr.	.09	.30	.10	.05
35,000	lb. installing fixed-wheel gate	.06	.30	.10	.05
60,000	lb. installing radial gates	.09	.08	.10	.05
21,000	lb. installing gate hoists	.15	.15	.10	.05
110,000	lb. installing high-pressure gates and conduit-lining castings	.06	.15	.10	.05
7,000	lb. installing control apparatus for high-pressure gates	.20	.20	.10	.10
18,500	lb. erecting hoist tower for fixed-wheel gate	.10	.20	.10	.05
20,500	lb. erecting structural steel in bridges	.07	.08	.10	.05
48,000	lb. installing trashracks	.07	.08	.10	.05
115,000	lb. installing welded-plate-steel tunnel and conduit lining	.12	.12	.10	.10
5,000	lb. installing float-well-intake, etc.	.25	.20	.10	.10
4,400	lb. installing pipe handrails	.45	.20	.10	.20
3,000	lb. installing miscellaneous metalwork	.30	.20	.10	.25
500	lin. ft. installing elect. metal conduit 1¼-in. and smaller	1.10	.30	.25	.50
450	lin. ft. installing elect. metal conduit 1½ to 2-in.	1.30	.40	.25	.75
1,000	lb. installing elect. conductors and ground wires	1.10	.20	.60	.30
2,500	lb. installing elect. apparatus	.60	.20	.60	.25
12.6	mi. fine grading	750.00	500.00	850.00	$1,000
42,000	cu. yd. excav., common, for roadway	.46	.50	.55	.60
21,000	cu. yd. excav., rock, for roadway	1.65	2.25	2.75	2.00
850,000	sta. cu. yd. overhaul	.015	.02	.01	.015
40,000	cu. yd. riprap for railroad structures	2.95	2.50	3.50	2.80
1,000	cu. yd. backfill about railroad structures	.60	1.00	1.00	.60
1,000	cu. yd. compacting backfill about railroad struct.	1.00	3.50	.50	1.50
400	tr. ft. galvanized metal deck protection on trestles	1.00	1.50	5.00	1.25
231,000	lb. structural steel in railroad bridge	.04	.07	.04	.05
14.6	tr. mi. laying track	$6,940	$9,000	$9,000	$7,000
8,500	ea. applying rail anchors	.10	.13	.10	.10
4	ea. constructing turnouts	300.00	300.00	300.00	300.00
26,000	cu. yd. ballasting	2.35	2.00	2.70	2.25
1	mi. right-of-way fences	500.00	300.00	400.00	$1,000
16	ea. cattle guards	60.00	150.00	75.00	200.00
12	MFBM highway crossings	80.00	60.00	100.00	100.00
1	mi. telegraph line	$1,000	$1,000	$1,000	$1,500
Lump sum,	removing and salvaging materials	$23,000	$30,000	$30,000	$30,000

Colorado—Grand County—Bur. of Reclam.—Earthfill

Granby Constructors, a joint venture by Brown & Root, Martin Wunderlich, Condon-Cunningham, Peter Kiewit Sons, Ed H. Honnen, Grafe-Callahan and Gunther & Shirley, submitted the lowest of three bids to the Bureau of Reclamation for construction of Granby Dam and dikes, a unit of the Colorado-Big Thompson Project. The amount of the bid was $5,988,969. The dam is located on the Colorado River 6 mi. northeast of Granby and will serve to store water which will be pumped into Shadow Mountain reservoir and thence conveyed through the Continental Divide tunnel to the east slope of the Rocky Mountains. The earthfill structure will be 885 ft. long with a maximum height of 233 ft. The outlet works will pass through the left abutment of the dam and an open channel spillway will cross over the left abutment. Both faces of the dam will be protected by riprap and two concrete cut-off walls will extend the full length of the foundation. Four earthfill dikes with the upstream slopes protected by riprap will be built in low places along the rim of the reservoir. Three other dikes are currently being constructed under an existing separate contract. Unit bids were as follows:

(1) Granby Constructors $5,988,969
(2) Bowen & McLaughlin and S. J. Groves & Sons 6,304,555
(3) Morrison-Knudsen Co., Inc. and J. F. Shea Co. $7,944,433

	(1)	(2)	(3)
Lump sum, diversion and care of river and unwatering foundations	$163,400	$90,000	$100,000
200,000 cu. yd. excav., stripping borrow pits	.60	.50	.49
35,000 cu. yd. excav., common, for diversion channel	1.00	1.50	1.06
2,000 cu. yd. excav., rock, for diversion channel	2.00	2.50	2.29
135 cu. yd. excav., rock, for outlet works	5.00	5.00	10.00
15 cu. yd. excav., rock, for elevator shaft-drainage	50.00	35.00	20.00
260,000 cu. yd. excav., common, for foundation of dam	3.00	2.80	2.75
15,000 cu. yd. excav., rock, for foundation of dam	6.00	5.00	5.29
1,000 cu. yd. excav., all classes, for fault and seam cut-offs	15.00	35.00	20.00
70,000 cu. yd. excav., all classes, for foundation, dike No. 3	.75	1.50	.85
1,000 cu. yd. excav., all classes, for conc. cut-off walls	25.00	20.00	20.00
12,000 cu. yd. excav., common, for spillway	.80	.75	1.36
71,000 cu. yd. excav., rock, for spillway	2.50	2.50	2.79
2,300,000 cu. yd. excav., com., in bor. pit & transp. to dam & dike No. 3	.84	.80	1.15
22,000 cu. yd. excav., rock, in bor. pit & transp. to dam and dike No. 3	2.00	2.50	2.00
1,400,000 cu. yd. excav., com., in bor. pits & transp. to dam & dike No. 3	.62	.80	.86
15,000 cu. yd. excav., rock, in bor. pits & transp. to dike No. 3	2.00	2.50	2.00
44,000 sta. cu. yd. overhaul betw. borrow pit No. 1 and dikes Nos. 1, 2 & 4	.06	.04	.06
2,400,000 cu. yd. earthfill in embankments	.25	.25	.45
10,000 cu. yd. tamping or puddling earthfill	2.00	2.50	3.00
760,000 cu. yd. sluiced sand, gravel, and cobble fill	.12	.25	.50
440,000 cu. yd. cobble-and-rock fill on downstream slopes	.40	.25	.75
60,000 cu. yd. riprap on upstream slopes of embankments	1.40	2.50	2.30
1,200 lin. ft. 4-in. sewer-pipe drains with uncem. joints	2.00	3.00	3.00
1,100 lin. ft. 6-in. sewer-pipe drains with uncem. joints	3.00	3.00	3.00
1,000 lin. ft. 8-in. sewer-pipe drains with uncem. joints	4.00	3.00	3.00
1,000 lin. ft. 12-in. sewer-pipe drains with uncem. joints	5.00	4.00	4.00
460 lin. ft. 4-in. sewer-pipe drains with uncem. jts. for elev. shaft drain.	15.00	4.00	3.00
600 lin. ft. drilling weep holes	2.50	2.00	3.00
600 lin. ft. core drilling 5½-in. holes not more than 30 ft.	10.00	20.00	10.00
8,000 lin. ft. drilling grout holes betw. 0 and 35 ft.	3.50	3.00	3.00
5,000 lin. ft. drilling grout holes betw. 35 and 60 ft.	4.00	3.00	4.00
4,000 lin. ft. drilling grout holes betw. 60 and 110 ft.	5.00	4.00	5.00
2,000 lin. ft. drilling grout holes betw. 110 and 160 ft.	6.00	5.00	6.00
4,000 lin. ft. drilling grout holes less than 35 ft. deep, with percus'n drills	2.00	3.00	8.00
7,000 lb. placing grout pipe and fittings	.50	.40	.25
22,000 cu. ft. pressure grouting	2.40	2.50	2.00
8,000 cu. ft. pressure grouting with packers	2.80	3.00	2.50
3,300 lin. ft. drilling holes for anchor bars and grouting bars in place	1.50	2.00	2.00
1,000 cu. yd. unformed conc. in footings of cut-off walls	25.00	40.00	25.00
1,500 cu. yd. conc. in cut-off walls	40.00	50.00	50.00
320 cu. yd. conc. in elevator shaft below surf. of rock foundation	60.00	90.00	60.00
280 cu. yd. conc. in tunnel plugs	75.00	70.00	35.00
250 cu. yd. conc. in trashrack struct.	80.00	90.00	50.00
200 cu. yd. conc. in elevator shaft above surf. rock foundation	80.00	90.00	35.00
50 cu. yd. conc. in elevator house	80.00	90.00	60.00
2,000 cu. yd. conc. in spillway	50.00	80.00	45.00
35,000 sq. ft. vac. conc. processing for spillway floor, pier, walls	.70	1.00	.20
3,300 cu. yd. conc. in parapet and curb walls	29.00	50.00	40.00
800,000 lb. placing reinforcement bars	.06	.05	.08
550 lin. ft. placing metal sealing strips	1.50	2.00	2.00
Lump sum, installing metal doors, etc., in elevator house			
53,200 lb. installing radial gates	.12	.10	.25
16,000 lb. installing radial-gate hoists	.10	.10	.25
15,700 lb. installing ring-follower gate and conduit linings	.15	.10	.25
1,500 lb. installing control apparatus for ring-follower gate	.30	.10	.25
9,350 lb. installing conc. valve and hollow-jet valves	.20	.10	.25
7,100 lb. installing outlet pipes	.10	.10	.25
21,000 lb. installing trashrack metalwork	.08	.10	.25
1,000 lb. installing float-well intake piping	.30	.10	1.00
1,100 lb. installing pipe handrails	.30	.20	1.00
40,000 lb. installing miscel. metalwork	.20	.30	.50
550 lin. ft. installing elec. conduit 1¼ in. or less	1.00	1.00	1.00
3,000 lin. ft. installing elec. conduit 1½ in. or larger	1.50	1.00	1.50
4,000 lb. installing elec. conductors and ground wires	.50	1.00	1.00

Irrigation . . .

Texas—Reeves County—Bur. of Reclam.—Earthwork and Struct.

H. B. Zachry Co., San Antonio, was the only bidder to the Bureau of Reclamation at $168,647 for earthwork, canal lining and structures on two portions of the Balmorhea Project. The unit bids follow:

SCHEDULE NO. 1—PHANTOM LAKE CANAL

8,400 cu. yd. excavation, common, for canal	.90
200 cu. yd. excavation, rock, for canal	2.20
200 cu. yd. overhaul	.02
3,300 cu. yd. excavation, common, for structures	1.85
50 cu. yd. excavation, rock, for structures	15.00
1,000 cu. yd. compacting embankments	.22
200 sq. yd. preparing rock foundations for canal lining	.70
19,000 sq. yd. trimming earth foundations for canal lining	.30
2,000 cu. yd. backfill	1.00
300 cu. yd. compacting backfill	1.00
175 cu. yd. concrete in structures	85.00
1,640 cu. yd. concrete in canal lining	28.90
105,000 lb. placing reinforcement bars	.02
25 sq. yd. dry rock paving	7.00
160 cu. yd. rubble masonry	21.00
2 MFBM erecting timber in structures	100.00

(Continued on next page)

there's NOT

Than the New Thew-Lorain

Here's the new, modern shovel-crane you've been waiting for . . .The unit with all the new developments and advantages you've been looking for in a really new post-war shovel-crane . . . The TL-20 is packed with design features (see list below) that will make more money for you . . . There's smoother, faster operation for greater output . . . A new turntable principle featuring "Unit Assembly" of all major components for simplified, easier service . . . A range of 10 different mountings and 5 interchangeable booms to meet the challenge of any job requirements . . . There's nothing like the new TL-20 on the ½ yd. market . . . It's ready now . . . You must see it . . . Call your nearest Thew-Lorain distributor today for this "eye-opening" story.

THE THEW SHOVEL COMPANY, LORAIN, OHIO

DRAGLINE

Here's a crawler dragline illustrating the TL-20 all-welded crane boom with flange-bolted connections, and the "cable-miser" fairlead . . . Dragline may be used on all mountings.

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Get your copy of this new 24 page catalog . . . completely describes and illustrates details of turntable, mountings, booms . . . get a copy from your Thew-Lorain Distributor listed . . . or write to The Thew Shovel Co., Lorain, Ohio.

Le Roi-Rix Machinery Co., Los Angeles 11
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Connelly Machinery Company, Billings and Great Falls, Montana
Sanford Tractor & Equipment Co., Reno, Nevada
The Mountain Tractor Co., Missoula, Montana
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Thew 120 Lorain

CRAWLER SHOVEL

Chain drive . . . 2 travel speeds either direction . . . propelling shaft and steering mechanism a "unit assembly," easily removable . . . all-welded shovel boom, one piece steel stick . . . electric dipper trip.

MOTO-CRANE

Highly mobile 2 engine units with speeds up to 33 m.p.h. . . . built in 6 and 4 wheel units, as 6 x 6, 6 x 4 and 4 x 4 drives . . . double reduction gear driven axles . . . 5 interchangeable booms.

SELF-PROPELLED

1-engine, 1-man control . . . 4 speeds, both directions, up to 7 m.p.h. . . . all controls in operator's cab . . . effortless air power steering . . . available as 6 and 4 wheel units in 6 x 4, 4 x 4 and 4 x 2 drives.

Star Studded Features:

- A COMPLETE PACKAGE—NO EXTRAS
- NEW, EXCLUSIVE "UNIT ASSEMBLY"
- 5 IDENTICAL CLUTCHES
- ANTI-FRICTION BEARINGS
- OIL-ENCLOSED CUT GEARS
- INTERCHANGEABLE PARTS
- ONE-PIECE ALL-WELDED BED
- HOOK ROLLERS
- DROP FORGED CRAWLER TREADS
- POSITIVE CRAWLER TRAVEL LOCK
- "FULL CIRCLE" CRAWLER STEERING
- CHOICE OF 9 RUBBER-TIRED MOUNTINGS
- POSITIVE, INDEPENDENT CABLE SHOVEL CROWD
- ALL-PURPOSE, ALL-WELDED CRANE BOOM

HOE

Equally efficient on crawler or rubber-tired mountings. All-steel, all-welded boom, with gooseneck to provide maximum digging reach and depth.

240	lin. ft. laying 15-in. dia. concrete pipe	.85
1,360	lin. ft. laying 27-in. dia. concrete pipe	1.20
132	lin. ft. laying 30-in. dia. concrete pipe	1.30
24	lin. ft. erecting No. 84 metal flume	2.00
2,000	lb. installing gates and misc. metal work	.12

SCHEDULE NO. 2—INLET FEEDER CANAL TO LOWER PARK RES.

11,500	cu. yd. excavation, common, for canal	.90
200	cu. yd. excavation, rock, for canal	1.50
200	cu. yd. overhaul	.02
200	cu. yd. excavation, common, for structures	2.50
20	cu. yd. excavation, rock, for structures	3.00
600	cu. yd. compacting embankments	.22
200	sq. yd. preparing rock foundations for canal lining	.40
22,000	sq. yd. trimming earth foundations for canal lining	.25
160	cu. yd. backfill	1.00
80	cu. yd. compacting backfill	1.00
80	cu. yd. concrete in structures	70.00
1,880	cu. yd. concrete in canal lining	25.50
110,000	lb. placing reinforcement bars	.02
20	MFBM erecting timber in structures	100.00
20	lin. ft. laying 30-in. dia. concrete pipe	1.30
20	lin. ft. laying 36-in. dia. concrete pipe	1.70
250	lb. installing gates and misc. metal work	.12
Lump sum,	temporary construction at R.R. crossings	30.00

Oregon—Malheur County—Bur. of Reclam.—Earthwork and Struct.

Henry L. Horn, Caldwell, Idaho, submitted a low bid of $177,700 to the Bureau of Reclamation for earthwork, concrete wasteway sections and various structures on the Fletcher Gulch wasteway, between the North Canal of the Owyhee Project and the Owhyee River. The following unit bids were submitted:

(1) Henry L. Horn $177,700
(2) Morrison-Knudsen Co., Inc. 248,290
(3) McLaughlin Construction Co. 249,655
(4) J. A. Terteling & Sons $277,490
(5) Vernon Bros. Co. 298,970

		(1)	(2)	(3)	(4)	(5)
60,000	cu. yd. excav., common, for wasteway	.40	.375	.45	.30	.62
500	cu. yd. excav., rock, for wasteway	1.00	1.50	3.00	5.00	4.00
55,000	cu. yd. excav., common, for structures	.40	.60	.65	.50	.94
500	cu. yd. excav., rock, for structures	1.00	2.00	4.00	5.00	6.00
14,000	cu. yd. backfill	.25	.35	.35	.30	.55
1,500	cu. yd. compacting backfill	.50	1.80	1.25	1.50	1.00
700	sq. yd. dry-rock paving	4.50	3.80	6.00	2.50	9.00
3,920	cu. yd. conc. in structures	27.00	38.50	38.00	49.00	43.50
373,000	lb. placing reinf. bars	.03	.055	.045	.04	.03
5,500	lin. ft. 6-in. underdrains, uncem. joints	.60	.65	.60	1.50	.70
200	lin. ft. 6-in. sewer pipe with cem. joints	.60	.65	.50	1.50	.80
19	MFBM erecting timber in struct.	50.00	100.00	65.00	60.00	50.00
18,000	lb. installing gates and gate hoists	.10	.18	.10	.10	.15
1,000	lb. installing miscel. metalwork	.10	.50	.25	.30	.20

California—Riverside County—Bur. of Reclam.—Earthwork and Struct.

Morrison-Knudsen Co., Inc. and J. F. Shea Co., Los Angeles, Calif., were low bidders on construction of earthwork, canal lining and structures on a section of the Coachella Canal between Station 5725 and 6106 in the vicinity of Indio. Two schedules were submitted for bid, the work differing only in that Schedule 1 provided for concrete lining and Schedule 2 for asphaltic lining. The low bidder submitted estimates on both schedules, whereas the other two bidders made offers on the first schedule only. The unit bids were as follows:

	Schedule 1	Schedule 2
(1) Morrison-Knudsen Co., Inc. and J. F. Shea Co.	$1,009,130	$1,126,902
(2) Mark C. Walker & Sons Co.	1,024,875	—
(3) Rhoades Bros. & Shofner	1,124,061	—

SCHEDULE 1

		(1)	(2)	(3)
396,500	cu. yd. excavation for canal	.25	.13	.30
220,000	cu. yd. excavation for drainage channels and dikes	.28	.15	.30
44,000	cu. yd. excavation for structures	1.00	.65	1.25
64,000	cu. yd. compacting embankment	.28	.32	.30
201,400	sq. yd. trimming foundations for concrete lining	.45	.25	.43
800	cu. yd. compacted subbase	2.00	4.00	.35
30,000	cu. yd. backfill about structures	.30	.38	.25
13,000	cu. yd. compacting backfill	1.50	2.35	1.25
12,800	cu. yd. backfill at top of concrete lining	.30	.75	.35
19,000	cu. yd. riprap	4.80	4.00	5.00
330	cu. yd. construction reverse filters	5.00	8.30	6.00
50	cu. yd. pit-run gravel blanket	3.00	3.00	3.00
4,200	cu. yd. concrete in structures	45.00	60.00	47.50
9,800	cu. yd. concrete in unreinforced lining	15.00	18.00	17.50
9,800	cu. yd. concrete in reinforced lining	15.00	18.00	17.50
610,000	lb. placing reinf. bars	.03	.04	.06
827,500	lb. placing reinf. fabric in canal lining	.035	.04	.06
1,500	sq. ft. placing elastic filler material in joints	1.00	1.10	1.25
820	lin. ft. placing rubber water stop in joints	2.00	2.20	2.50
112	MFBM erecting timber in structures	125.00	125.00	110.00
392	lin. ft. laying 18-in. conc. pipe	2.00	1.75	1.75
158	lin. ft. laying 18-in. conc. pipe	2.50	2.00	2.25
280	lin. ft. laying 34-in. conc. pipe	3.50	2.50	2.75
96	lin. ft. laying 36-in. conc. pipe	4.50	5.00	3.25
40	lin. ft. laying 12-in. asbestos-cement pipe	2.00	2.25	2.50
80	lin. ft. jacking 84-in. conc. pipe under railroad	100.00	150.00	55.00
6,800	lb. installing screw-lift gates	.12	.20	.30
18,000	lb. installing radial gates	.12	.20	.25
20,000	lb. installing radial-gate hoists and mechanisms	.15	.15	.30
6,500	lb. installing metal water stops in joints	.40	.45	.15
3,200	lb. installing miscellaneous metalwork	.25	.35	.30
65	cwt. placing bituminous material in float drums	4.00	5.00	3.50
360	lin. ft. installing electrical metal conduit	3.00	2.25	1.50
50	lb. installing ground wires and conductors	2.00	1.50	3.00

SCHEDULE 2

410,000	cu. yd. excavation for canal	.25	.....	.....
220,000	cu. yd. excavation for drainage channels and dikes	.28	.....	.....
44,000	cu. yd. excavation for structures	1.00	.....	.....
64,000	cu. yd. compacting embankment	.28	.....	.....
208,400	sq. yd. preparing foundations for asph. lining	.50	.....	.....
800	cu. yd. compacted subbase	2.00	.....	.....
30,000	cu. yd. backfill about structures	.30	.....	.....
13,000	cu. yd. compacting backfill	1.50	.....	.....
12,800	cu. yd. backfill at top of asphaltic lining	.30	.....	.....

(Continued on next page)

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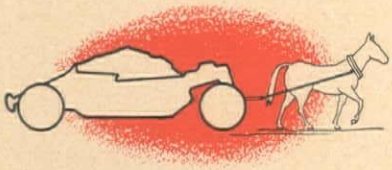
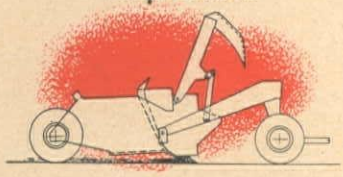


Lower Horsepower Requirements



Faster, Cleaner Dumping

The scrapers that give you all the good points of other rigs — *and a lot more besides!*

Whenever you find a scraper that consistently *outperforms* competitive models on job after job, it must have "something on the ball." And that certainly is the case with the new 8 and 14-yard LaPlant-Choate "Carrimors." On hundreds of tough earthmoving jobs from coast to coast these improved outfits are definitely getting bigger pay loads with less power . . . getting rid of them faster at the dump . . . and saving hours of costly "down-time" for maintenance and repairs.

Designed and built by earthmoving men with more than 33 years of specialized "know-how", LPC "Carrimors" are *yards* ahead in performance because they are *years* ahead in practical engineering features. But don't take our word for it. Ask to see them *in action*. Then you'll see why so many agree on LPC—for lowest possible cost per yard—wherever scrapers are used behind crawler tractors. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; Oakland, California.

*Reg. U.S. Pat. Off.

LaPLANT-CHOATE

Job-Proved Equipment... for Lowest Possible Cost in Moving Earth

19,000	cu. yd. riprap	4.80	.....	.....	.....
350	cu. yd. constructing reverse filter	5.00	.....	.....	.....
50	cu. yd. pit-run gravel blanket	3.00	.....	.....	.....
4,200	cu. yd. concrete in structures	50.00	.....	.....	.....
208,400	sq. yd. asphaltic canal lining, except asphalt	1.65	.....	.....	.....
2,100	tons asph. for base course for canal lining	25.00	.....	.....	.....
170	tons asph. for sealing treatment	40.00	.....	.....	.....
610,000	lb. placing reinforcement bars	.03	.....	.....	.....
1,130	sq. ft. placing elastic filler material in joints	1.00	.....	.....	.....
820	lin. ft. placing rubber water stop in joints	2.00	.....	.....	.....
112	MFBM erecting timber in structures	125.00	.....	.....	.....
392	lin. ft. laying 12-in. conc. pipe	2.00	.....	.....	.....
168	lin. ft. laying 18-in. conc. pipe	2.50	.....	.....	.....
280	lin. ft. laying 24-in. conc. pipe	3.50	.....	.....	.....
96	lin. ft. laying 36-in. conc. pipe	4.50	.....	.....	.....
40	lin. ft. laying 12-in. asbestos-cement pipe	2.00	.....	.....	.....
80	lin. ft. jacking 84-in. conc. pipe under railroad	100.00	.....	.....	.....
6,800	lb. installing screw-lift gates	.12	.....	.....	.....
18,000	lb. installing radial gates	.12	.....	.....	.....
20,000	lb. installing radial-gate hoists and mechanism	.15	.....	.....	.....
6,500	lb. installing metal water stops in joints	.40	.....	.....	.....
3,200	lb. installing miscellaneous metalwork	.25	.....	.....	.....
65	cwt. placing bituminous material in float drums	4.00	.....	.....	.....
360	lin. ft installing electrical metal conduit	3.00	.....	.....	.....
50	lb. installing ground wires	2.00	.....	.....	.....

Bridge and Grade Separation . . .

Wyoming—Sheridan County—State—Overhead

Peter Kiewit Sons Co., Omaha, Neb., was the low bidder at $189,791 to the Wyoming Highway Department on construction of an overhead crossing over the tracks of the Chicago, Burlington & Quincy R.R. and Ranchester, including grading and surfacing with roadmix of 0.5 mi. of the Ranchester-Sheridan road and similar treatment on 1.2 mi. of the Sheridan-Montana State Line road. The unit bids were:

(1) Peter Kiewit Sons Co. $189,791
(2) Blanchard Bros. 199,696
(3) J. H. & N. M. Monaghan 203,045
(4) Inland Construction Co. $204,056
(5) Northwestern Engineering Co. 220,000
(6) Engineer's estimate 202,617

		(1)	(2)	(3)	(4)	(5)	(6)
213,100	cu. yd. excavation	.202	.255	.23	.22	.31	.22
122,000	cu. yd. mi. haul	.10	.20	.15	.20	.15	.17
1,680	M. gal. watering	1.00	.75	1.50	1.50	1.50	1.75
1,480	hr. sheepsfoot roller	2.50	3.50	3.00	2.50	4.50	4.25
140	hr. pneumatic tired roller	4.50	3.60	6.00	4.25	6.00	5.25
40	cu. yd. structure excav.	2.50	2.00	5.00	2.20	3.00	2.20
780	cu. yd. excav. for pipe culv.	1.50	1.50	1.50	2.00	2.25	1.40
1,040	cu. yd. dry excav. for bridges	1.50	2.60	3.00	2.50	3.00	2.50
40	cu. yd. wet excav. for bridges	10.00	10.00	5.00	7.00	12.50	7.00
718	lin. ft. 18-in. C.M.P.	2.50	2.10	2.10	2.35	2.20	2.50
522	lin. ft. 24-in. C.M.P.	3.50	3.25	3.20	3.60	3.20	3.50
540	lin. ft. 36-in. C.M.P.	7.00	4.80	5.10	6.80	5.20	5.00
180	lin. ft. 60-in. std. reinf. conc. pipe	22.00	20.00	27.00	17.00	20.00	20.00
630	hr. mechanical tamping	4.50	3.40	4.00	3.75	4.00	3.50
100	cu. yd. Class 1 riprap	6.00	4.50	12.00	12.00	6.00	7.00
7	ea. drop inlets	150.00	70.00	7.50	125.00	160.00	75.00
619.5	cu. yd. Class A conc.	32.00	30.00	37.20	31.00	34.00	30.00
293.0	cu. yd. Class AA conc.	32.00	32.00	37.20	32.00	35.00	31.00
115,320	lb. reinf. steel	.08	.068	.075	.07	.068	.075
250,850	lb. structural steel	.11	.10	.105	.10	.112	.115
1	ea. trash racks	100.00	35.00	75.00	100.00	10.00	20.00
9,400	ton cr. gravel base crse. (¾-in. max.)	1.00	.95	1.00	.76	.90	1.10
240	M. gal. watering (base)	1.50	1.00	1.50	1.48	1.50	1.50
80	hr. roller operation (base)	4.50	4.00	6.00	4.25	6.50	4.50
87	ton base treatment MC-0	27.00	28.00	28.50	34.00	28.00	26.00
4,100	ton cr. gravel surf. (¾-in. max.)	1.25	.95	1.10	.76	.90	1.10
195	ton slow curing liquid asph. SC-4	22.00	21.50	28.50	31.00	23.00	26.00
43,000	sq. yd. processing roadway	.10	.06	.05	.075	.06	.07
75	ton seal coat RC-4	27.00	28.00	28.50	34.50	30.00	28.00
320	ton stone chips	4.00	3.60	4.00	4.35	4.50	4.75
10	ton sand	4.00	7.50	5.00	5.00	3.50	5.00
2,220	lin. ft. 2-ft. x 6-in. combined curb and gutter	2.25	1.60	1.20	1.75	1.80	2.00
236	ea. reflectorized guide posts	4.00	3.60	4.50	7.10	2.50	3.00
2,720	lin. ft. wire cable guard fence	1.50	1.10	1.65	3.00	1.30	1.75
3,970	lin. ft. standard R.O.W. fence	.15	.10	.12	.18	.13	.11
5,100	lin. ft. Type "A" R.O.W. fence	.22	.15	.20	.28	.20	.15
20	ea. end panels	12.00	15.00	6.50	9.00	10.00	11.00
30	ea. brace panels	8.00	9.00	8.50	7.50	6.50	8.00
19	ea. right-of-way markers	7.00	10.00	6.00	15.00	6.00	8.00
4	ea. reinf. conc. project markers	20.00	20.00	25.00	17.00	12.00	20.00
Lump sum,	remove and reset substation	$1,000	700.00	675.00	675.00	$2,074	700.00
0.4	mi. remove and reset power lines	500.00	450.00	175.00	450.00	350.00	500.00
0.6	mi. old road obliteration	300.00	100.00	350.00	280.00	250.00	250.00

California—Santa Clara County—State—Separation

Fredrickson & Watson Construction Co., Oakland, bidding $379,442 submitted the lowest bid to the California Division of Highways on construction of a separation structure on Bayshore Freeway at Santa Clara St. in San Jose. In addition, about 0.6 mi. of highway is to be graded and surfaced with Portland cement concrete and asphaltic concrete on crusher run base. Unit bids submitted were:

(1) Fredrickson & Watson Construction Co. $379,442
(2) Macco Construction Co. 394,396
(3) N. M. Ball Sons $395,457
(4) Dan Caputo and Edward Keeble 400,710
(5) Earl W. Heple 415,660

		(1)	(2)	(3)	(4)	(5)
2,600	cu. yd. removing concrete	2.50	1.95	2.00	3.00	3.00
Lump sum,	clearing and grubbing	$1,700	$1,300	$2,000	$2,000	200.00
45,000	cu. yd. roadway excavation	.42	.42	.55	.50	.50
2,810	cu. yd. structure excavation	2.35	2.00	2.00	3.00	2.00
2,000	cu. yd. structure backfill	1.75	.65	2.00	2.00	1.50
24,500	tons imported borrow	1.10	1.20	1.40	1.50	1.25
450,000	sta. yd. overhaul	.005	.005	.01	.01	.004
20,000	sq. yd. preparing Class "C" subgrade	.14	.10	.12	.10	.10
Lump sum,	dev. water supply and furn. water equip.	700.00	300.00	500.00	$1,000	200.00
960	M. gal. applying water	1.75	2.50	2.00	1.50	2.00
34	sta. finishing roadway	30.00	18.50	10.00	20.00	20.00
2,100	tons crusher run base	2.60	2.50	2.50	2.50	2.50
9	tons liquid asph. SC-1 (pr. ct. and pen. tr.)	26.00	20.00	18.00	30.00	50.00

(Continued on next page)

In your heavy duty engines, too,

you need matched teamwork for top efficiency

EXPERIENCED PARTNERS, working together, do the heavy jobs more efficiently. And that holds true even in your heavy duty gasoline truck and tractor operation, when Shell Gasoline is in the tank and Shell Rudis Oil in the crankcase.

With Shell Gasoline you get quick starting, fast pickup, high anti-knock and economy of operation. *It will turn up top efficiency in the highest compression tractor engine ever used in a standard make or model.*

With Shell Rudis Oil this peak power output is *protected,* because Rudis is compounded expressly to withstand the heavy bearing loads and severe temperature conditions of heavy duty operation. Rudis contains an ingredient which retards oxidation, the forerunner of sludge. It has extremely low carbon-forming tendency . . . is non-corrosive to bearing metals.

Put this perfectly matched team to work in your heavy duty gasoline engines — Shell Gasoline for full power, Shell Rudis Oil to protect that power. Order them both from your Shell salesman.

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SHELL GASOLINE and SHELL RUDIS OIL

The Combination for Heavy Duty

2¾	tons liquid asph. SC-2 (pen. tr.)	27.00	30.00	28.00	30.00	50.00
16	tons sand (pen. tr.)	5.00	6.00	3.30	3.00	50.00
6½	tons asph. emul. (pt. bdr. and seal coat)	35.00	35.00	35.00	40.00	50.00
2¾	tons liquid asph. SC-6 (armor coat)	27.00	30.00	28.00	40.00	50.00
44	tons screenings (armor coat)	5.00	6.00	4.00	5.00	4.00
1,450	tons asph. conc. (leveling course)	5.00	5.00	5.50	6.00	5.50
1,200	tons asph. conc. (Type "B" surf.)	6.00	5.50	6.80	6.00	6.50
350	lin. ft. raised bars	1.20	1.00	1.00	.50	1.10
4,700	cu. yd. Class "B" Portland cem. conc. (pave.)	10.60	11.50	10.25	10.00	11.00
2,950	ea. tie bolt assemblies	.58	.60	.65	.60	.60
7,100	cu. yd. Class "B" Portland cem. conc. (base slab)	11.20	11.20	11.50	11.00	15.00
950	cu. yd. Class "B" Portland cem. conc. (membrane base)	14.70	18.00	21.00	20.00	20.00
1,038	cu. yd. Class "A" Portland cem. conc. (structures)	44.00	37.00	35.00	42.00	42.00
2,518	lin. ft. furn. treated timber piles	1.28	1.10	1.10	1.25	1.00
84	ea. driving piles	28.00	25.00	40.00	50.00	40.00
8,750	sq. yd. membrane waterproofing	.60	1.30	1.43	.50	1.25
1,050	cu. yd. Class "B" P.C.C. (curbs, gutters and sidewalks)	28.00	32.00	24.50	24.00	25.00
21	ea. monuments	4.50	6.00	5.00	6.00	3.50
8	ea. center line monuments	14.00	23.00	20.00	10.00	5.00
775	lin. ft. 21-in. R.C.P.	2.90	4.00	2.80	3.75	3.00
1,320	lin. ft. 12-in. C.M.P. (16 ga.)	1.45	1.40	1.45	1.75	1.50
465	lin. ft. 18-in. C.M.P. (16 ga.)	2.10	2.00	2.20	2.75	2.00
1,650	lin. ft. 8-in. perf. metal pipe	1.00	1.00	1.20	1.00	1.15
185	cu. yd. filter material	4.40	4.00	5.50	4.00	3.50
265,400	lb. furnishing bar reinf. steel	.04	.04	.04	.0425	.036
265,400	lb. placing bar reinf. steel	.013	.01	.01	.01	.012
13,600	lb. misc. iron and steel	.24	.35	.20	.25	.25
339	lin. ft. steel railing	5.20	4.70	5.25	8.00	6.00
4,400	lin. ft. chain link fence	1.60	1.50	1.55	2.00	1.50
6,000	sq. yd. roofing paper	.17	.20	.20	.30	.35
8	ea. adjusting manholes to grade	50.00	40.00	40.00	20.00	40.00
2	ea. adjusting catch basins to grade	50.00	30.00	50.00	25.00	40.00
46	lin. ft. manholes	23.00	85.00	20.00	10.00	10.00
1,850	lin. ft. 2-in. galv. steel pipe	.90	1.20	1.00	.50	.75
1,750	lin. ft. 2½ in. galv. steel pipe	1.00	1.50	1.30	.75	.95
280	lin. ft. 3-in. galv. steel pipe	1.30	1.90	1.50	1.00	1.20
Lump sum,	electrical equipment	$7,200	$8,000	$7,000	$7,200	$6,700
Lump sum,	pumping equipment	$5,800	$5,500	$5,500	$6,300	$2,500
Lump sum,	misc. items of work	$1,400	$5,000	$2,500	$4,500	$2,000

Utah—Emery and Grand Counties—State—Steel and Concrete

Ora Bundy & Co., Ogden, was low bidder at $223,286 on a steel and concrete bridge over the Green River at Green River. Unit bids were:

(1) Ora Bundy & Co. $223,286
(2) Young & Smith Construction Co. 234,709
(3) Materials Supply & Constr. Co. $255,565
(4) Engineer's estimate 188,598

		(1)	(2)	(3)	(4)
3,180	cu. yd. excavation for structures	23.50	11.00	8.00	5.00
1,764	cu. yd. concrete, Class "A"	38.00	40.00	42.50	45.00
184,976	lb. reinforcing steel	.087	.079	.07	.075
672,226	lb. structural steel	.0925	.16	.205	.11
Lump sum,	furnishing pile driving equip.	$1,450	$4,000	$1,000	$1,500
200	lin. ft. rock filled wire baskets	9.00	15.00	17.00	20.00

Highway and Street...

California—San Diego County—State—Pave.

Basich Bros. Construction Co., Alhambra, with a bid of $1,098,840, was the lowest bidder on paving of 4.1 mi. of highway between San Diego and Mission Valley Road. Nearly a million cubic yards of excavation is involved in the project and over 25,000,000 sta. yd. of overhaul is required. The following unit bids were submitted:

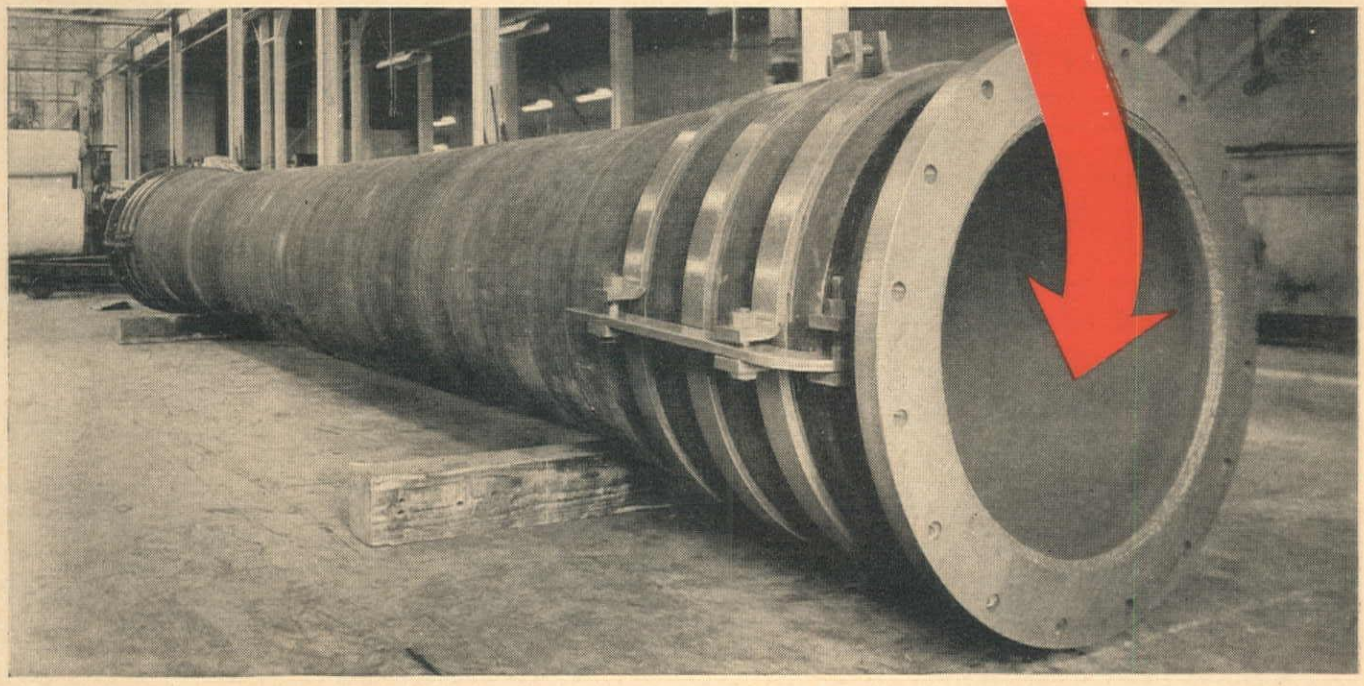
(1) Basich Bros. Construction Co. $1,098,840
(2) N. M. Ball Sons 1,118,769
(3) Griffith Company 1,142,807
(4) Peter Kiewit Sons Co. 1,194,389
(5) Bressi Bevanda Constructors and R. E. Hazard & Sons $1,260,162
(6) Daley Corp. 1,270,722
(7) J. E. Haddock, Ltd. 1,376,564
(8) V. R. Dennis Construction Co. 1,589,411

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
1,680	cu. yd. removing concrete	4.00	3.50	4.50	4.25	3.00	3.50	5.60
Lump sum,	clearing and grubbing	$3,000	$7,000	$8,000	$4,500	$3,000	$15,000	$16,800
843,000	cu. yd. roadway excav.	.32	.37	.35	.387	.40	.49	.42
12,000	cu. yd. structure excav.	1.80	1.80	1.70	1.00	1.55	1.80	2.35
9,650	cu. yd. ditch and channel excav.	.80	.75	.80	.65	.80	.75	1.50
25,675,000	sta. yd. overhaul	.0035	.002	.003	.002	.0025	.0035	.003
97,000	sq. yd. compacting original ground	.06	.04	.03	.02	.06	.05	.032
11	ac. plowing (weed control)	25.00	15.00	30.00	18.00	36.50	60.00	22.50
66	tons straw (slope erosion protection)	70.00	60.00	120.00	70.00	73.00	60.00	90.00
16½	tons fertilizer (slope erosion protection)	110.00	150.00	112.00	115.00	150.00	120.00	360.00
Lump sum,	dvlpg. wtr. sply. and furn. wtr. eqpt.	$2,500	$6,000	$4,500	$3,600	$6,000	$8,000	$17,500
21,400	M. gal. applying water	1.75	1.60	1.40	1.00	1.80	1.50	2.30
Lump sum,	finishing roadway	$3,600	$3,000	$2,300	$2,772	$3,000	$4,500	$7,500
26,400	sq. yd. cement subgrade 6-in. thick	.30	.24	.28	.40	.33	.25	.24
127,000	sq. yd. cement subgrade 4-in. thick	.20	.23	.26	.30	.193	.23	.18
7,300	bbl. Portland cement (cement subgrade)	2.80	2.55	2.52	2.50	3.30	2.90	3.30
222	tons asph. emul. (curing seal & seal coat)	35.00	28.00	33.50	30.00	35.00	35.00	45.00
240	tons screenings (seal coat)	3.00	3.50	3.40	6.00	5.00	5.00	5.00
6,400	sq. yd. preparing and shaping surf. (BST)	.10	.14	.32	.15	.09	.17	.15
51	tons liquid asph., SC-3 or SC-4 (BST)	16.00	16.00	12.60	20.00	14.30	20.00	18.00
8,150	tons bitum. surf.	2.20	2.95	5.25	5.15	5.08	3.75	4.30
53	tons liquid asphalt, SC-2 (prime coat)	16.00	18.00	18.00	20.00	22.00	20.00	18.00
3,100	tons plant-mix surf.	6.00	4.00	5.75	6.00	4.90	4.25	5.00
1,660	tons asph. conc. (base and level. course)	7.00	5.25	6.25	8.00	6.60	5.30	5.45
870	tons asph. conc. (Type "A" surf. course)	7.00	6.00	6.45	8.00	6.75	5.50	6.00
380	lin. ft. raised bars	.75	1.00	1.15	1.25	1.50	1.25	1.00
29,120	cu. yd. Portland cem. conc. (pavement)	9.15	9.37	9.60	9.90	11.60	9.50	11.00
21,770	ea. tie bolt assemblies	.60	.57	.53	.75	.60	.55	.60
380	cu. yd. Class "A" P.C.C. (structures)	48.00	50.00	39.00	55.00	52.00	50.00	60.00
80	cu. yd. Class "A" P.C.C. (ditch lining)	30.00	26.00	20.50	50.00	27.00	25.00	40.00
41,500	lb. bar reinf. steel	.09	.075	.075	.07	.095	.11	.09
700	sq. yd. mesh reinf.	.45	.40	.44	.40	.62	.80	.45
50	cu. yd. broken conc. masonry	20.00	20.00	23.00	26.00	18.30	17.00	30.00
75	cu. yd. broken conc. riprap	15.00	10.00	6.00	8.00	6.10	4.50	7.50
3,250	cu. yd. Portland cem. conc. (curbs & gtrs.)	20.00	24.50	21.00	27.50	24.50	21.00	26.00
80	ea. right-of-way monuments	5.00	4.00	4.50	4.75	4.90	4.50	7.50
22	ea. center line monuments	10.00	15.00	6.00	3.75	4.90	4.50	9.00

(Continued on next page)

7,500,000 yards of sand, rock and gravel will pass here*

**This dredge suction hose is a duplicate of one which will easily reach the above mark before the new one is installed. The original was built by us and went to work in 1942.*



American's big, specially built ***smooth bore*** *hose will endure longer in the most punishing heavy industries.*

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Our long specialization in building heavy duty suction and discharge hose results in many fine performance records. This specialty can mean greater efficiency in your own operations, whether using rough or smooth bore types in salt or fresh water. AMERICAN hose has high resistance to abrasion in tube and cover, all necessary flexibility, highest quality duck and wire reinforcement. Long proved methods of manufacture "weld" all these quality materials together into one long life unit.

THIS HIGH QUALITY HOSE MADE IN ALL STANDARD SIZES

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OAKLAND, CALIFORNIA
MANUFACTURERS OF RUBBER PRODUCTS FOR INDUSTRY

14,200 lin. ft. metal plate guard railing	2.00	2.10	1.90	2.00	1.90	1.70	2.80
265 ea. guide posts	5.00	4.00	4.75	3.00	3.00	4.50	3.60
130 ea. culvert markers and project markers	5.00	4.00	3.50	3.00	3.65	4.50	4.25
29,500 lin. ft. wire mesh fence	1.55	1.39	1.47	1.55	1.40	1.45	2.40
3 mi. new property fence	$1,250	$1,000	$1,300	$1,400	$1,300	$1,250	$1,500
412 lin. ft. 18-in. RCP (std. str.)	3.00	3.00	2.90	4.00	4.60	3.00	3.75
5,076 lin. ft. 24-in. RCP (std. str.)	3.90	3.70	3.55	5.00	5.60	3.80	4.50
444 lin. ft. 30-in. RCP (std. str.)	5.20	5.60	5.15	6.50	7.30	5.25	6.50
68 lin. ft. 48-in. RCP (std. str.)	10.30	10.50	9.75	11.50	12.20	10.00	13.30
1,348 lin. ft. 60-in. RCP (std. str.)	13.60	14.50	13.00	15.00	15.30	13.00	16.25
188 lin. ft. 24-in. RCP (extra str.)	4.50	4.50	4.60	6.00	6.30	5.00	6.25
200 lin. ft. 30-in. RCP (extra str.)	6.30	7.00	6.10	7.25	8.65	6.50	7.70
224 lin. ft. 36-in. RCP (extra str.)	7.80	8.00	7.50	9.00	9.15	8.00	10.00
444 lin. ft. 60-in. RCP (extra str.)	16.00	17.00	15.50	18.00	18.30	17.00	17.00
194 lin. ft. 12-in. CMP (16 ga.)	2.20	2.00	1.60	2.60	1.85	1.50	1.85
212 lin. ft. 18-in. CMP (16 ga.)	2.60	2.50	2.20	3.00	2.45	2.25	2.50
192 lin. ft. 24-in. CMP (14 ga.)	3.70	3.10	3.15	4.15	3.40	3.00	3.60
29 ea. spillway assemblies	20.00	24.00	22.00	20.00	18.30	25.00	35.00
466 lin. ft. 8-in. CMP downdrains (16 ga.)	1.50	1.50	1.30	2.00	1.60	1.50	1.35
90 ea. red reflectors	1.10	3.00	2.50	2.00	1.85	2.25	2.00
359,000 ea. ice plant cuttings	.03	.04	.04	.04	.035	.04	.042
Lump sum, engineer's office	$1,700	$2,500	$1,200	$1,000	$2,000	$3,000	$3,000
460 lin. ft. 6-in. cast iron pipe	3.00	2.50	2.80	3.45	2.30	3.60	2.45
300 lin. ft. 8-in. cast iron pipe	4.00	3.00	3.75	4.40	3.00	4.70	3.00
510 lin. ft. 8-in. vitrified clay pipe	2.60	2.70	1.30	2.45	1.10	3.00	1.10
3 ea. new sewer manholes	150.00	150.00	150.00	175.00	125.00	155.00	210.00

Colorado—Archuleta County—State—Grade. and Surf.

Colorado Constructors, Inc., Denver, were low bidders at $197,277 to the State Highway Department on the grading and surfacing of 3.9 mi. of State Highway 10 between Pagosa Springs and Wolf Creek Pass. The bid was slightly below the engineer's estimate for the project. Time allowed for construction was 365 calendar days. Unit bids were:

(1) Colorado Constructors, Inc. $197,277
(2) Peter Kiewit Sons 208,365
(3) Gerard Knutson 225,749
(4) J. H. & N. M. Monaghan 236,561
(5) Switzer & Hayes $274,491
(6) M. R. Latimer 279,176
(7) Engineer's estimate 200,078

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Lump sum, clear and grub	$2,500	$4,000	$7,500	$3,500	$4,000	$3,000	$3,000
Lump sum, remove salv. struct.	$1,000	400.00	$4,750	$1,500	$1,800	$1,500	$1,500
Lump sum, remove 37 structures	$1,000	$2,600	$1,500	$1,850	$2,200	$3,000	370.00
Lump sum, replace stringers	$1,000	$1,200	450.00	$1,500	500.00	500.00	$1,500
1 ea. remove, reset proj. mark	20.00	10.00	20.00	10.00	10.00	6.00	5.00
4 ea. remove, reset R.O.W. mark	5.00	4.00	4.00	5.00	6.00	4.00	3.00
1,150 lin. ft. remove guard fence	.10	.35	.09	.30	.10	.50	.10
1 ea. remove headwall cut key	150.00	160.00	350.00	175.00	300.00	125.00	50.00
Lump sum, remove detour culverts	100.00	100.00	400.00	200.00	100.00	200.00	10.00
5,300 lin. ft. remove fence	.03	.03	.03	.03	.03	.04	.03
14,600 lin. ft. remove, rebuild fence	.12	.12	.12	.10	.08	.15	.10
730 ea. line posts, tr. wood	1.00	1.20	1.60	1.00	1.00	1.25	1.50
212,000 cu. yd. unclass. excav.	.28	.29	.28	.48	.45	.53	.33
4,700 cu. yd. unclass. ditch excav.	.75	.55	.50	.70	.50	.75	.50
62,400 ton selected material	.55	.57	.77	.50	1.15	.75	.60
170 cu. yd. dry rock excav., str.	2.00	3.50	3.00	2.00	3.00	3.00	2.50
1,600 cu. yd. dry com. excav. str.	2.00	2.00	2.00	1.50	1.50	2.50	1.50
100 cu. yd. wet rock excav., str.	5.00	4.50	5.00	5.00	3.00	5.00	4.00
640 cu. yd. wet com. excav., str	5.00	4.50	3.50	4.00	3.00	4.00	3.00
100 hr. mechanical tamp	4.00	4.00	5.00	4.00	3.00	5.00	4.00
2,420 hr. roll emb. and cuts	3.00	3.50	3.00	3.00	3.00	3.00	2.50
6 unit furnish roller	100.00	100.00	100.00	50.00	100.00	75.00	50.00
4,600 M. gal. wet emb. and cuts	1.75	1.80	2.00	1.00	2.00	2.00	1.50
150 hr. roll with fin. roller	5.00	6.00	5.00	6.50	5.00	4.00	5.00
Lump sum, furnish finish roller	200.00	200.00	200.00	300.00	200.00	200.00	400.00
1,900 cu. yd. selected backfill	3.00	2.60	3.50	3.00	4.00	3.00	3.50
720,000 sta. yd. overhaul	.015	.015	.01	.01	.01	.02	.01
1,600 yd. mi. overhaul	.15	.20	.15	.20	.10	.20	.20
55 ton gravel surface	2.00	2.00	5.00	5.00	3.00	1.25	.80
100 ton mi. overhaul surface	.20	.20	.15	.01	.10	.20	.10
107,200 ton mi. overhaul select matl.	.09	.10	.12	.10	.08	.12	.10
0.4 mbft. untreat br. timber	200.00	240.00	185.00	250.00	150.00	175.00	200.00
372 cu. yd. Class "A" conc.	40.00	43.00	43.50	45.00	45.00	45.00	30.00
30 cu. yd. Class "B" conc.	40.00	43.00	45.00	45.00	45.00	45.00	30.00
5 cu. yd. Class "A" handrail	60.00	75.00	65.00	100.00	75.00	75.00	50.00
34,600 lb. reinf. steel	.085	.095	.10	.10	.10	.08	.08
13,100 lb. structural steel	.12	.15	.16	.14	.12	.13	.08
244 lin. ft. 18-in. C.M.P. culvert	2.00	2.20	2.50	2.50	3.00	2.50	2.20
2,886 lin. ft. 24-in. C.M.P. culvert	3.00	3.40	3.40	3.50	4.00	3.25	3.40
126 lin. ft. 30-in. C.M.P. culvert	4.00	4.25	4.00	5.00	5.00	4.50	4.40
110 lin. ft. 36-in. C.M.P. culvert	5.50	6.50	5.50	6.00	7.00	6.00	6.60
96 lin. ft. 48-in. C.M.P. culvert	8.00	8.50	7.80	10.50	9.00	7.50	10.90
700 lin. ft. 26¾-in. galv. flume	2.50	1.50	2.50	2.50	3.00	3.00	1.80
500 lin. ft. 6-in. perf. C.M.P. undrain	3.00	4.50	5.00	1.50	2.50	2.00	2.50
26,700 lin. ft. barb wire fence TWP	.14	.15	.15	.14	.13	.20	.14
6 ea. barb wire gates	10.00	10.00	10.00	7.50	12.00	15.00	6.00
57 ea. R.O.W. markers	7.00	6.50	6.00	6.50	10.00	5.00	5.00
4 ea. drain pipe, 4-in. x 2-ft.	8.00	12.00	11.00	10.00	10.00	10.00	5.00
181 ea. timber guard posts	3.50	3.50	4.00	5.00	4.00	4.00	2.50
4 ea. 30 deg. metal elbow 24-in. C.M.P.	20.00	15.00	21.00	20.00	20.00	30.00	15.00
2 ea. 45 deg. metal elbow 24-in. C.M.P.	20.00	15.00	21.00	20.00	20.00	30.00	20.00
4 ea. metal trans. section	70.00	60.00	75.00	75.00	70.00	100.00	35.00

Washington—Cowlitz County—State—Surf.

K. L. Goulter, Seattle, bidding $363,711, was low and was awarded the contract to grade and surface 2 mi. of State Highway No. 1 between Rocky Point and Ostrander. Two-thirds of the total amount of the contract is included in the excavation items. Unit bids are as follows:

(1) K. L. Goulter $363,711
(2) Fiorito Bros. 365,844
(3) Leonard & Slate of Oregon, Ltd. 387,956
(4) Northwest Construction Co. 442,230
(5) Peter Kiewit Sons Co. $462,345
(6) Erickson Paving Co. 481,909
(7) N. Fiorito Co. 520,043

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
35.81 ac. clearing	400.00	200.00	350.00	350.00	215.00	350.00	350.00
18.47 ac. grubbing	400.00	200.00	250.00	300.00	235.00	350.00	350.00
560,960 cu. yd. common excav. incl. haul of 600 ft.	.25	.22	.36	.32	.39	.30	.35
134,940 cu. yd. rock excav. incl. haul of 600 ft.	.70	.95	.36	1.00	.91	1.25	1.30
1,780 cu. yd. com. trench excav. incl. haul, 600 ft.	1.00	1.50	1.00	1.50	1.10	2.00	2.50
300,440 cu. yd. sta. overhaul	.01	.02	.01	.02	.02	.02	.02
3,792.68 M. cu. yd. stas. overhaul	5.00	5.00	10.00	5.00	5.00	6.00	6.00
5,675 cu. yd. structure excav.	2.50	1.75	2.00	2.00	2.25	2.50	2.50

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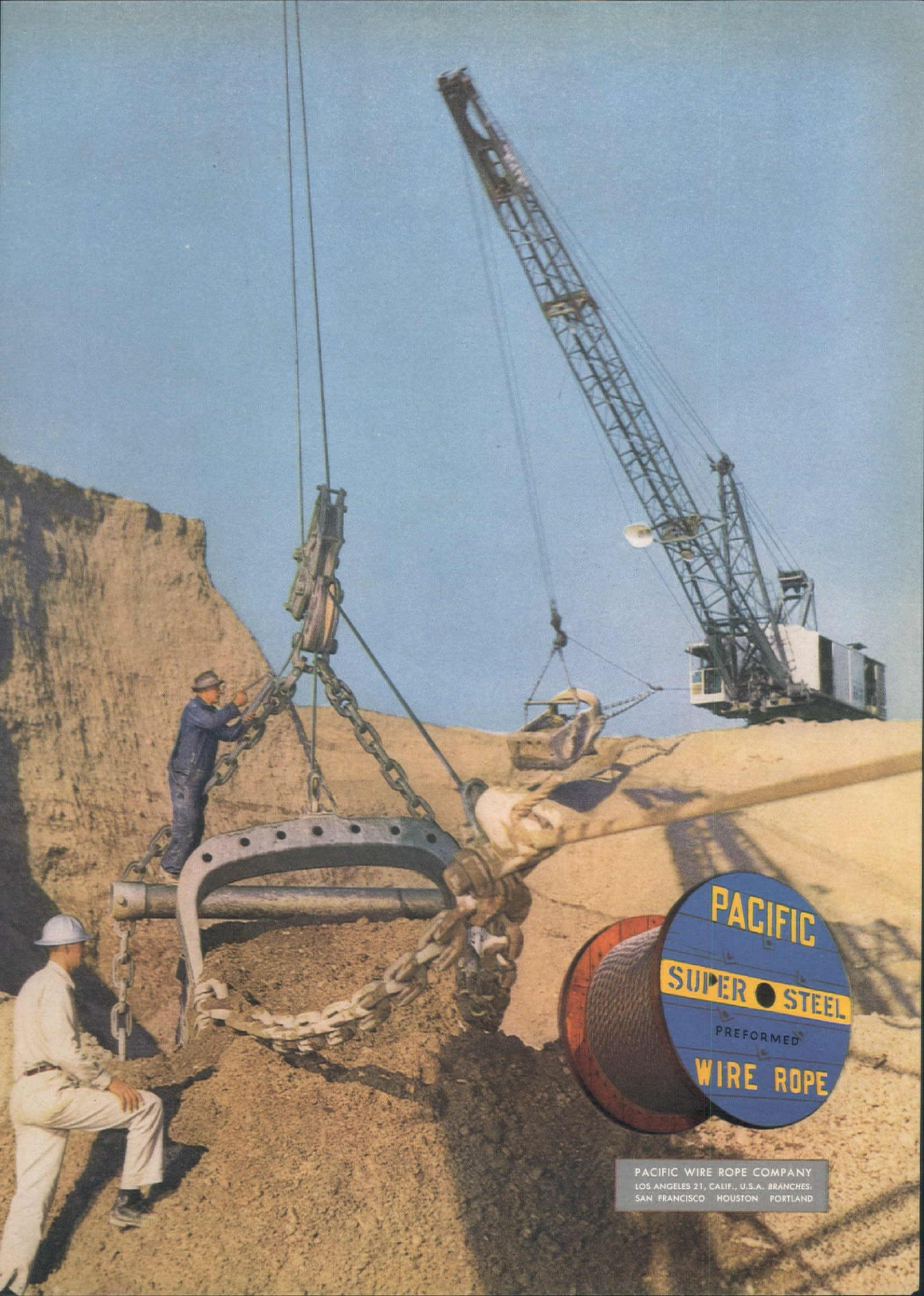


PACIFIC WIRE ROPE COMPANY
LOS ANGELES 21, CALIF., U.S.A. *BRANCHES:*
SAN FRANCISCO HOUSTON PORTLAND

13,316 lin. ft. slope treatment	.15	.12	.20	.10	.10	.14	.15
131.1 sta. finishing roadway	10.00	11.00	10.00	15.00	12.50	12.00	20.00
410 cu. yd. gravel backfill	4.00	4.00	4.00	4.00	3.80	5.00	6.00
515 cu. yd. cr. stone surf., top course	4.00	3.50	4.00	4.00	3.70	4.00	4.00
965 cu. yd. cr. stone surf., base course	4.00	3.50	4.00	4.00	3.70	4.00	4.00
1,880 cu. yd. ballast	3.00	2.50	3.00	2.50	2.30	3.00	3.00
73 M. gal. water	3.00	2.50	3.00	3.00	2.00	2.50	2.00
156 only, reinf. conc. R.O.W. markers	5.00	4.00	6.00	5.00	7.00	5.00	6.00
1 only, reinf. conc. F.A. marker	20.00	25.00	25.00	20.00	25.00	25.00	35.00
438.41 cu. yd. concrete, Class A	45.00	41.00	45.00	45.00	45.00	60.00	65.00
30 cu. yd. concrete, Class G	45.00	50.00	40.00	55.00	45.00	60.00	60.00
93,530 lb. steel reinf. bars	.10	.10	.08	.10	.095	.10	.10
22 cu. yd. sack riprap (conc. Cl. G)	20.00	30.00	40.00	35.00	35.00	60.00	30.00
3 ea. specl. brick or conc. block manhole	200.00	175.00	200.00	150.00	320.00	200.00	175.00
890 lin. ft. remov. exist. guard rail	1.00	.25	.30	.40	.50	.40	.45
Lump sum, remove. exist. wing walls and apron	200.00	50.00	100.00	100.00	125.00	300.00	350.00
42 lin. ft. relaying conc. pipe, 12-in. diam.	1.00	1.00	1.00	1.00	.85	.90	1.50
15 lin. ft. relaying conc. pipe, 18-in. diam.	1.50	2.00	1.25	1.50	1.25	1.25	2.50
12 lin. ft. relaying conc. pipe, 24-in. diam.	2.50	4.00	2.00	2.50	1.70	2.50	3.50
120 lin. ft. relay. wrought iron pipe 4-in. diam	.50	1.50	.50	4.00	1.40	1.00	1.50
18 lin. ft. wrought iron pipe 4-in. diam.	1.00	2.00	1.50	4.00	2.80	3.00	3.50
718 lin. ft. galv. iron pipe 4-in. diam.	1.25	2.50	1.50	2.00	1.50	2.50	3.50
215 lin. ft. conc. or V.C. drain pipe 8-in. diam.	1.00	1.00	.75	1.00	.95	.90	1.50
483 lin. ft. conc. or V.C. culv. pipe 12-in. diam.	1.50	1.25	1.25	1.35	1.55	1.20	1.75
90 lin. ft. std. R.C. culv. pipe, 12-in. diam.	2.00	1.55	2.00	1.75	1.95	1.50	2.00
603 lin. ft. std. R.C. culv pipe, 18-in. diam.	3.00	3.00	3.00	3.00	3.40	3.75	3.50
333 lin. ft. std. R.C. culv. pipe, 24-in. diam.	3.50	4.00	4.00	4.00	4.20	4.00	4.50
42 lin. ft. std. R.C. culv pipe, 36-in. diam.	10.00	9.00	8.00	9.00	10.00	10.00	6.50
296 lin. ft. std. R.C. culv. pipe, 48-in. diam.	15.00	13.00	12.00	16.00	14.00	13.00	10.00
690 lin. ft. ex. str. R.C. culv. pipe, 24-in. diam.	4.25	4.75	4.50	5.00	5.00	5.25	5.50
520 lin. ft. ex. str. R.C. culv. pipe, 36-in. diam.	11.00	10.00	9.00	11.00	11.00	11.00	8.00
60 lin. ft. jacking ex. str. R.C. culv. pipe, 36-in. diam.	10.00	20.00	10.00	20.00	25.00	20.00	25.00

Oregon—Jackson County—State—Paving

McNutt Bros., Eugene, bidding $492,280 were the lower of two contractors submitting bids on grading and concrete paving the Reese Creek-Antelope Creek section of the Crater Lake Highway. The unit bids were as follows:

(1) McNutt Bros. $492,280
(2) Warren Northwest, Inc. $506,400

	(1)	(2)
Lump sum, clearing and grubbing	$13,000	$4,250
3,900 cu. yd. trench excav., unclassified	3.00	3.25
4,000 cu. yd. borrow excav., unclassified	1.10	1.00
190,000 cu. yd. general excav., unclassified	.43	.55
600,000 cu. yd. sta. short overhaul	.15	.01
10,000 cu. yd. stas. long overhaul	.50	.30
21,000 lin. ft. rounding cutbanks	.15	.15
6.65 mi. finishing roadbed and slopes	600.00	400.00
130 lin. ft. 12-in. conc. pipe	1.75	1.50
3,600 lin. ft. 18-in. conc. pipe	3.25	3.25
550 lin. ft. 24-in. conc. pipe	4.50	4.50
120 lin. ft. 36-in. conc. pipe	8.25	8.50
1,700 lin. ft. 18-in. conc. siphon pipe	4.50	3.50
300 lin. ft. 8-in. perf. corr. metal drain pipe—coated	1.25	1.25
230 lin. ft. salvaging culv. pipe	1.50	2.00
50 cu. yd. rock or gravel backfill in drains	5.00	5.00
100 cu. yd. Class "A" conc. in miscl. structures	50.00	60.00
2 MFBM lumber in flume	200.00	250.00
750 lin. ft. spring bracket guard rail with wood posts	1.75	3.25
250 lin. ft. Class "A" conc. in box culverts	50.00	50.00
39,000 lbs. metal reinf.	.07	.085
72,000 cu. yd. selected roadbed topping	.50	.45
198,000 yd. mi. hauling roadbed topping	.12	.15
9,000 cu. yd. ¾-in. - 0 gravel in leveling crse. and shoulders	3.00	2.35
1,900 cu. yd. ½-in. - 0 materials in cushion course	3.50	3.00
1,660 M. gal. sprinkling	2.00	2.50
86,000 sq. yd. Portland cement conc. pave.	2.45	2.55
150 lin. ft. expansion joints in pave.	.40	.15
52,000 lin. ft. contraction joints	.03	.02
47,000 lb. tie bars and reinf.	.07	.07
60 hr. roadside grading with bulldozer	12.50	5.00
60 hr. roadside grading with blade grader	8.50	6.50
30 hr. roadside grading with scraper and tractor	15.00	11.50
40 ac. seeding	25.00	30.00

Tunnel . . .

New Mexico—Otero County—Public Roads Administration—Tunnels

Henry Thygesen and Frank P. Llewellyn, Albuquerque, submitted the low bid to the Public Roads Administration, Denver, Colo., on a 500-ft. tunnel and 0.7 mi. of surfacing on the Alamogordo-Pinon Highway in Lincoln National Forest. The amount of the bid was $381,024. The same contractors submitted the low bid of $286,016 for excavation and surfacing 3.5 of the same highway adjacent to the previously mentioned sections. Rejection was recommended for both contracts. Unit bids on the tunnel proposal follow:

(1) Henry Thygesen and Frank P. Llewellyn $381,024
(2) Lowdermilk Bros. 423,959
(3) Jones Bros. $426,775
(4) Engineer's estimate 214,322

	(1)	(2)	(3)	(4)
132,000 cu. yd. unclass. excav.	1.18	1.50	1.25	.70
4,000 cu. yd. unclass. excav. for struct.	3.00	4.50	3.50	2.00
5,000 cu. yd. unclass. excav. for borrow	.25	.80	1.25	.40
700,000 sta. yd. overhaul (1000 ft. free haul)	.025	.03	.03	.01
6,350 cu. yd. mi. special overhaul, borrow	.40	.40	.45	.15
6,350 cu. yd. concrete Class A	40.00	65.00	50.00	30.00
175 lb. reinforcing steel	.15	.12	.15	.08
22,000 MFBM untreated timber	175.00	140.00	200.00	100.00
100 cu. yd. Class B stone masonry	15.00	50.00	10.00	25.00
40 lin. ft. 24-in. C.G.S.M. culv. pipe	3.40	5.00	3.50	3.00
242 lin. ft. 30-in. C.G.S.M. culv. pipe	3.90	6.00	4.00	3.50
64 lin. ft. 36-in. C.G.S.M. culv. pipe	6.25	7.50	6.50	6.00
240 cu. yd. hand laid rock embankment	6.00	5.00	6.25	2.50
132,000 lin. ft. 6-in. perf. C.G.S.M. pipe underdrain	1.70	6.00	3.00	2.00
4,000 sq. yd. grouted rubble gutter	5.00	5.00	5.00	4.00
5,000 cu. yd. tunnel excav.	11.10	10.50	13.00	6.00
700,000 cu. yd. tunnel enlargement excav.	20.00	10.50	15.00	10.00

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 may be secured concerning employment conditions, wage rates, etc., by writing directly to the contractor. When available, the names of the supervisory personnel will be published in the "Supervising the Jobs" columns.

LATE BID OPENINGS

Utah Construction Co., San Francisco, and **Winston Bros.**, Los Angeles, were low to the Bureau of Reclamation on 6.6 mi. of the west canal of the Columbia Basin Project, Washington. Amount of bid, $2,871,797.

Grafe-Callahan Construction Co., Gunther & Shirley, both of Los Angeles, and **W. K. McIlyear**, Dallas, Tex., submitted low bids on construction on Horsetooth reservoir of the Colorado-Big Thompson project, Colorado. On the high dam their proposal was for $9,755,507, and for the low dam, $7,726,562.

Utah Construction Co., San Francisco, bidding $4,237,476, was low to the Bureau of Reclamation for construction of Angostura Dam in South Dakota, near Hot Springs. Amount, $4,237,476.

Granby Constructors, Granby, Colo., at $3,329,994, were low to the Bureau of Reclamation on construction of the Granby pumping plant, a unit of the Colorado-Big Thompson project.

Roy L. Bair & Co., and **James Crick & Sons**, both of Spokane, were low to the Bureau of Reclamation at $2,771,887 for the South Dam across the mouth of the Grand Coulee, an earthfill section of the Grand Coulee Irrigation Project.

CONTRACTS AWARDED

Large Western Projects...

Western Contracting Co., San Francisco, Calif., at $540,632, received the contract for nearly 8 mi. of highway east of Yuma, Ariz., from Arizona Highway Department, Phoenix.

James I. Barnes Construction Co., Santa Monica, Calif., was awarded a $1,672,266 contract for highways and bridges in Los Angeles and Long Beach, by Calif. Division of Highways, Sacramento.

Gifford Hill & Co., Dallas, Tex., and **American Pipe & Construction Co.**, Los Angeles., Calif., have a $1,449,686 contract for a water conduit between Wichita Falls and New Lake, Texas, from City Council, Wichita Falls.

Consolidated Steel Corp., Los Angeles, Calif.; **Morrison-Knudsen Co., Inc.**, Boise, Ida., and **American Steel and Wire Co.**, Oakland, Calif., on a joint bid of $3,000,000 received the contract to build a 12,400-ft. steel tower and cable aerial passenger tramway to 8,500-ft. level of Mt. Jacinto from near Palm Springs from the San Jacinto Mountain Park Authority.

Leonard & Slate, Ltd., and **E. C. Hall**, Portland, received the contract at $1,244,725 from the U. S. Engineer Office, Portland, for highway and railroad relocation, and a pipe line at the site of Dorena Dam on the Row River, Lane Co., Ore.

Guy F. Atkinson Co., Long Beach, Calif., has been awarded a contract for $984,960 to construct channel improvements along the Los Angeles River betwen Aliso St. and Alhambra Ave., in Los Angeles, by U. S. Engineer Office, Los Angeles.

General Construction Co., Seattle, was given a contract amounting to $2,947,000 for eight piers at the Tongue Point Naval Station, Astoria, Ore., by the Bureau of Yards and Docks, Washington, D. C.

Guy F. Atkinson Co., San Francisco, at $1,279,845, will construct a concrete arch dam on Matilija Creek, for the Ventura County Flood Control District, Ventura, Calif.

Al Johnson Construction Co., Winston Bros. Co., and **Peter Kiewit Sons' Co.,** Minneapolis, Minn., were awarded a contract for $12,203,692 for construction of Fort Gibson Dam on the Grand River in Oklahoma, by U. S. Engineer Office, Tulsa, Okla.

Swinerton & Walberg and **Ben C. Gerwick, Inc.,** San Francisco, received a contract of $4,370,000 for a pier, truck causeway, and other facilities at the Richmond Refinery of Standard Oil Co. at Richmond, Calif.

Cahill Bros., San Francisco, at $1,800,000, will build a nine-story structural steel addition to the Western Merchandise Mart in San Francisco.

L. H. Hoffman, Portland, was given an $11,000,000 contract for the expansion of their Portland paper and pulp plant, by Crown Zellerbach Corp., Portland.

Guy F. Atkinson Co., Long Beach, Calif., will get $3,517,410 for constructing an ocean outfall sewer from the Hyperion activated sludge plant in Los Angeles, Calif., from the Los Angeles Board of Public Works.

J. H. Pomeroy & Co., Inc., San Francisco, received a contract for the first $6,000,000 of work on a new $25,000,000 tin plate mill at Pittsburg, Calif., by Columbia Steel Co., San Francisco.

Highway and Street . . .

Arizona

COCONINO CO.—**J. E. Skousen,** 243 W. 1st Ave., Mesa—$125,568 for about 7 mi. hwy. base and surf., approx. 2 mi. SW. of Flagstaff—by State Highway Department, Phoenix. 5-20

GILA CO.—**Orr & Orr Construction Co.,** 302 W. Monte Vista Rd., Phoenix—$496,568 for approx. 3 mi. grade., drain., base., and surf., Superior-Miami Hwy., starting at Pinal-Gila Hwy. going E.—by State Highway Department, Phoenix. 5-15

MARICOPA CO.—**Arizona Sand & Rock Co.,** Box 596, Phoenix—$47,297 for widening approx. one-half mi. of conc. pavement, and incidental work in city of Mesa—by State Highway Department, Phoenix. 5-20

MARICOPA CO.—**Daley-Tulloch Construction Co.,** Box 1590, Phoenix—$16,480 for improvements to Dayton St., from 20.6 ft. N. of N. line of Thomas Rd. to E. and Windsor Ave. from 2 ft. W. of W. line of Dayton St. to latter line, Phoenix—by City Council, Phoenix. 5-10

MOHAVE CO.—**Fisher Contracting Co.,** 516 S. 17th St., Phoenix—$147,376 for realignment of 9 mi. of Kingman - Ashfork Hwy., starting at Kingman, going NE.—by State Highway Department, Phoenix. 5-17

NAVAJO CO.—**Diggs Construction Co.,** Box 701, Phoenix—$128,233 for 14.2 mi. roadway betw. Showlow and Pinetop, Sitgreaves National Forest—by Public Roads Administration, Phoenix. 5-10

NAVAJO CO.—**Andrew A. Larsen,** Box 1572, Phoenix—$154,341 for 4.5 mi. roadway betw. Globe and Showlow, Sitgreaves National Forest—by Public Roads Administration, Phoenix. 5-9

NAVAJO AND APACHE COS.—**Wallace & Wallace,** Box 470, Phoenix—$189,967 for reshaping rd., surf., finishing and placing base material and bitum. surf. treat., etc., on U. S. Hwy. 60, 12 mi. E. of Showlow extending NE. approx. 19½ mi. to Concho—by State Highway Department, Phoenix. 5-20

PINAL CO.—**Tiffany Construction Co.,** Box 846, Phoenix—$179,248 for reshaping road surf., new base material and road mixed bitum. surf. approx. 3 mi. S. of Florence extending SE. for 19 mi.—by State Highway Department, Phoenix. 5-20

YUMA CO.—**Western Contracting Co.,** 604 Mission St., San Francisco, Calif.—$540,632 for grade. and drain. 7¾ mi. of Yuma-Gila Bend Hwy., starting 15 mi. E. of Yuma and extending through Gila Mountains—by State Highway Department, Phoenix. 5-17

California

ALAMEDA AND CONTRA COSTA COS.—**J. R. Armstrong Construction Co.,** 400 Central St., El Cerrito—$79,669 for 10.5 mi. repairing shoulders and constructing deceleration lane on portions of hwy. betw. El Cerrito Hill overhead in Albany and Carquinez bridge—by Division of Highways, Sacramento. 5-27

ALAMEDA CO.—**Independent Construction Co., Ltd.,** 46th Ave. and Clement St., Oakland—$33,445 for removing old railroad ties and pavement on center 22 ft. of E. 14th St., Hwy. Route 105, from S. end of bridge across San Leandro Creek to

N. city limits; and paving—by City Council, San Leandro. 5-8

BUTTE CO.—**Lester L. Rice,** 605 14th St., Marysville—$104,971 for repairing existing surf. and constr. of borders and shoulders betw. Oroville Wye and Nelson, betw. Big Chico Creek and 6th St. in Chico and betw. Durham railroad crossing and Chico—by Division of Highways, Sacramento. 5-20

DEL NORTE CO.—**W. C. Railing,** 27 Lowell St., Redwood City—$100,845 for 3.7 mi. base and surf., betw. 6.3 mi. and 2.6 mi. S. of Crescent City—by Division of Highways, Sacramento. 5-7

HUMBOLDT CO.—**Mercer-Fraser Co.,** 2nd and Commercial Sts., Eureka—$92,375 for 3.4 mi. surf. and seal coat betw. Patrick's Point and Big Lagoon—by Division of Highways, Sacramento. 5-2

KERN CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$90,532 for 10.4 mi. repairing hwy. with plantmix surf., betw. Famoso and Cecil Ave., Delano—by Division of Highways, Sacramento. 5-29

KERN CO.—**Geo. Von Kleinsmid,** Box 971, Bakersfield—$137,333 for 2.7 mi. of federal hwy., Project Calif. FH-95-B, Mount Pinos, Los Padres National Forest—by Public Roads Administration, San Francisco. 5-24

LOS ANGELES CO.—**Vido Kovacevich Co.,** 5300 Imperial Highway, South Gate—$15,108 for 2,000 lin. ft. of grade., pave. 148th and 149th Sts. W. from Central Ave. and along Central Ave. betw. 148th and 149th Sts., W. of Compton—County Board of Supervisors, Los Angeles. 5-17

LOS ANGELES CO.—**Harvey Construction Co.,** 1147 E. Garvey Ave., El Monte—$60,286 for grade., pave., and constr. of curbs, gutters and sidewalks in new subdivision, Interceptor and Inglefort, Los Angeles—by McCarthy Co., Los Angeles. 5-3

LOS ANGELES CO.—**Highway Construction Co.,** 2406 E. Rosecrans Ave., Compton—$40,000 for constr. of sts., curbs, gutters, sewers and water systems in new subdivision along W. side of Paramount Blvd. at Alameda St., Los Angeles—by S. V. Hunsaker and Associates, Los Angeles. 5-3

LOS ANGELES CO.—**Perscallo Construction Co.,** 867 Sunset Blvd., Los Angeles—$13,882 for conc. walks, gutters, curbs and driveways W. of Gardena—by Los Angeles County Board of Supervisors, Los Angeles. 5-3

LOS ANGELES CO.—**T. E. Sherlock,** 1103 W. 40th Pl., Los Angeles—$299,254 for grade., pave., etc., of Olympic Blvd., betw. Park View and Western Ave., Los Angeles—by Board of Public Works, Los Angeles. 5-10

LOS ANGELES CO.—**T. E. Sherlock,** 1103 W. 40th Pl., Los Angeles—$19,551 for grade., pave. Exposition Blvd., betw. Hope St. and Figueroa St., Los Angeles—by Board of Public Works, Los Angeles. 5-17

MENDOCINO CO.—**Piombo Bros. & Co.,** 1571 Turk St., San Francisco—$121,695 for grade. and base on 1 mi. of hwy. at Slick Rock Creek—by Division of Highways, Sacramento. 5-21

MENDOCINO CO.—**C. M. Syar,** Box 1431, Vallejo—$69,726 for 2.6 mi. surf. betw. Willits and 2 mi. N.—by Division of Highways, Sacramento. 5-16

MODOC CO.—**E. B. Bishop,** Orland, and **D. Gerald Bing,** 2440 Marshall Way, Sacramento—$409,591 for 29.5 mi. grade. portions of hwy., surf. on new subgrade and existing surf., and seal coat, betw. Eagleville and 4 mi. N. of Lake City—by Division of Highways, Sacramento. 5-27

ORANGE CO.—**Griffith Co.,** 502 L. A. Railway Bldg., Los Angeles—$52,030 for 2.3 mi. resurf. and widening of shoulders with bitum. surf. treat., betw. Los Patos Ave. in Sunset Beach and 2nd St. in Seal Beach—by Division of Highways, Sacramento. 5-10

PLUMAS CO.—**A. Teichert & Co.,** Box 1133, Sacramento—$176,938 for 11 mi. hwy. constr., Almanor, Plumas National Forest—by Public Roads Administration, San Francisco. 5-9

RIVERSIDE CO.—**Arthur A. Johnson,** 421 Pearl St., Laguna Beach—$50,933 for hwy. improvements betw. 6 mi. E. of Desert Center and Hopkins Well, 10.4 mi. of surf. and seal coat—by Division of Highways, Sacramento. 5-10

SACRAMENTO CO.—**McGillivray Construction Co.,** Box 873, Sacramento—$13,684 for improvement of sts., aves., etc., in Swanston Park Unit No. 3, Sacramento—by City Council, Sacramento. 5-20

SACRAMENTO CO.—**J. R. Reeves,** Box 1072, Sacramento—$40,378 for improvement of Swanston Park Unit No. 6, Sacramento—by City Council, Sacramento. 5-6

SAN FRANCISCO CO.—**Eaton & Smith,** 715 Ocean Ave.,

San Francisco—$13,032 for extension of Persia Ave. from Mission St. to Ocean Ave., San Francisco—by Department of Public Works, San Francisco. 5-17

SAN FRANCISCO CO.—**Chas. L. Harney,** 625 Market St., San Francisco—$21,679 for improvement of Rivera St., betw. 38th and 40th Aves., San Francisco—by Department of Public Works, San Francisco. 5-17

SAN JOAQUIN CO.—**M. J. Rudy & Son,** Modesto—$113,002 for repair of 5.5 mi. of U. S. Hwy. 50 betw. Byron and Banta Rds. near Tracy—by Division of Highways, Sacramento. 5-7

YOLO CO.—**Fredrickson Bros.,** 1259 65th St., Emeryville—$149,536 for 14 mi. repairing hwy. with surf. and base, and putting borrow on shoulders betw. Cache Creek and Dunnigan—by Division of Highways, Sacramento. 5-27

Colorado

ARCHULETA CO.—**Colorado Constructors, Inc.,** Denver—$197,277 for rebuilding U. S. Hwy. No. 160 from 5 mi. NE. of Pagosa Springs to Wolf Creek Pass—by State Highway Department, Denver. 5-18

DELTA CO.—**Gerard Knutsen,** Denver—$186,053 for gravel resurf. of 3 mi. state hwy. betw. Hotchkiss and Delta—by State Highway Department, Denver. 5-3

DELTA CO.—**Schmidt Construction Company,** Kremmling—$90,004 rebuilding 2 mi. of U. S. Hwy. No. 50 W. of Delta—by State Highway Department, Denver. 5-18

OURAY CO.—**Schmidt Construction Company,** Kremmling—$176,884 for 5 mi. of State Hwy. No. 62 from Ridgway W. towards Dallas Divide—by State Highway Department, Denver. 5-18

PROWERS CO.—**Brown Construction Company,** Pueblo—$139,302 for rebuilding 4 mi. U. S. Hwy. No. 287 on new alignment from Lamar S.—by State Highway Department, Denver. 5-18

RIO BLANCO CO.—**J. H. and N. M. Monaghan & Associates,** 332 S. Race St., Denver—$112,322 for gravel surf. of 4.4 mi. of hwy. betw. Meeker and Rangley—by State Highway Department, Denver. 5-3

SAGUACHE CO.—**Brown Construction Company,** Pueblo—$169,809 for constr. of 8 mi. of State Hwy. No. 114 from Saguache W.—by State Highway Department, Denver. 5-18

Idaho

ADA CO.—**Quinn-Robbins Co.,** 703 S. 16th St., Boise—$84,356 for resurf. and widening 7 mi. of U. S. 30 betw. Meridian and Cole School—by Bureau of Highways, Boise. 5-18

BANNOCK CO.—**Carl E. Nelson,** Box 397, Logan—$59,897 for surf. 6 mi. of Yellowstone Park Highway betw. Red Rock and Downey—by Bureau of Highways, Boise. 5-18

BEAR LAKE CO.—**W. W. Clyde & Co.,** Springville, Utah—$335,745 for roadbeds, drainage structs., surf. on 4.8 mi. of U. S. 30, N. of Georgetown Summit—by Bureau of Highways, Boise. 5-3

CASSIA CO.—**Tony Marrazzo,** Box 876, Boise—$98,365 for widening and resurf. 7 mi. U. S. 30 from Twin Falls-Cassia line E.—by Bureau of Highways, Boise. 5-18

CLEARWATER AND LEWIS COS.—**Standard Asphalt Paving Co.,** 603 Chronicle Bldg., Spokane, Wash.—$78,410 to resurf. with crushed rock 16 mi. State Highway No. 7 N. of Nezperce and crushed gravel surf. and cover coat material on State Hwy. No. 9 near Orofino—by Bureau of Highways, Boise. 5-18

KOOTENAI CO.—**Materne Brothers,** E. 227 Longfellow St., Spokane, Wash.—$17,203 for reconditioning existing bitum. surf. and seal coating 10 mi. of U. S. 95 from Mud Bay School to Morley—by Bureau of Highways, Boise. 5-18

LATAH CO.—**McAtee & Heathe,** Box 2188, Spokane, Wash.—$35,912 for surf. six mi. of State Highway No. 8 betw. Troy and Deary—by Bureau of Highways, Boise. 5-18

LEMHI CO.—**Nic Burggraf,** Box 397, Idaho Falls—$107,947 for surf. 10 mi. State Highway No. 28 near Gilmore and seal coat. nine mi. U. S. No. 93 N. and S. of Salmon—by Bureau of Highways, Boise. 5-18

Kansas

RUSH CO.—**Southwest Sand and Gravel Co.,** Dodge City—$12,186 for approx. nine mi. hwy. surf. in Rush Co.—by State Highway Commission, Topeka. 5-15

Montana

BIG HORN CO.—**Peter Kiewit Sons' Co.,** Box 875, Sheridan, Wyo.—$202,169 for grade., drain., surf. and road mix oiling on 10.7 mi. of the St. Xavier-Hardin Rd.—by State Highway Commission, Helena. 5-22

DANIELS CO. — **Albert Lalonde Co.,** Sidney — $127,615 for grade., drain. and bitum. surf. 11.9 mi. on the Scobey-Opheim Rd.—by State Highway Commission, Helena. 5-22

FERGUS CO.—**E. H. Blakeslee Construction Co.,** 431 Ford Bldg., Great Falls—$24,732 for constr. of treated timber pile trestles on the Moore E. section of the Armington-Lewiston Rd. —by State Highway Commission, Helena. 5-22

LAKE CO.—**Union Construction Co.,** Box 1845, Great Falls—$143,255 for grade., drain. and surf. 3.2 mi. of the Flathead E. Shore Rd.—by State Highway Commission, Helena. 5-22

LIBERTY CO. — **Union Construction Co.,** Box 1845, Great Falls—$95,257 for grade., drain. and bitum. surf. of 14 mi. on the Joplin N. Rd.—by State Highway Commission, Helena. 5-22

MADISON CO. — **McLaughlin, Inc.,** 431 Ford Bldg., Great Falls—$66,857 for grade., drain., surf. of 6 mi. on the Harrison-Pony Rd.—by State Highway Commission, Helena. 5-22

MISSOULA CO. — **Union Construction Co., Inc.,** Box 1845, Great Falls—$87,063 for 3.1 mi. grade., drain., surf. and oiling, Missoula-Clinton Rd.—by State Highway Commission, Helena. 5-23

RAVALLI CO. — **Union Construction Co.,** Box 1845, Great Falls—$113,483 for grade., drain. and bitum. surf. of 5.8 mi. on the Hamilton-Stevensville Rd.—by State Highway Commission, Helena. 5-22

Nevada

LYON CO.—**Dodge Construction Co., Inc.,** Fallon—$222,550 for portion of state hwy. from Dalzell Canyon to junction with State Rt. No. 3 near Central, with spur connection to Wellington, Rt. 22—by Department of Highways, Carson City. 5-11

PERSHING CO. — **The Silver State Construction Co., Inc.,** South Main St., Fallon—$336,810 for 11.6 mi. hwy. constr. from Humbolt House to Mill City, Rt. 1, Section 4—by Department of Highways, Carson City. 5-8

WASHOE CO.—**Isbell Construction Co.,** 1300 E. 4th St., Reno —$63,748 for 4.3 mi. of secondary hwy. 709 from junction with U. S. 395 near Franktown to U. S. 395 approx. 3 mi. SE. of Franktown—by Department of Highways, Carson City. 5-13

New Mexico

CURRY CO.—**G. I. Martin,** 520 S. Tulane, Albuquerque—$15,544 for 28 mi. hwy. on N. M. 88 betw. Melrose and junction of N. M. 18 and 88—by State Highway Commission, Santa Fe. 4-27

DONA ANA AND SOCORRO COS.—**Henry Thygesen and Co.,** Box 876, Albuquerque—$13,996 for sealing on U. S. 80 betw. Las Cruces and Anthony, and 9 mi. betw. Socorro and San Antonio—by State Highway Commission, Santa Fe. 5-3

EDDY CO.—**Henry Thygesen and Co.,** Box 876, Albuquerque —$15,833 for 15 mi. hwy. betw. Carlsbad and Malaga on U. S. 285—by State Highway Commission, Santa Fe. 4-27

LINCOLN CO.—**Walter L. Denison,** Albuquerque—$26,420 for 42 mi. hwy. betw. Capitan and Roswell on U. S. 380—by State Highway Commission, Santa Fe. 4-27

QUAY CO.—**G. I. Martin,** 520 S. Tulane, Albuquerque—$146,143 for grade., base and top course surf. on 21 mi. on N. M. 86 betw. House and Ragland — by State Highway Commission, Santa Fe. 5-3

ROOSEVELT CO.—**Wheeler and Trotz,** Albuquerque—$13,937 for 10 mi. hwy. work U. S. 70 betw. Kenna and Elida—by State Highway Commission, Santa Fe. 4-27

ROOSEVELT CO.—**Wheeler and Trotz,** Albuquerque—$10,817 for 19 mi. of State Hwy. 18 betw. Portales and Tatum—by State Highway Commission, Santa Fe. 4-27

SAN JUAN AND RIO ARRIBA COS.—**Brown Brothers,** Box 1479, Albuquerque—$173,515 for 19½ mi. on N. M. 44 betw. Bloomfield and Cuba—by State Highway Commission, Santa Fe. 4-27

SANTA FE, SAN MIGUEL AND TORRANCE COS.—**The Skousen Construction Co.,** 207 Springer Bldg., Albuquerque—$175,464 for cement base and bitum. surf. on 19 mi. on U. S. No. 285 betw. Lamy and Encino—by State Highway Commission, Santa Fe. 5-3

Oregon

HARNEY CO.—**Jacobsen and Taggart,** Portland—$293,049 for regrade., surf. and oiling rds. in Harney Co.—by State Highway Commission, Salem. 5-17

JEFFERSON AND WASCO COS.—**Adler Construction Co.,** 3419 W. Smith St., Seattle, Wash.—$109,767 for Mill Creek-Filler Flat section of Warm Springs Hwy.—by State Highway Commission, Salem. 5-2

KLAMATH CO.—**R. A. Heintz Construction Co.,** 8101 NE. Union, Portland—$208,473 for Spring Creek Hill section of The Dalles-California Hwy.—by State Highway Commission, Salem. 5-2

LINCOLN CO.—**C. J. Eldon,** Box 5686, Kenton Sta., Portland —$34,320 for Waldport rock production project on Oregon Coast and Alsea Hwys.—by State Highway Commission, Salem. 5-2

LINCOLN CO.—**T. W. Thomas,** Portland—$132,810 for Oceanlake section of Oregon Coast Hwy.—by State Highway Commission, Salem. 5-3

POLK CO.—**United Contracting Co.,** 311 Stock Exchange Bldg., Portland—$42,000 for grade., pave. and surf. on 23 sts. in Dallas—by City Council, Dallas. 5-16

WASCO CO.—**Curtis Gravel Co.,** 1401 Fancher Way, Spokane, Wash.—$156,123 for Mill Creek Forks-The Dalles section of Mill Creek Co. Rd.—by State Highway Commission, Salem. 5-3

Texas

BEE CO.—**Southern Construction Co.,** 310 N. Center St., San Antonio—50 mi. of seal coat on County lateral rds.—by County Judge, Beeville. 5-21

BEXAR CO.—**Southern Construction Co.,** 310 N. Center St., San Antonio—$20,375 for asph. and seal coat pave. on the Culebra Rd. from Leon Creek to Kallison Lane, Tulsa—by County Commission, Bexar. 5-13

BEXAR, WILSON, BANDERA COS.—**Ned B. Hoffman,** 306 Mid-Continent Bldg., Fort Worth—$34,103 for asphalt surf. treat. on Hwys. 181, 87, 16 and Spur 112, 218—by State Highway Department, Austin. 5-22

BROOKS AND HIDALGO COS.—**Brown and Root, Inc.,** Box 3, Houston—$107,293 for 20.4 mi. grade., structs., base., asphalt surf. treat. on Hwy. FM 430 and 490, Rachel to approx. 10.5 mi. W. and from U. S. 281, 10 mi. N. of Edinburg through Hargill to Willacy Co. line—by State Highway Department, Austin. 5-23

CHILDRESS CO.—**Benson & McGann Construction Co.,** Wichita Falls—$22,493 for constr. of conc. pavement, widening and resurf. sts., Childress—by City Council, Childress. 4-30

COCHRAN CO.—**W. O. Pelphrey,** Wichita Falls—$85,621 for 10 mi. grade., drain., foundation course and surf. from Whiteface S. 10 mi.—by Cochran County Judge, Morton. 5-20

CULBERSON AND PRESIDIO COS.—**Ned B. Hoffman,** 306 Mid-Continent Bldg., Fort Worth—$16,329 for 4.9 mi. seal coat on Hwy. 80, from Hudspeth Co. line to Van Horn and Presidio Co.; 8.3 mi. seal coat on Hwy. 17 from Jeff Davis Co. line to Marfa—by State Highway Department, Austin. 5-22

DONLEY, COLLINGSWORTH COS.—**Fred Hall and Son,** Box 1188, Waco—$181,242 for 7.8 mi. grade., structs., base and surf. treat. from Hedley near E. Collingsworth Co. line on Hwy. 203—by State Highway Department, Austin. 5-22

ERATH CO.—**A. L. Bucy,** Brownwood—$71,259 for 1.9 mi. grade., structs., base and surf. from U. S. 281 E. of Stephenville to U. S. 281—by State Highway Department, Austin. 4-26

GUADALUPE CO.—**Holland Page,** Box 1181, Austin—$82,297 for 18.9 mi. asphalt conc. pave. on Hwys. 3 and 90, in Seguin and from Seguin to San Marcos River Bridge—by State Highway Department, Austin. 5-22

HUNT CO.—**Texas Bitulithic Co.,** Box 5297, Dallas—$33,032 for 3 mi. underseal and hot mix asphalt conc. pave. on Hwys. 67 and 24, near Greenville—by State Highway Department, Austin. 5-22

JOHNSON CO.—**John F. Buckner,** Box 76, Cleburne—$64,855 for 11.4 mi. grade., base., and asphalt surf. on FM 110, Cleburne to Grandview—by State Highway Department, Austin. 5-23

LAMB CO.—**C. Hunter Strain,** Box 1057, San Angelo—$112,097 for 17.4 mi. grade., drainage, base, surf., Lamb Co. Rd. District No. 6, from 3 mi. N. of Amherst N. to Co. line—by County Judge, Littlefield. 4-30

LIBERTY CO.—**Brown and Root, Inc.,** 708 Colorado St., Austin—$253,806 for asphalt underseal and conc. pave. on Hwy. 90 from Harris Co. line to approx. 8 mi. E. of Liberty—by State Highway Department, Austin. 5-22

MARTIN, WINKLER, MIDLAND, UPTON COS.—**Ned B. Hoffman,** 306 Mid-Continent Bldg., Fort Worth—$69,622 for 67.8 mi. seal coat and base preserv. on Hwys. 67, 82, 549 and 137—by State Highway Department, Austin. 5-22

McCULLOCH CO.—**H. E. Williams,** Box 235, Austin, and **Midwest Trucking Company,** 2824 Colonial Ave., Waco—$73,108 for 9.2 mi. grade., drain., structs., flexible base and single asphalt treat. on FM 42 and 502, Brady SW. to Davis School, and from U. S. 283 1 mi. NW. of Mercury, SE. and E. through Mercury—by State Highway Department, Austin. 5-23

McCULLOCH, COMANCHE COS.—**W. L. Johnson Co.,** San Angelo—$26,328 for 7.8 mi. seal coat and surf. treat. from Brown Co. line SW. 10.7 mi. from Junction to U. S. 67 near W. Comanche to Sidney; from 1.5 mi. SE. of Comanche to Gustine on Hwy. 283 and St. 36—by State Highway Department, Austin. 5-22

MEDINA CO.—**Holland Page,** Box 1181, Austin—$284,759 for 9.6 mi. grade. struct. overpass, base and surf. on U. S. 90—by State Highway Department, Austin. 5-21

NUECES CO.—**Heldenfels Bros.,** Rockport—$34,425 for grade., drain., structs., and base and surf. treat. on 4.6 mi. of Precinct Line Rd. betw. Precincts 3 and 4, Corpus Christi—by County Judge, Nueces. 5-10

NUECES CO.—**Tingle and McQuire,** Corpus Christi—$28,058 for seal coat and asph. surf. treat. on 34.8 mi. hwy. in Precincts 2 and 3, Corpus Christi—by County Judge, Nueces. 5-10

PALO PINTO, HOOD, SOMERVELL COS.—**Public Construction Co.,** Box 380, Denton—$25,461 for 4.9 mi. seal coat on Hwy. 108 from Mingus to Strawn; 9.4 mi. seal coat on Hwy. 16 from Brad to Brazos River Bridge; 4.8 mi. seal coat on Hwy. FM. 7 from Hwy. 291 to Pipan; 14 mi. seal coat on Hwy. 144 from Granbury to Glen Rose; 6 mi. seal coat on Hwy. 144 from Glen Rose to Bosque Co. line—by State Highway Department, Austin. 5-22

POTTER CO.—**Bell & Braden,** Herring Hotel, Amarillo—$225,436 for 7.4 mi. grade., structs., etc., on Hwy. 136 to Moore Co. line—by State Highway Department, Austin. 5-23

SHERMAN CO.—**Bell & Braden,** Herring Hotel Bldg., Amarillo—$184,669 for 8.6 mi. grade., structs., base and conc. on U. S. 54 from Stevens to Texhoma—by State Highway Department, Austin. 4-26

TOM GREEN CO.—**Thomas and Ratliff,** Rogers—$99,974 for 12 mi. grade., drain. structs., base and asphalt surf. treat. on Hwy. 380, from Tom Green Co. line to Paint Rock—by State Highway Department, Austin. 5-22

TOM GREEN CO.—**Thomas and Ratliff,** Rogers—$67,618 for 12 mi. grade., drain. structs., base and surf. treat. on Hwy. 380, from San Angelo to Concho Co. line—by State Highway Department, Austin. 5-22

TRAVIS CO.—**Dean Word,** Box 330, New Braunfels—$465,542 for 9.7 mi. grade. and structs. on Hwy. 20, intersect Cameron Rd. near NE. city limits of Austin to 0.7 mi. E. of Manor—by State Highway Department, Austin. 5-21

WISE CO.—**John T. Leslie,** Bailey—$20,098 for road bed treat. and base, from State Hwy. 24 in Decatur to Slidell Rd. on Hwy. FM 51, 4.8 mi.—by State Highway Department, Austin. 5-23

YOUNG CO.—**Ned B. Hoffman,** 306 Mid-Continent Bldg., Fort Worth—$45,876 for 5.2 mi. base and surf. treat. on Hwy. FM 67, from approx. 7 mi. N. of Graham to Loving—by State Highway Department, Austin. 5-22

YOUNG CO.—**Public Construction Co.,** Box 380, Denton—$37,106 for hot mix asphalt conc. pave. from 1.6 mi. S. of Graham to Stephens Co. line on Hwy. 67—by State Highway Department, Austin. 5-22

Utah

MORGAN CO.—**Reynolds Construction Co.,** Springville—$58,212 for 12½ mi. road work betw. Porterville and Peterson—by County Commission, Morgan. 5-18

UINTAH CO.—**Deal Mendenhall,** Springville—$171,699 for crushed rock or crushed gravel rd. surf. on Bonanza-U. S. 40—by State Road Commission, Salt Lake City. 5-25

Washington

JEFFERSON CO.—**Rush and Baird,** Seattle—$19,782 for surf. and treat. roadways in Jefferson Co.—by Department of Highways, Olympia. 5-11

Canada

BRITISH COLUMBIA—**General Construction Co.,** Vancouver—$49,512 for reconstr. of a section of the Comox Road—by British Columbia Government, Victoria. 4-27

BRITISH COLUMBIA—**Highway Construction Co.,** Vancouver—$35,709 for reconstr. work on the Vernon-Lumby Rd. in the North Okanogan—by British Columbia Government, Victoria. 4-27

Bridge & Grade Separation...

California

LAKE CO.—**Kiss Crane Co.,** 2700 San Pablo Ave., San Pablo—$129,345 for two bridges, one across Robinson Creek and other across Scott Creek, betw. 1 and 2 mi. S. of Upper Lake—by Division of Highways, Sacramento. 5-10

LOS ANGELES CO.—**James I. Barnes Construction Co.,** 1119 Montana Ave., Santa Monica—$1,672,266 for hwy. constr. on

Pacific Coast Highway betw. Dominguez Channel and San Gabriel Ave., Los Angeles and Long Beach, and four bridges—by Division of Highways, Sacramento. 5-3

PLUMAS CO.—**Kiss Crane Co.**, 2700 San Pablo Ave., San Pablo—$72,173 for steel girder bridge with conc. deck across Hamilton Branch, betw. Big Meadows Dam and Lassen Co. line—by Division of Highways, Sacramento. 5-13

SAN BERNARDINO CO.—**Denni Investment Corporation**, 736 N. Avalon Blvd., Wilmington—$652,359 for grade. and surf. 3.2 mi. for hwys. in San Bernardino Co. and constr. of bridge across City Creek—by Division of Highways, Sacramento. 5-21

Utah

WEBER CO.—**Gibbons and Reed**, 259 W. 3rd South St., Salt Lake City—$442,702 for a conc. T-beam bridge and conc. T-beam overhead with conc. and bitu. surf. approaches on U. S. 91 betw. Riverdale and South Ogden—by State Road Commission, Salt Lake City. 5-25

Water Supply . . .

California

KERN CO.—**The Wonderly Construction Co.**, 2694 Lime Ave., Long Beach—$104,716 for alterations to water distribution system, Naval Ordnance Test Sta., Inyokern—by Bureau of Yards and Docks, Washington, D. C. 5-17

SAN MATEO CO.—**C. W. Stevens**, 2010 Carroll Ave., San Francisco—$5,222 and $14,146 for water mains in portion of Rockaway Beach area, Rockaway Beach No. 1 and No. 2, Sharp Park—by North Coast County Water District, Sharp Park. 5-17

STANISLAUS CO.—**J. H. Brizendine Co.**, 135 Faustina Ave., Modesto—$7,558 for laying conc. pipeline in District 64, Benoit branch of lateral No. 4—by Modesto Irrigation District, Modesto. 5-24

STANISLAUS CO.—**Fred J. Early, Jr., Co., Inc.**, 369 Pine St., San Francisco—$39,485 for two pre-stressed conc. tanks, 60 ft. in dia., and reinf. conc. struct., Modesto—by City Council, Modesto. 5-6

Texas

BAILEY CO.—**Panhandle Construction Co.**, Box 1500, Lubbock—$78,378 for water works and sewer improvements, Muleshoe—by City Council, Muleshoe. 5-15

DALLAS CO.—**Midwest Contracting Co.**, 403 S. Haskell, Dallas—$31,889 for constr. of water mains and sanitary sewers in various parts of Dallas and Oak Cliff—by City Council, Dallas. 5-3

DALLAS CO.—**F. S. Oldt Co.**, 403 S. Haskell, Dallas—$31,982 for constr. of water mains and sanitary sewers in various parts of Dallas—by City Council, Dallas. 5-3

WICHITA CO.—**Gifford Hill & Co.**, Dallas, and **American Pipe & Construction Co.**, Box 3428, Los Angeles, Calif.—$1,449,686 for conduit betw. Wichita Falls and New Lake in Archer Co.—by City Council, Wichita Falls. 5-7

Utah

DAVIS CO.—**Perkins Construction Company**, 626 Dooly Bldg., Salt Lake City—$21,651 for constr. of a 4,000,000-gal. conc. ground storage reservoir at Bountiful—by City Council, Bountiful.

Washington

GRANT CO.—**Roy L. Blair**, W. 1220 Ide, Spokane—$38,000 for shaft and tunnel excav. for water system improvements in Grand Coulee—by City Council, Grand Coulee. 5-15

GRANT CO.—**Goodfellow Bros., Inc.**, Ferry and Mission, Wenatchee—$74,368 for pipe line for water system improvements, Grand Coulee—by City Council of Grand Coulee. 5-15

Territories

ALASKA—**Chicago Bridge & Iron Co.**, 22 Battery St., San Francisco—$23,685 for 100,000-gal. capacity electric steel water supply tank, Anchorage—by Alaska Railroad, Anchorage. 5-10

Sewerage . . .

California

FRESNO CO.—**Pacific Pipeline Construction Co.**, 2268 Firestone Blvd., Los Angeles—$71,287 for sewerage system, Fresno

Portals, Fresno Portals No. 2, Clinton Park, Stadium Heights, Stadium Tract, Wilshire Gardens, Nelson Manor and Irwin Manor, Fresno — by City Council, Fresno. 5-28

LOS ANGELES CO.—**Artukovich Bros.,** 7320 Atlantic Ave., Hynes—$20,000 for constr. and installation of sewer system, Intercepter and Inglefort near 96th St., Los Angeles—by the McCarthy Co., Los Angeles. 5-10

LOS ANGELES CO.—**Guy F. Atkinson Co.,** 1103 Heartwell Bldg., Long Beach—$3,517,410 for constr. of ocean outfall sewer from Hyperion activated sludge plant, Los Angeles—by Board of Public Works, Los Angeles. 5-31

LOS ANGELES CO.—**A. R. Milosevich,** 303 N. Alma St., Los Angeles—$2,764 for installation of sanitary sewers in Corto St. extending into Veterans Emergency Housing area, Alhambra—by City Commission, Alhambra. 5-20

LOS ANGELES CO. — **O'Shaughnessy Construction Co.,** 2400 Piru St., Compton —$5,001 for constr. of sanitary sewers in 261st St. and President Ave. Sewer District, Los Angeles — by the Los Angeles Board of Public Works. 5-3

LOS ANGELES CO.—**Steve Rados,** 2975 San Fernando Rd., Los Angeles—$78,047 for sanitary sewers in Califa St. and Tyrone Ave. Sewer District, Los Angeles—by Board of Public Works, Los Angeles. 5-20

SAN MATEO CO. — **Freethy-Fogelberg Co.,** 1436 Kearney St., El Cerrito—$23,070 for Capuchino interceptor sewer from Capuchino Golf Corp. subdivision No. 2. to proposed pumping plant site NE. of S. P. RR., and Elm St. interceptor SW. — by Lomita Park and Capuchino Sanitary District, Lomita Park. 5-28

SANTA BARBARA CO. — **Pacific Pipe Line Construction Co.,** 2268 E. Firestone Blvd., Los Angeles — $37,474 for Mesa trunkline sanitary sewer from point near SW. corner of Puente Verde tract on Mesa to intersection of Edgewater Way and Mesa Lane, Santa Barbara—by City Council, Santa Barbara. 5-28

SISKIYOU CO.—**M. W. Brown,** Redding —$8,237 for constr. of storm drain and installing connections to cross drains, 0.15 mi., at Dunsmuir—by Division of Highways, Sacramento. 5-3

Oregon

LINN CO.—**Leonard & Slate Oregon Ltd.,** Multnomah—$84,520 for 34,887 ft. of lateral sewers in newly-acquired city areas, Albany—by City Council, Albany. 5-15

Texas

DALLAS CO.—**E. L. Dalton,** 406 Great National Life Bldg., Dallas — $24,536 for water mains and sanitary sewers in East Inwood Estates—by City Council, Dallas. 5-17

DALLAS CO.—**E. L. Dalton,** 406 Great National Life Bldg., Dallas—$21,787 for sanitary sewers and water mains in Oak Cliff—by City Council, Dallas. 5-17

LAMB CO.—**Cullum and Hodgson,** Great National Life Bldg., Dallas—$44,662 for sewer improvements, Amherst — by City Council, Amherst. 5-21

Utah

SALT LAKE CO.—**The Contracting Co.,** 320 5th Ave., Salt Lake City—$16,608 for sewers for the housing project on 21st South and 24th to 27th East Sts., Salt Lake City—by William G. Lichfield, Salt Lake City. 4-27

SEVIER CO.—**L. A. Young,** Richfield—$9,000 for constr. of the sewerage project in Richfield—by City Council, Richfield. 4-27

Washington

YAKIMA CO.—**Fowler & Walters,** Seattle—$23,500 for sewage facilities at county hospital, Yakima—by County Commission, Yakima. 5-17

YAKIMA CO.—**Clyde C. Philip,** 417 E. Pine St., Seattle — $109,148 for sewage treat. plant, Grandview—by City Council, Grandview. 5-13

Waterway . . .

California

LOS ANGELES CO.—**Guy F. Atkinson Co.,** 1103 Heartwell Bldg., Long Beach—$984,960 for constr. of Los Angeles River improvements, Aliso St. to Alhambra Ave., Los Angeles—by U. S. Engineer Office, Los Angeles. 4-30

SAN FRANCISCO CO. — **Duncanson-Harrelson Co.,** 1404 DeYoung Bldg., San Francisco—$254,800 for furnishing material and driving piles for constr. of conc. headwall for Mission Rock terminal, San Francisco — by Board of State Harbor Commissioners, San Francisco. 5-17

Oregon

CLATSOP CO. — **General Construction Co.,** 3840 Iowa St., Seattle—$2,947,000 for eight reinf. conc. deck and precast conc. pile piers with apprs., Tongue Point Naval

Sta., Astoria—by Bureau of Yards and Docks, Washington, D. C. 5-6

MULTNOMAH CO. — **Kaiser Co., Inc.**, Swan Island, Portland—$160,000 for constr. of inactive fleet berthing, Swan Island, Portland—by Bureau of Yards and Docks, Washington, D. C. 5-17

Washington

PIERCE CO. — **Todd Pacific Shipyards, Inc.**, Tacoma — constr. of inactive fleet berthing, Tacoma — by Bureau of Yards and Docks, Washington, D. C. 5-17

Dam . . .

California

LOS ANGELES CO.—**Guerin Bros.**, 649 S. Olive St., Los Angeles—$483,578 for completion of embankment and spillway, Santa Fe Dam on San Gabriel River, 3½ mi. SW. of Azusa—by U. S. Engineer Office, Los Angeles. 5-1

SAN DIEGO CO.—**E. P. Watson**, Spreckels Theater Bldg., San Diego—$19,500 for reconstr. of Morena Dam spillway approx. 9 mi. NW. of Campo—by City Council of San Diego. 5-3

VENTURA CO.—**Guy F. Atkinson Co.**, Russ Bldg., San Francisco—$1,279,845 for conc. arch type Matilija Dam, 620 ft. long and 168 ft. high to create reservoir of 7,000-ac. ft., 16 mi. N. of Ventura on Matilija Creek—by Board of Supervisors of Ventura Co., Ventura. 5-29

Oklahoma

MUSKOGEE CO.—**Al Johnson Construction Co., Winston Bros. Co.**, and **Peter Kiewit Sons Co.**, Minneapolis, Minn.—$12,203,692 for Fort Gibson Dam approx. 5 mi. N. of Fort Gibson on Grand (Neosho) River—by U. S. Engineer Office, Tulsa. 5-13

Oregon

LANE CO.—**Leonard & Slate**, 7805 SW. 40th Ave., Portland, and **E. C. Hall**, Rt. 6, Box 630, Portland—$1,244,725 for hwy. and railroad relocation and pipe line at site of Dorena Dam on Row River — by U. S. Engineer Office, Portland. 6-1

Tunnel . . .

Colorado

LARIMER CO. — **Schmidt Construction Company**, Kremmling—$99,000 for processing sand and gravel for portals and concrete lining on Rams Horn and Prospect Mountain tunnels on the Colorado-Big Thompson project, near Estes Park—by Bureau of Reclamation, Denver. 5-9

Irrigation . . .

Oklahoma

GREER AND JACKSON COS.—**James and Phelps Construction Company**, Oklahoma City—$299,547 for 50 mi. of laterals and sub-laterals for irrigation system of Altus Project, near Blair, Martha and Hester—by Bureau of Reclamation, Amarillo. 5-13

Texas

DALLAS AND ELLIS COS.—**Bill McSwane**, Coleman—$58,850 for levee repairs,

Trinity River—by Dallas Co. and Ellis Co. Levee Improvement Districts 14 and 3. 5-3

Washington

GRANT CO. — **Morrison-Knudsen Co., Inc.,** 603 Hoge Bldg., Seattle—$619,000 for earthwork, main canal, sta. 751 plus 94 to sta. 1100 plus 90.8, Columbia Basin Project, near Stratford and Adrian—by Bureau of Reclamation, Coulee Dam. 5-6

Power . . .

Idaho

GOODING AND TWIN FALLS COS. —**Morrison-Knudsen Co., Inc.,** 319 Broadway, Boise—for hydroelectric installations at Lower Salmon plant on Snake River and Malad River plant—by Idaho Power Company, Twin Falls. 5-15

Montana

CASCADE CO. — **Cahill - Mooney Construction Co.,** 220 E. Front St., Butte—$288,807 for 304 mi. new rural electric line to serve 331 consumers in Augusta Flat Creek, Power-Dutton, Sun River slope and Belt Creek—by Sun River Electric Cooperative, Fairfield. 5-10

VALLEY CO.—**The Northwestern Engineering Co.,** Box 1392, Rapid City, S. Dakota—$435,412 for 348 mi. electric transmission lines, Opheim—by the Northern Electric Co-op., Inc., Opheim. 5-2

Texas

BEXAR CO.—**Gibbs and Hill, Inc.,** New York City, New York—$3,000,000 for addition to city's electric generating plant on Mission Rd., San Antonio—by City Public Service Board, San Antonio. 5-28

Washington

DOUGLAS CO.—**Electric Smith,** E. 121 Sprague, Spokane—$68,522 for Grand Coulee-Foster Creek section of Grand Coulee-Snohomish 230-kv. wood pole transmission line beginning at W. switchyard, Grand Coulee Dam—by Bonneville Power Administration, Portland. 5-24

Building . . .

Arizona

MARICOPA CO.—**Willmoth & Wittman,** Phoenix—70 2-bedroom frame houses to sell to veterans at $4,650 each, one-ac. tract S. of Broadway on 15th Ave., Phoenix—by self. 4-29

MOHAVE CO.—**W. S. Ford,** Box 928, Kingman — $198,205 for constr. of seven six-room dwellings and 13 five-room dwellings at the Davis Government camp, approx. 30 mi. W. of Kingman—by the Bureau of Reclamation, Denver, Colo. 5-3

PIMA CO.—**W. H. Walker,** 1034 N. 10th Ave., Tucson—$60,000 for one-story, seven-unit apartment bldg., E. First St. and N. Campbell Ave., Tucson—by self. 4-26

YUMA CO.—**Norman Hill,** Yuma—$65,000 for two one-story motel bldgs. and paved parking area, called Coronado Motel Annex, Yuma—by John Peach, Yuma. 4-26

California

ALAMEDA CO.—**David D. Bohannon,** 859 San Mateo Dr., San Mateo—$8,500 each for 1000-unit prefabricated subdivision, tracts adjacent to San Lorenzo Village, Hayward—by self. 5-7

ALAMEDA CO.—**H. J. Christensen Construction Co.,** 3454 Harlan St., Oakland—$450,000 for factory bldg., Fifth and Virginia Sts., Berkeley—by Dobeckman Co., Emeryville. 5-8

ALAMEDA CO.—**M. J. King,** 231 Franklin St., San Francisco—$7,500 each for 38 five-room bungalows, San Leandro — by self. 5-10

ALAMEDA CO.—**Will F. Lynn,** 1040 Folger Ave., Berkeley—$135,000 for two-story steel frame, conc. and iron warehouse at 7th St. and Folger Ave., Berkeley—by Tay-Holbrook, Inc., Oakland. 5-21

ALAMEDA CO. — **Geo. J. Maurer,** 50 York Dr., Piedmont — $92,800 for two-story frame medical bldg., 2340 Ward St., Berkeley—by Dr. S. H. Babingston, Berkeley. 5-6

ALAMEDA CO. — **Permanente Metals Corp.,** 1924 Broadway, Oakland—$100,000 for reconstr. and enlargement of the Permanente Foundation Hospital at Broadway and MacArthur Blvd., Oakland—by self. 5-15

ALAMEDA CO.—**Ray Towers,** 2508 Benvenue Ave., Berkeley—$6,500 and $10,000 each for 225 houses in subdivision to be called Fairview Terrace, adjoining Seven Oaks, near golf links, Oakland—by Edward McGah, Oakland. 5-17

CONTRA COSTA CO. — **Cannon and Larsen,** Rm. 800, 1 Drumm St., San Francisco—$5,000 each for 543 one-story wood frame homes N. of Hwy. 40 and E. of Giant Rd., near San Pablo—by California Homes, Inc., San Francisco. 4-26

CONTRA COSTA CO.—**Ganiats & Taylor,** 201 Market St., San Jose—$10,000 each for 35 five- and six-room houses as first unit of 300-house subdivision, Sun Valley Estate, Lafayette—by self. 5-1

CONTRA COSTA CO.—**Minton & Kubon,** 200 Davis St., San Francisco—$162,000 for 33-house subdivision, part of even-

tual 136-home project, S. of Fitzuren Rd. and W. of Wills Ave., Antioch—by self.

CONTRA COSTA CO.—**Ragnor Monson,** 3525 McBryde, Richmond—$1,400,000 for 149-home subdivision, frame and stucco, 2½ mi. N. of Walnut Creek on Concord Hwy. at intersection of Oak Grove Blvd. —by self. 5-17

CONTRA COSTA CO.—**Swinerton and Walberg,** 225 Bush St., San Francisco, and **Ben C. Gerwick, Inc.,** 112 Market St., San Francisco—$4,370,000 for constr. of a truck causeway, enlargement of the pier, reconstr. of repair dock, office bldg., machine shop and warehouse at Standard of California's Richmond Refinery, Richmond—by Standard of California. 5-29

CONTRA COSTA CO.—**Swinerton and Walberg,** 225 Bush St., San Francisco—$250,000 for 100-home subdivision, S. of W. Garrison, Pittsburg—by C. A. Hooper & Co., San Francisco. 5-7

KERN CO.—**H. B. Nicholson,** 1151 S. Broadway, Los Angeles—$73,957 for 10-stran-steel huts, Naval Ordnance Test Sta., Inyokern—by Bureau of Yards and Docks, Washington, D. C. 5-17

LASSEN CO.—**B. & R. Construction Co.,** 268 Market St., San Francisco—$143,277 for one-story conc. classroom bldg., Lassen Junior College, Susanville — by Lassen Union High School Board, Susanville. 5-14

LOS ANGELES CO.—**Aldon Construction Co.,** 6233 Wilshire Blvd., Los Angeles —80,000 for two 20-room, frame and stucco hotel bldgs., Cochran and S. Burnside Aves., Los Angeles—by Jack Silver, Los Angeles. 4-26

LOS ANGELES CO.—**The Austin Co.,** 777 E. Washington Blvd., Los Angeles—$250,000 for one-story frame and stucco rayon manufacturing plant, S. Reservoir St., S. of Lexington Ave., Pomona—by Hess, Goldsmith of California, Inc., Los Angeles. 5-3

LOS ANGELES CO. — **Filomena M. Barry,** 14653 Roscoe Blvd., Van Nuys—$61,800 for six double dwellings in the 8300 block Tobias and the 14600 block Roscoe Blvd., Van Nuys—by self. 5-3

LOS ANGELES CO. — **Bechtel Bros., McCone Co.,** 3780 Wilshire Blvd., Los Angeles—$750,000 for conc. footings and foundations, etc., for bldg. betw. Slauson Ave. and Randolph St., Vernon—by Bethlehem Pacific Coast Steel Corp., Los Angeles. 5-13

LOS ANGELES CO.—**A. Farnell Blair,** 7052 Santa Monica Blvd., Los Angeles—$10,000 each for 151 two- and three-bedroom dwellings on Overland Ave. near Culver City—by self. 5-3

LOS ANGELES CO.—**California National Builders, Inc.,** 128 S. La Brea Ave., Los Angeles—$18,000 each for 16 eight-unit apartment bldgs., 4400 block, Banner Dr., Long Beach—by Banner Investment Co., Long Beach. 5-17

LOS ANGELES CO.—**George O. Chapman,** 14140 Van Owen St., Van Nuys—$75,000 for two-story, 24-unit motel bldg., 17310 Sunset Blvd., W. Los Angeles—by Royden Henderson, Los Angeles. 5-17

LOS ANGELES CO.—**Community Building Co.,** 6307 Wilshire Blvd., Los Angeles —$8,500,000 for 850 $10,000, one-story, frame and stucco houses on 180-ac. subdivision at 108th St. and Western Ave., Los Angeles—by self. 5-17

LOS ANGELES CO. — **Dike, Driggers, and Lownes, Inc.,** Room 310, 408 S. Spring St., Los Angeles—constr. of 120 one-story frame and stucco homes, attached garages, Azusa—by self. 5-20

LOS ANGELES CO.—**Dike, Driggers & Lownes, Inc.,** 408 S. Spring St., Los Angeles—constr. of 95 frame and stucco, one-story houses, Van Nuys Blvd. near San Fernando Rd., Pacoima—by self. 5-17

LOS ANGELES CO.—**Howard Dunn,** Box 525, North Hollywood—$149,000 for one-story, frame and stucco, double U-shaped administrative bldg., and one-story, reinf. conc. warehouse, Montebello and Whittier Blvds., Montebello—by Montebello City Unified School District, Montebello. 5-10

LOS ANGELES CO.—**S. S. Gross,** 11444 Olympic Blvd., W. Los Angeles—$134,000 for group of hotel apartment bldgs., 11411 Ohio Ave., W. Los Angeles—by self. 5-17

LOS ANGELES CO.—**Irvine Grusine,** 641 S. Detroit St., Los Angeles—$68,500 for a 12-family, 48-room, frame and stucco apt. bldg. at 151 S. Doheny Dr., Los Angeles—by Jacob Cohen, Los Angeles. 5-3

LOS ANGELES CO.—**Halper Construction Co.,** 739 N. Highland Ave., Los Angeles—$100,000 for constr. of sound stage at 5350 Melrose Ave., Los Angeles—by Enterprise Productions. 5-3

LOS ANGELES CO.—**Peter Kiewit Sons Co.,** 345 Kieways Ave., Arcadia—$687,606 for transit shed on Berths 3 and 4, Pier A, Long Beach Outer Harbor—by Board of Harbor Commissioners, Long Beach. 5-17

LOS ANGELES CO.—**G. D. King,** 1821 W. Whittier Blvd., Whittier—$187,300 for 53 frame and stucco, five- and six-room houses, Richelieu Ave. and Terrace, Whittier—by King & Matter, Whittier. 5-17

LOS ANGELES CO.—**H. S. Lamb,** 3906 Wilshire Blvd., Los Angeles—$81,732 for three eight-family, 28-room frame and stucco apt. bldgs. at 82325¾ N. Detroit St. and 1136-42½ N. El Centro Ave., Los Angeles—by Louis E. Schwartzmann, Los Angeles. 4-26

LOS ANGELES CO.—**Majestic Builders, Inc.,** 362½ N. Stanley Ave., Los Angeles—$70,000 for two five-family, 28-room apartment houses at 1334-36 and 1342-44 Beverly Glen Blvd., W. Los Angeles—by self. 5-3

LOS ANGELES CO.—**Robert E. McKee,** 4700 San Fernando Rd., W., Los Angeles—$280,500 for two-story factory bldg., steam plant, trestle driveway to dock, altering storage bldg., and constr. of two-story addition to bagging bldg., 1301 Walter St., Long Beach—by Standard Gypsum Co., Long Beach. 5-6

LOS ANGELES CO.—**J. A. McNeil Co.,** 714 W. Olympic Blvd., Los Angeles—$375,000 for two school buildings at Corvallis High School, Laurel Canyon Blvd. and Maxwell Rd., Studio City—by Marymount School. 4-26

LOS ANGELES CO.—**J. A. McNeil Co.,** 714 W. Olympic Blvd., Los Angeles—$185,000 for two-story, 16-classroom school on Garfield Ave., Montebello, at the Sacred Heart of Mary High School—by the Roman Catholic Archbishop, Los Angeles. 4-26

LOS ANGELES CO.—**Myers Bros.,** 3407 San Fernando Rd., Los Angeles—$215,000 for warehouse, offices and shipping bldg., 5458 San Fernando Rd., Glendale. 5-17

LOS ANGELES CO.—**Wm. P. Neil Co., Ltd.,** 4814 Loma Vista Ave., Los Angeles—$86,000 for one-story warehouse at 1566 Rio Vista Ave., Los Angeles—by Sealright Pacific Co., Los Angeles. 5-3

LOS ANGELES CO.—**Fred Olsen,** 2400 W. 74th St., Los Angeles—$125,000 for church, 400-seat auditorium, complete education and recreational facilities, Queen St. and Hillcrest Blvd., Inglewood—by Inglewood Presbyterian Church, Inglewood. 5-17

LOS ANGELES CO.—**Harold W. Powell,** 342 E. 1st St., Long Beach—$100,000 for two-story, 18-unit apartment bldg., 60 Glendora Ave., Long Beach—by John A. Krancus, Long Beach. 5-17

LOS ANGELES CO.—**Herbert B. Pratt Co.,** 325 W. 8th St., Los Angeles—$63,000 for 31 four-room houses in the 11500 Kagel Canyon St. block, 11400 Kamloops St. block, and the 10500 Kelowna St. block in the Sunland-Tujunga District—by self. 5-3

LOS ANGELES CO.—**Albert Rothenberg,** 2162 Talmadge St., Los Angeles—$80,000 for four apartment bldgs. with 64 units and 80 rooms, 10995 Le Conte Ave., W. Los Angeles—by self. 4-26

LOS ANGELES CO.—**Royal Building Corp.,** 11201 Long Beach Blvd., Lynwood—$83,255 for school, one-story, six-classroom frame and stucco bldg. at NW. corner of Plant and Vail Aves., Redondo Beach—by Redondo Beach City School District. 4-26

LOS ANGELES CO.—**Ryness Construction Co.,** 6614 McKinley Ave., Los Angeles—$57,600 for 12 homes in Long Beach—by George A. Ryness, Los Angeles. 5-3

LOS ANGELES CO.—**S. & S. Builders,** 140 W. Glendale Ave., Glendale—constr. of 224 one-story, three-bedroom, frame and

stucco houses N. of Foothill Blvd. at Michigan Ave., Flintridge—by self. 5-17

LOS ANGELES CO.—**Marcelle Schmidt,** 2497 Horseshoe Canyon Rd., Los Angeles —$60,000 for 36-room, frame and stucco store and motor hotel bldg., 8200-02 Sunset Blvd. and 1485 Havenhurst Ave., Los Angeles—by self. 4-26

LOS ANGELES CO.—**Seaside Construction Co.,** 6521 Wilshire Blvd., Los Angeles —constr. of 48 four-unit apartments, Venice Way and Grand Ave., Venice—by Homestead Investment Co. and Venice Housing Corp., Los Angeles. 5-17

LOS ANGELES CO.—**Julius Simon,** 11536 Kittridge St., Van Nuys—$65,000 for 12-family bungalow court, 15210-20½ Dickens St., Van Nuys—by self. 4-26

LOS ANGELES CO.—**Wm. Simpson Construction Co.,** 816 W. 5th St., Los Angeles—$500,000 for two-story reinf. conc. addition to folding box factory, 55th St., near Alameda St., Vernon—by Pioneer Division, The Flintkote Co., Los Angeles. 5-17

LOS ANGELES CO.—**Standard Constructors, Inc.,** 140 W. Glendale Ave., Glendale—constr. of 71 one-story, three-bedroom, frame and stucco houses, Van Owen and Louise Sts., Van Nuys—by self. 5-17

LOS ANGELES CO.—**James Stewart Corp.,** 305 Henry Ford Ave., Long Beach —$346,000 for additions to copra processing plant: scale house, cake storage and grinding bldg., 305 Henry Ford Ave., Long Beach—by Spencer Kellogg & Sons Corp., Long Beach. 5-29

LOS ANGELES CO.—**Thoresen Construction Co.,** 6305 Yucca St., Hollywood —$10,000 each for 30 one-story frame and stucco dwellings, Keystone and Lamer Sts., Burbank—by self. 5-10

LOS ANGELES CO.—**Vermont Contractors, Inc.,** 9700 W. Pico Blvd., Los Angeles—constr. of 239 one-story, frame and stucco houses, betw. 132nd and 135th Sts. and Vermont and Budlong Aves., Los Angeles—by self. 5-10

LOS ANGELES CO.—**Vinnell Co.,** 108 W. 6th St., Los Angeles—$523,325 for 87 five- and six-room houses, Woodcock Ave., Nurmi St., Polk St., Norris Ave., Lakeside St., Berg St., Rex St., Glenoaks Blvd., Tyler St. and Lyle St., Van Nuys—by Rayden Building Co., Los Angeles. 4-26

LOS ANGELES CO.—**Vinnell Co.,** 1145 Westminster, Alhambra—$130,000 for addition of five bldgs. to a factory at 3311 E. Slauson Ave., Vernon—by Kerotest Pacific Co. 4-26

LOS ANGELES CO.—**J. M. Walker,** 1631-D University Ave., Berkeley—constr. of 50 three-bedroom dwellings, Santa Cruz Rd., Santa Anita Gardens, Arcadia—by Rancho Santa Anita, Inc., Arcadia. 4-26

LOS ANGELES CO.—**S. L. Wallace, Ltd.,** 5200 W. 115th St., Venice—$120,000 for 18 6-room frame and stucco residences in the 6100 W. 96th St. block and the 9400 and 9500 Jenny Ave. blocks, Venice—by self. 5-3

LOS ANGELES CO.—**S. L. Wallace, Ltd.,** 5200 W. 115th St., Los Angeles—$90,000 for 13 6-room frame and stucco homes in the 5400 W. 115th block and the 5400 and 5500 W. 116th St. blocks, Los Angeles—by self. 5-3

LOS ANGELES CO.—**William C. Warmington Construction Co.,** 8330 W. 3rd St., Los Angeles—constr. of 229 dwellings, frame and stucco, six rooms, 135th St. and Vermont Ave., Los Angeles—by self. 5-17

LOS ANGELES CO.—**Western Homes,** 1728 W. 108th St., Los Angeles—$1,387,400 for 156 frame and stucco dwellings, Normandie and Imperial Hwys., Los Angeles—by Sunset Homes, Los Angeles. 4-26

LOS ANGELES CO.—**Weymouth-Crowell Co.,** 2104 W. 15th St., Los Angeles—$166,599 for 6 bldgs. and facilities for jet propulsion laboratory, Pasadena—by California Institute of Technology, Pasadena. 5-9

LOS ANGELES CO.—**Earl L. White,** 3300 Magnolia Ave., Burbank—$495,000 for 90 five-room, frame and stucco houses, Fair, Klump, Bakman and Elmer Aves. and Keswick and Lull Sts., Van Nuys—by self. 5-17

MARIN CO.—**D. O'Connor & Son, Inc.,** 1367 25th Ave., San Francisco—$80,000 for two-part, 36-unit, two-story conc. and wood auto court; to start constr. of first part, $40,000, main hwy. betw. Sausalito and San Rafael—by Chapman and Wilson, Sausalito. 5-28

MARIN CO.—**A. Von Rotz,** 23 Brookside Dr., San Anselmo—$10,000 each for 14 residences, Hilldale Dr., just off Sequoia Park, to be called Hilldale Park—by James and David Leach, San Anselmo. 5-13

RIVERSIDE CO.—**Frank Pinkerton,** 108 S. West Blvd., Corona—$200,000 for frame and stucco packing house, 5-ac. site in Corona—by Corona Foothill Lemon Co., Corona. 4-26

SAN BERNARDINO CO.—**Wm. C. Crowell Co.,** 170 E. California St., Pasadena—$309,210 for 165 family dwelling units for veterans, San Bernardino—by Federal Public Housing Authority, San Francisco. 5-17

SAN FRANCISCO CO.—**Cahill Brothers,** 206 Sansome St., San Francisco—$1,800,000 for nine-story and basement, reinf. conc. and struct. steel addition to Western Merchandise Mart, 9th and Market Sts., San Francisco—by Western Merchandise Mart, San Francisco. 5-27

SAN FRANCISCO CO.—**M. J. King,** 231 Franklin St., San Francisco—$17,000 a pair for 12 pair deluxe frame and stucco flats, 42nd and 43rd Aves.; $14,000 each for four frame and stucco flats, 43rd, 44th Aves. and Balboa St., San Francisco—by self. 5-10

SAN JOAQUIN CO.—**Bartlett & Hosking,** 541 Civic Center, Richmond—$500,000 for 150-180-room, frame auto court, drive-in theater, combination dining room and cocktail lounge and outdoor swimming pool, 3 mi. S. of Stockton, W. of intersection at Tracy Hwy. with McKinley Rd.—by Blumfeld Theaters, Inc., San Francisco. 5-17

SAN JOAQUIN CO.—**Haas Construction Co.,** 320 Merchants Exchange Bldg., San Francisco—$285,000 for three-story and basement steel and concrete addition to telephone bldg., N. San Joaquin and Lindsay Sts., Stockton—by Pacific Telephone & Telegraph Co., San Francisco. 5-22

SAN MATEO CO.—**Buri-Buri Homes,** S. San Francisco—$11,000,000 for 1,000 to 1,200 five- and six-room residences, shopping center, market, service stas. and parking area, playground, park, school and community church, 60-unit motel with dining room, all underground facilities, 231-ac. tract on W. side of El Camino Real adj. California Golf Club property, S. San Francisco—by self. 5-1

SAN MATEO CO.—**Ernest Conougher,** 1420 Castro St., San Francisco—$100,000 for 15 one-story frame houses, Niantic St. and Westlake Ave., Daly City—by Jas. Mayer, San Francisco. 5-7

CONSTRUCTION PLANT AND EQUIPMENT FROM SHASTA DAM, CALIFORNIA

AVAILABLE FOR SALE **IMMEDIATE DELIVERY**

CABLEWAYS AND HOISTS

3—Lidgerwood, 3-drum electric hoists with 500 h.p. G. E. motors. Ward Leonard control, complete with controls and all electric equipment.

2—Lidgerwood, 3-drum electric hoists with 500 h.p. Westinghouse motors complete with controls and all electrical apparatus.

5—Cableway towers, structural steel, 3—125 ft.; 1—75 ft. and 1—45 ft., complete with travel mechanism.

6—Complete sets of carriages, main and auxiliary, fall and dump blocks, fall rope carriers, buttons, takeup bars and takeup sheaves.

1—American pillar crane. Cap. 5 T. at 48½ ft. and 15 T. at 25 ft. radius.

1—Colby elevator hoist, double drum, 75 h.p., equipped with brakes and emergency equipment, including one hoist cage. 15 ton capacity.

12,000 lin. ft. of used 3" dia. locked coil cable in length from 500 to 2600 lin. ft.

Misc. lot of sheaves, jewels, blocks, etc.

CEMENT PLANT

1—Dual No. 265 Fuller Fluxo cement pump, duplex type complete with gravity feed and automatic control equipment. 400 bbls. per hr. capacity. Pumping distance 3300 ft.

1—C-200 Fuller single stage rotary compressor Westinghouse motor 100 h.p.

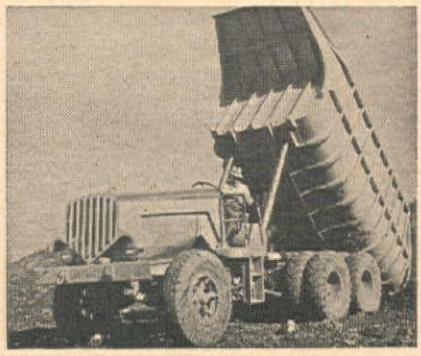
CONVEYORS

30—Motor-operated gates for sand and gravel up to 6" cobbles with 1-h.p. Allis-Chalmers gear motor.

2—Complete sets, including 42" tandem drive pulleys, 42" head pulleys, 36" tail pulleys.

3—150 h.p. Westinghouse gear motors, 144 r.p.m., 2300 volts, 3-phase, 60 cycle.

1—Airplane tripper for 36" belt with two 17' wing belts, capacity 1,000 T. per hour, complete with pulleys, drives and gear motors.



10—White Dump Trucks Model 1580-691, 24 cu. yd. capacity in good condition.

DRILLING EQUIPMENT

2—Mod. 315 I-R portable compressors, gas driven.
5—I-R paving breakers.
8—I-R drifters DA35.
1—I-R-54 drill sharpener.
10—I-R jackhammers.

TANKS AND RECEIVERS

10—8 cu. yd. steel hoppers, including gates and air rams.
2—Water filters.
2—Wallace & Tiernan chlorinators.
1—9500 bbl. all welded water tank, 48' dia., 30' high.
1—5400 bbl. all welded water tank, 36' dia., 30' high.
1—200 bbl. steel water tank.
10—Sandblast tanks 24" x 96" with hoppers and fittings.
10—Lubricator tanks 14" x 30"; 24" x 48"; and 24" x 60".

PUMPS

2—Bingham type SVD submersible pumps.
10—I-R No. 25 sump pumps.

MIXING PLANTS

1—3000 cy. bin with 5 compartments for aggregates, 2 compartments cement, incl. turnhead, gates.

1—Complete set C. S. Johnson fully automatic batching equipment for 5 aggregates, cement and water for 4 cy. batchers.

5—4 cy. Koehring concentric zone mixers, including batchmeters, timers, consistency meters.

MISCELLANEOUS

1—P.A.X. automatic telephone switchboard with 76 phones.

Pole line hardware.

Floodlites—500 to 1500 w.

1—1¼ cu. yd. heavy duty clamshell bucket.

12—Muck skips, 7—14 cu. yds.

50—Chicago pneumatic concrete vibrators, Nos. 417, 518 and 519.

Several sizes of monkey wrenches, wood borers, chipping and riveting guns.

New and used rubber hose, ¾" to 4".

MACHINERY AND SUPPLIES

1—125 kw. motor generator set, 275 volts D.C.

Complete stock of warehouse supplies.

Complete line of transformers and electric motors.

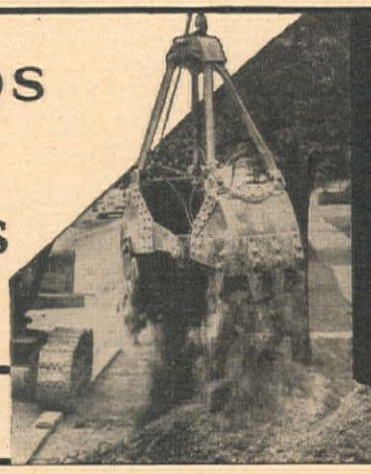
ALL ITEMS SUBJECT TO PRIOR SALE

PACIFIC CONSTRUCTORS, INC.

GENERAL CONTRACTORS—BOX 898, REDDING, CALIFORNIA **Phone 512 REDDING**

On most jobs When Excavating is Necessary

OWEN BUCKET CO., LTD.
BERKELEY, CALIF.
Dealers: Los Angeles, Spokane, Seattle, Portland, Salt Lake City, Honolulu.



You'll most likely come face to face with one or more Owen buckets, should your travels take you to an excavating job.

The reason why is most simple, for consistent superior bucket performance by Owens is responsible for their widespread use and acceptance.

Bring your equipment catalog files up to date NOW by requesting your copy of the latest Owen Catalog.

SAN MATEO CO.—**Richard Delucchi & Co.,** 420 San Mateo Ave., San Bruno—$75,000 for frame, stucco and wood apartment bldg., Baywood Tract on Parrott Dr., San Mateo—by Dr. Mulligan, San Mateo. 5-29

SAN MATEO CO.—**Dinwiddie Construction Co.,** 210 Crocker Bldg., San Francisco—$120,000 for new burial vaults, Cypress Lawn Cemetery, Colma—by Cypress Abbey Co., San Francisco. 5-24

SAN MATEO CO.—**J. & S. Construction Co.,** 156 Castenada Ave., San Francisco—$75,000 for leather factory and cafeteria, Daly City—by Forest Leather Products Co., San Francisco. 5-7

SAN MATEO CO.—**M. J. King,** 231 Franklin St., San Francisco—$7,500-$9,500 each for 225 one-story frame and stucco bungalows, Redwood City—by self. 5-10

SAN MATEO CO.—**Rademann & Guisto,** 40 Ringold St., San Francisco—$225,000 for reinf. conc. and struct. steel factory bldg. and offices, S. San Francisco—by N. Rothman, San Francisco. 4-30

SAN MATEO CO.—**R. A. White,** 744 Crossway Rd., Burlingame—Constr. of 50-unit industrial district consisting of warehouses, stores, etc., on Rollins Road, Burlingame—by Industrial Realty Co., R. A. White and Walker Thorn. 5-14

SANTA CLARA CO.—**E. A. Hathaway,** 1275 Glen Eyrie Ave., San Jose—$120,000 for conc. and steel industrial bldg., W. San Carlos St., San Jose—by Orchard Supply Co., Ltd., San Jose. 5-16

SANTA CRUZ CO.—**Hamilton & Church,** 383 Ocean St., Santa Cruz—$200,000 for work on Hotel Casa Del Rey, Santa Cruz—by Harry A. Farros and M. Michel, San Francisco. 5-14

STANISLAUS CO.—**Matthew A. Little,** 1 Grand View Ave., San Francisco—$700,000 for 80-unit subdivision, two and three bedrooms, Oakdale—by self. 5-1

STANISLAUS CO.—**Robert McCarthy Co.,** 1050 Kirkham St., San Francisco—$114,152 for moving and erecting 76 emergency veterans' housing units, Stanislaus Co.—by Federal Public Housing Authority, San Francisco. 4-26

TULARE CO.—**Harris Construction Co.,** Box 109, Fresno—$99,693 constr. of cafeteria bldg. at High School on Olive St., Porterville—by Porterville Union High School District. 5-21

VENTURA CO.—**MacIsaac & Menke,** 3440 E. 22nd St., Los Angeles—$175,000 for one-story, masonry frozen foods bldg., 5th St., Oxnard—by Ventura Farms Frozen Foods Inc., Oxnard. 5-10

VENTURA CO.—**Paul Spencer,** 832 W. 5th St., Los Angeles—$157,852 proceed order for 76 family dwelling units, Oxnard—by Federal Public Housing Authority, San Francisco. 5-28

Nevada

WASHOE CO.—**Ludwig Flyge,** Reno—$136,049 for automobile sales and service bldg., Virginia and California Sts., Reno—by Mr. and Mrs. Gerald Lyons, Reno. 5-28

New Mexico

BERNALILLO CO. — **Kilbourne L. House,** Albuquerque—$65,000 for conc. and brick bldg. for storage maintenance and repairs of buses and an office section, at 609 S. Yale, Albuquerque—by Albuquerque Bus Company, Albuquerque. 5-3

Oregon

MARION CO.—**F. I. Bressler Co., Inc.,** Box 28, Salem—$2,000,000 for 250-dwelling private housing project, 72-ac. site 1¼ mi. N. of Salem city limits on River Rd. to Newport—by Commonwealth, Inc., Portland. 4-26

MULTNOMAH CO.—**William C. Bauman,** Portland—$150,000 contract on a cost-plus basis for constr. of administration bldg. at 5525 N. Northwick, Portland—by City Council, Portland. 5-23

MULTNOMAH CO.—**Roy T. Earley & Co.,** 321 Middle Waterway, Tacoma, Wash.—$300,000 for two hollow-tile, steel and conc. bldgs., Portland—by Pennsylvania Salt Manufacturing Co., Portland. 5-2

MULTNOMAH CO.—**Ross B. Hammond Co.,** 1241 Williams Ave., Portland—$228,000 for one-story and basement, steel and conc. warehouse, SE. Third and Mill St., Portland—by Northwest Grocery Co., Portland. 5-20

MULTNOMAH CO.—**L. H. Hoffman,** 715 SW. Columbia, Portland—routine work on $11,000,000 expansion of pulp and paper plant, Portland — by Crown Zellerbach Corp., Portland. 5-27

MULTNOMAH CO.—**Reimers & Jolivette,** Builders Exchange Bldg., Portland—$150,000 for two-story reinf. conc. office and warehouse bldg., Portland—by Van Waters & Rogers, Inc., Seattle, Wash. 5-23

Texas

BEXAR CO.—**Austin Co.,** Clifford Ave., Fort Worth—$100,000 for warehouse and processing plant at Seguin Hwy., San Antonio—by Associated Seeds, Inc., San Antonio. 5-21

BEXAR CO.—**Lynn and Morsey,** Box 2546, San Antonio—$270,000 for school bldg. at the corner of Zarzamora and Kentucky Sts., San Antonio—by Shrine of Little Flower, San Antonio. 5-22

BEXAR CO.—**Walsh and Burney Co.,** 928 N. Flores St., San Antonio—$150,000 for three-story bldg., 108 Marcia St., Alamo Heights—by St. Peter's Church, Alamo Heights, San Antonio. 4-30

DALLAS CO.—**J. W. Bateson,** 1103 Irwin-Keasler Bldg., Dallas—$500,000 for one-story manufacturing plant at Ledbetter Dr. and U. S. 75, Dallas—by Verson Allsteel Press Co., Chicago, Ill. 5-9

DALLAS CO.—**J. W. Bateson,** 622 Irwin-Keasler Bldg., Dallas—$250,000 for one- and two-story plant and office bldg. at Cedar Springs Rd. in Airlawn Industrial Park, Dallas—by Continental Motors Corporation, Garland. 5-7

DALLAS CO.—**G. L. Morten,** Dallas—$100,000 for two-story bldg., auditorium and classrooms, 839 W. 10th St., Dallas—by Grace Temple Baptist Church, Dallas. 4-26

DENTON CO.—**J. W. Bateson,** Irwin-Keasler Bldg., Dallas—$1,038,000 for general work for Bruce Hall Dormitory, State Teachers College, Denton—by Board of Regents, State Teachers College. 5-22

POTTER CO.—**L. S. Lambert Co.,** Amarillo—$95,000 for one-and two-story theater and store bldg., Amarillo—by Interstate Theaters Inc., Amarillo. 5-20

RANDALL CO.—**C. S. Lambie Construction Co.,** Box 1167, Amarillo—$127,000 for

veteran housing, Canyon — by W. Texas State Teachers College, Canyon. 5-2

TARRANT CO. — **Andrews & Osborne,** Fort Worth—$400,000 for two-story office and apartment bldg., steel and brick, White Settlement Rd., Fort Worth—by Frank W. Maddox, Fort Worth. 4-29

TARRANT CO.—**E. D. Ingrum,** Fort Worth—$108,000 for 18 one-story dwellings in the Crestwood Addition. Fort Worth—by self. 5-7

TARRANT CO. — **H. I. Moreland,** Fort Worth—$75,000 for one-story school bldg., Fort Worth—by St. Mary's School, Fort Worth. 5-6

TRAVIS CO.—**Bank Building and Equipment Corp. of America,** 906 Sidney St., St. Louis, Mo. — $170,000 for two-story and basement addition to bank and remodeling, Austin National Bank, Austin—by Austin National Bank. 4-29

WINKLER CO.—**G. C. Dunlap,** Abilene —$195,700 for grade school bldg., Kermit—by Independent School District, Kermit. 5-8

Utah

SALT LAKE CO.—**Jacobsen Construction Co.,** 724 S. 3rd, East, Salt Lake City—$750,000 for three addt. stories and elevator wing to Mountain States Telephone & Telegraph Co., Salt Lake City—by Mountain States Telephone & Telegraph Co., Salt Lake City. 5-22

WEBER CO.—**W. E. Thatcher,** 17th and Jackson, Ogden—$100,000 for constr. of bowling alley, Ogden—by E. M. Peterson, Ogden. 4-27

Washington

KING CO. — **John W. Maloney,** Central Bldg., Seattle—$102,000 for completion of three-story S. wing of Seattle College, Broadway and Madison, Seattle—by Seattle College. 5-24

KITSAP CO.—**General Construction Co.,** 3840 Iowa Ave., Seattle—$2,930,000 for two conc. piers and 10 moorings and access trestles for inactive vessels at Puget Sound Navy Yard, Bremerton — by Bureau of Yards and Docks, Washington, D. C. 5-17

KITSAP CO.—**Henrik Valle Construction Co.,** 407 3rd Ave. W., Seattle—$240,000 for five-story reinf. conc. bldg., 4th St., betw. Pacific and Washington Sts., Bremerton—by Joseph Haas & Son, Port Orchard. 5-17

PIERCE CO.—**George Warter,** Tacoma—$170,000 for three-story, fire-resistant school bldg. on the Pacific Lutheran College grounds, Tacoma—by Pacific Lutheran College, Tacoma. 5-3

PIERCE CO.—**Woodworth & Co.,** 1200 E. D St., Tacoma—$200,000 for additions to Centennial Flouring Mills Co., and two-lane tunnel hwy. beneath it, Tacoma—by Centennial Flouring Mills Co., Tacoma. 5-6

SPOKANE CO.—**Gus J. Bouten Construction Co.,** Spokane—$100,000 for constr. of a two-story reinf. conc. plant at E. 304 Second, Spokane—by Ainslie Paper Box Company, Spokane. 5-7

WALLA WALLA CO.—**A. Ritchie & Co.,** Walla Walla — $125,000 for constr. of a two-story, reinf. conc. bldg. at the SE. corner of Boyer and Marcus Sts., Walla Walla—by Empire Furniture Company, Walla Walla. 5-11

WHATCOM CO. — **Eiford & Chisholm,** Box 54, Bellingham—$268,300 for brick grade school bldg., Nooksack—by Whatcom County School District No. 506, Nooksack. 5-27

Territories

ALASKA—**R. J. Sommers Construction Co.,** Seattle — $125,000 for two-story and basement bldg. of full conc. constr., Juneau —by Dr. Robert Simpson, Juneau. 5-15

HAWAII—**McNeil Construction Co.,** 5860 Avalon Blvd., Los Angeles—$225,000 for two-story fireproof store and office bldg. at the corner of King Kalakaua and Young Sts., Honolulu—by King Kalakaua Bldg., Honolulu. 5-3

Canada

BRITISH COLUMBIA — **Bennett & White Construction Co., Ltd.,** 510 W. Hastings St., Vancouver—constr. of block of terraced houses, 17 bldgs., 136 family units, Fourth Ave. betw. Macdonald and Waterloo Drs., Vancouver—by Housing Enterprises, Ltd., Vancouver. 5-23

BRITISH COLUMBIA—**Jack Dalrymple,** Penticton—$100,000 for cold storage warehouse and packing plant for apples, Canoe—by Salmon Arm Farmers' Exchange, Canoe.

BRITISH COLUMBIA—**Dominion Construction Company, Ltd.,** 150 West First Ave., Vancouver—$80,000 for new furniture factory at 74th Ave. and Marine Drive, Vancouver—by A. P. Madsen & Co., Vancouver. 5-11

Miscellaneous . . .

California

CONTRA COSTA CO.—**J. H. Pomeroy & Co., Inc.,** 333 Montgomery St., San

Francisco—$6,000,000 for preliminary work on $25,000,000 tinplate mill: conc. foundations, pave., grade., pipe-laying, rail relocation, track installation, constr. of 600-ft. dock, Pittsburg—by Columbia Steel Co., Pittsburg. 5-17

KERN CO. — **Haddock-Engineers Ltd.,** 129 W. 2nd St., Los Angeles—$278,783 for outside utilities for research laboratory: paving, steam distribution system, generating plant, water mains, sewage and waste line, trackage, fencing, gates, power and telephone lines, etc., Naval Ordnance Test Station, Inyokern—by Bureau of Yards and Docks, Washington, D. C. 4-27

RIVERSIDE CO. — **Artukovich Bros.,** 2320 Atlantic Ave., Hynes—work incidental to placing of 130-mi. coaxial buried cable from Whitewater to Blythe — by Southern California Telephone Co., Los Angeles. 5-2

RIVERSIDE CO. — **Consolidated Steel Corp.,** Box 6880, E. Los Angeles Branch, and **Morrison-Knudsen Co., Inc.,** Box 450, Boise, Ida.; **American Steel and Wire Co.,** 60th and Lowell Sts., Oakland—$3,000,000 for 12,400-ft. steel tower and steel cable aerial passenger tramway from near Palm Springs to top of 8,500-ft. Mt. Jacinto—by San Jacinto Mountain Park Authority, San Jacinto. 5-30

SAN DIEGO CO.—**T. A. Kvale,** La Luna Ave., Ojai—$42,995 for removal of tracks, ties, etc., and installing ties, tracks and pave. with conc. at the station railroad spur tracks, Marine Corps Base, San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-20

Idaho

VALLEY CO.—**Wixon & Crowe,** Box 799, Redding, Calif.—$191,000 for clearing part of Cascade reservoir site, N. Fork of Payette River, 1 to 10 mi. NW. of Cascade, Boise Project—by Bureau of Reclamation, Cascade. 5-17

Nevada

CLARK CO.—**Fleetwater Swimming Pool Co.,** 14332 Ventura Blvd., Sherman Oaks—$89,800 for 30 x 75-ft. swimming pool and one wading pool, Las Vegas—by City Manager, Las Vegas. 5-27

Oklahoma

TULSA CO. — **Pool Construction Co.,** Shawnee—$19,345 for clearing and grubbing at Mohawk water plant, Tulsa—by City Council, Tulsa. 5-13

Oregon

MULTNOMAH CO.—**Commercial Iron Works,** 412 SE. Stephens St., Portland—$175,774 for dry-dock and overhaul of the U. S. dredge Col. P. S. Michie—by U. S. Engineer Office, San Francisco. 5-22

MULTNOMAH CO.—**Homes Construction Co.** and **Ross B. Hammond Construction Co.,** Builders' Exchange Bldg., Portland—$25,000,000 for 2,000 residences, 22 mi. of sts., curbs, sanitary sewer system, shopping areas, etc., Cedar Hills area betw. Sunset Hwy. and Canyon Rd., 6 mi. W. of downtown Portland—by selves. 5-3

Washington

MASON CO.—**F. E. Wilder,** Rt. 6, Olympia—$59,400 for clearing right-of-way for 115,000-volt transmission line, Shelton-Allyn, Bonneville project—by Bonneville Power Administration, Bonneville City. 5-24

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

The new SUTTON-MORF TRACTOR CO. plant on 19th and Broadway in Sacramento, Calif., will be one of INTERNATIONAL HARVESTER CO.'s most up-to-date units. Costing $100,000 and being

built by Stolte, Inc., of Oakland, it is noted for its modernistic design and use of non-critical materials. Reinforced concrete and glass are the major building materials.

☆ ☆ ☆

Norman W. Tatteson, with headquarters in Stockton, has been named sales representative for the EDWARD R. BACON COMPANY of San Francisco, to cover San Joaquin, Stanislaus, Calaveras and Tuolumne counties. **Ray Campbell** has been transferred to the company's Oakland office as field representative.

☆ ☆ ☆

SQUARE D CO., Los Angeles, Calif., is building a new West Coast Division plant in Los Angeles to manufacture and assemble electrical control and distribution equipment. General manager of the West Coast Division is **Joseph H. Pengilly,** a vice president who returned to the firm after service in the Army Engineers.

☆ ☆ ☆

San Francisco will be headquarters for **George E. Gates,** newly - appointed staff member of WORTHINGTON-RANSOME CONSTRUCTION EQUIPMENT DIVISION of Worthington Pump & Machinery Co., of Harrison, N. J.

☆ ☆ ☆

Lieut. Col. Beverly G. Brown, formerly superintendent of construction and maintenance, San Francisco General Office of TIDE WATER ASSOCIATED OIL COMPANY, on April 1st returned to the company following his release from military service.

☆ ☆ ☆

W. Z. Bancroft is now district manager of LE ROI CO., Milwaukee, Wis., in the San Francisco office.

☆ ☆ ☆

Two new appointments at RHEEM MANUFACTURING CO., Richmond, Calif., are **Kenneth W. Browning** to sales promotion manager at Chicago, Ill., and **Norman E. Thompson** as production manager for all plants of Rheem, with headquarters at New York City. Browning joined the firm's Salt Lake City stoker plant in 1945, and Thompson joined in 1943 as assistant manager for all the Chicago plants.

☆ ☆ ☆

Election of **J. E. Butler** as comptroller has been announced by COLUMBIA STEEL CO. Butler, who succeeds **C. T. Redmond,** resigned, was comptroller of government-owned Geneva Steel Co. near Provo, Utah, before rejoining the Columbia branch of U. S. Steel.

☆ ☆ ☆

GAR WOOD INDUSTRIES, manufacturer of truck bodies and hoists, of winches and cranes, road machinery and other equipment recently announced the appointment of **Ross Miller** as manager of their Pacific Coast factory in San Francisco.

☆ ☆ ☆

Just appointed manager of radio sales at GENERAL ELECTRIC SUPPLY CORP., San Francisco, Calif., was **Howard M. Hitt,** former district service manager.

☆ ☆ ☆

Since May 1, **Francis M. Rich** has been vice president in charge of operations at the Fontana iron and steel plant of KAISER CO., INC., Oakland, Calif. Rich was formerly with the Steel Co. of Canada, Ltd.

☆ ☆ ☆

Los Angeles will receive a new western manager of the Thermo-Aire division of EVANS PRODUCTS CO., Detroit, Mich. **E. J. Sanders,** who has contributed to the perfection of the Thermo-Control Fan, has the appointment. **Frank Dolinich** will assist **J. J. Brandon,** eastern sales manager at Cranford, N. J., and **Frank A. Chase** is now central sales manager of the Thermo-Aire division with offices in Cleveland.

☆ ☆ ☆

James L. Fee has recently become manager of industrial relations for BETHLEHEM PACIFIC COAST STEEL CORP., San Francisco, Calif. His position includes operations of three steel plants, two fabricating works and four mill depots. He will continue as assistant to **T. S. Clingan,** vice president in charge of mill operations.

☆ ☆ ☆

LaPLANT-CHOATE MANUFACTURING CO., INC., of Cedar Rapids, Ia., has set up a factory branch at 1022 77th Ave., Oakland, Calif., to provide an adequate supply of parts and better service for earthmoving equipment users in the West. In charge of **S. I. Harris,** western division

sales manager, the new branch replaces the former one at San Leandro, Calif., and will include sales, service and parts headquarters for seven western states, Alaska, Hawaiian Islands and British Columbia.

SALES MANAGER of the new western division of LA PLANT-CHOATE MANUFACTURING CO., INC., Cedar Rapids, Ia., is S. I. HARRIS, top left, with his headquarters in Oakland, Calif., and will be assisted by WARREN F. MARTIN, M. E. NESBIT and G. H. TAYLOR as district sales representatives. Harris was in charge of the equipment firm's central California district for a number of years before he joined the U. S. Engineer Corps as a captain in 1942. Martin, who will represent Southern California and Arizona, did buying and selling of construction equipment before he entered the Engineer Corps in 1942. Discharged in 1945, he returned to the E. H. Edwards Co., from which he resigned to go with LaPlant-Choate. "Monty" Nesbit is district representative for Northern California, Nevada and Utah with headquarters in Sacramento. Before the Engineer Corps claimed him he worked in highway construction. Herb Taylor, an old LaPlant-Choate Caterpillar man, has been transferred from the Southeast to Portland, Ore., as Pacific Northwest representative. He was also chief inspector in Cedar Rapids for four years.

☆ ☆ ☆

Two new vice presidents are included in the organization changes of the Associated division of TIDE WATER ASSOCIATED OIL CO., San Francisco, Calif. **Herschel Y. Hyde** has been appointed vice president in charge of manufacturing, succeeding **Lloyd F. Bayer** who will devote his full time to the duties of chairman of the operating committee. **W. P. Hugo,** who continues as manufacturing manager, was appointed an assistant vice president of the company. **T. O. Edwards, Jr.,** general superintendent of Avon Refinery for more than eight years, has been named general manager of the Avon plant. **C. K. Viland** is general supervisor of the research and development department, succeeding Hyde, and **T. L. Wark** is new vice president in charge of production.

☆ ☆ ☆

The ADOLF FRESE CORPORATION is now handling the Ward sieve shaker, an efficient and economical means of rapid and thorough segregation of grain sizes for cements, highway and construction materials, sand, clay and chemicals. The Adolf Frese Corporation is located at 116 West 17th St., Los Angeles, and has a complete stock of laboratory apparatus and supplies.

W. D. Jones has been appointed manager of the Industrial Tire and Track division of B. F. GOODRICH CO., Akron, O., succeeding **Charles H. Kanavel** who has been named Los Angeles district manager for the automotive, aviation and government sales division.

☆ ☆ ☆

A manufacturing development division at CATERPILLAR TRACTOR CO., Peoria, Ill., has been formed under the direction of **C. A. Matheny** who formerly was factory superintendent at the Peoria plant and was works manager of Caterpillar Military Engine Co.

☆ ☆ ☆

R. M. BUZARD, right, Western district manager for International Harvester Co., congratulates A. W. ENGSTROM, works manager, as first International heavy duty Western model truck rolls off assembly lines at Emeryville plant.

☆ ☆ ☆

INTERMOUNTAIN

Exclusive territorial distributors of Ransome Blue Brute pavers and mixers, made by WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J., are: Interstate Truck & Equipment Co., Billings, Mont.; Caird Engineering Works, Helena, Mont.; Airport Machinery & Storage Co., Anchorage, Alaska; J. K. Wheeler Machinery Co., Salt Lake City, Utah; Shaw Equipment Co., Dallas, Tex.; Bud Fisher Co., Albuquerque, N. Mex., and Andrews Equipment Service, Portland, Ore., and Spokane, Wash.

☆ ☆ ☆

Appointment of **Frank Axhauer** as Arizona manager for SEASIDE OIL COMPANY has been announced by **F. E. McClaren**, vice president. Axhauer will supervise all Seaside operations in the state. With more than 15 years' experience in the marketing of petroleum products, Axhauer is well grounded for his new duties. For the last five years he has been manager of the company's Phoenix office.

☆ ☆ ☆

Appointment of H. W. LEWIS EQUIPMENT CO., San Antonio, Texas, as southern Texas distributor for the DAVEY COMPRESSOR CO. of Cleveland, Ohio, was announced recently. The Lewis company will handle the complete Davey line, including portable and stationary compressors, power timber saws and other equipment.

Ralph K. Alexander, until recently district sales manager for CECO STEEL PRODUCTS CORP. at Oklahoma City, Okla., has been appointed the firm's Texas manager with headquarters in Houston. **William A. Smith,** assistant manager at Washington, D. C., has been named his assistant.

☆ ☆ ☆

PACIFIC NORTHWEST

KENWORTH MOTOR TRUCK CORP., Seattle, Wash., has sent its first truck rolling off the production line of the new Seattle plant. The old Kenworth plant stopped production March 4. The new one was used as Boeing Plant 3 during the war, and was previously the Fisher Body Plant.

☆ ☆ ☆

Rufus W. Gilley has been appointed manager of GILLEY BROS., LTD., New Westminster, B. C., building materials firm. He has also been named manager of the Monarch Towing & Trading Co., Ltd., according to **Gordon Farrell,** president of Evans, Coleman & Gilley Bros., Ltd., parent company.

☆ ☆ ☆

A recent important timber transaction was the simultaneous purchase by UNITED STATES PLYWOOD CORP., New York, of an additional 59 per cent of the Kosmos Timber Co. and acquisition of the Seattle Export Lumber Co. Kosmos covers 55,000 ac. north of Mt. Rainier, Washington, and Seattle Export operates a large sawmill on Puget Sound, producing more than 175,000 ft. of lumber per day.

☆ ☆ ☆

Operations of the CANADIAN MIXERMOBILE CO., LTD., Vancouver, B. C., were transferred to its new plant in North Vancouver recently.The new factory was formerly the McLean-Weir plant and has wharfage for scows and rail facilities. Mixermobile recently secured markets for its machinery in Peru, Columbia, Argentina, Venezuela, Chile and Mexico.

☆ ☆ ☆

AMONG THE MANUFACTURERS

R. G. LeTOURNEAU, INC., of Peoria, Ill., received one of the nation's top industrial advertising honors when the Associated Business Papers named the firm a winner in the machinery and equipment division of its Fourth Annual Business Paper Advertising Competition. Presentation of the award was made to LeTourneau advertising manager, **Eugene E. Weyeneth.** This is the second time LeTourneau has won the award in the four years of competition.

☆ ☆ ☆

Returnee to DAVEY COMPRESSOR CO., Kent, O., is Navy veteran **J. T. Myers,** who has been appointed assistant general manager.

☆ ☆ ☆

THE GOODYEAR TIRE & RUBBER CO., Akron, Ohio, in its annual report announces consolidated net sales for the year 1945 were $716,176,748, as compared with $786,722,287 for 1944. The decrease reflects the cancellation of war contracts at the termination of hostilities. Consolidated earnings amounted to $15,136,816, equivalent to $5.87 per share of common stock outstanding.

☆ ☆ ☆

The annual report of the CHAIN BELT COMPANY of Milwaukee, Wis., for the fiscal year ending October 31, 1945, revealed total sales for the year of $28,197,939, the second largest in the history of the company. Net earnings for the year, after deducting taxes, renegotiation and all other charges amounted to $854,081, as compared with $828,968 in 1944.

☆ ☆ ☆

GARDNER-DENVER CO., Quincy, Ill., has its old advertising manager, **B. P. Spann,** back after more than 38 months in the Navy. During the war, Spann was officer in charge of maintenance and overhaul spare parts for all Navy transport aircraft at the Aviation Supply Office in Philadelphia.

☆ ☆ ☆

Harvey A. Craig is new Pacific Coast manager of REPUBLIC STEEL CORP., Cleveland, O.

Manhattan Rubber Division RAYBESTOS-MANHATTAN, INC., Passaic, N. J., was recently awarded one of the first annual awards of the American Public Relations Asso. at its convention. The award, made in the field of management, was received by **J. J. De Mario.**

☆ ☆ ☆

After 33 years with the J. D. ADAMS MFG. CO., Indianapolis, Ind., **Howard R. Meeker** has been elected president, succeeding **Roy E. Adams** who will remain as chairman of the board. Meeker has served as factory manager, division sales manager, general sales manager and, since 1939, as executive vice president.

☆ ☆ ☆

Work is well under way for the erection of the new office building and warehouse

for JOHN A. ROEBLING'S SONS COMPANY of Illinois. The structure is designed and located to facilitate material handling and expedite customer service, and is at 5525 W. Roosevelt Road, in Chicago, Ill.

☆ ☆ ☆

Appointment of **Walter K. Farst** as general manager of the Zanesville, Ohio, cement plant of PITTSBURGH PLATE GLASS CO. was recently announced by **E. T. Asplundh,** vice president in charge of the company's chemical and cement division. Associated with the glass company for 23 years, Farst has been chief engineer in chemical plants operated by the Columbia Chemical Division of the company for the past five years. He succeeds the late **Arthur R. Haley.**

☆ ☆ ☆

The annual report of the CHAIN BELT CO., Milwaukee, Wis., for the fiscal year ending Oct. 31, 1945, shows total sales for the year amounted to $28,197,939.85, the second largest in the history of the company. Net earnings for the year, after deducting the provisions for renegotiation, taxes, reserves and all other charges, amounted to $854,081.06, as compared with $828,968.62 for the previous year. In ratio to net sales earnings increased from 2.8% in 1944 to 3% in 1945. This improvement in ratio is in part the result of the larger proportion of peacetime business included in the year's sales. On a per share basis, net earnings were equal to $1.75 as compared with $1.70 in 1944 and an average of $1.77 for the four war years.

☆ ☆ ☆

On May 1st **Richard W. Darrow** took over his new duties as director of public relations for THE GLENN L. MARTIN COMPANY, Baltimore, Md.

INCREASING SALES and engineering strength in branch offices, Ilg Electric Ventilating Co., Chicago, Ill., has appointed four young officials. E. J. STONE succeeds A. H. KIRKPATRICK as manager of the Detroit office. CAPT. W. L. HOCHSCHILD is in the Chicago branch office as sales engineer. JOHN D. BRIGGS has been assigned to the Ilg branch office in Philadelphia, and WILLIAM S. GORHAM has been named sales engineer in the Los Angeles office. These appointments bring the number of principal Ilg offices up to 43.

☆ ☆ ☆

Four recent changes among the personnel of THE TIMKEN ROLLER BEARING CO., Canton, Ohio, include: the transfer of **F. R. MacFadyen** from the Milwaukee offices to the Canton engineering department, as industrial engineer; the promotion of **Walter F. Green** to assistant manager of the company's Division of Research and Development, with **Joseph M. Roshong** becoming superintendent of the same division; and Green's former position of works engineer now being handled by **Harley J. Urbach.**

☆ ☆ ☆

Charles L. Saunders became executive vice president of WHEELCO INSTRUMENTS CO., Chicago, at the annual board of directors meeting. New director of the company is **R. A. Schoefeld,** a present vice president, and new vice presidents are **Claude A. Gates** and **C. H. Joy.**

☆ ☆ ☆

In its annual report to stockholders for the year 1945, THE WHITE MOTOR CO., Cleveland, O., tells that heavy production was maintained throughout the year, with favorable earnings accruing from the operations. Net profit was $2,033,598, equal to $3.25 a share, based on total net sales of $100,508,268.

☆ ☆ ☆

Edmund P. Cadle, western distributor for the INTERNATION VIBRATION CO., has added the YAUN DRAGLINE BUCKET CO. of Baton Rouge, La., to his distributing service.

☆ ☆ ☆

Gordon Rieley, vice president of BRYANT HEATER CO., Cleveland, Ohio, has been appointed director of the newly-established building and construction price

division of the Office of Price Administration. He is on leave of absence from the Bryant company, with whom he has been associated for the past twelve years. Prior to that, he was a market analyst and sales consultant.

☆ ☆ ☆

The annual report for the calendar year 1945 of the LINK-BELT COMPANY and subsidiaries shows total sales for the year of $77,665,174.71. The net income of the company and its subsidiaries was $3,003,521.73 after provision for taxes and other charges, as compared with net income for 1944 of $3,264,141.53.

☆ ☆ ☆

THE HEIL CO., Milwaukee, announces the appointment of **T. W. Boyle** as District Manager for the sales of all Heil products in the states of Nebraska, Wyoming, Kansas, Iowa and Missouri, with headquarters at the Heil District Sales Offices in Kansas City, Mo. **Sam Tuttas,** formerly in charge of this territory, has been made sales manager of the Bottle Washer Division at Milwaukee.

☆ ☆ ☆

Discharged after more than three years as an officer in the Navy, **Dan K. Heiple** has rejoined R. G. LeTOURNEAU, INC., Peoria, Ill., as a field engineer in the installation department.

☆ ☆ ☆

Announcement was recently made that **Henry W. Dodge,** former vice president and general sales manager of THE TEXAS COMPANY, New York City, has been elected Chairman of the Board of AIR PRODUCTS, INC. He will make his headquarters at the company's New York offices.

☆ ☆ ☆

The 1945 Annual Report of UNITED STATES STEEL CORP., New York City, discloses that the corporation had one of the largest production years in history, but financial results for the year showed a continuation of a downward trend, largely as a consequence of increased labor and other costs combined with ceiling prices. Revenue from the sale of products and services in 1945 was $1,747,338,661, or 16.1% less than the revenue of $2,082,186,895 in 1944. Dividends on both preferred and common stock remained the same as in previous recent years.

☆ ☆ ☆

P. W. Brown, recently retired Director of Manufacturing for Wright Aeronautical Corp., has been named a member of the Board of Directors and the Executive Committee to serve as Director of Production for TYSON BEARING CORP., Massillon, Ohio. Brown, who is widely regarded as one of the outstanding production men in the country, was throughout the war a member of the Automotive War Production Council and Chairman of the Manufacturing Coordinating Board of all companies manufacturing Wright products.

☆ ☆ ☆

Herbert W. Axe, formerly with the American Central Manufacturing Corp. at Connersville, Ind., has joined the staff of the Ingersoll Steel Division, BORG-WARNER CORP., New Castle, Ind.

NEW EQUIPMENT

MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, California.

Dumpcrete

Manufacturer: Maxon Construction Co., Inc., Dayton, Ohio.

Equipment: Concrete handling equipment.

Features claimed: The Dumpcrete unit is built of all-welded high tensile steel and permits discharge of concrete from as

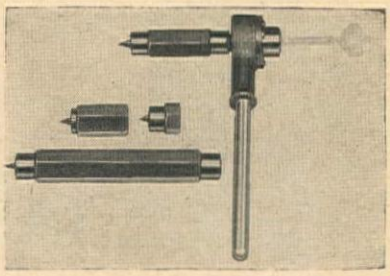
high as 6 ft. above the ground. Especially designed hydraulic hoisting mechanism provides a dumping angle of 90 deg. This, plus all-rounded corners, makes possible a clean and fast discharge. Two models are available, each designed for mounting on a standard truck chassis. The struck volumes are 3.5 and 6.25 cu. yd.

Ratchet Drill

Manufacturer: Techtmann Industries, Milwaukee, Wis.

Equipment: Ratchet drill driver.

Features claimed: Designed for drilling between studs and joists or in other restricted spaces, the tool gives positive feed



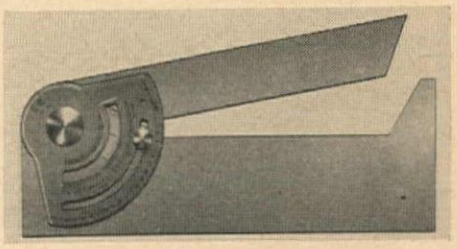
at each turn of the bit. The compact head allows centering of holes within 1¼ in. of the nearest obstruction. Standard wood bits or steel drills can be used. The thrust of the lead screw is carried directly to the drill shank by a solid shaft. The ratchet is fully enclosed in a strong semi-steel head, and extensions 1, 2 and 8 in. in length are available.

Drafting Quadrangle

Manufacturer: Stewart-Jackson Instrument Co., Los Angeles, Calif.

Equipment: Plastic drafting tool.

Features claimed: An adjustable quadrangle which combines many drafting features not usually available in one instrument. Angles may be set from 0 to 90 deg.;



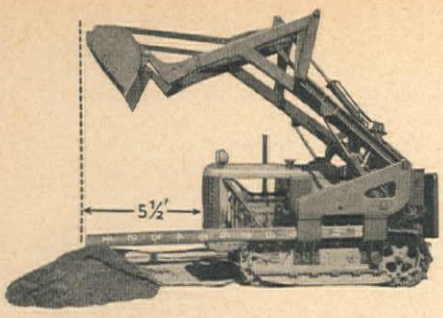
percentage slopes from 0 to 100 per cent; sine or cosine functions and tangents may be found. The instrument has 8 drawing edges and may be used as a triangle. The over-all size of the instrument is 4 x 11 in., convenient for desk drawer, brief case or coat pocket.

High Lift Loader

Manufacturer: Drott Manufacturing Corp., Milwaukee, Wis.

Equipment: Front end tractor loader.

Features claimed: This loader is designed for mounting on Oliver Cletrac tractors. It has an unusually high lift of approximately 10 ft. 8 in. and dumps its load about 5 feet ahead of the radiator. The standard bucket has a capacity of 1¼ cu. yd. and a light material handling shovel of 1¾ cu. yd. is available. The unit is hy-



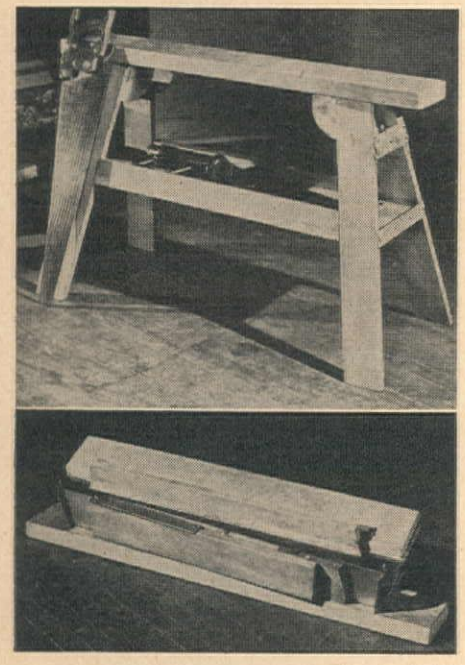
draulically operated by fingertip controls while the tractor is either in motion or standing still. The load is not carried on tractor, but when breaking out of the cut the weight of the entire load is transferred to the shoes, which are making ground contact, and is not transported on the front end of the tractor.

Folding Saw Horse

Manufacturer: Unique Tool Products Co., Chicago, Ill.

Equipment: Fold-horse.

Features claimed: A solidly built saw horse to meet every tradesman's and home craftsman's needs, this equipment will fold down in four operations to a convenient 8 x 8 x 42-in. size for car, transportation or



storage. Hardware is of 14 gauge steel, cadmium plated. The top surface is 2 x 6 x 42 in., of clear white pine, and underneath this is a 9 x 36-in. tool tray. Hardware is out of the way so that it will not be nicked by saws or other tools and also will not loosen through usage.

Diesel-driven Welder

Manufacturer: Lincoln Electric Company, Cleveland, O.

Equipment: Diesel powered electric arc welder.

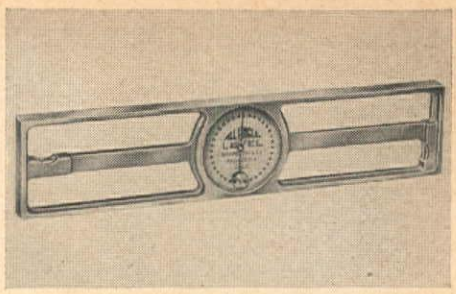
Features claimed: Powered by a two-cycle diesel engine, this 300-amp. capacity arc welder is especially made for use in locations where electric power is not available, or not economical. Current range for welding is from 20 to 40 volts, 60 to 375 amp. No external reactance or stabilizer is required and the machine supplies uniform welding current for metallic arc welding in any position. All control parts are in a steel cabinet with no current carrying parts exposed. The generator frame is attached to the diesel engine housing and the generator shaft is connected to the engine flywheel by a flexible coupling.

Spirit Level

Manufacturer: Brand Tool Co., Pasadena, Calif.

Equipment: All angle level.

Features claimed: An all aluminum spirit level with a dial indicator in the center, may be used in any position. It weighs less than 1 lb. and the dial indicator is guaranteed accurate to within ½ deg. The dial is



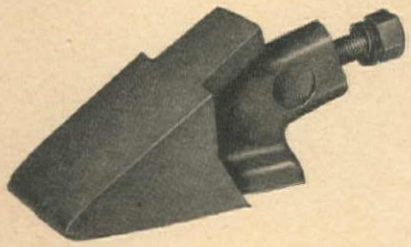
protected by an unbreakable crystal. Two air bubble tubes, one for horizontal use and one for plumb testing are built in. Total length is 14⅝ in., width is 3 in. and thickness ¾ in.

New Tooth Point

Manufacturer: Page Engineering Co., Chicago, Ill.

Equipment: Reversible center shank tooth point.

Features claimed: The new reversible center shank tooth point is a distinct improvement in the design and construction of tooth points for dragline service. The



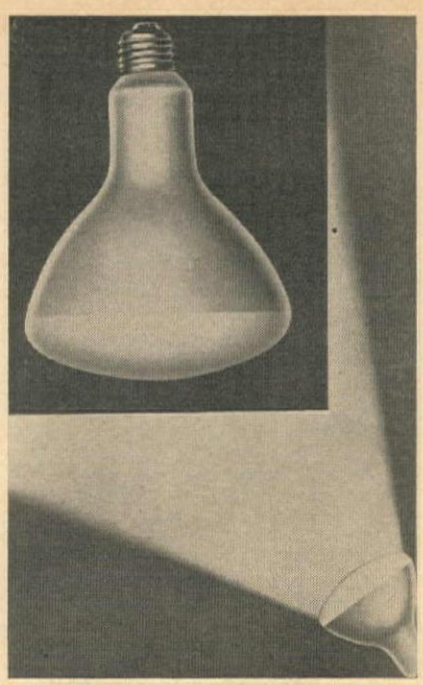
new hook bolt fastening is especially designed so that the bolt will not wear or tear loose from the point. This new tooth point will never come loose or work off if 25 per cent minimum bearing is maintained, both on the stud ends and on the shank above and below the bolt head.

Reflector Flood Light

Manufacturer: Wabash Appliance Corp., Brooklyn, N. Y.

Equipment: Sealed silver reflector flood light.

Features claimed: This flood light has a pure silver reflector lining hermetically sealed inside, with its filament precision mounted at the proper focal point. The light beam is moderately concentrated between a 0-60 deg. zone and feathers away to a soft diffusion at the edges. The bulb



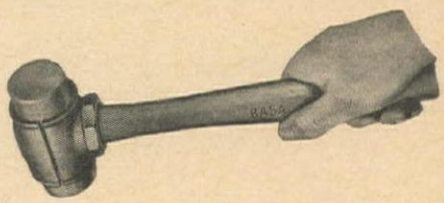
is 5 in. in diameter at the widest point and 6½ in. in over-all length. Sizes available are 100, 150, 200 and 300 watts, each with an average burning life of 1,000 hrs. The silver lining cannot tarnish.

Plastic Mallet

Manufacturer: Greene, Tweed & Co., New York, N. Y.

Equipment: Soft-faced hammer.

Features claimed: A soft-faced hammer designed to speed construction, repair and metal working operations involving surfaces that must not be marred, this tool has the exclusive split-jaw construction which permits speedy replacement of faces. These Basa faces do not shrink, expand, chip or disintegrate. If desired for special purposes, replaceable hammer faces of plastic, copper and babbitt may



also be secured. These Basa hammer faces protect the work, prevent user fatigue, will stand hard wear, are adaptable and convenient. Although faces may be replaced easily, all parts are firmly held when properly put together.

Emergency Cutting

Manufacturer: Victor Equipment Co., San Francisco, Calif.

Equipment: Pack type emergency cutting outfit.

Features claimed: A compact back-pack type oxy-acetylene emergency cutting unit designed and produced for the Navy and now offered to fire departments, rescue squads, state highway police, and industry. The complete unit is packed in an enclosed aluminum carrying case. The unit itself is cradled in an aluminum saddle and enclosed in a well-fitting canvas pack bag. Both the oxygen and acetylene regulators are factory

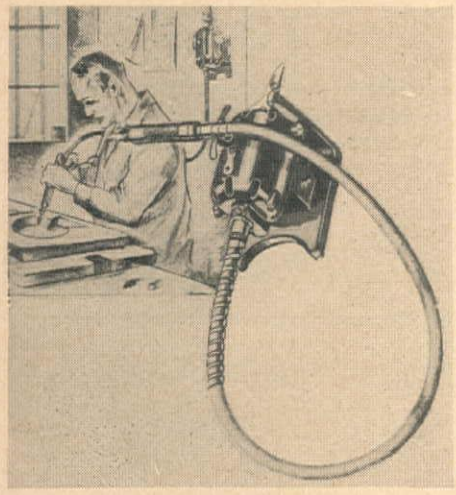
preset to deliver the necessary oxygen and acetylene gas pressures — and all that is necessary for the operator to do is open the cylinder valves prior to fastening unit and harness upon shoulders. The outfit is then ready for the emergency cutting.

Flexible Grinder

Manufacturer: Wyzenbeek & Staff, Inc., Chicago, Ill.

Equipment: Universal Hy-speed grinder.

Features claimed: Grinding efficiency combined with great flexibility is the special recommendation for this machine, which can be set on a bench, hung from a hook or suspended from the operator's



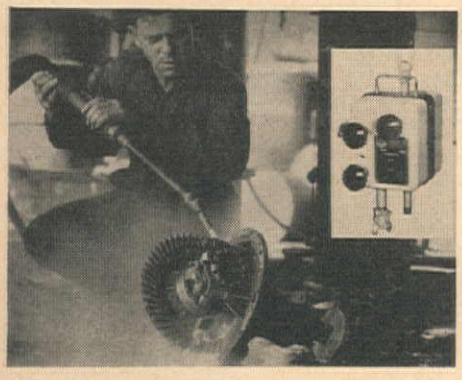
belt. Flexible shafts have a patented casing which insures a vibrationless and true-running shaft. Handpieces are cool, with precision ball bearings and interchangeable collets. Three sizes are made, with speeds varying from 15,000 to 18,000 rpm., each being useful in grinding, burring, filing, sanding or polishing.

Steam Cleaner Unit

Manufacturer: Turco Products, Inc., Los Angeles, Calif.

Equipment: Hydro steam cleaning unit.

Features claimed: A low-cost, portable hydro steam cleaning unit using your own steam supply to give powerful cleaning action produced by plants costing many times as much. The unit weighs only 28 lb.



so it is easily portable. Any steam line maintaining 80 to 150 lb. pressure with a ¾-in. valve outlet is all that is required for connecting up the unit. Three manual controls vary the temperature, quantity of solution and nozzle pressure as required by the work at hand. It is safe, easy to operate and practically foolproof. No toxic or explosive cleaning agents are used.

Impact Wrench

Manufacturer: Independent Pneumatic Tool Co., Chicago, Ill.

Equipment: Pneumatic impact wrench.

Features claimed: The first of a new series of Thor impact tools, this wrench will drive or remove nuts, bolts, etc., up to ⅜ in. thread size. Streamlined design of

the housing has reduced the weight to 3¾ lbs. and the length of the tool is only 5⅞ in. Operation is comfortably carried out with one hand. The main principles of the device are rotatively striking impact jaws set at a wide radius from the spindle center and a short, rigid spindle shank that delivers the blow close to the work.

Optical Micrometer

Manufacturer: Aireon Manufacturing Corp., Burbank, Calif.

Equipment: Glass gauging instrument.

Features claimed: The instrument is a microscope that can be screwed up and down in an outer tube, the lower end of which is held against the sheet to be measured. A crayon mark on the opposite side from the instrument gives the thickness by sharply focusing the mark in the microscope. Lucite, Plexiglass or plate glass can be measured even when curved. Having no mechanical micrometer ball head to sink into the plastic, there is no danger of damaging the optical surface.

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 5, California.

Caterpillar Tractor Co., Peoria, Ill.— Another of this large company's excellent publications is "Men of Vision," with 32 profusely illustrated pages pointing to the major role played by research and engineering experts in the development of Caterpillar products. The theme originates with the pioneering work on the horse-drawn combined harvester and carries through the continued advancement of steam-powered wheeled traction engines, gasoline engine track-type tractors, Diesel engines, electric sets, marine engines and a complete line of earth-moving equipment.

The White Motor Co, Cleveland, O.— After an outstanding role in war, White machines are entering an era of intensified peacetime motor transportation, according

to a new folder. It shows that White provides everything from garbage trucks to motor buses, and so is prepared to provide essential transportation service with the latest in scientific testing, repairing and rebuilding equipment in the shops of its branches, distributors and dealers.

Littleford Bros., Inc., Cincinnati, O.—The firm's models 102 and 103 supply tanks, discussed in one of the newest bulletins, are made in semi-trailer frameless construction excellent for long distance hauling. The supply tanks transport the supply of hot or cold materials to the pressure distributor doing the application work, and special models can also be furnished, according to the publication.

Chase Brass & Copper Co., Waterbury, Conn.—Chase's most recent brochure on the subject of radiant heating is titled "Chase Copper Tube for Radiant Heating" and is designed "to give the plumbing, heating and building trades information on the theory, broad principles and advantages of radiant heating and the practical problems involved in its installation."

Templeton, Kenly & Co., Chicago, Ill.—A new 64-page catalog of Simplex lever, screw and hydraulic jacks has just been published. Hundreds of jacks of conventional and special types, in sizes from three to 100-ton capacity, with complete specifications, are pictured and described in this convenient pocket-size book.

Jones & Laughlin Steel Corp., Pittsburg, Pa.—Otiscoloy is the subject of a 16-page booklet giving technical information, suggested applications and other useful information on this new steel. Otiscoloy is a high-tensile, low-alloy steel made to meet the need for a readily weldable and easily fabricated, corrosion-resistant steel of substantially greater strength than the standard carbon structural steels.

Chas. W. Downs and Son Co., Detroit, Mich.—This designing engineering firm has published "Truper," a small booklet advertising the firm's true perspective drawing aids for making perspective drawings. The full perspective drawing kit gives a variety of at least six different positions in which the subject may be shown.

Pittsburgh Plate Glass Co., Pittsburgh, Pa.—Pittchlor is the material discussed in the firm's new red, white and blue broadside. Pittchlor is a high-test, stable calcium hypochlorite for water supply systems. Suitable for any type of chlorination, solution feeding is generally preferred, since it is more accurately and conveniently controlled. It is an especially convenient source of chlorine for reservoirs, mains, filter and emergency uses.

Chicago Bridge & Iron Co., Chicago, Ill.—With a beautiful red cover, Bulletin B on "The Horton Floating Roof" is just off the presses. Typical for tank roofs from 48 ft. to 80 ft. in diameter, the Horton roof embodies all the best construction features disclosed during the firm's existence. Floating roofs are used primarily to reduce evaporation loss and eliminate fire hazards, and this roof does so at a minimum of expense and effort.

American Hoist & Derrick Co., St. Paul, Minn.—The company has just released a new pocket-size information card on the use and application of "Crosby" wire rope clips.

Gale Oil Separator Co., Inc., New York, N. Y.—With a dramatic blue full-cover photograph of a stream rushing over boulders on the front, this folder shows Gale liquid separation systems and conservation and recovery systems. These systems make possible the re-use of water, oil and other liquids at low cost. A list of 12 "operation facts" is also given.

Caterpillar Tractor Co., Peoria, Ill.—Recent newcomers in the bulldozer line are No. 8S and No. 7S, featured in a new broadside published by Caterpillar, which describes and illustrates these bulldozers, designed and built for exclusive use with Caterpillar Diesel D8 and D7 tractors. It features the balanced design, unexcelled digging characteristics, ease of mounting and dismounting, easily made blade pitch and tilting adjustments and long life.

Cast Iron Pipe Research Assoc., Chicago, Ill.—A folder describes the company's new sound motion picture entitled "Installing Cast Iron Pipe," which is available without charge to engineering bodies and schools, and to municipal departments. The pipe is shown from the time it leaves the factory until it is inspected for leaks after installation.

Homelite Corp., Port Chester, N. Y.—The completely new line of portable, gasoline engine-driven generators produced by this firm is described in Bulletin L-406, with on-the-job photographs to illustrate the advantages of a truly portable power plant which is always ready to furnish power under all conditions and at any location.

Caterpillar Tractor Co., Peoria, Ill.—Telling the story behind Caterpillar products' outstanding performance is "Manufacturing Excellence," a 16-page illustrated booklet. It teams performance records of the finished product with manufacturing details which produce them, and portrays with text and pictures many of the manufacturing machines, processes and details that develop Caterpillar products.

Builders-Providence, Inc., Providence, R. I.—This firm is a comparatively new designation for the Instrument Division of Builders Iron Foundry. Its new blue and white brochure gives a list of instruments used by builders of water and sewage works, photos of each instrument, short descriptions and the number of each bulletin, which may be obtained for more detailed information.

Eastern Equipment Co., Willow Grove, Pa.—Welding lenses for goggles, helmets and handshields are the topics discussed in a broadside issued by this company. The first presentation of its type, it gives complete descriptions and photographs on every type of welders' lens and on indus-

(Continud on next page)

Speaking of Employment . . .

MEN

JOBS

OPPORTUNITY SECTION

Literature From Manufacturers (Continued)

trial safety lenses for chipping and grinding operations.

The Cloroben Corp., Jersey City, N. J.—An "Aquatic Weed Control Manual," a green and white booklet with a cover photo of water flowing over weeds is an attractive presentation of one of the major problems confronting irrigation engineers. Benoclor 3C application is the answer to the problem and its worth is acknowledged by many reliable organizations.

Builders - Providence, Inc., Providence, R. I.—Bulletin 360 describes the Flo-Gage, a simple, inexpensive flow indicator which promotes the efficient utilization of liquids and/or gases consumed, particularly by the elimination of wasteful excess. This midget differential meter indicates rate of flow of gases and liquids through lines containing orifices, venturi tubes and insert nozzles as differential producers, and also indicates liquid level and pressure differences.

Sanstorm Manufacturing Co., Fresno, Calif.—A bright yellow, grey and white folder illustrates the Sanstorm sand blasting machine for any type of hard or soft-grit blasting. Claiming "The machine that produces what the name implies," the folder says it is simple, compact, economical and easily operated.

Cleveland Worm & Gear Co., Cleveland, O.—A pictorial bulletin in three colors describes the applications of worm gear speed reducers to various types of mixing and grinding equipment. Each worm gear application is briefly discussed and each photo is accompanied by a facsimile blueprint detailing the drive application shown.

B. F. Goodrich Co., Akron, O.—A ten-page catalog section on its complete line of industrial protective clothing has just been issued by the Goodrich Co. In the line are heavy duty clothing for workers in construction, agricultural, transportation and chemical fields, including the new vinyl-resin industrial coat that can't be stained by oil and grease and a complete line of rubber gloves and footwear.

INDEX TO ADVERTISERS
★ IN THIS ISSUE ★