WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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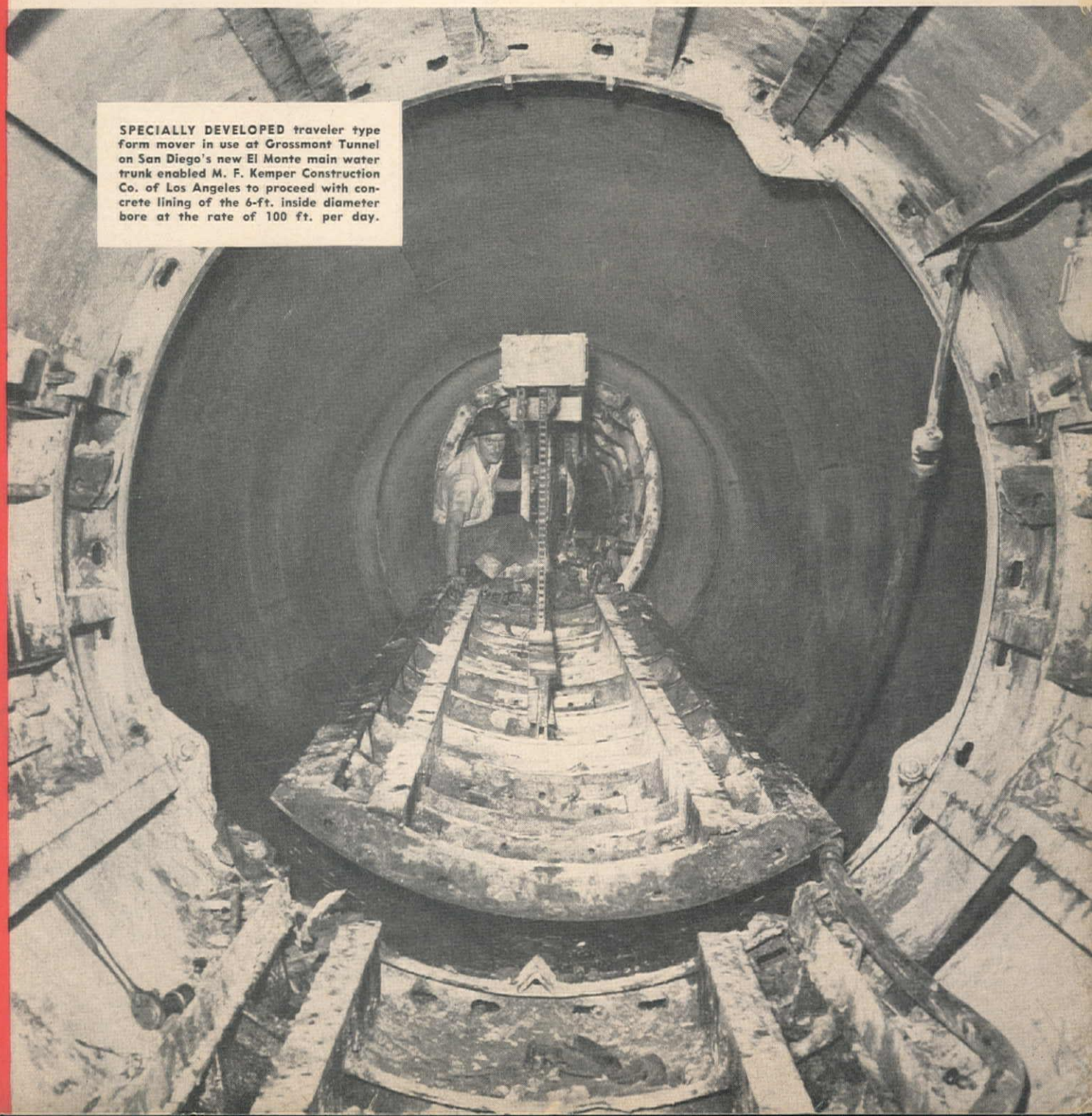
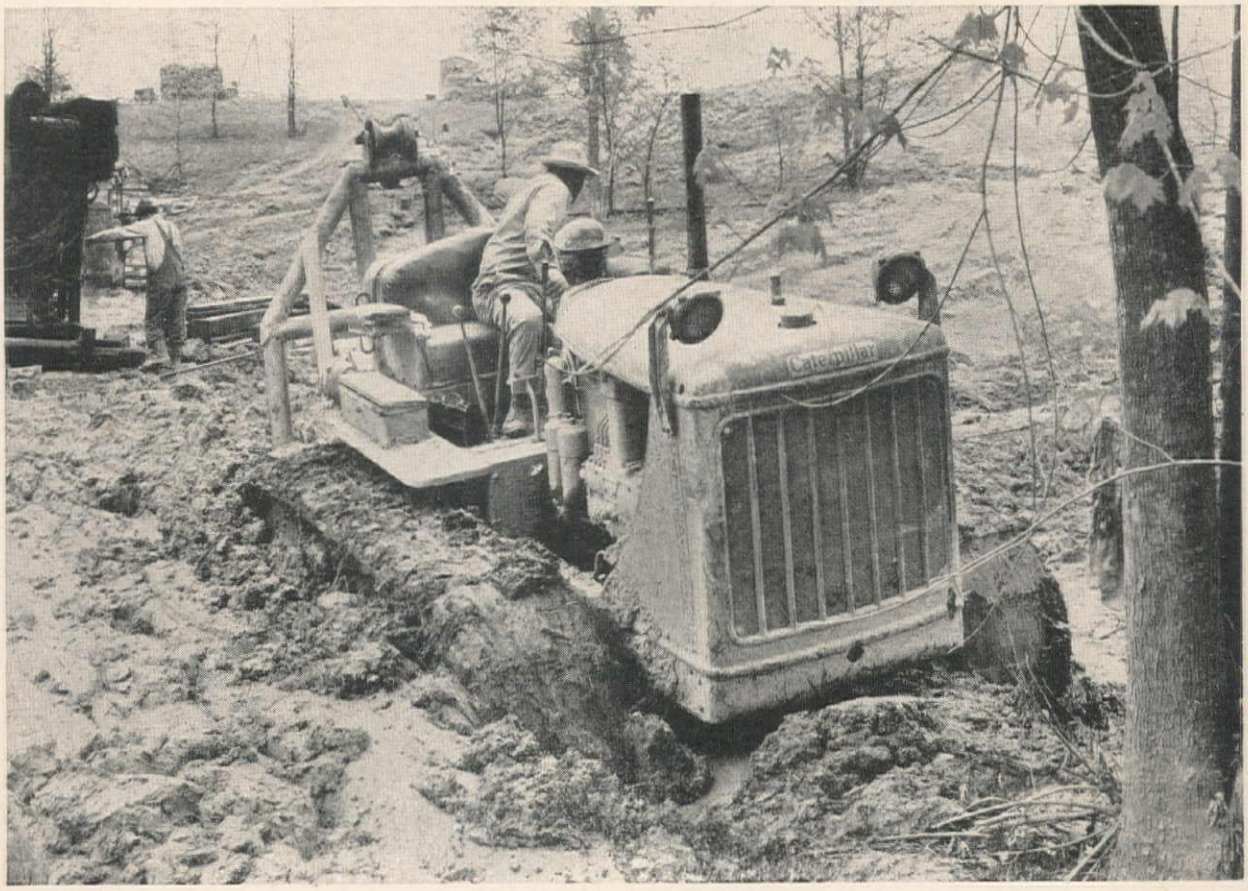


SPECIALLY DEVELOPED traveler type form mover in use at Grossmont Tunnel on San Diego's new El Monte main water trunk enabled M. F. Kemper Construction Co. of Los Angeles to proceed with concrete lining of the 6-ft. inside diameter bore at the rate of 100 ft. per day.

MAKE YOUR TOUGH LUBRICATING JOBS } EASY



Seal chassis bearings against dirt and moisture with Texaco Marfak

Use *Texaco Marfak* to protect vital chassis bearings in your earthmoving equipment, and solve one of your toughest lubricating problems.

Texaco Marfak is super-tough and long-lasting — doesn't budge from the bearings. It seals itself in — seals out destructive dirt and moisture. It prolongs bearing life, assures freedom from rust, smoother operation and lower chassis maintenance costs.

For wheel bearings, *Texaco Marfak Heavy Duty* is the lubricant to use. It forms a fluid film inside the bearing, yet retains its original, firm consistency at the outer edges — sealing itself in, assuring safer braking. No seasonal change required.

The fact that more than 275 million pounds of Marfak have been sold, is your assurance of proved performance.

Use the Texaco Simplified Lubrication Plan. A Texaco Lubrication Engineer will gladly give you details. Call the nearest of the more than 2500 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, New York.

2 MORE LUBRICATION JOBS SIMPLIFIED

Dirt and moisture are tough on track rolls, also. Protect them with *Texaco Track Roll Lubricant.* It stays in the bearings, seals out dirt and moisture, prolongs bearing life. For heavy-duty Diesel and gasoline engines, use *Texaco Ursa Oil X**.* It is fully detergent and dispersive — makes engines last longer, deliver more power, use less fuel.

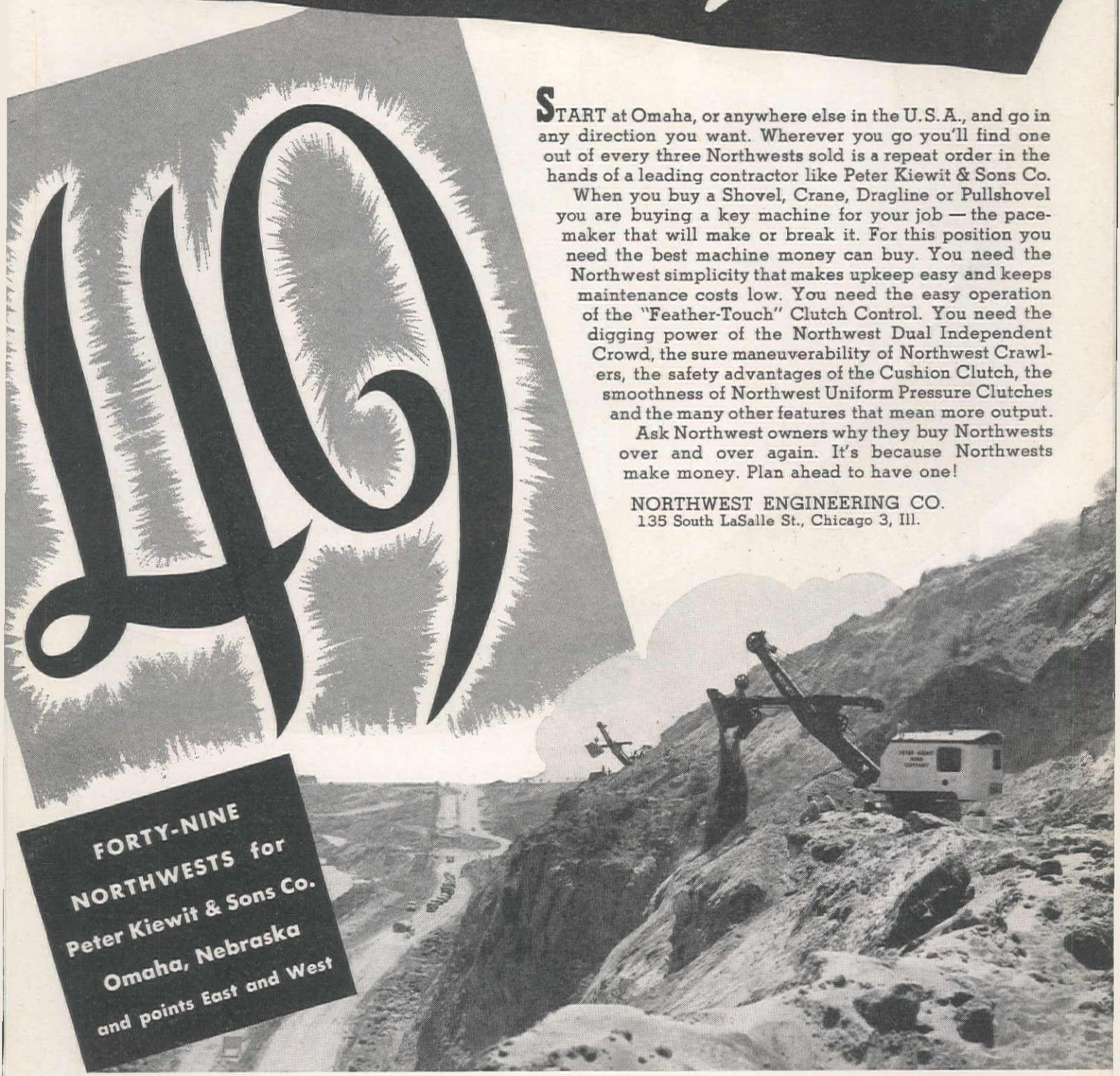
TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

TUNE IN . . . TEXACO STAR THEATRE presents the TONY MARTIN SHOW every Wednesday night. • METROPOLITAN OPERA broadcasts every Saturday afternoon.

we said forty-nine!



START at Omaha, or anywhere else in the U.S.A., and go in any direction you want. Wherever you go you'll find one out of every three Northwests sold is a repeat order in the hands of a leading contractor like Peter Kiewit & Sons Co. When you buy a Shovel, Crane, Dragline or Pullshovel you are buying a key machine for your job — the pacemaker that will make or break it. For this position you need the best machine money can buy. You need the Northwest simplicity that makes upkeep easy and keeps maintenance costs low. You need the easy operation of the "Feather-Touch" Clutch Control. You need the digging power of the Northwest Dual Independent Crowd, the sure maneuverability of Northwest Crawlers, the safety advantages of the Cushion Clutch, the smoothness of Northwest Uniform Pressure Clutches and the many other features that mean more output. Ask Northwest owners why they buy Northwests over and over again. It's because Northwests make money. Plan ahead to have one!

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135 South LaSalle St., Chicago 3, Ill.

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41 "EUCS"

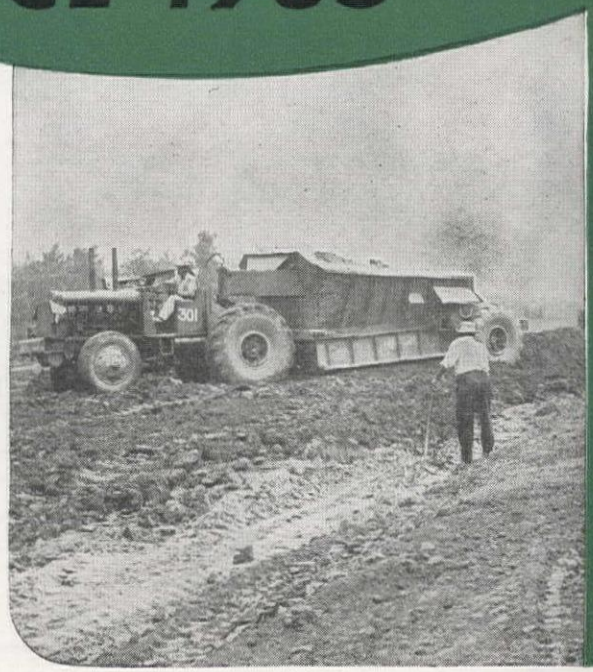
FOR PIONEER CONTRACTING CO.

SINCE 1935

● Pioneer Contracting Co., Inc. of Dyersburg, Tennessee has been a steady user of Euclid Equipment since it first purchased Bottom-Dump Euclids in 1935 for levee work. One of the leading dam and levee contractors, this company has constantly added to its fleet because it has found that Euclids consistently move dirt at lowest cost per yard on the toughest jobs.

"We have used 'Eucs' continually", reports Guy Hall, "because we know we can always depend on their performance. They are easy to handle, deliver big yardages day after day, and save us time and money."

Ability to haul large pay loads over soft fills and to dump loads clean and fast are two reasons why Bottom-Dump Euclids are so widely used on construction jobs. Your Euclid distributor or representative will be glad to discuss your requirements and supply helpful information.



The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

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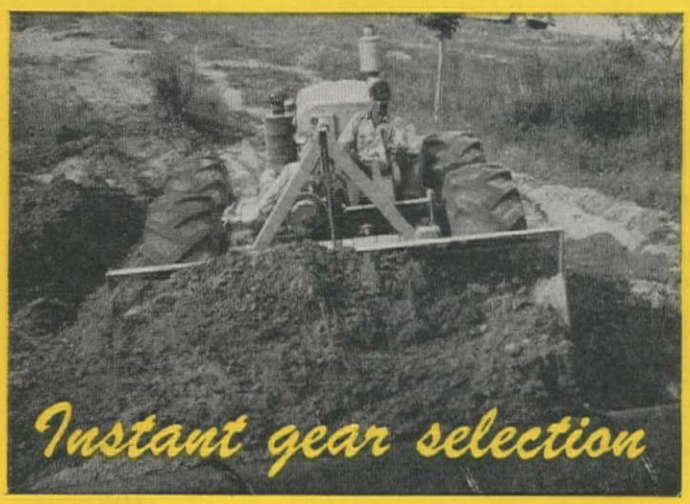
Covering the Western Half of the National Construction Field

Don't buy any DOZER the revolutionary

The Tournadozer is correctly designed for efficient pushing as well as dozing. Increasing load on blade puts more weight onto Tournadozer's giant rubber tires giving more traction for greater pushing power. Maneuverability through high speeds in forward or reverse means more scraper units served per pusher . . . less waiting time.

Big 21.00 x 25 rubber tires on the Tournadozer provide plenty of flotation and traction . , . eliminate multiple moving parts constantly operating in grinding dirt. Tapered bead tire and rim design prevent tire slippage . . . permit lowering tire pressures for extra flotation to meet extreme conditions in sand or mud, ice or snow.



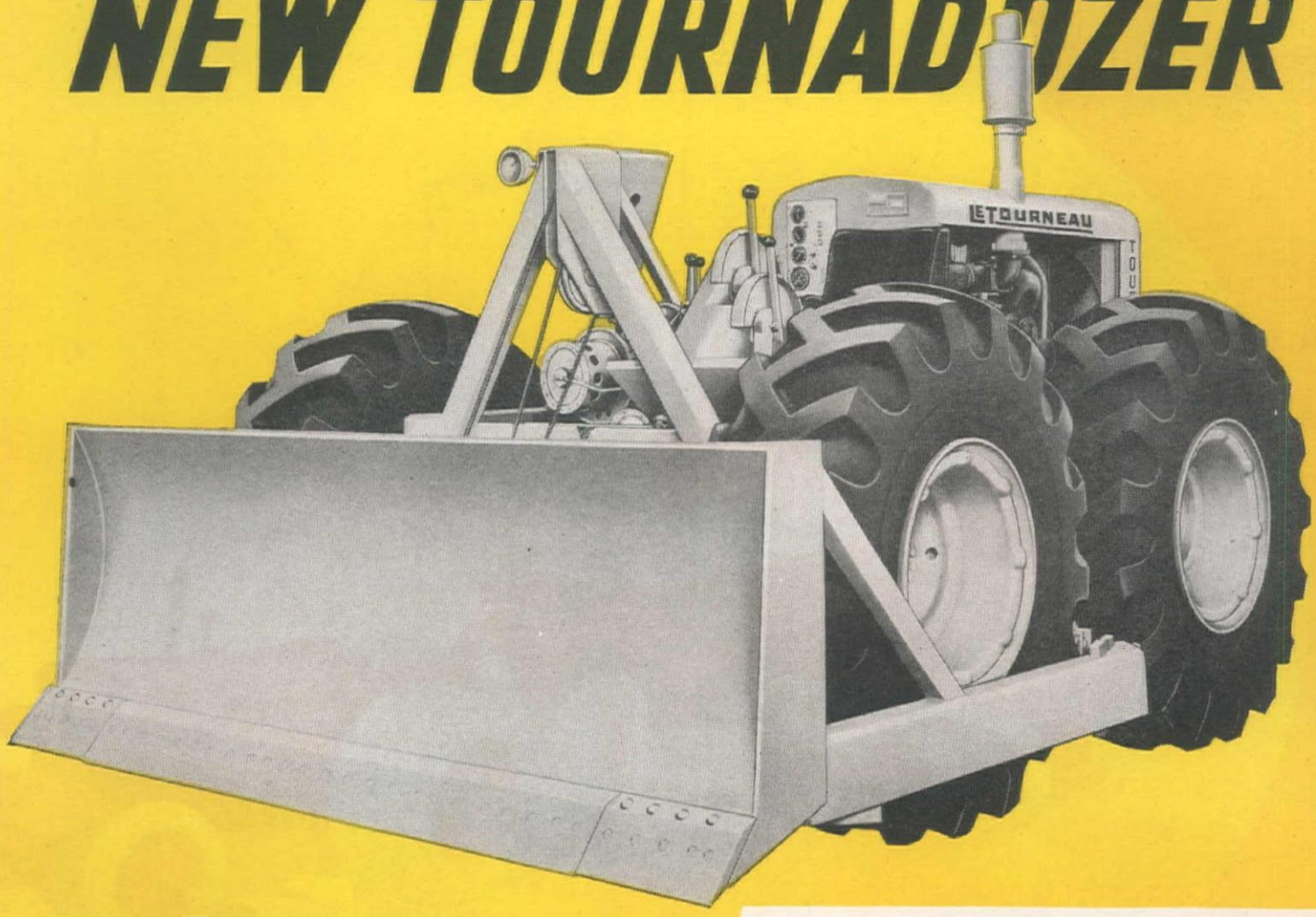
Finger touch selection is instantaneous for any one of four gear combinations that drive the Tournadozer . . . 1.91 to 15 m.p.h. both forward or reverse. Constant mesh Tournamatic transmission with air-actuated controls eliminates conventional gear shifting, simplifies operation.

Air actuated controls throughout, low pressure shock-absorbing tires, good visibility and a special hydraulic suspension seat reduce operator fatigue. He's happier because he drives a faster, snappier, easier riding rig . . . gets more work done . . . no end-of-day letdown.

LE TOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

until you've seen NEW TOURNADOZER



THE NEW high-speed, rubber-tired Tournadozer is built for both dozing and pushing . . . ideal for road construction, maintenance, backfilling, clearing and leveling land, building dams or levees, stripping, conveyor and hopper loading, and for pusher service on scraper dirtmoving. Travels two to three times faster than crawler-tractor. No delay in shifting gears with Tournamatic constant-mesh transmission. Quick on-the-job or job-to-job moves . . . no hauling equipment needed . . . travels on pavement, black-top, or cross country. Gets more jobs completed at lower cost per job. Wait till you see this Tournadozer in operation before buying any ordinary dozer!

Tournadozer, Tournamatic — Trademark R112e

Model C

- Speeds up to 15 m.p.h., forward and REVERSE
  4-speed selections from 1.91 m.p.h.
- Non-stop, instantaneous speed selection
  Constant-mesh Tournamatic transmission.
- Easy to operate . . . air actuated controls
  Finger-tip steering and blade operation . . . single pedal for brakes.
- Tapered bead tires . . . 21.00x25
  Permit lower pressure for operation in sand or muck.
- Big load capacity . . . 11' 2"x43" blade
  Lift 44", drop, unlimited; cable control; fast-acting.
- 180 h.p. Diesel . . . weight 15 ½ tons.

LETOURNEAU
PEORIA, ILLINOIS

HIGH-SPEED RUBBER-TIRED

TOURNADOZERS

Cut Your Costs, too

Above: An International TD-9 Diesel Crawler with Dozer-Shovel is loading gravel on a wagon drawn by a modified International ID-9 Diesel Wheel Tractor.

On opposite page: An International TD-9 with Bulldozer-Shovel is shown loading rock on a truck in a quarry that supplies a crushing plant.

CRAWLER TRACTORS
POWER UNITS
DIESEL ENGINES
WHEEL TRACTORS

INTERNATIONAL

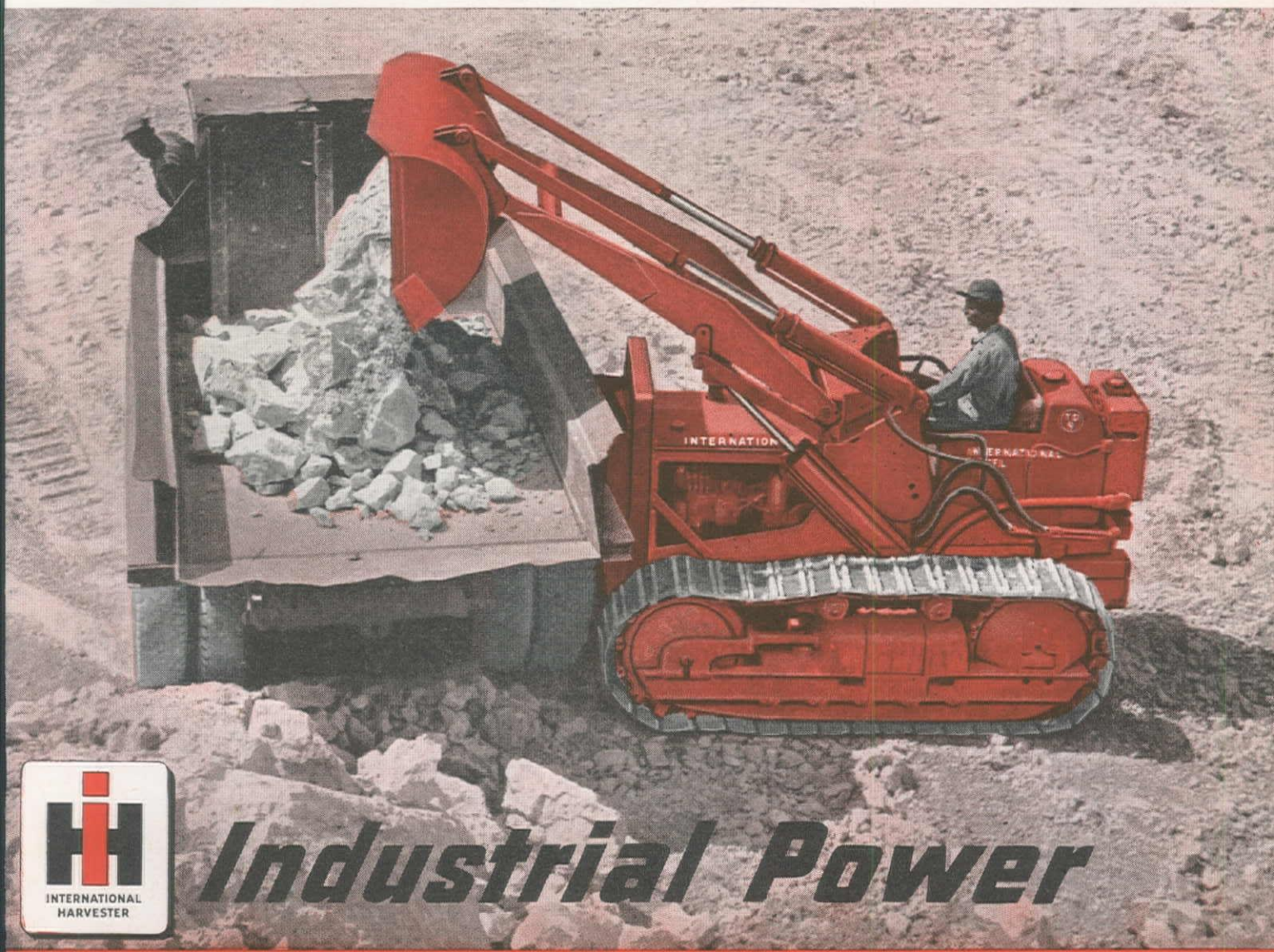
. . with INTERNATIONAL DIESELS

You'll find International Diesel Crawlers hard to beat for excavating, loading and general utility work. When equipped with tractor shovels that are also 'dozers, International Diesels work and save in many ways. They can cut your costs to rock bottom with their low-cost operation and top-notch efficiency.

Use these units to dig basements and other excavations, to dig out and load sand and gravel—or snow—on trucks or wagons. Use them also as bulldozers in backfilling and many other jobs.

When crawlers offer the versatility, operating economy and dependability of International Diesels, it is good business to standardize on them. Ask your International Industrial Power Distributor to assist you in selecting the tractors and equipment you need.

Industrial Power Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue • Chicago 1, Illinois



INTERNATIONAL HARVESTER

Industrial Power

It's built to last when

It's built of Steel

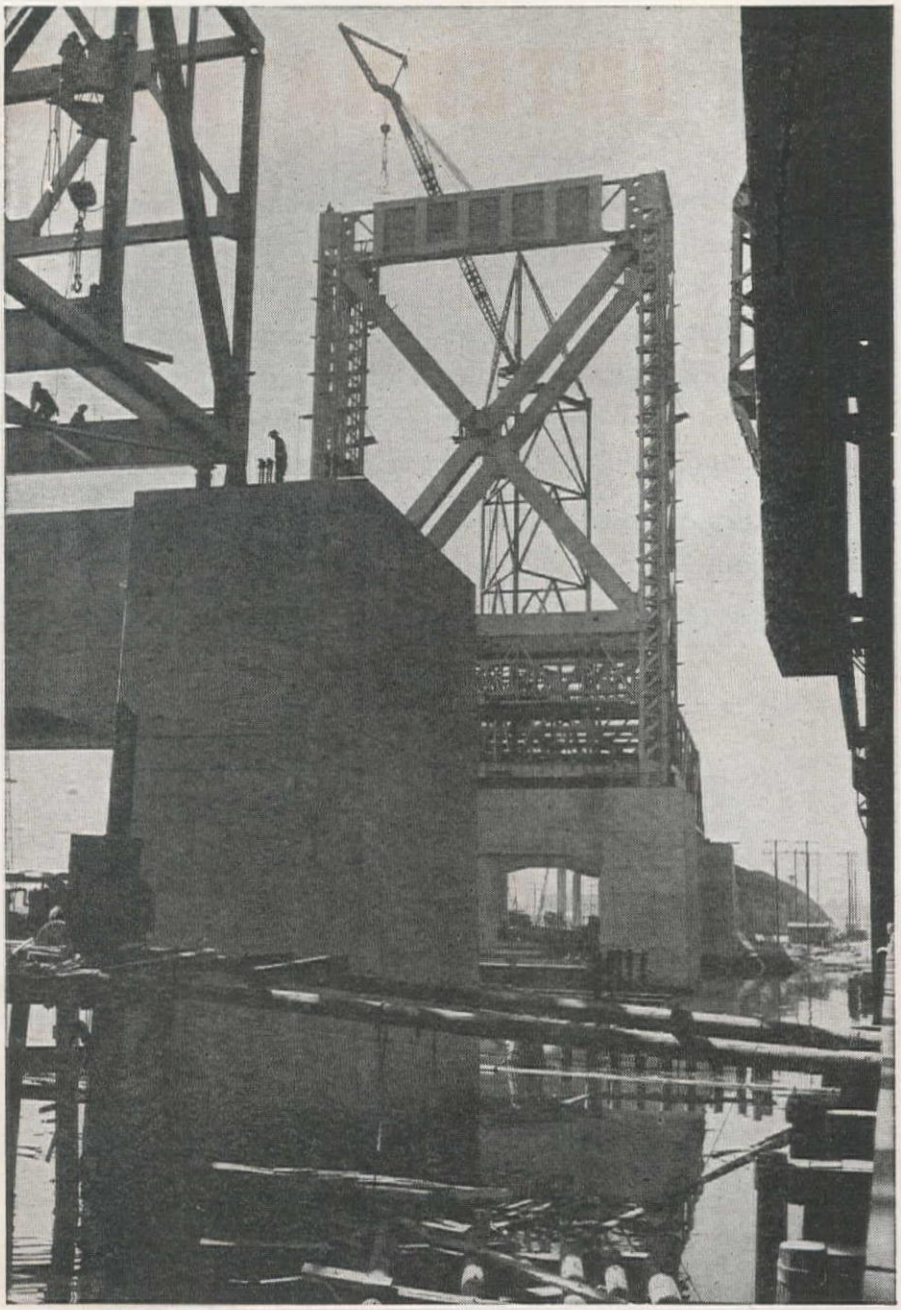
In countless construction projects, large and small, throughout the West, steel from Columbia is helping get a permanent job done, fast. For steel is the one material that passes the test for all kinds of construction. Steel structural members... steel doors, floors and ceilings... steel roofing and siding... all are adding speed and durability to Western building.

For information on the many steel products of Columbia mills, or any of the other great mills of United States Steel, contact the Columbia Steel Company office nearest you.

When you build

... for today... for the future...

BUILD WITH STEEL



New Terminal Island Bridge uses West's largest lift span

This unusual project across Cerritos Channel features a lift span 240' long, stretching between towers 184' high. Overall length of bridge: 4000'. Roadway is six-lane, divided. When completed it will contain more than 10,000 tons of U·S·S structural steel.

Only STEEL can give you all 7 of these structural advantages

Extra toughness and shock resistance • Incombustibility • High strength-weight ratio • Highest modulus of elasticity • Versatility of application • Great durability • Ultimate economy.

Columbia Steel Company

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AMERICAN BRIDGE COMPANY • AMERICAN STEEL & WIRE COMPANY
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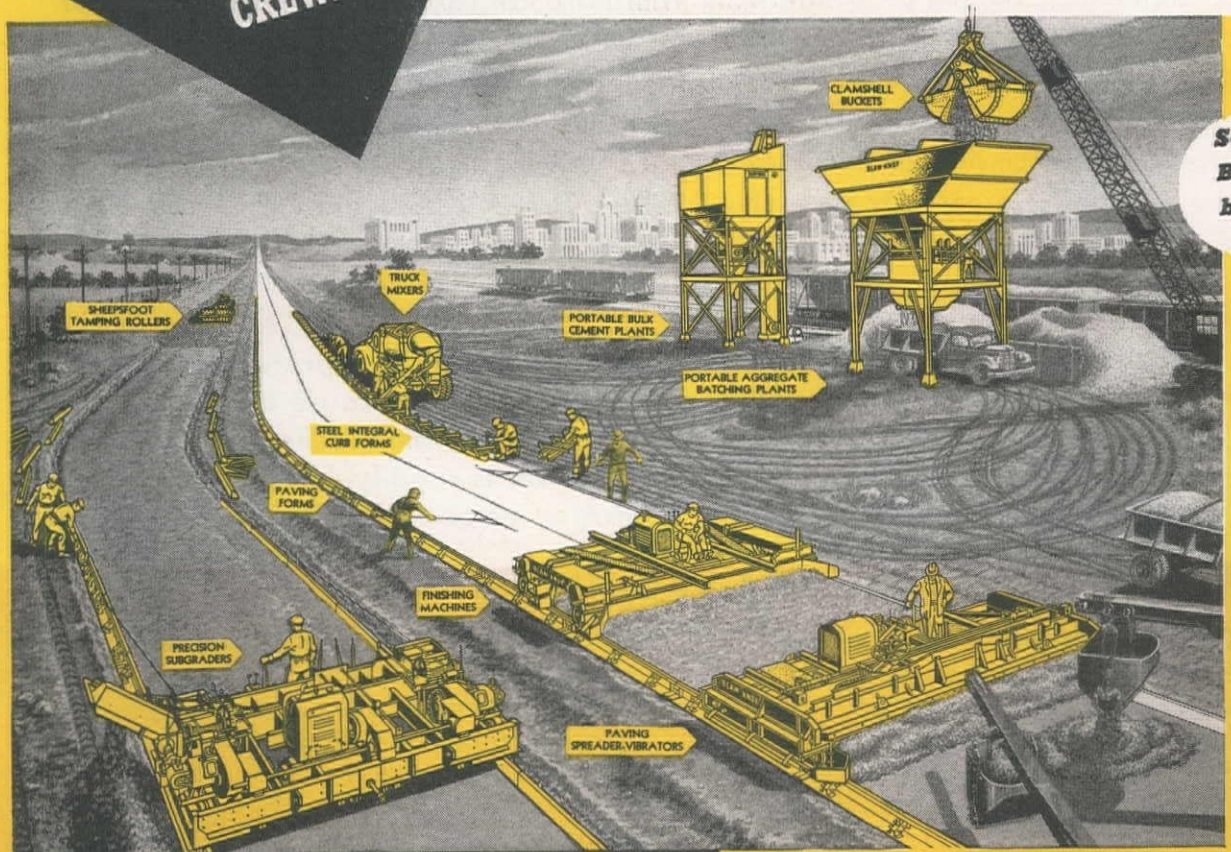
UNITED STATES STEEL

REMEMBER WHEN?

..get MAXIMUM PERFORMANCE with MINIMUM CREWS

NOW- *complete Blaw-Knox* MECHANIZATION

Assures Better Paving . . . Fewer Men . . . Lower Costs . . . Earlier Completion



See your nearest Blaw-Knox Dealer before and after you bid.

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P. O. Box 784
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The contractor's only single source for a complete outfit of job-tested concrete paving machinery is . . . . . **BLAW-KNOX**

Saves Time ON EVERY BATCH

KOEHRING HEAVY DUTY

KOEHRING Heavy-Duty *twinbatch* gives STEADY OUTPUT . . . SPEED . . . ECONOMY

On concrete highway paving, every second saved on each batch means more batches per hour . . . more concrete poured per day. With the Koehring 34-E *twinbatch* paver, split-second Autocycle control saves valuable seconds . . . eliminates waste motion . . . gives you maximum number of batches on the grade. You save time on every cycle of operation — that means extra profits for you.

Fast drum charge . . .

Big, roomy flow-line skip is fast charging, provides sufficient space for large batch, without congestion. Large throat permits almost complete discharge of materials before skip is in elevated position . . . skip hoists in only 8 seconds.

Fast mix and bucket load . . .

With *twinbatch* mixing, you increase number of batches as much as 75% over single drum pavers. Positive air control by Batchmeter actuates transfer and discharge chutes . . . saves more seconds.

Fast dump and spread . . .

Delivery bucket travels along the boom as it swings, by power, for high-speed concrete distribution on the grade. Wide, double-door boom bucket dumps the batch instantaneously.

And—your profits are protected against costly downtime, because every maintenance point on the Koehring 34-E *twinbatch* paver is readily accessible, to keep producing at peak efficiency.

CK815

YOUR KOEHRING DISTRIBUTOR CAN GIVE YOU COMPLETE FACTS

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Pacific Hoist & Derrick Co., *Seattle*
The Harry Cornelius Co., *Albuquerque*
Western Machinery Co., *Spokane*

KOEHRING HEAVY-DUTY PAVERS

KWIK-MIX — 7-second discharge — 11-S DANDIE

Faster discharge means seconds saved on every batch . . . seconds that add up to extra batches every day! KWIK-MIX Dandie's exclusive Flow Line Discharge Chute discharges a full 12.1 foot batch in about 7 seconds, or 2 drum revolutions. Chute reaches farther into drum because it's tilted, intercepts load of buckets at proper angle without changing flow line of mixed concrete.

Bay Cities Equipment, Inc. ..... Oakland
Columbia Equipment Company ..... Portland, Boise
Harron, Rickard & McCone Co. of So. Calif. ..... Los Angeles
Kimball Equipment Company ..... Salt Lake City
McKelvy Machinery Company ..... Denver
Moore Equipment Company ..... Stockton
Neil B. McGinnis Company ..... Phoenix
Pacific Hoist & Derrick Company ..... Seattle
The Harry Cornelius Company ..... Albuquerque
Western Machinery Company ..... Spokane

JOHNSON — extra tonnage, no extra cost — CLAMSHELL

Faster operation . . . bigger loads . . . longer life! Large diameter sheaves easy on cable — sealed needle bearings reduce friction for longer life and faster, smoother operation. Johnson buckets dig straight and deep . . . capacity loads every time. All welded construction improves balance, lowers center of gravity, permits heavier lips, heavier sides, heavier bottom. Hard manganese cutting edge actually gets tougher with use.

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Pacific Hoist & Derrick Company ..... Seattle
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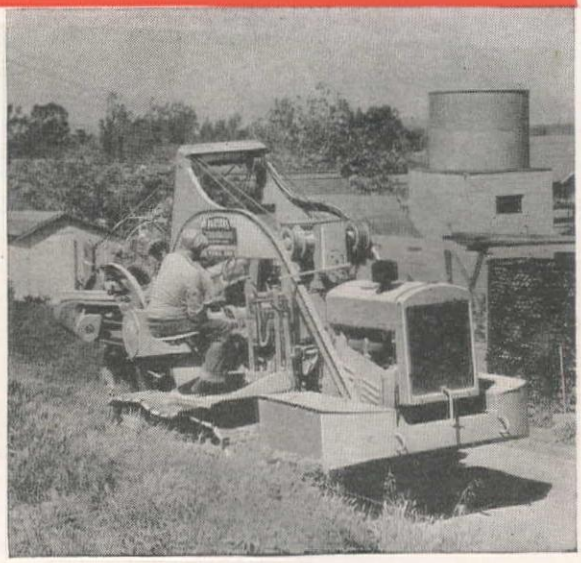
PARSONS — mile-a-day 200 wheel — TRENCHLINER*



Specially designed for subgrade drainage work preparatory to paving. Parsons Model 200 Trenchliner provides accurately graded trenches as fast as you need them. Leaves clean, smooth, round-bottomed trenches ready to receive pipe without added cost of hand trimming. Simple direct power flow means more trench per day, more power to wheel. Digs 5'6" trench, 15" to 26" wide. Parsons tile chute increases output as much as 20%.

*Reg. Trademark

Bay Cities Equipment, Inc. ..... Oakland
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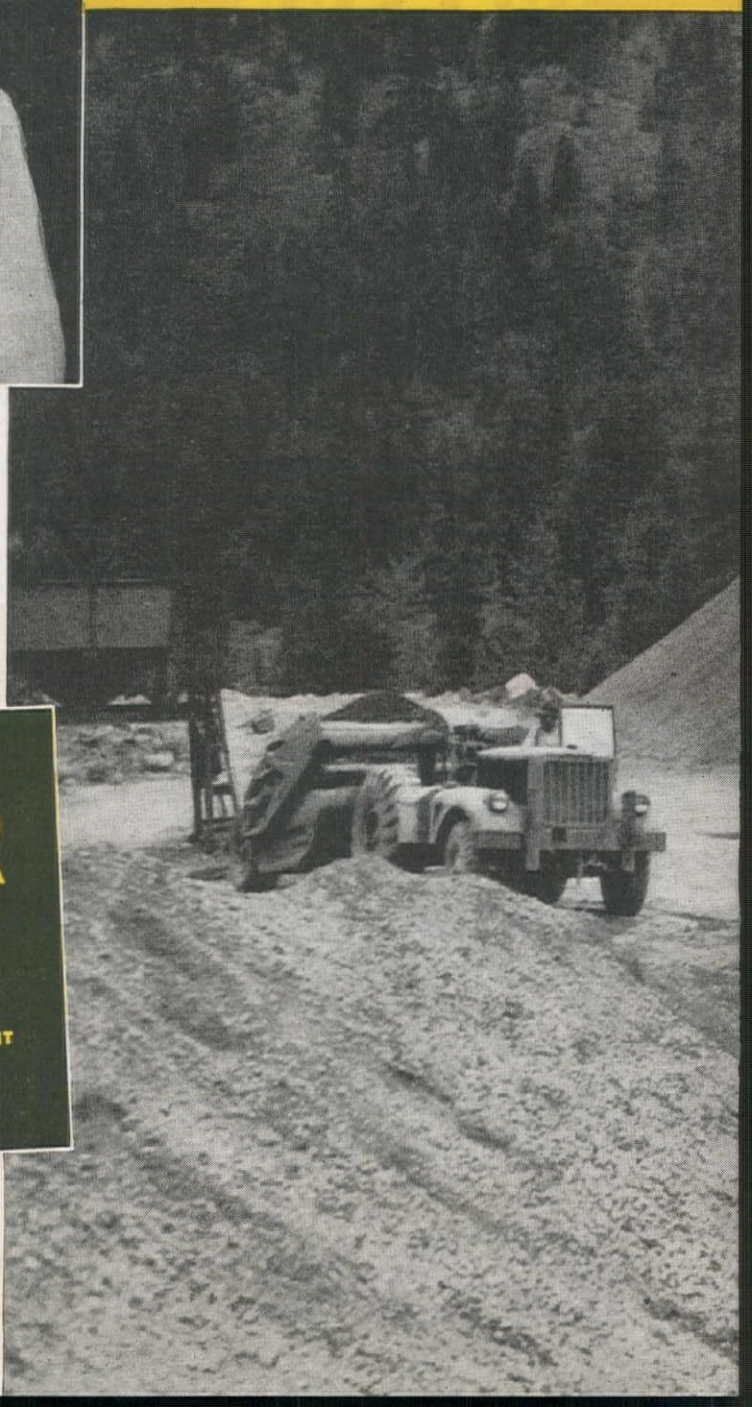
The Harry Cornelius Company ..... Albuquerque
Western Machinery Company ..... Spokane

'Round and round they go!

Mr. R. Campbell says:

"I have found the DW-10 Tractors very versatile and very suitable in the proper kind of dirt. Also for gravel work and spreading they are eminently suitable. 'Caterpillar' equipment, both on tracks and rubber, is 'standard equipment' on our jobs."



CATERPILLAR

REG. U. S. PAT. OFF.

DIESEL

ENGINES • TRACTORS
MOTOR GRADERS
EARTHMOVING EQUIPMENT

OPERATION: Princeton-Hedley Highway, British Columbia.

. . . with clocklike timing and penny-accurate costs

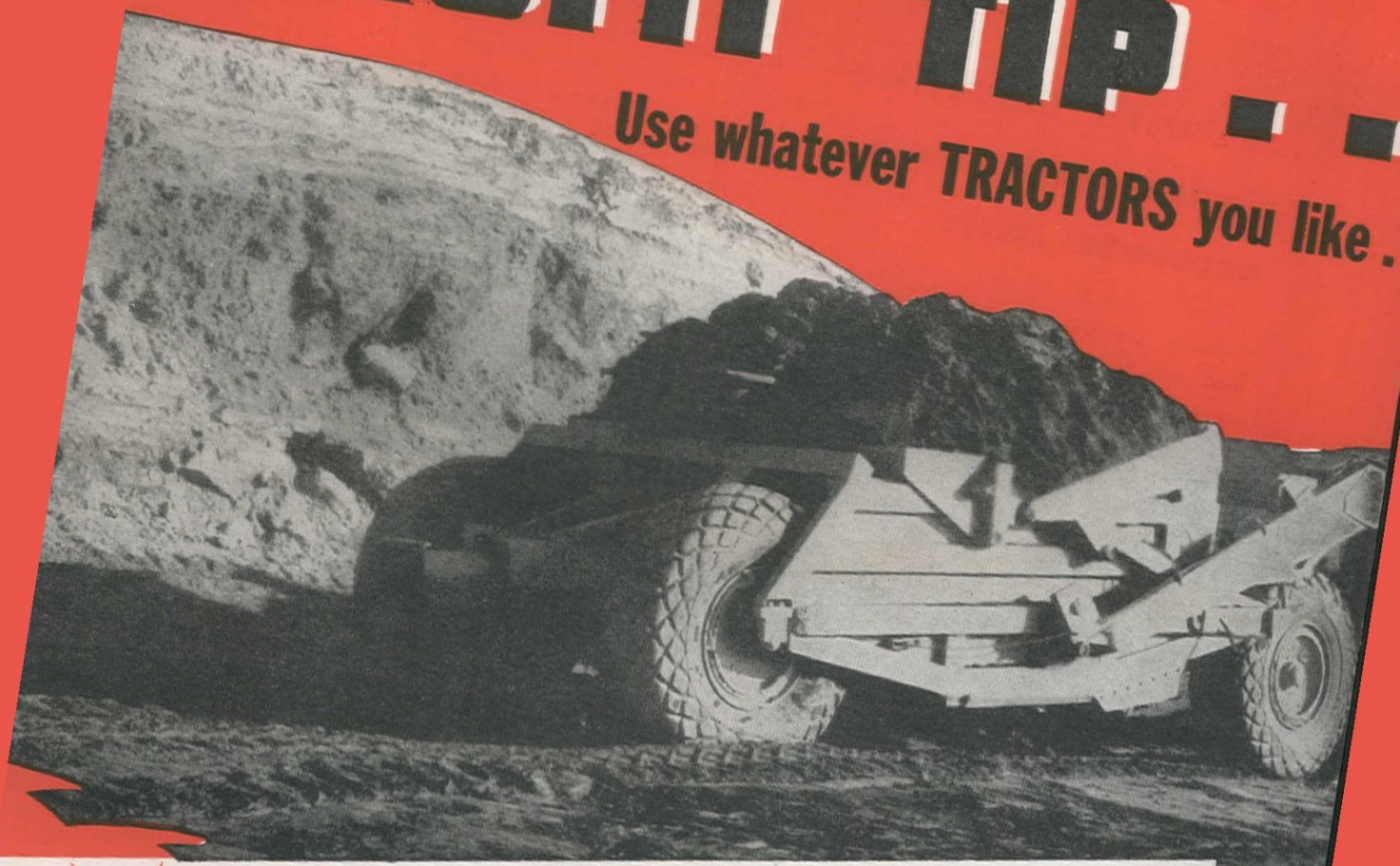
Surfacing materials can definitely be handled with top efficiency and rock-bottom costs. With "Caterpillar" matched equipment and studied methods, the Campbell Contracting Company, Ltd., of Vancouver, British Columbia, has reduced lost motion to a minimum.

A "Caterpillar" Diesel track-type Tractor bulldozes the raw material right into the crusher—with one handling. Three "Caterpillar" Diesel DW10 (wheel) Tractors, equipped with 10-yard scrapers, receive the finished material from the hopper—run it onto a scale to compute the yardage cost accurately—high-speed it about 2/5 of a mile to location—spread it—hurry back . . . all in a cycle time of approximately 10 minutes. That's efficiency! And volume! And definitely low cost!

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

PROFIT TIP . . .

Use whatever TRACTORS you like . .



When it comes to buying tractor-scraper rigs, remember *it's the scraper that controls the "payload."* And as every experienced dirtmover knows, there's a big difference in the performance of various scrapers under varying job conditions. Moreover, a difference of only 5 yards per hour, figured over the operating life of a scraper, can easily mean *60,000 yards of "pay dirt"—gained or lost—at your own bid price!*

That's why you'll find more and more smart dirtmovers buying their scrapers *entirely independent of the tractor* and holding out for job-proved LaPlant-Choate "Carrimors." Why LPC? Because operating records on hundreds of jobs prove conclusively that LaPlant-Choate rigs deliver *highest average production at lowest overall cost.* For one thing, they get bigger loads faster and easier in *all kinds of materials.* They also gain time traveling to and from the fill because they're free of costly dead weight. And when it comes to spreading—man, there isn't a scraper on the market that can match LaPlant-Choate *positive* forced ejection for cleaning the bowl in a hurry because *the apron moves ahead with the load*—no chance of jamming sticky or bulky material between the ejector and apron.

But that's only part of this interesting profit story. For complete facts call or write your nearest LaPlant-Choate dealer today. See him also for dependable repair parts and prompt, efficient service on your present LPC rigs. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland 3, Calif.

LaPLANT-CHOATE

Positive **FORCED EJECTION SCRAPERS**

FIRST in Value because they're FIRST in Performance!

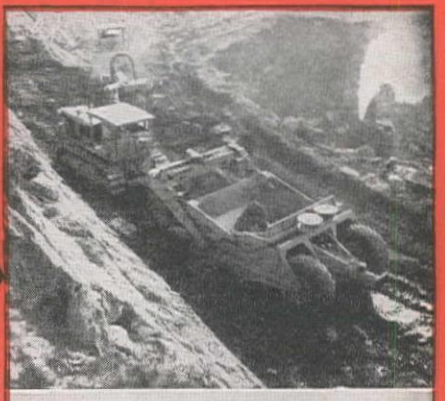
FOR TRACTOR-SCRAPER BUYERS!

...but be sure you get LaPLANT-CHOATE SCRAPERS

for best results under the most conditions

are you aware of the **BIG DIFFERENCE** in SCRAPER PERFORMANCE?

FINE SAND! One of Michigan's leading contractors used a LaPlant-Choate C-108 with an old RD-7 tractor and pusher to move this fine dune sand in building a recreation area along Lake Michigan. Scraper (equipped with oversize tires for extra flotation) got heaping loads in 15 to 20 seconds, traveling only 40 feet — a record few outfits could match in such hard loading material.



BIG ROCKS! Plenty tough going here — with rocks half as big as a desk plus bumpy terrain and close quarters. Yet F. G. Cheney's C-114 scraper did a remarkable job of "horsing in" the heavy clay overburden—rocks and all—on this stripping job for Lincoln Brick Co. Ripper used for breaking up rock overburden appears in the background.

STICKY GUMBO! LaPlant-Choate's high lifting front apron and exclusive method of positive forced ejection paid real dividends to Benbow Construction Co. on this pond building job in Kansas. As Supt. Dick Fields put it, "I've used them all and the LaPlant-Choate scraper has 'em all beat in every way. It moves more dirt at less cost than any scraper I've ever seen."

SANDY LOAM! In leveling this site for a new housing area, Contractor John Fleming loaded and spread a lot of yardage in a hurry, using a LaPlant-Choate C-108 scraper behind an International TD-18. Material consisted of wet sandy loam soil, mixed with tree roots and chunks of concrete from old foundations but the C-108 handled it with ease without the aid of a pusher.

WRAP UP YOUR MAINTENANCE PROBLEMS WITH THIS EQUIPMENT PACKAGE . . .

Allis-Chalmers HD-5 Tractor with Tracto-Shovel* and Model A-D Motor Grader

*All-'Round, All-Year Machine — Besides 1 cu. yd. standard bucket, interchangeable attachments for Tracto-Shovel include 3/4 cu. yd. narrow bucket and bucket teeth, 2 cu. yd. snow loader bucket, bulldozer blade and V-type snowplow. Outfit may be used with Gar Wood 2-wheel scraper, too, using shovel hydraulic system.

SOME OF THE JOBS YOU CAN DO WITH THIS COMBINATION—*working together or separately:*

- Clean and shape-up ditches
- Cut and smooth backslopes
- Handle regular maintenance
- Widen and reshape roads
- Make driveways
- Build berms
- Scarify roads
- Backfill pipe, culverts, bridges
- Take out cuts
- Make fills
- Do all bulldozing
- Plow, move and load snow
- Skid trees
- Load rocks and stumps
- Dig and load dirt or other material
- Mix black-top
- Do crane work
- Handle hauling or pulling

A TYPICAL JOB TO BE DONE — straightening out road, cutting down hill and making ditches for proper drainage.

ROAD PROTECTION AT LESS COST

Allis-Chalmers Brings You A New, Low Cost Plan For Road And Street Upkeep

Outfit moves quickly from one job to another. HD-5 on trailer easily pulled by A-D motor grader.

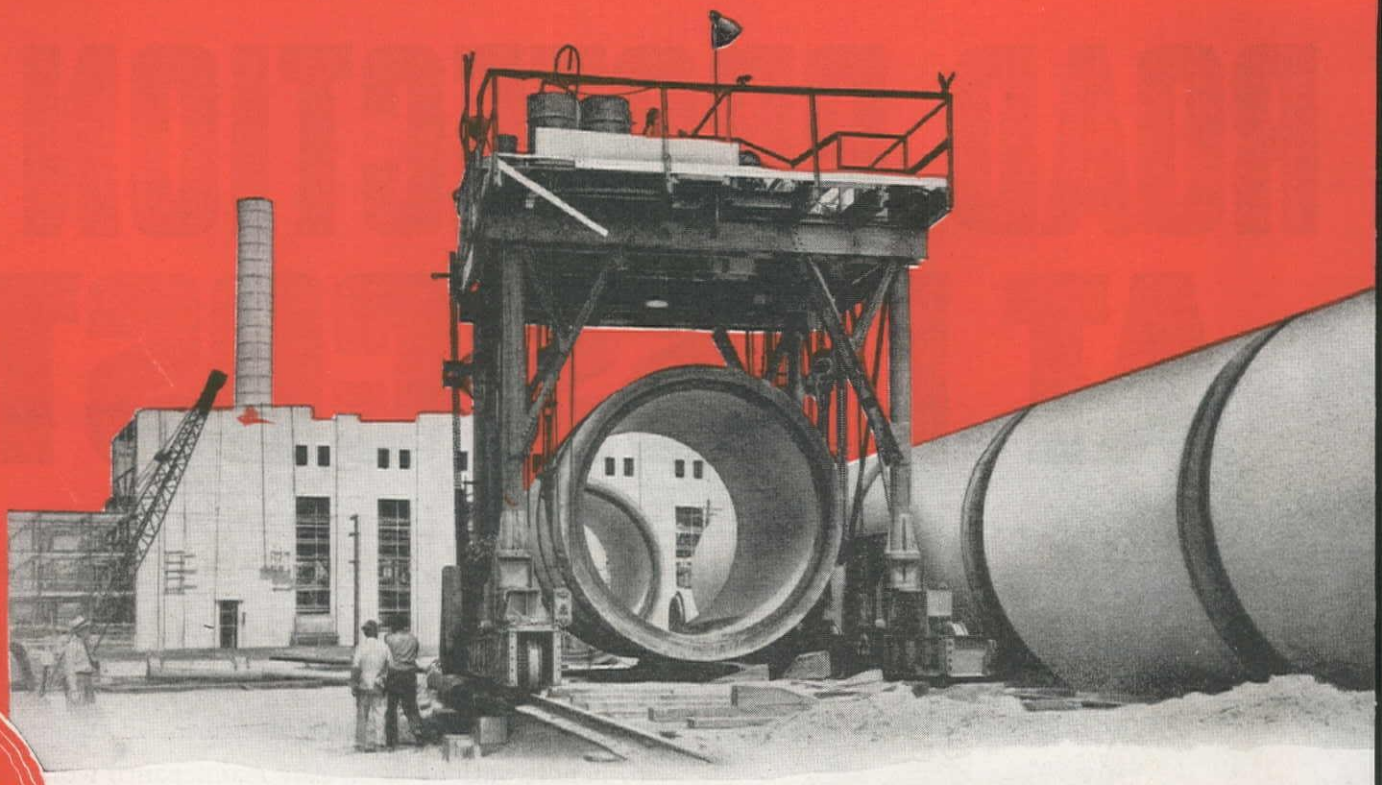
No need to make a major investment in equipment to handle various jobs. Any maintenance work . . . and much of your construction . . . is quickly, efficiently done with this versatile combination — AT BIG SAVINGS. There is only a nominal original cost with correspondingly low upkeep . . . but the work accomplished is considerably widened. Take a look at the list of jobs you can do — it's endless! Whatever your maintenance problem, this equipment package will wrap it up at the lowest cost.

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

JOB NEARING COMPLETION — all grading handled with HD-5 and Tracto-Shovel and the Model A-D Motor Grader. Surplus dirt loaded into trucks with shovel . . . shaping and finishing done with grader.

CLEANING-UP DITCHES—here the road surface is kept intact, only ditches and slopes made. Accomplished by pulling up dirt with A-D motor grader and loading surplus into trucks with HD-5 and shovel.

CUTTING THE BACKSLOPES — sloping, ditching, rough and fine grading . . . all these jobs are quickly, accurately handled with the greater earth-moving capacity of the Model A-D motor grader. Its extra traction and power make it the ideal machine, too, for scarifying and plowing snow.



Pipe is suspended under special gantry crane which moves on a trestle track to position of installation. Divers then direct lowering and permanent placement of pipe under the ocean.

Pacific Ocean

Southern California Edison Co's

REDONDO STEAM STATION
Stone & Webster Engineering Corporation, Engineers.
Macco Corporation, contractors for subaqueous portion.

FOR IMPORTANT SUBAQUEOUS INSTALLATION—

large precast reinforced concrete pipe assures maximum permanence, performance and economy.

Extending under the Pacific Ocean for almost half a mile, two parallel alternating intake and discharge lines will perform the task of circulating ocean water, at an average flow of 400 second feet, for use in connection with the steam condensing system of the Southern California Edison Company's Redondo Steam Station, now nearing completion.

Each section of 120" I.D. pipe is equipped with Lock Joint Rubber Gasket joints which assure easy and accurate placement, as well as maximum joint flexibility for this important subaqueous installation.

Typical of American Pipe and Construction Co. products, here is a permanent pipe, offering the advantages of economical installation and maintenance, maximum hydraulic capacity, corrosion resistance and inherent strength, plus a large safety factor so necessary to any permanent installation.

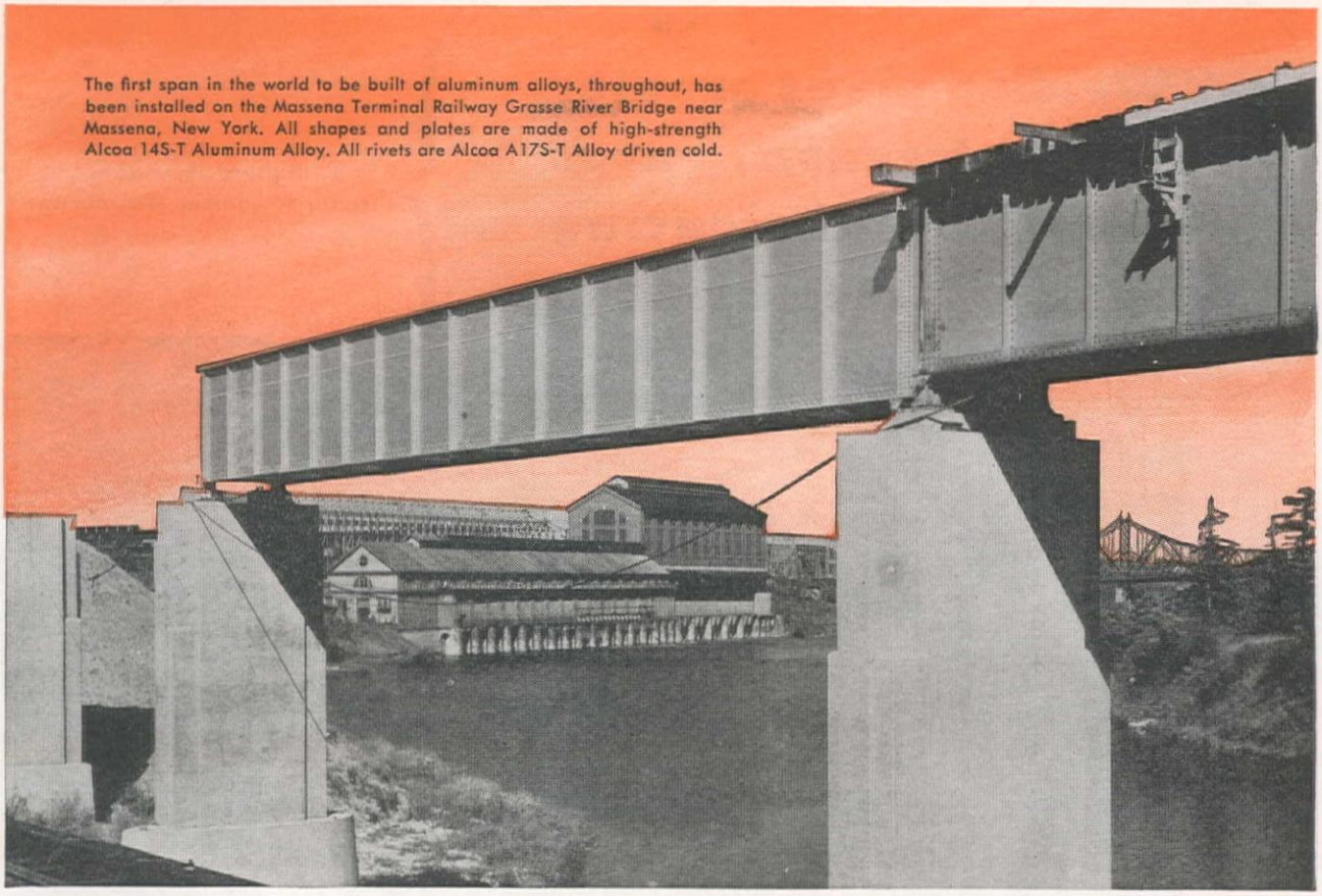
This company has enjoyed a wide experience in the field of water supply line engineering and construction over a long period of years and this experience and training is available to water works officials and engineers. Information available upon request.

American
PIPE AND CONSTRUCTION CO.

Concrete Pipe for Main Water Supply Lines, Storm and Sanitary Sewers, Subaqueous Pipe Lines. • P. O. Box 3428, Terminal Annex, Los Angeles 54, California

Quality pipe line products manufactured and installed by American include — Lock Joint Concrete Cylinder Pipe, Prestressed Lock Joint Concrete Cylinder Pipe, American Concrete Cylinder Pipe, Centrifugal Concrete Pressure Pipe.

Main Offices and Plant — 4635 Firestone Blvd., South Gate, California
District Offices and Plants — Oakland • San Diego • Portland, Oregon



The first span in the world to be built of aluminum alloys, throughout, has been installed on the Massena Terminal Railway Grasse River Bridge near Massena, New York. All shapes and plates are made of high-strength Alcoa 14S-T Aluminum Alloy. All rivets are Alcoa A17S-T Alloy driven cold.

These ALCOA Aluminum Alloys have muscles like steel

. . . AND ⅓ THE WEIGHT

Tensile strengths comparable to structural steel . . . structural shapes to meet all needs . . . light weight to reduce dead load . . . high resistance to corrosion . . . these advantages make Alcoa Aluminum Structural Shapes ideal for many structures.

Alcoa Aluminum Alloys are fabricated by standard structural shops. Erection goes faster because of light weight and ease of handling.

Shown in the table at right are a few typical properties of Alcoa Standard Structural Aluminum Alloys. Ask the nearby Alcoa sales office for a copy of "Structural Aluminum Handbook" containing complete design and fabrication data on all forms of Alcoa Structural Aluminum. ALUMINUM COMPANY OF AMERICA, 1811 Gulf Building, Pittsburgh 19, Pennsylvania. Sales offices in 54 leading cities.

Alcoa Alloy	Ultimate Tensile Strength	Yield Strength
14S-T6	70,000 psi.	60,000 psi.
14S-T4	62,000 psi.	40,000 psi.
61S-T6	45,000 psi.	40,000 psi.

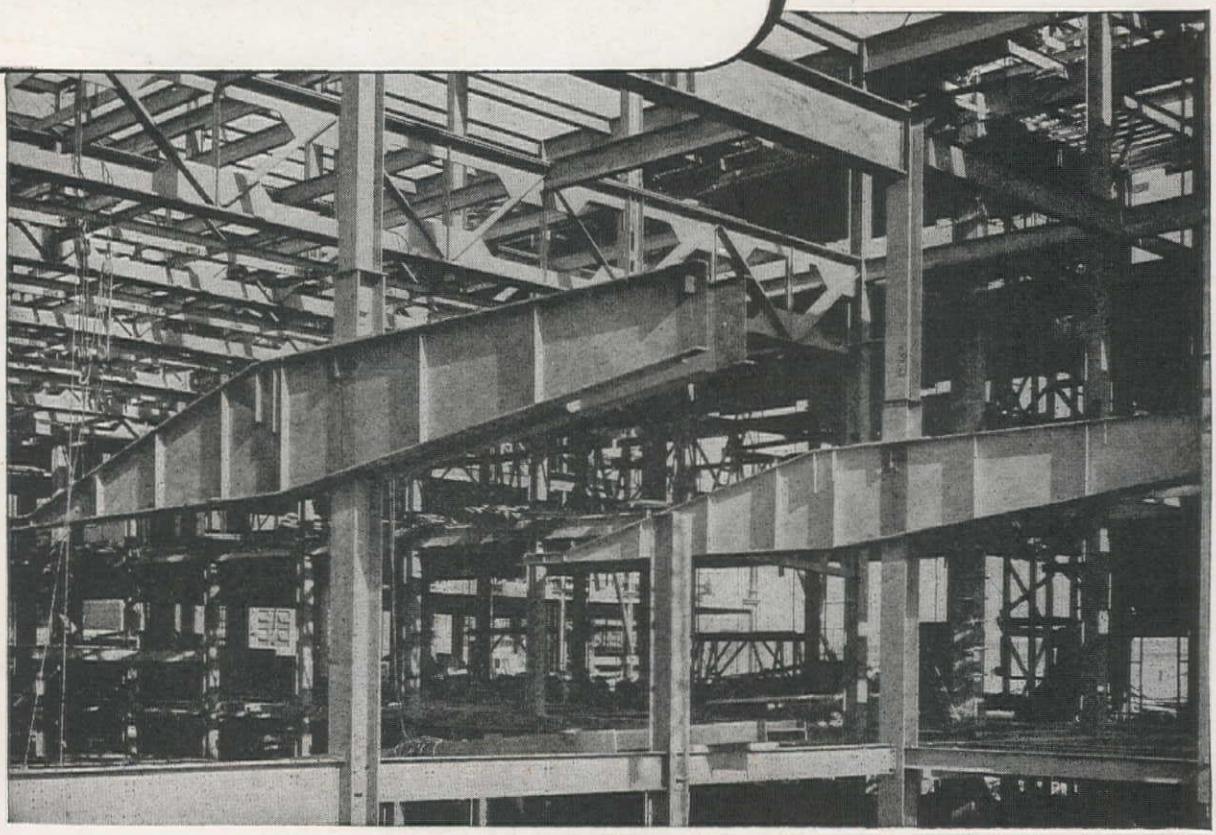
ALCOA FIRST IN ALUMINUM

REG. U. S. PAT. OFF.

IN EVERY COMMERCIAL FORM

"Welding gives greater design freedom, saves steel in fabricating built-up members . . ."

T. R. Mullen, President,
LEHIGH STRUCTURAL STEEL COMPANY



In full, Mr. Mullen stated, *"Welded construction provides greater freedom in architectural and structural design. It saves steel in fabricating built-up members — and, also, results in better appearance of exposed steel work, due to smoother surfaces and outlines."*

Other practical reasons for using arc welding in construction work include: its quietness, the ease with which alterations and additions can be made to existing structures, and a saving of steel in structural connections.

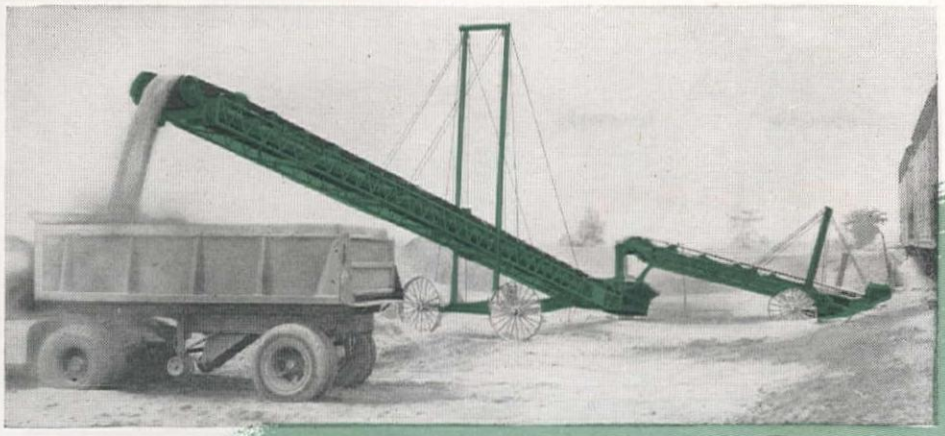
Why not specify or recommend this modern construction process — a process that affords unquestionable strength and enduring safety — at a saving. Today, efficient application is practical anywhere, thanks to the greatly increased number of skilled war-trained welders.

For more information about this time-proved construction technique, and how it will bring savings on your next job, write to

Dept. WCN-7108, Air Reduction
1280 - 45th Street,
Emeryville, California

AIRCO **AIR REDUCTION**
Offices in All Principal Cities

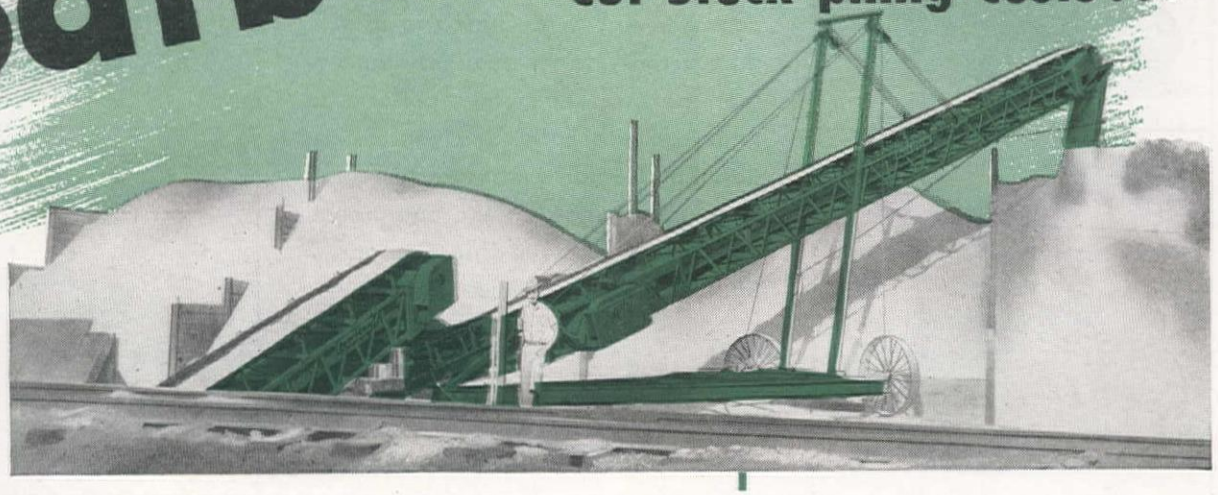
HEADQUARTERS FOR OXYGEN, ACETYLENE AND OTHER GASES...CARBIDE...GAS WELDING AND CUTTING APPARATUS AND SUPPLIES...ARC WELDERS, ELECTRODES AND ACCESSORIES



Cut Truck-loading Time...

Barber-Greene

Cut Stock-piling Costs...



Speed up—*and Save*—with B-G "Portables"!

Trucks can make round trips faster if you turn over your loading problems to one or more B-G Portable Conveyors—and stock-piling service is a "natural" for them, too.

Used singly or in "teams," B-G portable Conveyors carry sand, crushed rock, coal and other bulk materials at a constant flow that means fast, low-cost loading, unloading and stock-piling. Power consumption is low, maintenance is negligible.

The B-G Heavy-duty Portable Conveyors shown above are only examples of the many popular types and capacities in the broad Barber-Greene line. See your Barber-Greene distributor.

Standardized construction: B-G "Portables" are easily lengthened or shortened by simple addition or removal of sections.

◆

Highly portable for travel—readily moved around the job.

◆

Wide variety of types and capacities—including crawler mounted B-G Stackers up to 150 feet in length.

◆

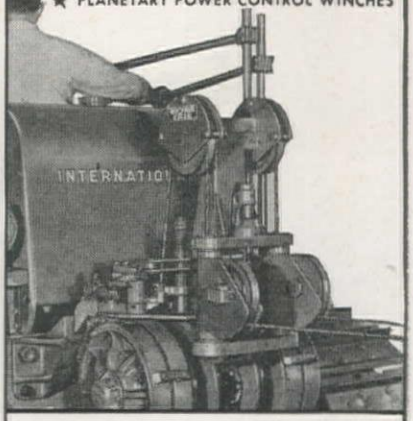
Available with either electric or gasoline power.

BARBER-GREENE COMPANY • AURORA, ILLINOIS

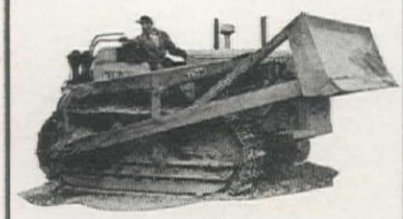
FOR SALE BY: Brown-Bevis Equipment Co., Los Angeles 11, California; Columbia Equipment Co., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; Wilson Equipment & Supply Co., Cheyenne, Wyoming, Casper, Wyoming; Contractors Equip. & Supply Co., Albuquerque, New Mexico; Ray Corson Machinery Co., Denver 9, Colorado; Jenison Machy. Co., San Francisco 7, California; Western Construction Equipment Co., Billings, Montana, Missoula, Montana; Kimball Equipment Co., Salt Lake City 10, Utah; State Tractor & Equipment Co., Phoenix, Arizona.

Hitch Your Tractor to One of These *Stars*

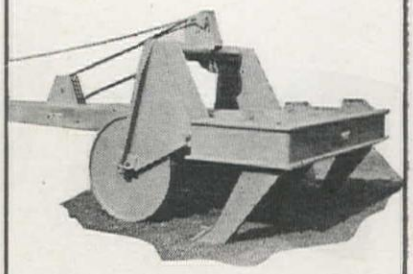
★ PLANETARY POWER CONTROL WINCHES



★ CABLE BULLGRADERS and BULLDOZERS



★ RIPPERS



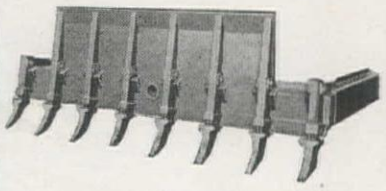
Hitch your International Tractor to a star from the Bucyrus-Erie line of tractor equipment. Each unit in this complete line is designed to match the tractor — to give you a balanced tool that will efficiently perform a wide range of jobs. See your International Tractor distributor for complete information on the equipment you need. Bucyrus-Erie Company, South Milwaukee, Wisconsin.

★

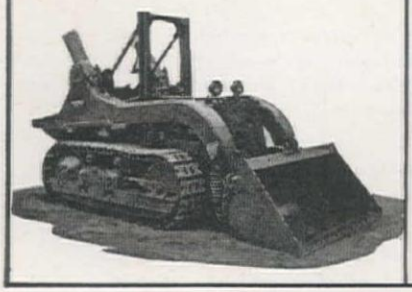
86T47

★ 4-WHEEL (Cable) SCRAPERS

★ HYDRAULIC or CABLE GRUBBERS

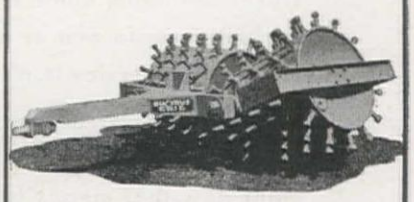


★ DOZER-SHOVELS



★ 2-WHEEL (Hydraulic) SCRAPERS
★ HYDRAULIC BULLGRADERS and BULLDOZERS

★ TAMPING ROLLERS



See Your INTERNATIONAL Industrial Tractor Distributor

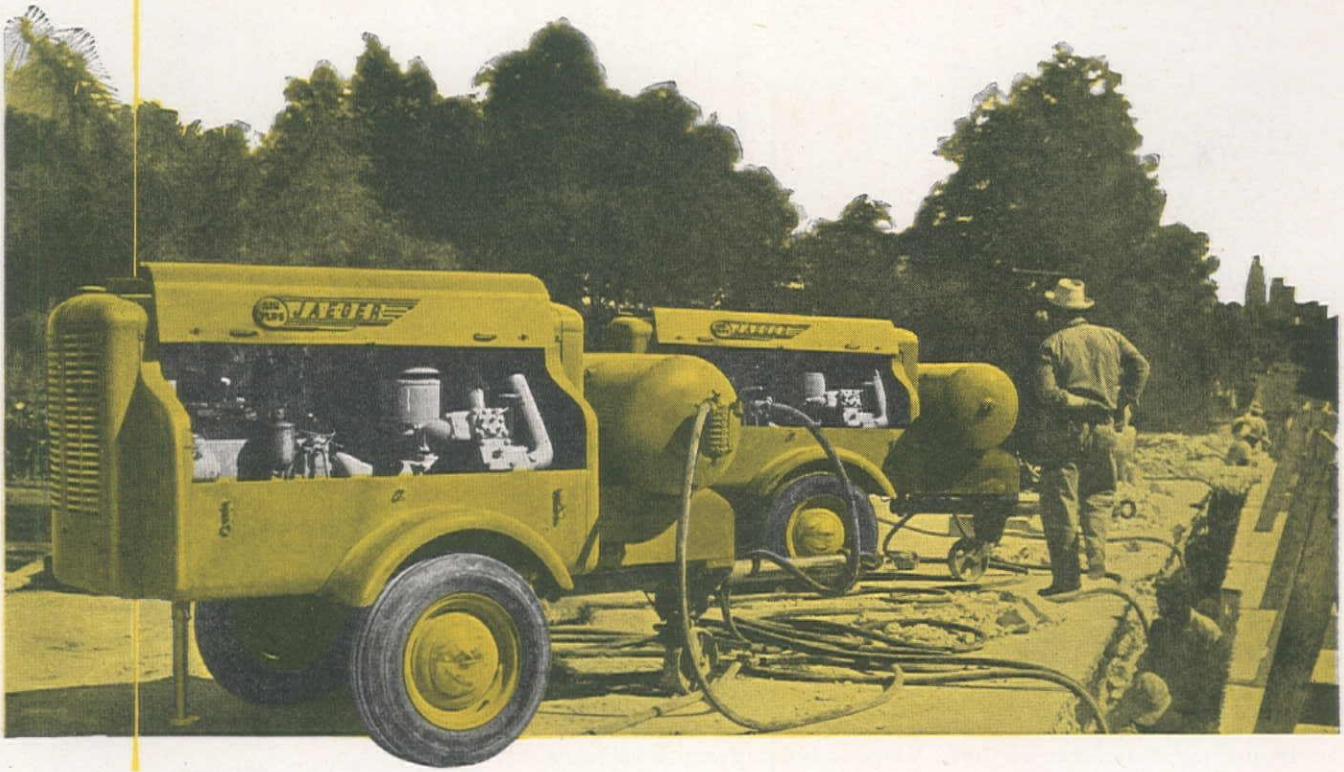
ARIZONA: John P. Duncan, Yuma; Flagstaff Implement Co., Flagstaff; The Lines Co., Safford; Northern Arizona Supply Co., McNary; F. Ronstadt Hardware Co., Tucson; The O. S. Stapley Co., Phoenix. **CALIFORNIA:** Allied Equipment Co., Fresno, Madera & Reedley; Bay Cities Equipment Co., Inc., Oakland; Braman-Dickerson Co., Riverside; M. Elitiste & Co., Inc., Santa Ana & Anaheim; Exeter Mercantile Co., Visalia & Exeter; Farmers Exchange, Alturas; Farmers Mercantile Co., Salinas, Hollister, King City & Watsonville; Gallagher Tractor & Impl. Co., Merced; Edw. F. Hale Co., Hayward; Hanson Equipment Co., Santa Maria; Kern County Equipment Co., Bakersfield & Wasco; L. G. Maulhardt Equipment Co., Oxnard; Purdy-Holmquist Co., El Centro; Sacramento Valley Tractor Co., Sacramento; Smith Booth Usher Co., Los Angeles; Southern Equipment & Supply Co., San Diego; Stanislaus Implement & Hdwe. Co., Modesto; Stevenson Equipment Co., Santa Rosa; Thompson-Sage, Inc., Stockton, Lodi & Tracy; Valley Equipment Co., San Jose. **IDAHO:** Intermountain Equipment Co., Boise & Pocatello. **NEVADA:** Brown Truck & Equipment Co., Reno; Clark County Wholesale Mercantile Co., Inc., Las Vegas. **NEW MEXICO:** Hardin & Coggins Co., Albuquerque. **OREGON:** Howard-Cooper Corp., Portland & Eugene. **UTAH:** The Lang Co., Inc., Salt Lake City. **WASHINGTON:** Howard-Cooper Corp., Seattle; Intermountain Equipment Co., Spokane. **WYOMING:** Wilson Equipment & Supply Co., Cheyenne & Casper.

TRACTOR BUCYRUS ERIE EQUIPMENT TE-3

bought 5 more Jaegers

HERE'S WHY: *This 6 months' operating record of their first 4 compressors is the reason why Bell Compressor Rental Co. now owns 9:*

Total number of jobs done by four Model 105 units..... 503
Average number of hours worked by each..... 745.7
Average gasoline consumption per machine per hour. 1.35 gals.
Cost of repairs and replacements..... None
Frequency of oil change..... 200 hours



Highlights from Mr. Ferrara's Report:

In the rental business, we are interested in low cost operation and upkeep. With other makes in our fleet of the same age and use, gasoline consumption was higher and repairs amounted to over $50 for this same period. We have since added 5 more Jaegers as a result.

From over 15 years experience, I say that the Jaeger is the best. It embodies the most desirable features of all compressors, including a large receiver for steady, even pressure; easy starting; easiest to oil, grease and make adjustments — a very important factor.

Our customers feel the same way. With a Jaeger they have no delays or breakdowns and accomplish more work. Time and again, our customers ask us to furnish a Jaeger "Air Plus" compressor on their job.

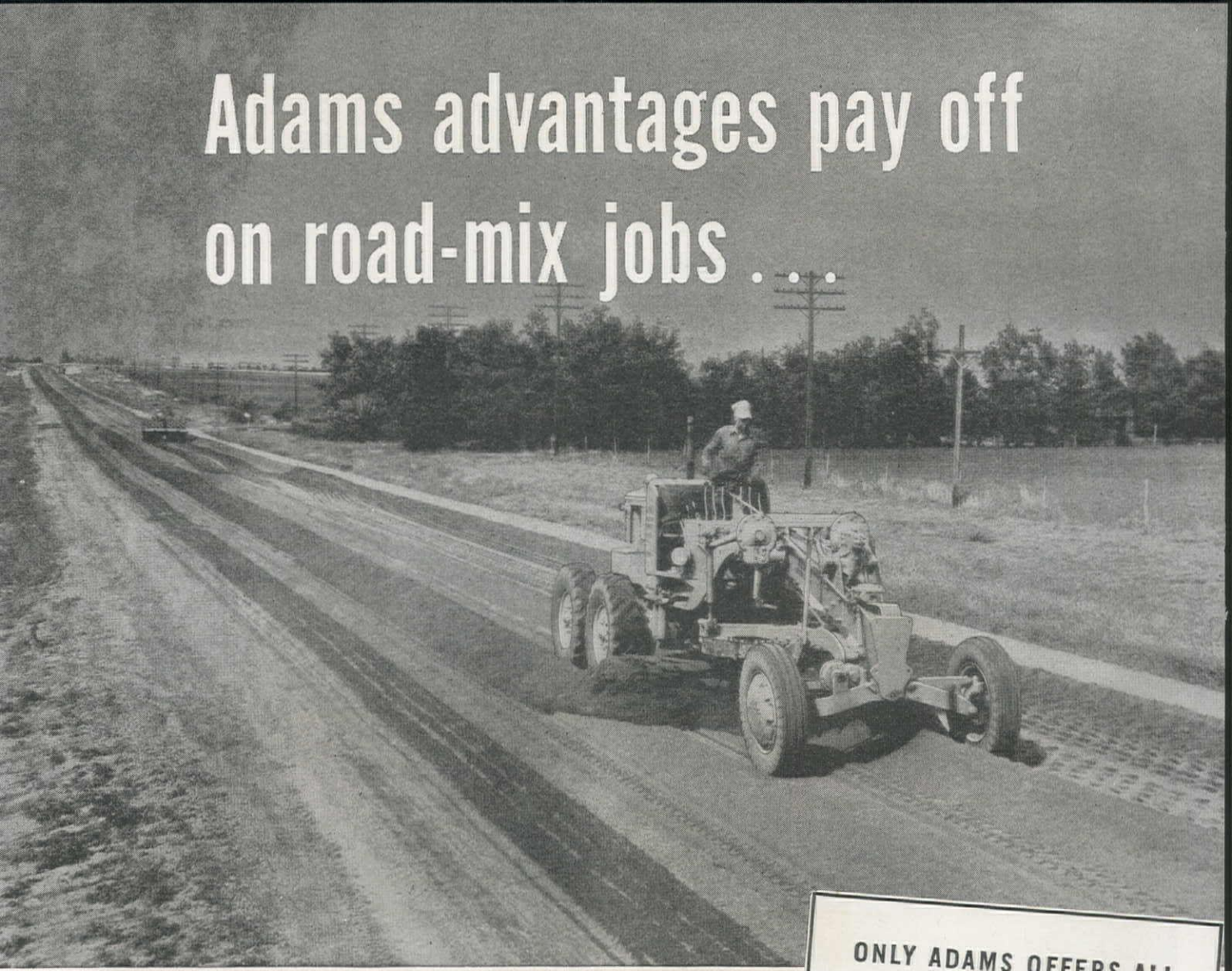
James Ferrara
Bell Compressor Rental Co., Washington, D. C.

Tops in service, too — "AIR PLUS" Compressors, in 60 to 600 ft. sizes, are sold, rented, serviced in 130 cities of the U. S. and Canada. See your Jaeger distributor.

Sold, Rented and Serviced by

EDWARD R. BACON CO.....San Francisco 10, Calif.
SMITH BOOTH USHER CO.....Los Angeles 54, Calif. and Phoenix, Ariz.
A. H. COX & CO.....Seattle 4, Wash.
NELSON EQUIPMENT CO.....Portland 14, Ore. and Twin Falls, Ida.
ANDREWS EQUIPMENT SERVICE.....Spokane 9, Wash.
WESTERN MACHINERY COMPANY.....Salt Lake City 13, Utah and Denver 2, Colo.
CENTRAL MACHINERY CO.....Great Falls, Mont.
TRACTOR & EQUIPMENT CO.....Sidney, Mont.
WORTHAM MACHINERY CO.....Cheyenne, Wyo., Billings, Mont.
HARDIN & COGGINS.....Albuquerque, N. M.
MILES CITY EQUIPMENT CO.....Miles City, Mont.

Adams advantages pay off on road-mix jobs . . .



ROAD-MIX WORK—to be fast, efficient, economical—calls for motor graders with the combination of operating advantages found only in Adams Motor Graders.

In the picture above you see these Adams advantages at work on a typical road-mix job. On work of this kind Adams high-arch front axle permits straddling of big windrows so blade may be set at sharp angle for maximum mixing action. And Adams 8 forward speeds provide exactly the right speed to mix the material at the fastest practical rate. Finally, Adams power-operated precision controls enable the operator to lay out material accurately to specifications—*every time.*

Just as Adams Motor Graders excel on road-mix work, so are they tops for all grader operations. Let your local dealer explain how Adams Motor Graders are *Your Best Buy—All Ways.*

J. D. ADAMS MANUFACTURING CO. • INDIANAPOLIS, INDIANA

ONLY ADAMS OFFERS ALL THESE OUTSTANDING ADVANTAGES

- 8 Overlapping Forward Speeds
- High-Arch Front Axle for Clearance
- Push-Button Starting from Cab
- Positive Mechanical Controls
- Wide Range of Blade Adjustments
- Exceptional Blade Clearance in All Operating Positions
- Balanced Weight Distribution
- Easy Access for Fast Servicing
- World-Wide Dealer Service

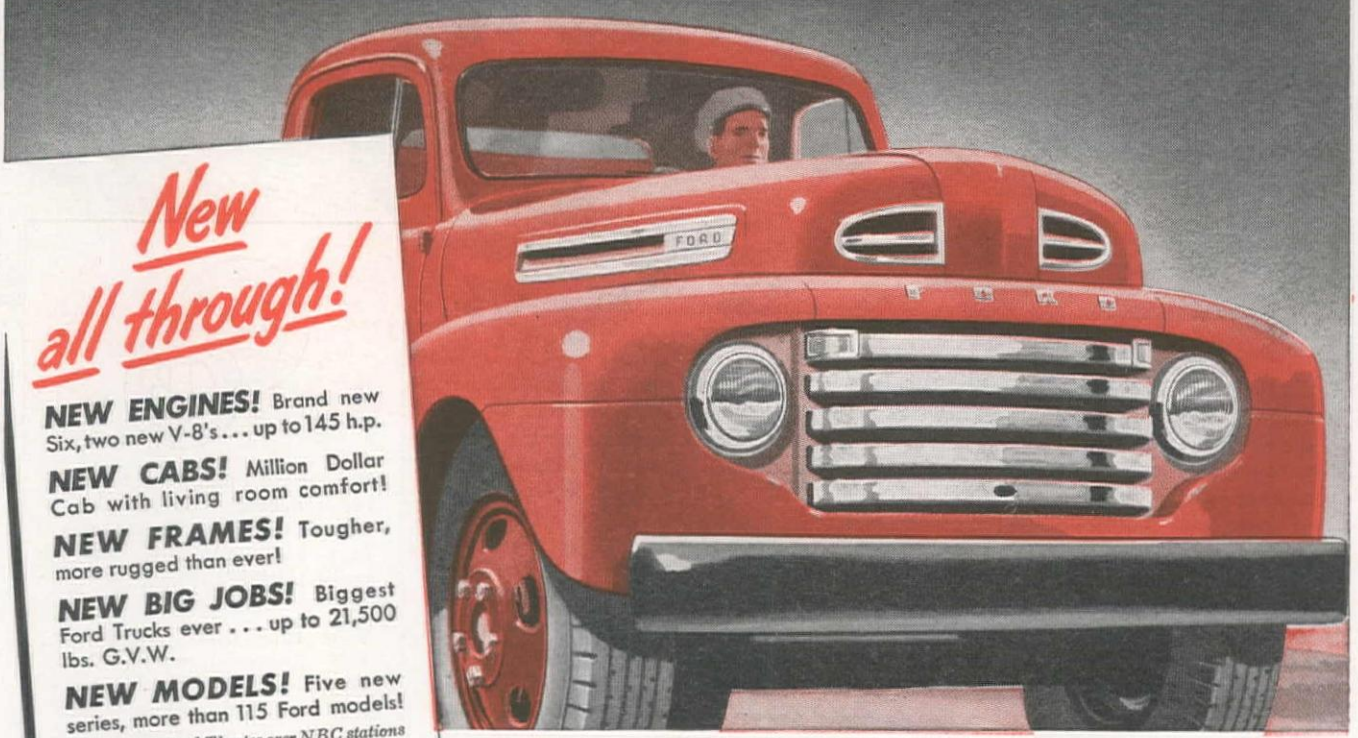
LOCAL Adams DEALERS

CALIFORNIA—*Western Factory Branch,* J. D. ADAMS MANUFACTURING CO., 230 7th Street, San Francisco 3; Adams Distributors at: San Francisco, Oakland, Los Angeles, Sacramento, Redding, Riverside, San Jose, Fresno, Stockton, Salinas, Santa Rosa, Modesto, Visalia, Merced, Bakersfield, Santa Maria and San Diego • ALASKA—Glenn Carrington & Co., Fairbanks • ARIZONA—The O. S. Stapley Company, Phoenix • COLORADO—McKelvy Machinery Co., Denver • IDAHO—Intermountain Equipment Co., Boise, Pocatello • MONTANA—Industrial Equipment Co., Billings, Missoula; Hi-Line Equipment Co., Great Falls • NEVADA—Brown Motors, Reno; Clark County Whse. Merc. Co., Las Vegas • NEW MEXICO—Hardin & Coggins, Inc., Albuquerque • OREGON—Howard-Cooper Corp., Portland, Eugene • UTAH—The Lang Company, Inc., Salt Lake City • WASHINGTON—Howard-Cooper Corp., Seattle; Intermountain Equipment Co., Spokane • WYOMING—Industrial Equipment Co., Billings, Montana; The Lang Company, Inc., Salt Lake City, Utah.

Brand NEW for '48

FORD Bonus* Built TRUCKS

BUILT STRONGER TO LAST LONGER



New all through!

NEW ENGINES! Brand new Six, two new V-8's . . . up to 145 h.p.

NEW CABS! Million Dollar Cab with living room comfort!

NEW FRAMES! Tougher, more rugged than ever!

NEW BIG JOBS! Biggest Ford Trucks ever . . . up to 21,500 lbs. G.V.W.

NEW MODELS! Five new series, more than 115 Ford models!

Listen to the Ford Theater over NBC stations Sunday afternoons 5:00 to 6:00 p.m., E.S.T.

Bonus* Built —THE AMAZING RESULT OF AN ENGINEERING PRINCIPLE THAT ASSURES LONGER TRUCK LIFE . . . and ONLY Ford Trucks Have It!

The great new Ford Trucks for '48 are revolutionary not only because they are *new all through* but because they are the amazing result of a time-proved truck engineering principle. This principle is Ford Bonus Built construction.

Bonus Built—Extra Strength! Every single one of the great new Ford Trucks for '48 is Bonus Built . . . designed and built with a margin of *extra strength* in every vital part. But that is only *part* of this vital truck building principle . . .

Bonus Built—Work Reserves! This *extra strength* provides WORK RESERVES that pay off for truck operators in two important, money-saving ways . . .

Bonus Built—Greater Range of Use! These Bonus Built WORK RESERVES give Ford Trucks a *greater range of use* by permitting them to handle loads beyond the normal call of duty! That means that Ford Trucks are *not* limited to doing only one single, one specific job!

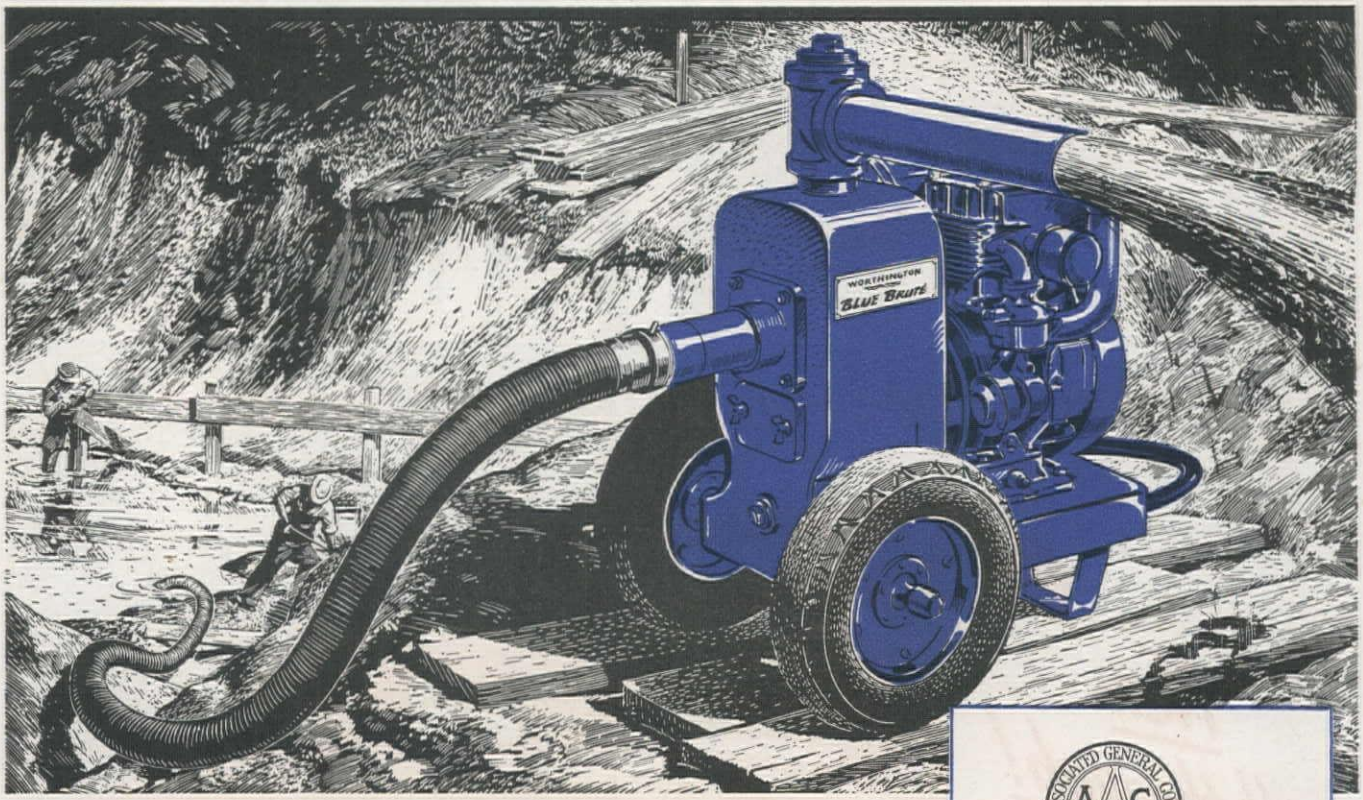
Bonus Built—Longer Life! What's more, these same WORK RESERVES allow Ford Trucks to relax on the job . . . to do their jobs easier, with less strain and less wear. Thus, Ford Bonus Built Trucks last *longer* because they are built to work *easier!*

See the great new line of Ford Bonus Built Trucks for '48 now!

***BONUS:** "Something given in addition to what is usual or strictly due."— Webster's Dictionary*

LIFE INSURANCE EXPERTS PROVE . . . FORD TRUCKS LAST UP TO 19.6% LONGER!

NOW... CONTRACTORS' PUMPS BY WORTHINGTON



Meet the Blue Brute Portable Self-Priming Centrifugal Pump, newest development of Worthington's 100-years-plus of experience in the design and manufacture of pumps. Fabricated of rust and abrasion-resisting alloy steel, it is ruggedly built to take the hardest knocks, yet light in weight for easy portability.

Fast, unfailing self-priming is a built-in feature of its advanced hydraulic design — not a troublesome auxiliary device. There is no priming valve to get out of order, none of the usual "recirculation" that reduces capacity or efficiency. The result is quick, dependable pick-up of water at all times.

Thoroughly tested in the modern research laboratories of the world's largest builder of pumps, this latest addition to the famous Blue Brute Construction Equipment line is a compact, streamlined portable pumping unit — in which simplicity of design and sturdiness of construction provide top performance under severest operating conditions . . . further proof that *there's more worth in Worthington-Ransome.*

For additional information on Blue Brute Portable Self-Priming Centrifugal Pumps, see your nearby Worthington Distributor. Or, write for Bulletin W-2010-B2.

H6-25

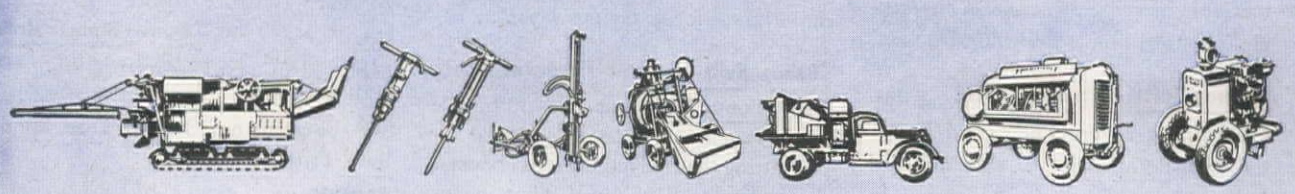
Blue Brute Pumps are built to the standards of the Associated General Contractors of America, Inc., and carry the A.G.C. rating plates.

Your Blue Brute Distributor will gladly show you how Worthington-Ransome construction equipment will put your planning on a profitable basis.

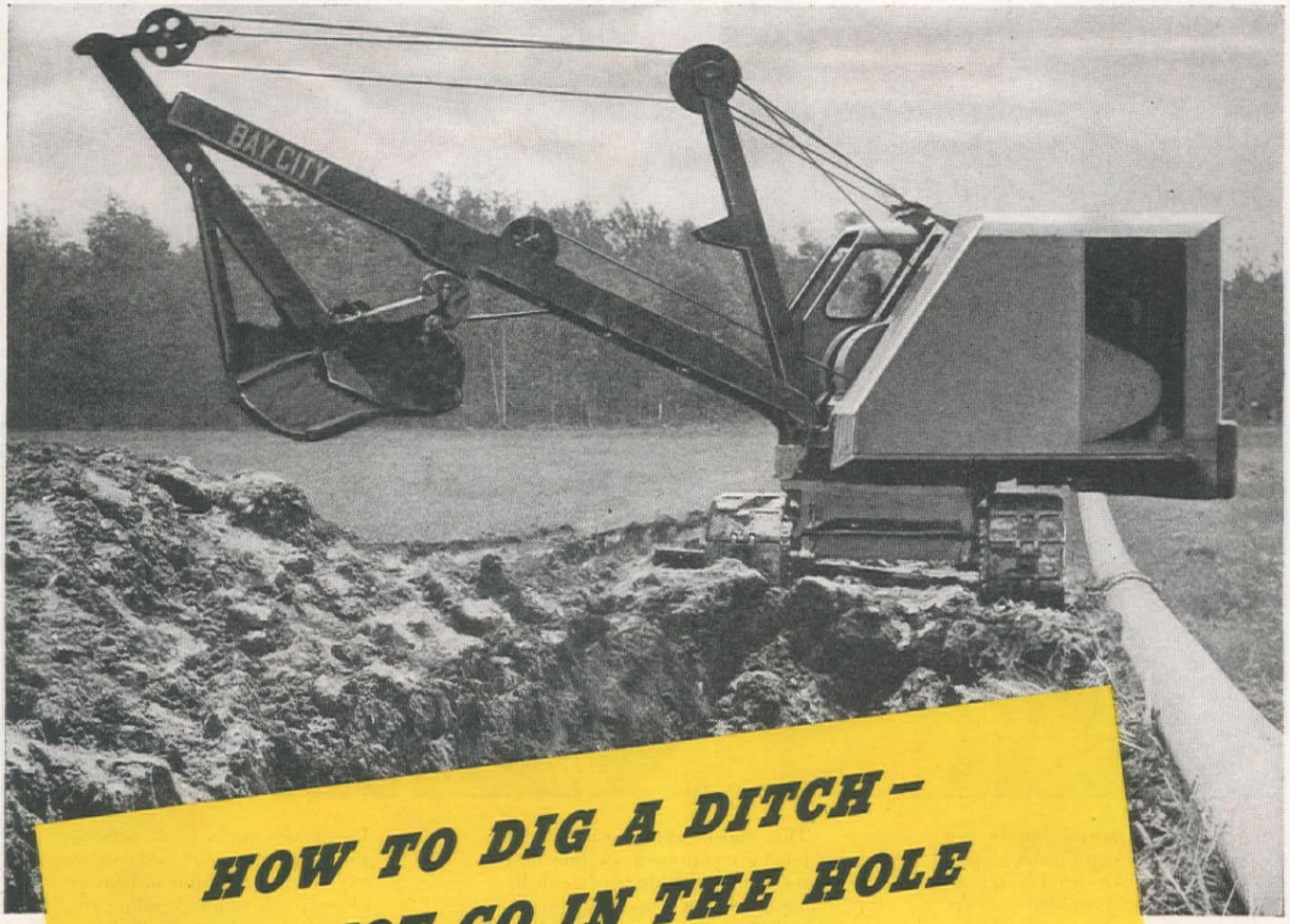
WORTHINGTON

Worthington Pump and Machinery Corporation, Worthington-Ransome Construction Equipment Division, Holyoke, Mass.

BUY BLUE BRUTES



IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB



HOW TO DIG A DITCH – AND NOT GO IN THE HOLE

Yager and Sons, Beaverton, Michigan, call the 3-cylinder GM Series 71 Diesel that powers this shovel "just about the best power we've ever used." Inset shows Mr. Fay Yager, in charge of the shovel operation, who says, "You fellows just don't boast enough about that GM Diesel engine."

Shown here is a General Motors Diesel-powered Bay City ¾ yard shovel. It's doing the toughest part of a pipe-trench job—mile after mile of 6′ by 12′ trench—cutting through wet sand, swamp mud, pulling stumps, digging in the roughest kind of terrain.

Taking jobs like this in stride is everyday work for GM Diesel-powered equipment. The 2-cycle GM Diesel gives instant response to widely fluctuating power demands, operates on low-cost fuel, and delivers long, economical service.

No wonder so many operators rely on GM Diesel power to help them trim costs on close-figured contracts. You, too, will find it pays to specify GM Diesels for repowering old equipment or when buying new. Write today for complete details.

DETROIT DIESEL ENGINE DIVISION

DETROIT 28, MICH. ● { SINGLE ENGINES . . Up to 200 H. P. / MULTIPLE UNITS . . Up to 800 H. P.

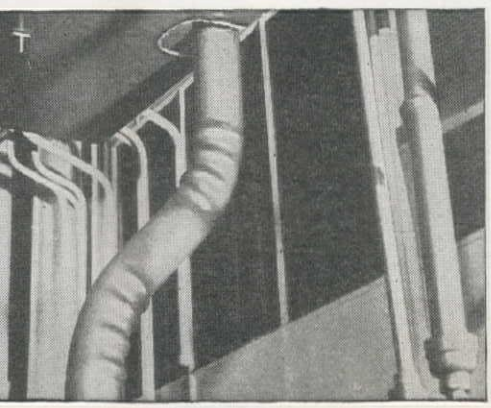
GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

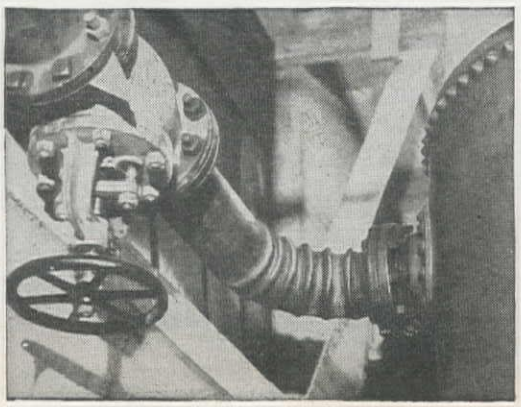
GM GENERAL MOTORS DIESEL POWER

Evans Engine & Equipment Co. SEATTLE 9, WASH.
Cate Equipment Co. SALT LAKE CITY, UTAH
Fred M. Viles & Company SPOKANE 8, WASH.
Mountain Tractor Co. MISSOULA, MONT.
Gunderson Bros. Equipment Corp. PORTLAND 9, ORE.
Olson Manufacturing Co. BOISE, IDAHO
Capitol Tractor & Equipment Co. SACRAMENTO, CALIF.
Anderson-O'Brien Co. LOS ANGELES 21, CALIF.

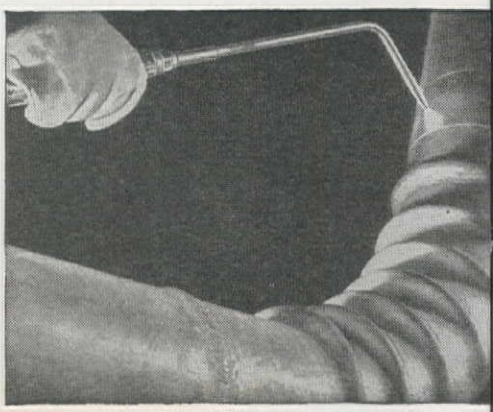
"Tailor-Made" Bends



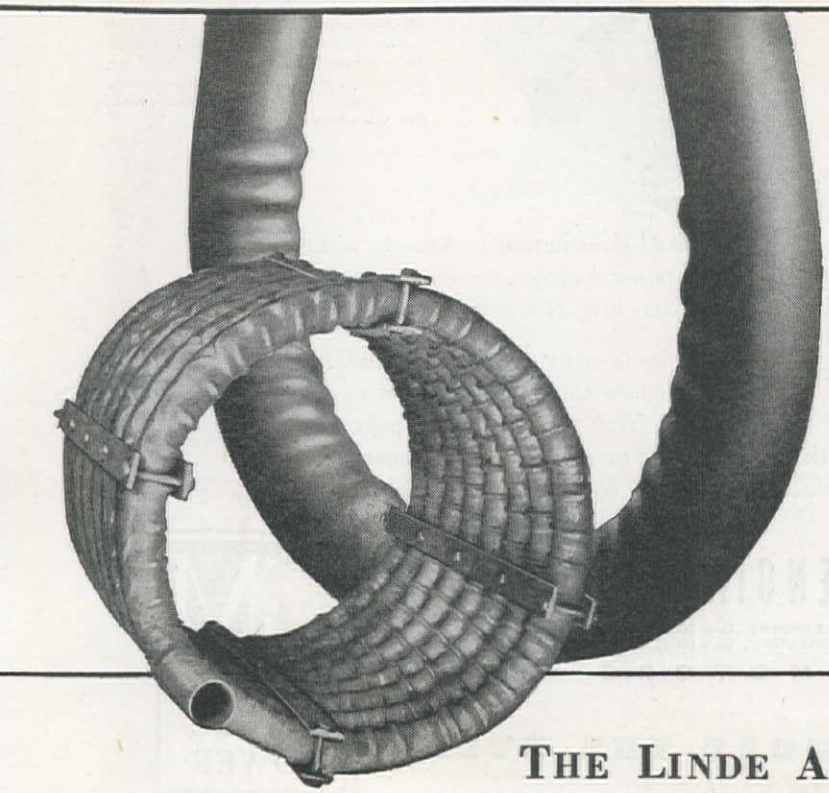
Where compound bends are required in a continuous section of pipe, wrinkle-bends offer an ideal solution. Wrinkle-bends are leakproof, as strong as the pipe itself, require no maintenance, and are easy to insulate.



This short-radius wrinkle-bend joins a compressed air line to a reservoir. Wrinkle-bends can be made in brass, copper, aluminum, and steel pipe from 2 inches to 26 inches in diameter.



Pipe bends can be made right on the spot with the aid of an oxy-acetylene welding or heating blowpipe, a simple bending rig, and a few common tools. Wrinkle-bending does not reduce the thickness of pipe walls.



This condenser coil made from 2-inch stainless steel pipe has 350 wrinkle-bends.

There are many LINDE methods for forming, cutting, joining, and treating metals. LINDE engineering service is always on call to help customers with production, construction, and maintenance jobs. Just call the nearest LINDE office.

Linde

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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

In Canada: DOMINION OXYGEN COMPANY, LIMITED, Toronto

LOADING HEAVY, WET CLAY

2½ Yards In 7 Minutes

● Case "DI" tractor and Hough hydraulic loader, shown above, are filling 2½-yard trucks in seven minutes with wet, heavy clay from a street-widening operation.

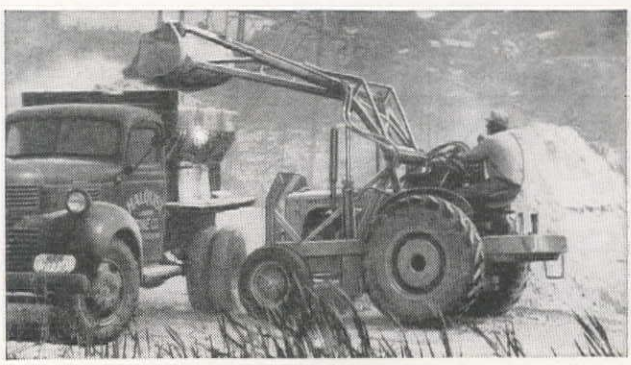
● Model "DI" with White extensible-boom loader not only picks up and loads ready-mix material but reaches out and dumps it in the center of the truck.

It's the Power Behind that Puts You Ahead

You get more yardage per man-hour when the power behind the shovel is eager, flexible, easy to handle. With the way their engines pull steadily when throttled down, plus the velvet action of their robust clutches, Case tractors give quick and confident control to the man at the wheel. Their sure-footed traction and stability, plus extra strength to stand up under added loads, make them ideal power for loaders, cranes, winches, snow-plows, highway mowers and rotary brushes. Case industrial tractors, in four basic sizes, cover a weight range from 2500 to 10,000 pounds. For ENDURANCE as well as performance they have earned an enviable reputation.

CASE

Your Case industrial dealer is strategically located to serve you conveniently, staffed and stocked to serve you well. Besides Case tractors and engine units he offers a well chosen line of related equipment such as tractor-mounted cranes, loaders, winches, snow-plows and rotary brushes. Specializing in the power and equipment problems that prevail in your area, he has broad experience that can be helpful to you in the choice, use and care of equipment. J. I. Case Co., Oakland, Los Angeles.



● Lull shovel-loader with ram-controlled bucket, powered by Case "SI" tractor, takes agricultural lime from quarry pile, pours it gently into truck.

Take the DEAD END STREETS Out of Your Thoroughfares

. . . speed up your jobs with dependable Le Roi Airmaster compressors and Le Roi-Cleveland Air Tools

Air power costs you less money when you make it with any of the 7 sizes of Airmasters. You get your jobs done faster, too. Here's why:

- **Higher average working pressures** — the patented fuel-saving Econotrol adjusts engine speed to the demand for air. Fuel is saved, wear-and-tear reduced, and higher pressures maintained. Air tools do more work.
- **High-speed towing** — automotive steering and semi-elliptical spring suspension get you to and around the job faster, saving valuable time.
- **Tireless dependability** — Airmasters — with their sturdy unit construction, extra-heavy balanced crankshafts, cushioned valves, pressure lubrication — keep plugging away. Down-time is less. Job schedules are completed sooner. Larger profits go into your pocket.

This efficiency saves you both time and money. But you can get still more out of your Airmasters by teaming them with Le Roi-Cleveland Air Tools. Le Roi Paving Breakers, for example, hit hard, yet they are easy-holding. Our hand-held drills, the 30-lb. H-66, the 45-lb. H-10, and the 55-lb. H-111, have the holding, the drilling speed, and rotation that produce more feet per shift. For holes from 20 to 40 feet in depth, your best bet is the Le Roi-Cleveland wagon drill.

Get all the money-saving facts from your Le Roi distributor. Write us today for latest literature.

Airmaster
Portable Air Power at its BEST!

LE ROI COMPANY
MILWAUKEE 14, WISCONSIN
NEW YORK • WASHINGTON • CLEVELAND • BIRMINGHAM
MILWAUKEE • TULSA • BUTTE • SAN FRANCISCO

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

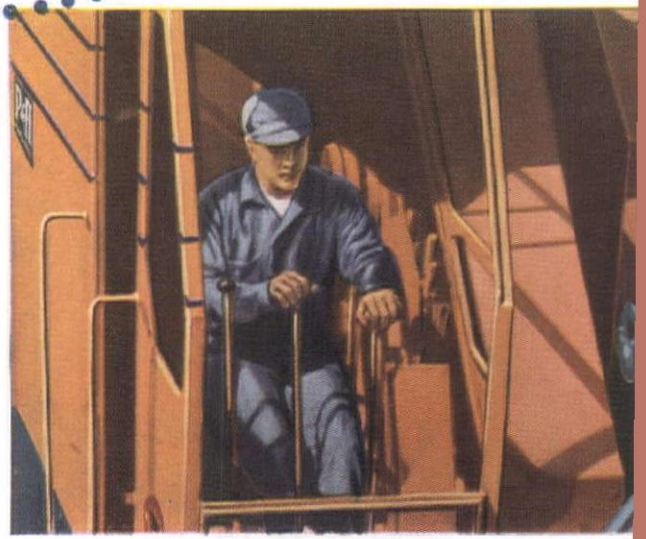
Smooth Operation

P&H's Hydraulic Control Is Easier On the Machine — Easier for the Operator

One of the most outstanding advancements in excavator operation, P&H's direct-acting hydraulic control, is the same low pressure principle used in the braking system of your trucks — thoroughly proved — both in simplicity and trouble-free performance.

You'll like the smooth, velvety action that cushions the mechanism against shocks — saves repair bills. You'll like the quick response on every movement that means faster digging — greater production per day. And you'll like the easy handling that reduces physical effort to a minimum.

There's a P&H working somewhere near you. Why not see it in action?



LONG LEVER CONTROLS are grouped for convenience, providing natural coordination for the operator — far less muscular effort is required. The operator feels the effect of braking pressure on the load just as you do when you operate the brakes on your car. That's why you save so much time in swinging and spotting.

P&H **EXCAVATORS**

4490 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

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

ANOTHER

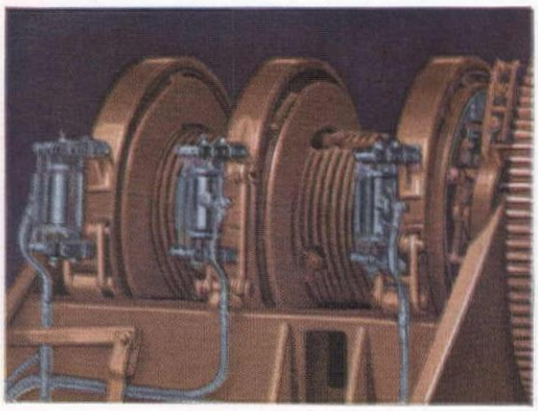
P&H

ADDED VALUE

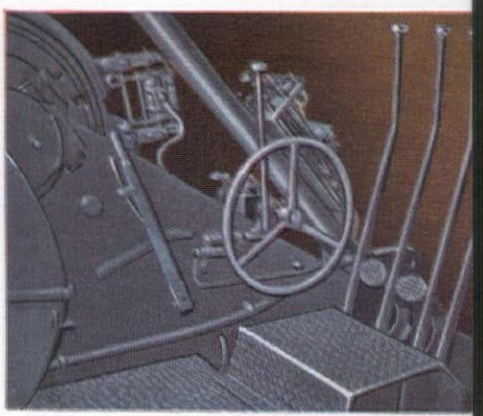
Why CONTROL IS MORE DEPENDABLE

P&H's direct-acting hydraulic control is far simpler and safer. By eliminating the multiplicity of mechanical levers, reach rods, rockers, rocker pins, etc., throughout, there are fewer things to cause trouble or go wrong.

Why RESPONSE IS QUICKER—*effort less*

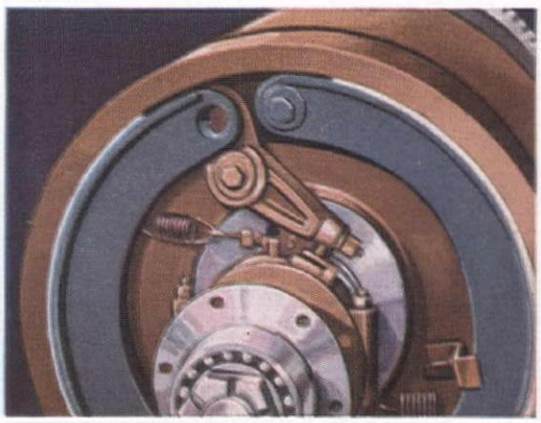


The elimination of complicated mechanical hookups also eliminates a lot of wear and the resulting waste motion at the operating levers.

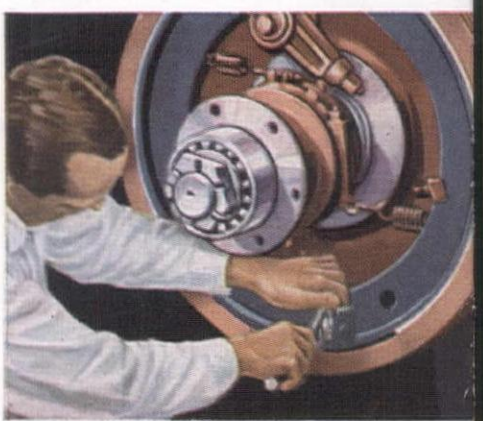


With P&H's low pressure hydraulic system, motion is actuated by control levers and transmitted directly to operating part by a solid column of fluid. Operation requires less effort . . . response is quicker.

Why MAINTENANCE COSTS ARE LOWER • •



In addition to the elimination of mechanical parts, brake and clutch bands last a lot longer. Bands are nearly full wrap on the drum . . . providing 15% to 20% more braking surface. Also, shoes are reversible. Note that they can be changed to provide still additional service.



P&H's direct-acting hydraulic control is but one of many P&H Added Values that make your investment in excavating equipment go further. Why not get the facts about all of them? See your nearest P&H representative or write us for literature.

P&H EXCAVATORS

4490 W. National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

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

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Warehouses and Service Stations: SEATTLE, LOS ANGELES, SAN FRANCISCO

PORTLAND 14, Oregon	Loggers & Contractors Machinery Co.
WILLOWS, California	Willows Motor Sales Co.
BAKERSFIELD, California	Kern Tractor & Equipment Co.
NAPA, California	Berglund Tractor & Equipment Co.
SALT LAKE CITY 1, Utah	National Equipment Co.
BOISE, Idaho	Olson Manufacturing Company
EL CENTRO, California	Faure Tractor & Equipment Company
FRESNO, California	Allied Equipment Co.
SAN DIEGO, California	Southern Equipment & Supply Co.
SPOKANE 8, Washington	F. M. Viles & Co.
RENO, Nevada	Dennison Tractor & Supply Company
SEATTLE 4, Washington	Glenn Carrington & Co.

UNION IS STRENGTH

When It's The *Proper* Union!

That's one of the important reasons for the outstanding performance of the Timken Removable Rock Bit.

Here is a union that saves the bit and steel threads by taking the drill impact on the broad, flat machined shoulder of the steel; a union with only a single joint.

Here is a shoulder construction that is a single solid piece of steel — nothing to loosen up under the constant shock of the hammer blows no matter how hard the rock may be; a shoulder construction that has proved its correctness through 14 years of successful service in mines, quarries and on construction projects of all kinds.

You can't beat the combination of the Timken Rock Bit made of Timken Fine Steel and the original Timken shoulder construction. That's the combination for speed, endurance, uniform performance and economy. Make sure you get it.

TIMKEN

TRADE-MARK REG. U. S. PAT. OFF.

ROCK BITS

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO

NEW TRUCKS-

NEW Styling

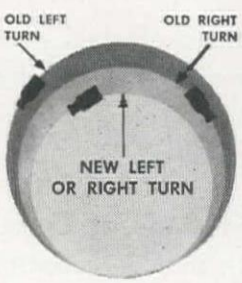
Here are wide, massive trucks representing DESIGN with a PURPOSE . . . trucks combining appearance with comfort, safety, performance, economy, and ease of handling.

NEW Ease of Handling

Less turning space needed . . . right or left. Better weight distribution

Remarkable new ease of handling and driving is yours in these new "*Job-Rated*" trucks. You can turn them in much smaller circles. You can park, back into alleys or up to loading platforms with much greater ease. You get all this with a new type of steering, in combination with shorter wheelbases that accommodate full-size bodies, and the roomier, longer cabs.

You get much better weight distribution, too, with this new design. Front axles have been moved back, and engines forward. This places more of the engine and cab weight on the front axle. Loads are more evenly distributed.



NEW COMFORT

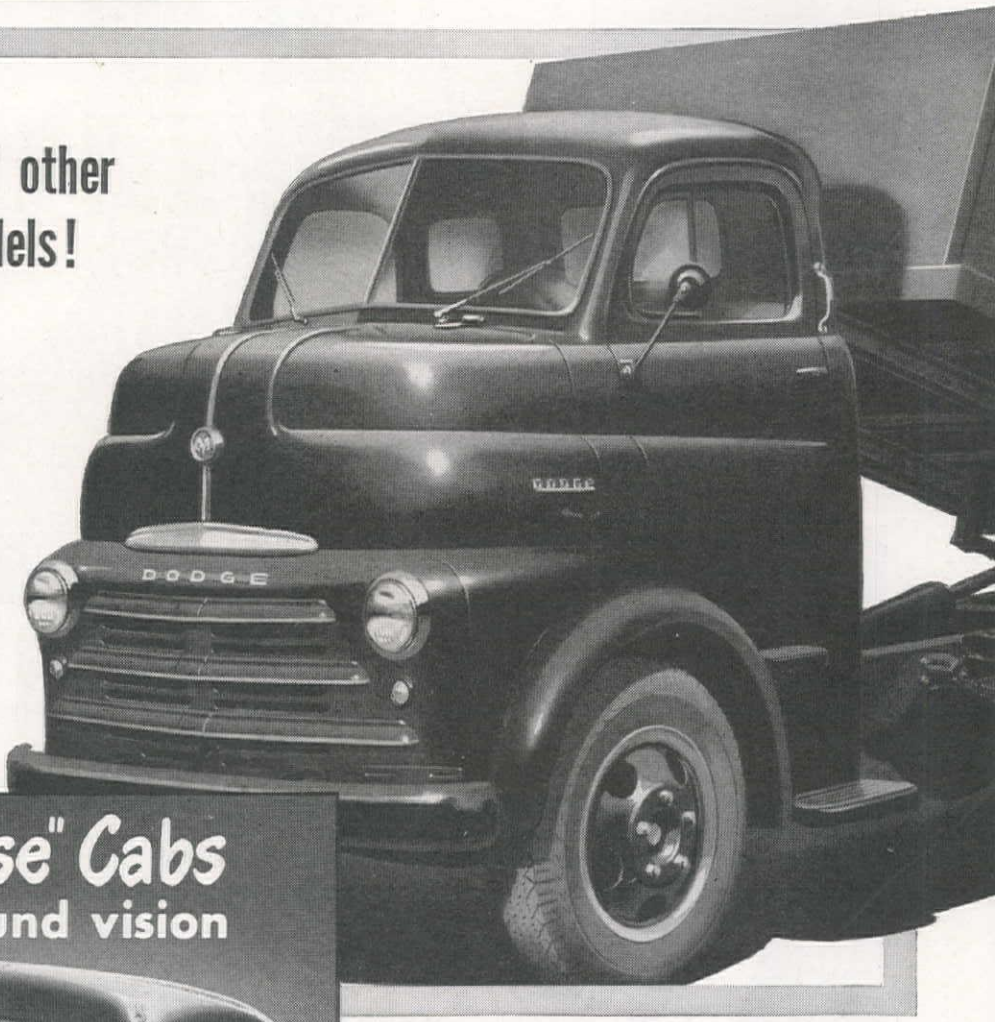
1. **PLENTY OF HEADROOM**
2. **STEERING WHEEL** . . . right in the driver's lap.
3. **NATURAL BACK SUPPORT** . . . adjustable for maximum comfort.
4. **PROPER LEG SUPPORT** . . . under the knees where you need it.
5. **CHAIR-HEIGHT SEATS** . . . just like you have at home.
6. **"AIR-O-RIDE" CUSHIONS** . . . adjustable to weight of driver and road conditions.
7. **7-INCH SEAT ADJUSTMENT** . . . with safe, convenient hand control.

ALL THIS... and more...with the NEW DODGE

-REALLY NEW!

NEW Tractors and other High Tonnage Models!

You'll find, in these *new* high tonnage models, many *exclusive* advancements: Strong, durable metals and alloys . . . precise machining, and a much wider range of equipment. Engines have cost-reducing sodium-cooled valves, and stellite-faced exhaust valves and seat inserts. Other outstanding features include sturdy 5-speed transmissions; rugged 12″ and 13″ clutches; smooth, safe brakes—finest in the trucking industry.

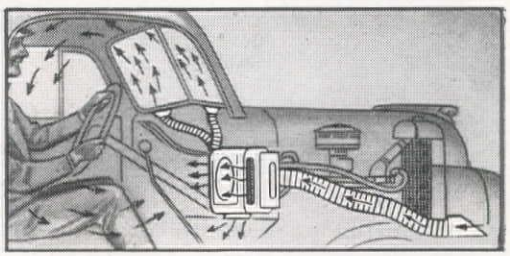


NEW "Pilot-House" Cabs with all 'round vision

Note the tremendously increased *vision* of these cabs. Windshields and windows are higher and wider. New rear quarter windows add still more to vision, and to safety.

With this increased glass area throughout, you get "Pilot-House" vision . . . in *all* directions. With welded all-steel construction, they're the *safest* cabs ever built.

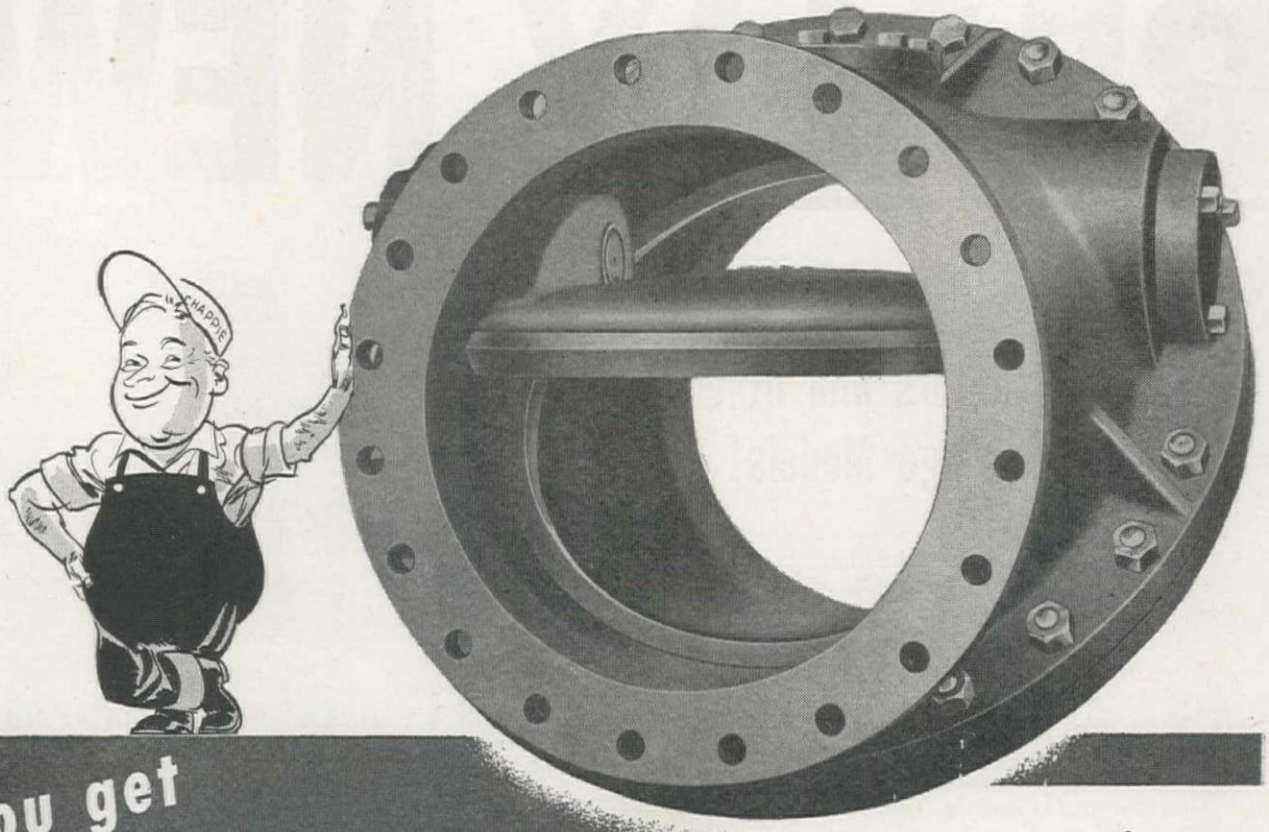
NEW All-Weather Ventilation



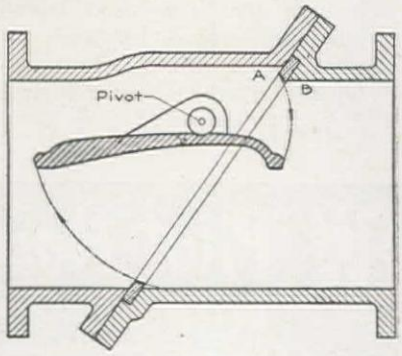
You drive in comfort whether it's 10° below or 100° above. Available is an ingenious combination of *truck* heater, defroster vents, vent windows, cowl ventilator, and a new fresh air intake from behind the front grille. It's the *finest* "All-Weather" heating and ventilating system ever installed in a truck cab.

"Job-Rated" TRUCKS

Now on Display
SEE YOUR
DODGE DEALER



You get MINIMUM WEAR and MINIMUM HEAD LOSS with CHAPMAN TILTING DISC CHECK VALVES



Cross-section of the Chapman Tilting Disc Check Valve illustrating the way that the balanced disc is supported on the pivot, with arrows showing the travel of the disc. A feature of the design is that the disc seat lifts away from the body seat when opening, and drops into contact when closing, with no sliding or wearing of the seats.

There's only *one moving part* in Chapman Tilting Disc Check Valves—the balanced hinge-pinned disc. When opened, the disc rides smoothly in the flow, minimizing wear on bearings and hinge pins. And since the disc seat lifts away when opening, and drops back when closing, there's minimum wearing of the seats. The disc closes quickly and quietly because of the effect of the stream against the short flap. Hammering and consequent strains on pipe lines are eliminated.

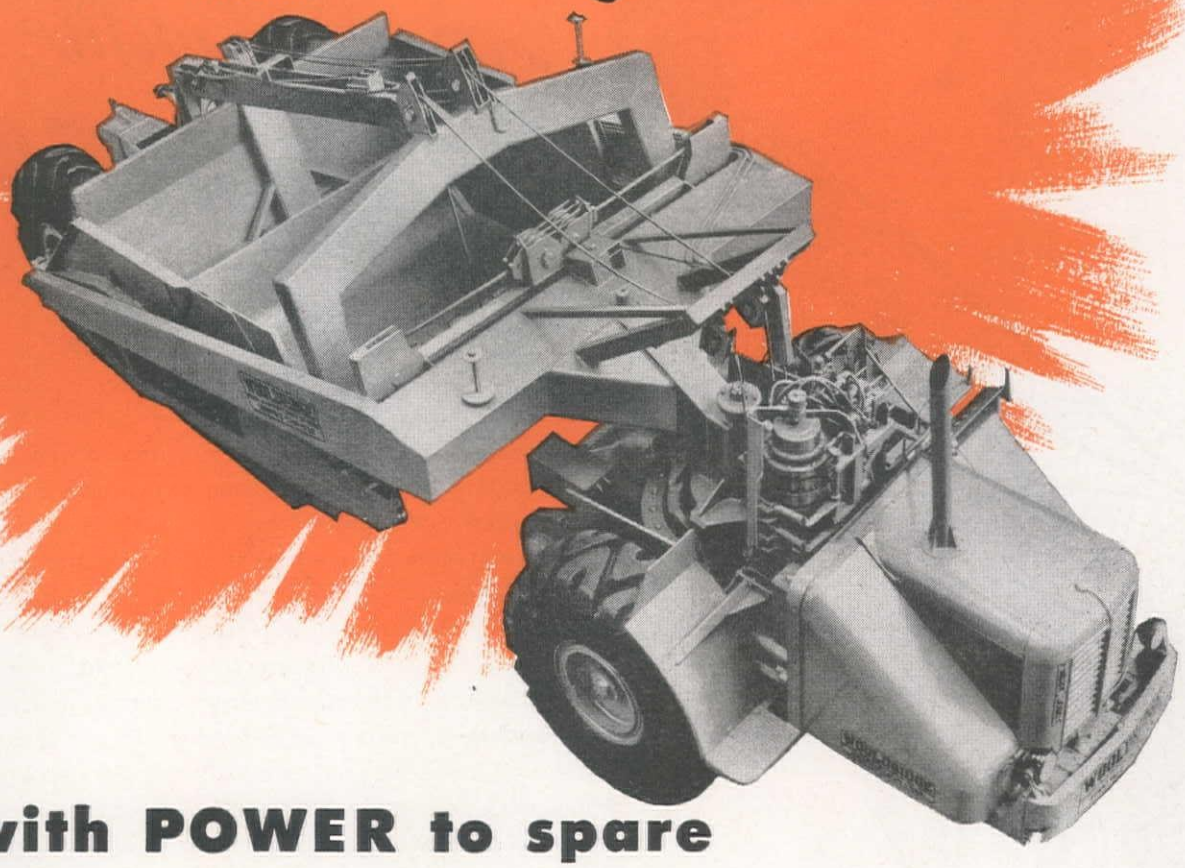
Head losses are also reduced to a minimum because of the design and balancing of the streamlined disc. Experience has proved that Chapman Tilting Disc Check Valves effect savings of from 65% to 80% in head losses over those experienced with conventional type check valves.

Chapman Tilting Disc Check Valves are available in either iron or steel.

Send for bulletin containing engineering data and reports of tests.

The Chapman Valve Manufacturing Co.
INDIAN ORCHARD, MASSACHUSETTS

NEW TERRA-COBRA PACKS 200 H.P.



...with POWER to spare

Keeping pace with demands for greater power on earthmoving operations, the new Wooldridge TC-S14 high-speed Terra-Cobra now packs a rugged, 200 H.P. diesel engine. This added horsepower provides ample tractive pull under heavily loaded conditions to traverse soft mud, loose sand and sticky clay, and easily negotiate steep grades with a minimum of gear shifting. In converting this power into performance, the new model embodies a larger clutch and heavier transmission. New 17" single plate clutch, of the non-adjustable dry disk type automatically compensates for facing wear. High-capacity, constant-mesh helical gears permit faster shifting and smoother operation. Added to the Terra-Cobra's widely recognized advantages of positive hydraulic steering, free flexible travel and earth-geared traction, greater yardage production per hour, per shift is assured. For higher yardage profit at lower costs investigate the new model TC-S14 Terra-Cobra. Send for new Bulletin TA-751 today.

Buy and Rely on

WOOLDRIDGE

TERRA COBRA

HIGH-SPEED • SELF-PROPELLED
EARTHMOVERS

WOOLDRIDGE MFG. CO.
SUNNYVALE, CALIFORNIA, U.S.A.

SEE YOUR NEAREST WOOLDRIDGE DEALER

GET THE MOST OUT OF YOUR JOBS WITH WOOLDRIDGE EQUIPMENT

SCRAPERS · BULLDOZERS · RIPPERS · POWER CONTROL UNITS · TRAILBUILDERS

LARGEST DRAGLINE IN THE NORTHWEST

Rigged with BETHLEHEM ROPE

Granddaddy of all the walking draglines in the Pacific Northwest, the 15-cu-yd Monighan shown here is said to be the largest ever used in this section. It is excavating broken basalt from the main canal of the Columbia Basin Irrigation Project.

The highly-abrasive volcanic rock and the heavy loads handled by this dragline are rough on the wire-rope rigging. To get the longest possible rope service under these conditions the operators use Bethlehem Purple Strand.

Made of improved plow steel, Purple Strand Rope is Bethlehem's top grade. It has the strength and wear-resistance needed for the toughest kind of earth-moving jobs. It comes in a range of sizes and constructions suitable for rigging all types of 'dozers, scraper wagons, shovels and draglines.

Ask your distributor for Bethlehem Purple Strand the next time you need wire rope. You'll find it pays.

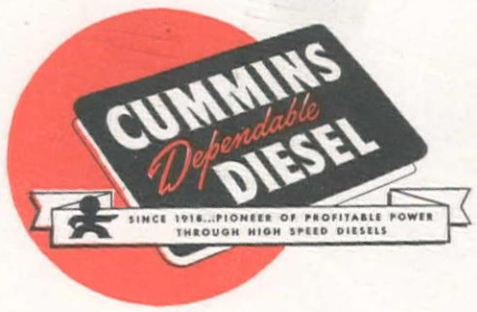
BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

BETHLEHEM PACIFIC

★ BETHLEHEM STEEL ★

Excavating the Main Canal on the Columbia Basin Project. The 15-cu-yd dragline shown here is rigged with Bethlehem Purple Strand Wire Rope. Contractor: J. A. Terteling and Sons, Boise.



Multiple Endorsement

...FROM MANUFACTURERS OF POWERED EQUIPMENT

The strongest possible testimonial to the proved performance of Cummins Dependable Diesels is the number of Manufacturers who offer Cummins Diesels as standard or optional power in the equipment they build. These Manufacturers recognize customer demand for dependable, economical, smooth-running engines . . . advantages provided by Cummins Diesels in applications requiring up to 275 hp. Ask your Cummins Dealer for a complete list of the Manufacturers offering Cummins Diesel Power.

CUMMINS ENGINE COMPANY, INC.
COLUMBUS, INDIANA

39 material-handling and earth-moving equipment Manufacturers . . .

8 diesel-electric locomotive Manufacturers.

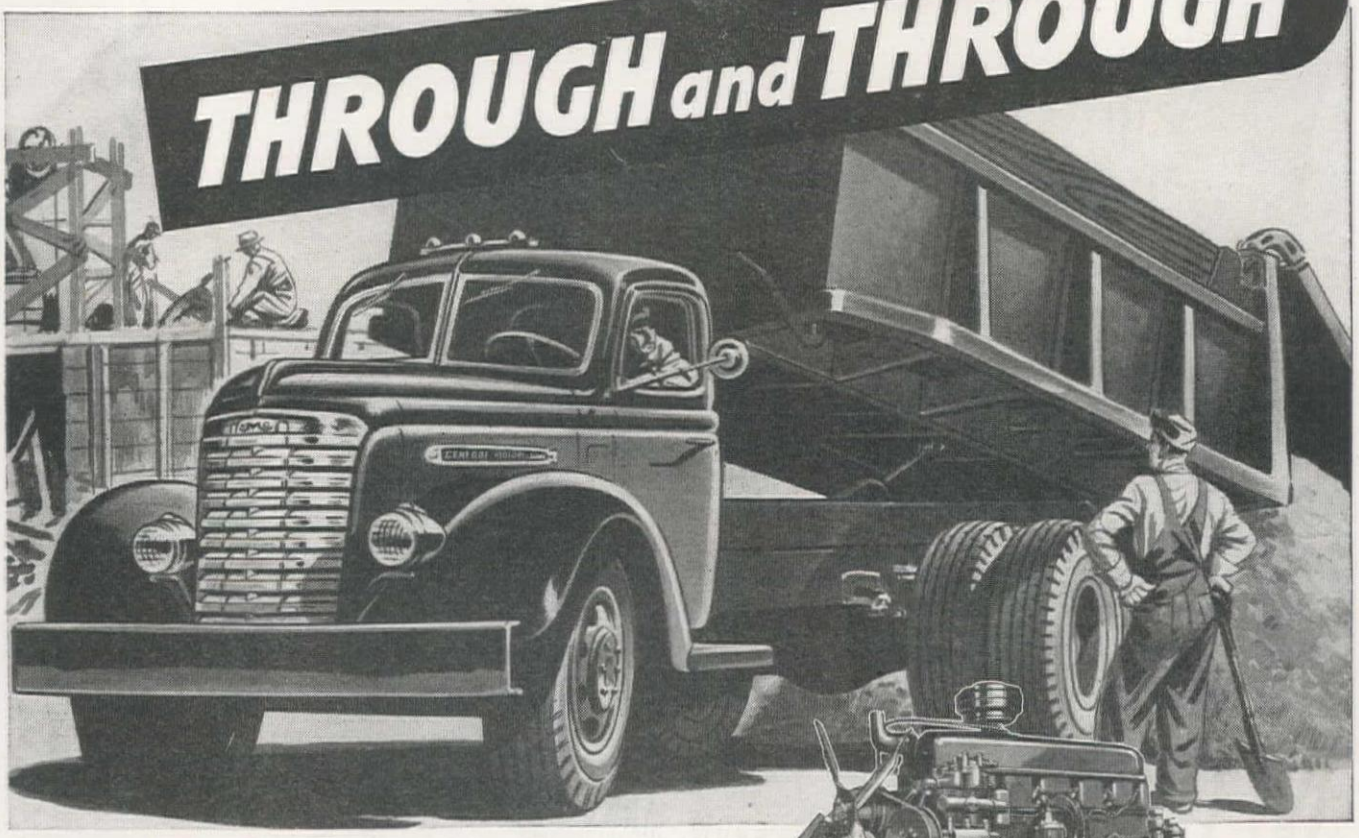
25 heavy-duty truck Manufacturers . . .

19 oil field equipment Manufacturers . . .

10 logging equipment Manufacturers . . .

101 Manufacturers of Powered Equipment offer Cummins Dependable Diesels as standard or optional power. Cummins Diesels also have wide acceptance in portable and stationary industrial power applications and marine service.

Heavy Duty THROUGH and THROUGH



GMC heavy duty models are extra tough and rugged . . . heavy duty through and through. They are built that way because GMC is in the commercial vehicle business exclusively, because GMC designers and engineers know the kind of engines, axles, frames, transmissions, clutches and springs that will best perform on every heavy hauling operation. And they prove out that way . . . over-the-highway, off-the-road, or in city stop-and-go.

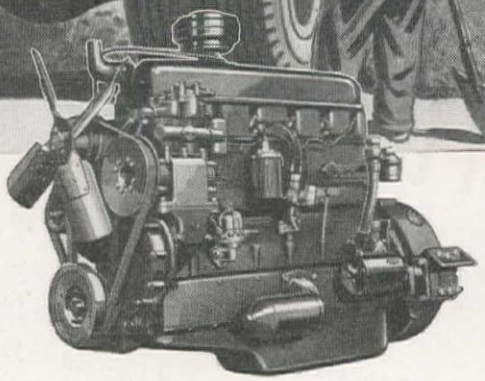
GMC heavy duty models are available in gross weight ratings of 19,000 to 90,000 pounds and offer wheelbase, engine and chassis options which permit manufacture of vehicles exactly suited to specific hauling needs. Let your GMC dealer show you how a heavy duty GMC can do a better heavy hauling job for you.

GMC TRUCK & COACH DIVISION • GENERAL MOTORS CORPORATION

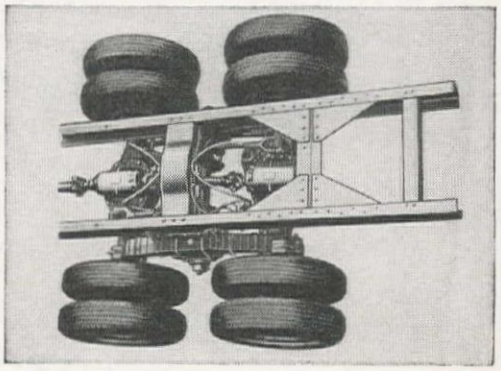
THE TRUCK OF VALUE

GMC TRUCKS

GASOLINE • DIESEL

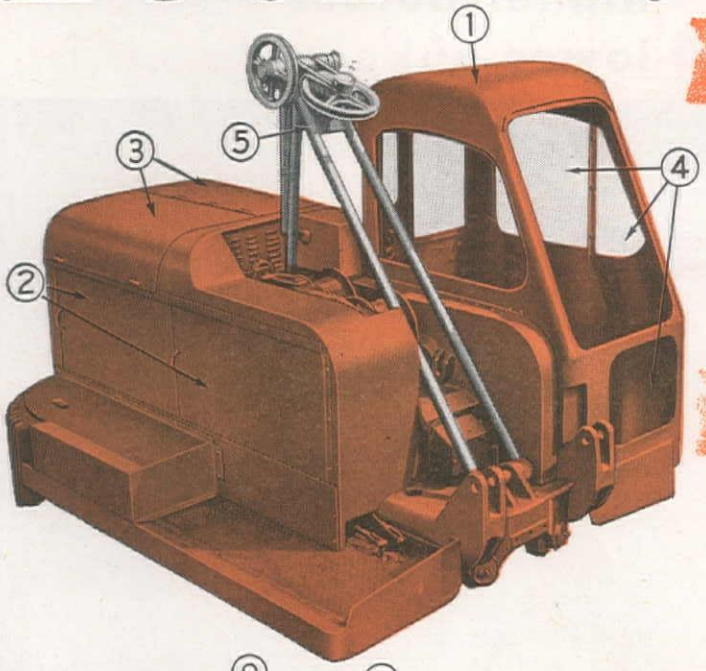


GMC's four heavy duty gasoline engines, of proved, efficient valve-in-head design, offer such performance and dependability extras as Turbo-Top Pistons, Airplane-type Main Bearings, Tocco-hardened Crankshafts.



GMC's wide range of chassis options includes six basic rear axle designs. Illustrated is the rugged Worm Drive Tandem providing dual drive and maximum traction for extra heavy duty truck or tractor work.

Look *into* UNIT!



FULL VISION CAB

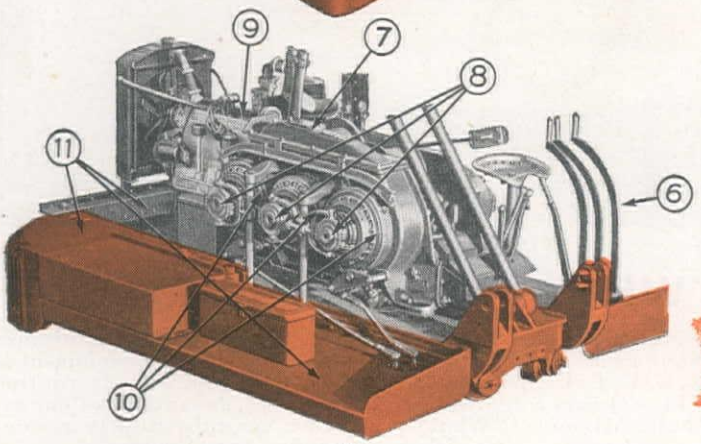
1. Streamlined to the minute in design . . . operator can see in ALL directions . . . clear visibility around a complete 360° circle, without sacrificing weight, capacity, or headroom.

2. Sliding side panels provide accessibility to motor and clutches.

3. Easily lifted top hood covers . . . locked from within the cab.

4. Shatter-proof Safety Glass used throughout the entire cab.

5. A Frame front legs and end connections are one-piece drop forgings.



MAIN MACHINERY

6. Curved operating levers . . . for easy operation and control.

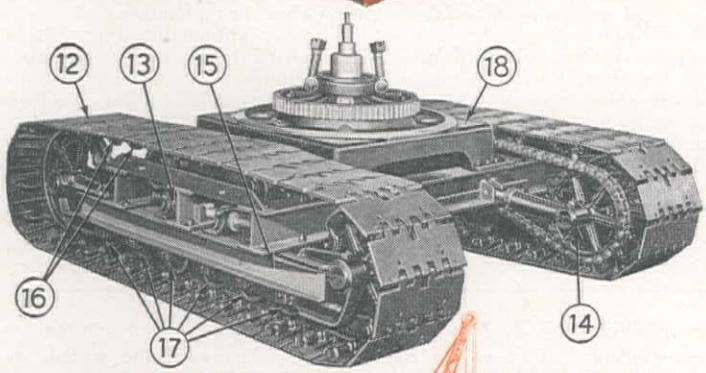
7. One-piece cast gear case completely encloses all gears and shafts in a constant flow of oil . . . Positive protection for all moving parts. Bored for perfect alignment by machine designed specifically for this accurate operation . . . misalignment is impossible.

8. Heat-treated alloy steel gears and shafts are involute splined. No keys to replace . . . no worn-out keyways. Large diameter shafts with short spans between bearings . . . minimizes deflection and bending . . . reduces bearing replacement.

9. Gas or Diesel engines are mounted in straight line with main machinery. Worm driven power take-off . . . silent, efficient, and compact.

10. All operating clutches are disc type . . . interchangeable . . . simple adjustment . . . mounted on high-speed countershafts instead of directly to drum shafts . . . smoother operation and longer life.

11. Turntable, Platforms, and Counterweight . . . These three important members are perfectly aligned, forming a single rigid unit that provides extra resistance to shocks and strains.



LOWER STRUCTURE

12. Multiple hinged shoes maintain alignment . . . minimize wear of shoes and tumblers.

13. Single adjusting screw for adjusting tread belt and drive chain enclosed in grease, free from dirt, rust, or outside damage.

14. One-piece end bearings with added outboard bearings maintain perfect and permanent alignment of drive shaft and end roller shaft.

15. Husky trussed frame . . . reinforced by one-piece end castings.

16. Drive Sprocket guides . . . prevent treads from jumping off if operating too loose.

17. Idler rollers are drop forged alloy steel . . . manganese bronze bushed . . . Alemite lubrication.

18. Heavily ribbed and flanged lower frame (carbody) of annealed alloy steel . . . roller track cast integral with body.

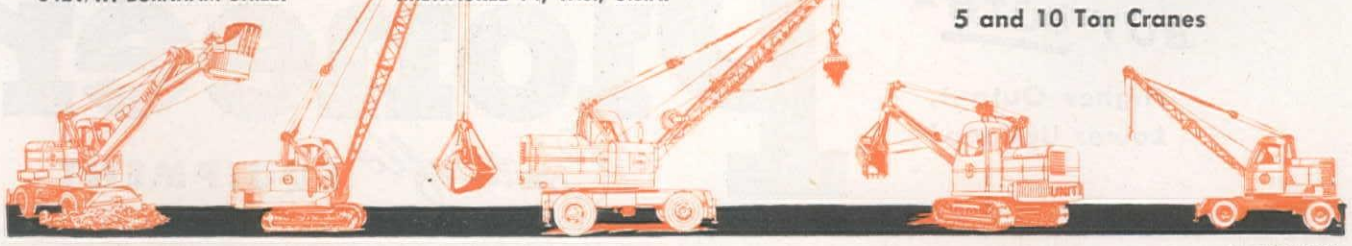
Automatic Traction Brakes are another exclusive UNIT feature! A friction type locking device for both crawlers . . . self-engaged by spring action . . . automatically released when power is applied.

CONTACT FACTORY DIRECT FOR PRICE AND DELIVERY OR SEE YOUR DEALER

UNIT CRANE & SHOVEL CORP.

6421 W. BURNHAM STREET MILWAUKEE 14, WIS., U.S.A.

½ and ¾ Yd. Excavators
5 and 10 Ton Cranes

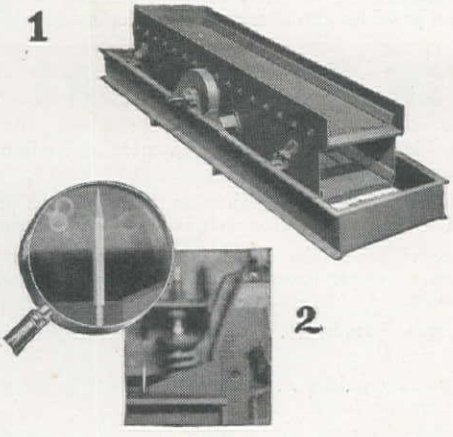


A 5226-1PC-R

....."You'll buy both!...

higher output– lower upkeep!"

1



2

When you buy PIONEER

"Just one thing was considered when we bought equipment for our quarry plant," says V. R. Cruse, president of the West Lake Quarry & Material Co., St. Louis, Missouri. "What equipment would produce material *at the lowest cost per ton.*

"On that basis we selected a Pioneer Jaw Crusher, Feeder, Conveyors and Vibrating Screens.

"150 tons an hour . . . that's what Pioneer engineers told us the plant would produce, but it's been turning out 200 tons an hour. Their layout went together with a minimum amount of effort. The equipment is sturdy and requires only routine maintenance. As a result of our experience we unhesitantly recommend Pioneer equipment."

Whether you're handling gravel, abrasive flintrock or the toughest ore, you, like Mr. Cruse, will find that Pioneer equipment out-produces, out-wears.

Let Pioneer engineers show you how you can *produce more material at lower cost per ton.*

PIONEER ENGINEERING WORKS

1515 Central Avenue Minneapolis 13, Minnesota

1. Pioneer Vibrating Screens have a positive, eccentric throw that puts all the action in the pan—where it gives you increased output.

2. This unretouched picture was taken with the screen operating at full speed. The pencil, standing on the main frame, didn't quiver during the one minute exposure.

BUY BOTH–

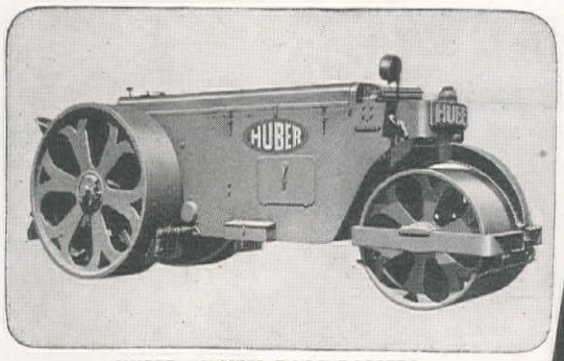
Higher Output, Lower Upkeep!

Pioneer

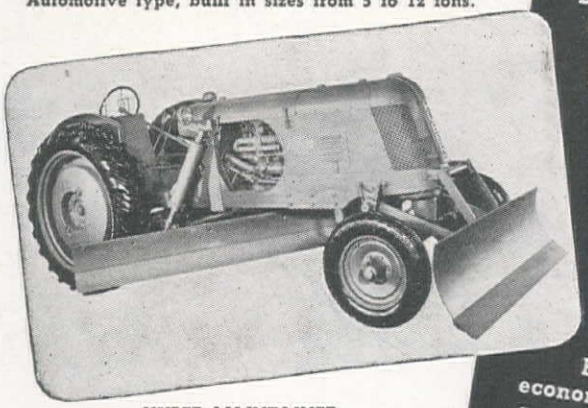
Continuflo **EQUIPMENT**

Neil B. McGinnis Company, Phoenix, Arizona; Pioneer Machinery Company, Idaho Falls, Idaho; Tractor & Equipment Company, Sidney, Montana; Westmont Tractor & Equipment Company, Missoula, Montana; Coast Equipment Company, San Francisco; Central Machinery Company, Great Falls, Montana; Wortham Machinery Company, Billings, Montana; Elton T. Fair Co., Denver; Feenaughty Machinery Co., Portland, Seattle, Spokane, Boise; Harron, Rickard & McCone Co. of Southern Calif., Los Angeles; The Lang Company, Salt Lake City.

PIN THIS TO YOUR FUTURE SHOPPING LIST . . .



HUBER 3-WHEEL ROAD-ROLLERS
Automotive type, built in sizes from 5 to 12 tons.



HUBER MAINTAINER
A versatile machine that also serves as a bulldozer, lift-loader, patch roller, snow-plow or rotary broom.

7 REASONS WHY HUBER ROAD MACHINERY IS YOUR BEST BUY

HUBER offers a complete line of road machinery for road, highway, parks and airport construction and maintenance.

●

Built by men who know your problems.

●

Backed by almost three-quarters of a century of experience in building road machinery.

●

Every feature is time proven and tested before going into the field.

●

Only the best materials, carefully selected for their ability to absorb stresses and strains at the right places, are used.

●

Ball and roller bearings used wherever desirable, plus sturdy construction throughout insures long life service.

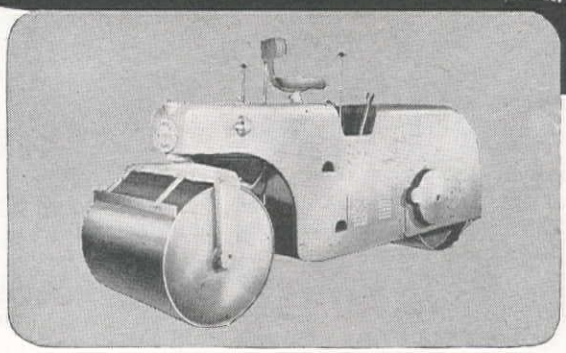
●

Ease of operation – maximum operation economy – a minimum of maintenance.

See your Huber Distributor for a demonstration.

HUBER'S "ONE-MAN GANG"

Do you need a light machine that is as versatile as a one-man-band—but far more useful . . . a maintainer that is a "jack of all trades"—and master of them all . . . then the HUBER ROAD MAINTAINER is the very machine for you. When not working as a scraper or bulldozer, it will: make the snow fly—brush the streets clean—do a good job of patch rolling—or serve as a load-lifter. Have your Huber Distributor put it through its "paces" for you. He will be glad to do it.



HUBER TANDEM ROLLERS
Variable weight, built in sizes from 3 to 12 tons.

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

LEE & THATRO EQUIPMENT CO.	Los Angeles 21, Calif.
JENKINS & McCLOUD	Reno, Nevada
CONTRACTORS' EQUIP. & SUPPLY CO.	Albuquerque, N. M.
NEIL B. McGINNIS CO.	Phoenix, Arizona
FEENAUGHTY MACHINERY CO.	Portland 14, Oregon
FEENAUGHTY MACHINERY CO.	Boise, Idaho
FEENAUGHTY MACHINERY CO.	Seattle 4, Washington
FEENAUGHTY MACHINERY CO.	Spokane 2, Washington
EDWARD F. HALE CO.	Hayward, California
EDWARD F. HALE CO.	San Francisco 7, California
FOULGER EQUIPMENT CO., INC.	Salt Lake City 8, Utah
THE COLORADO BUILDERS' SUPPLY CO.	Denver 9, Colorado
THE COLORADO BUILDERS' SUPPLY CO.	Scotts Bluff, Nebr.
THE COLORADO BUILDERS' SUPPLY CO.	Casper, Wyoming

GET BIGGER PAYLOAD PROFITS WITH LOW-COST OPERATION

HENDRIX Lightweight DRAGLINE BUCKETS

3/8 to 40 Cu. Yds.

Yes, you too can get bigger payload PROFITS with low-cost operation by hooking up a Hendrix Lightweight Dragline Bucket, because a Hendrix automatically steps up your YARDAGE. Since they are 20% to 40% lighter than other buckets, type for type, they can be used on a machine designed for small operations and still maintain the allowable loaded weight.

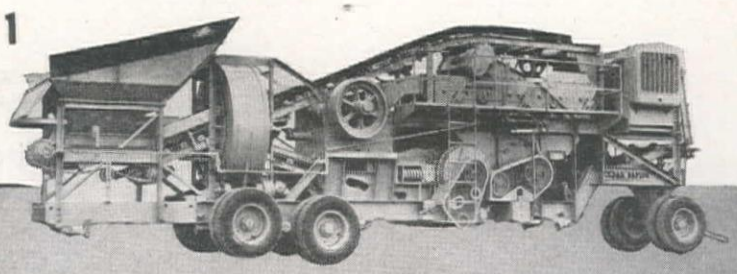
Where else can you find a bucket which is lightweight, yet as durable as a Hendrix? Designed by men with "know-how" in the dirt-moving field, and built by men of experience, the Hendrix Lightweight is your best bet FOR BIGGER PAYLOAD PROFITS WITH LOW-COST OPERATION.

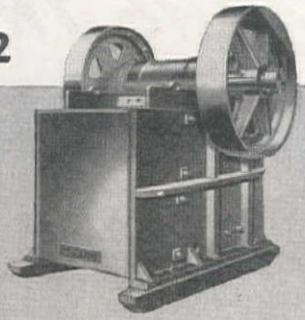
HERE'S WHAT YOU GET:

- ★ **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 Payload every trip, even in wet digging.**
- ★ **Perfect Balance; handles easier, fills faster, dumps cleaner.**
- ★ **Three Types: light, medium, and heavy duty. with or without perforations.**

Write us or ask your dealer for descriptive literature.

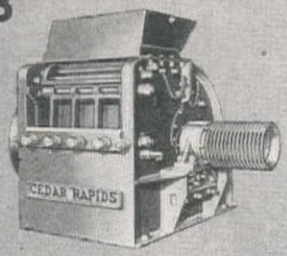
HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA

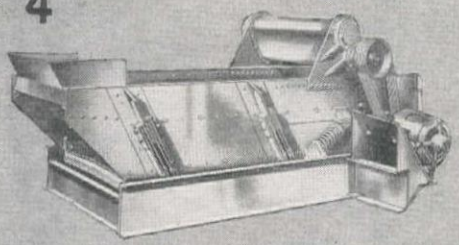


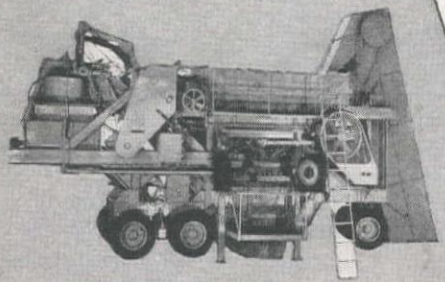


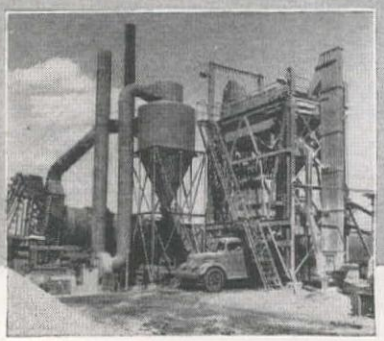
Plan now...

for a more prosperous 1948!









1. Cedarapids portable crushing and screening plants, the Master Tandem, Junior Tandem (shown) and the Pitmaster will cut your costs of producing aggregate and give you more tonnage per hour.
2. Here's a complete line of jaw crushers from 6" x 12" to 32" x 40" and twin jaw crushers from 12" x 16" to 18" x 36" for your portable and stationary plants.
3. Three sizes of hammermills will meet all your requirements for crushed limestone up to 1½" sizes or agricultural limestone.
4. Cedarapids horizontal vibrating screens have *everything* for faster, better, more profitable screening. Sizes from 2' x 6' to 4' x 12' in single or double decks.
5. The Patchmaster is a rugged, low-cost, continuous-mix plant for producing bituminous mixes to specifications. Capacity 20 to 30 tons per hour. Master Mixer will handle still greater volume.
6. The Model "FA" is our most portable, batch-type bituminous mixing plant. 25 cu. ft. capacity. Gasoline, diesel or electric power.
7. For your biggest black top jobs, buy a Model "E" portable, batch-type bituminous mixing plant. 3,000 or 4,000 lb. capacity. Gasoline, diesel or electric power.

Buy the best...

Buy—

Cedarapids

Built by IOWA

PRODUCT OF IOWA

IOWA MANUFACTURING COMPANY

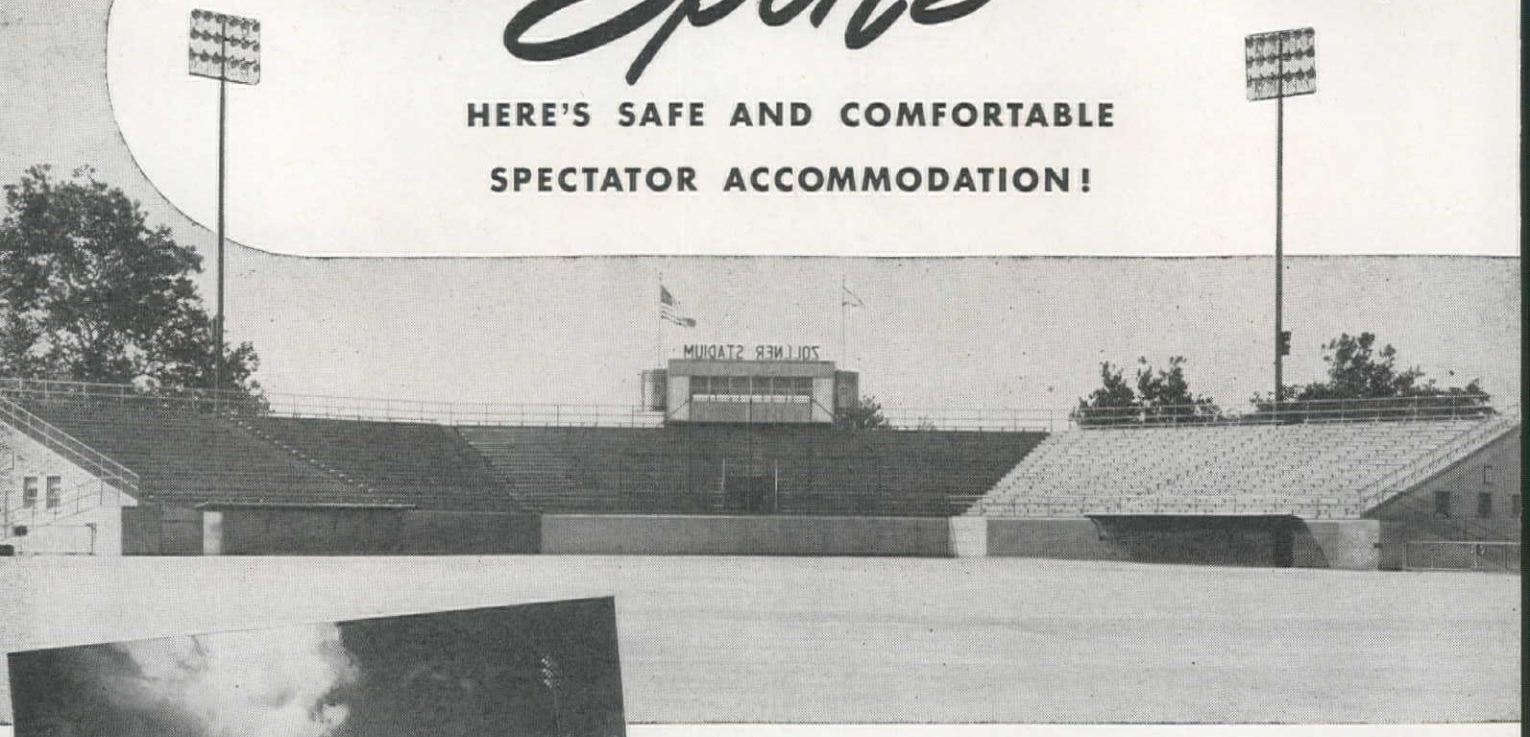
Cedar Rapids, Iowa, U. S. A.

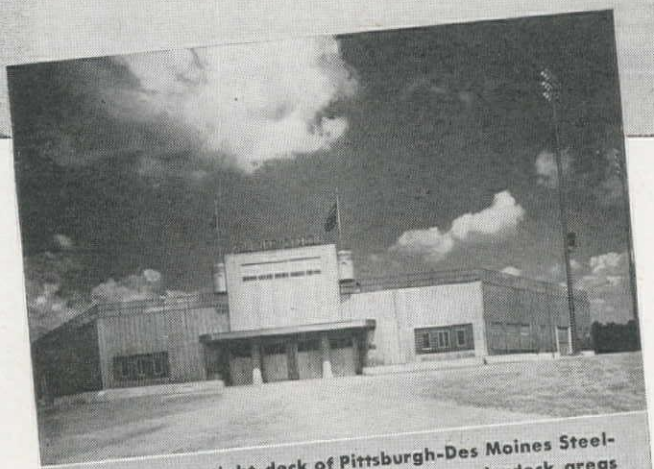
The Iowa Line *of Material Handling Equipment is distributed by:*

HOWARD-COOPER CORP., Seattle, Washington, Portland, Eugene, and Central Point, Oregon; HALL-PERRY MACHINERY CO., Butte, Great Falls, Missoula, and Billings, Montana; INTERMOUNTAIN EQUIPMENT CO., Boise and Pocatello, Idaho, and Spokane, Washington; WORTHAM MACHINERY CO., Cheyenne, Wyoming; KIMBALL EQUIPMENT CO., Salt Lake City, Utah; BROWN-BEVIS EQUIPMENT CO., Los Angeles, California; H. W. MOORE EQUIPMENT CO., Denver, Colorado; EDWARD F. HALE CO., Hayward and Redding, California; ARIZONA-CEDAR RAPIDS CO., Phoenix, Arizona; R. L. HARRISON CO., INC., Albuquerque, New Mexico; SIERRA MACHINERY CO., Reno, Nevada.

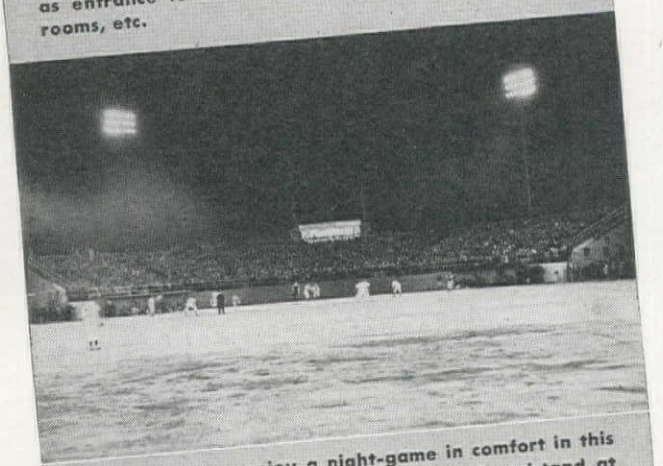
WHERE Sports THE THING

HERE'S SAFE AND COMFORTABLE SPECTATOR ACCOMMODATION!





The weather-tight deck of Pittsburgh-Des Moines Steel-Deck Grandstands permits use of the underdeck areas as entrance lobbies, offices, dressing rooms, storage rooms, etc.



3000 spectators enjoy a night-game in comfort in this new Pittsburgh-Des Moines Steel-Deck Grandstand at Fort Wayne.

PITTSBURGH •DES MOINES *Steel Deck* GRANDSTANDS

This handsome soft-ball stadium, recently erected at the Zollner Machine Works athletic field in Fort Wayne, indicates the wide applications of Pittsburgh-Des Moines Steel-Deck Grandstands for municipal and industrial spectator-sports requirements.

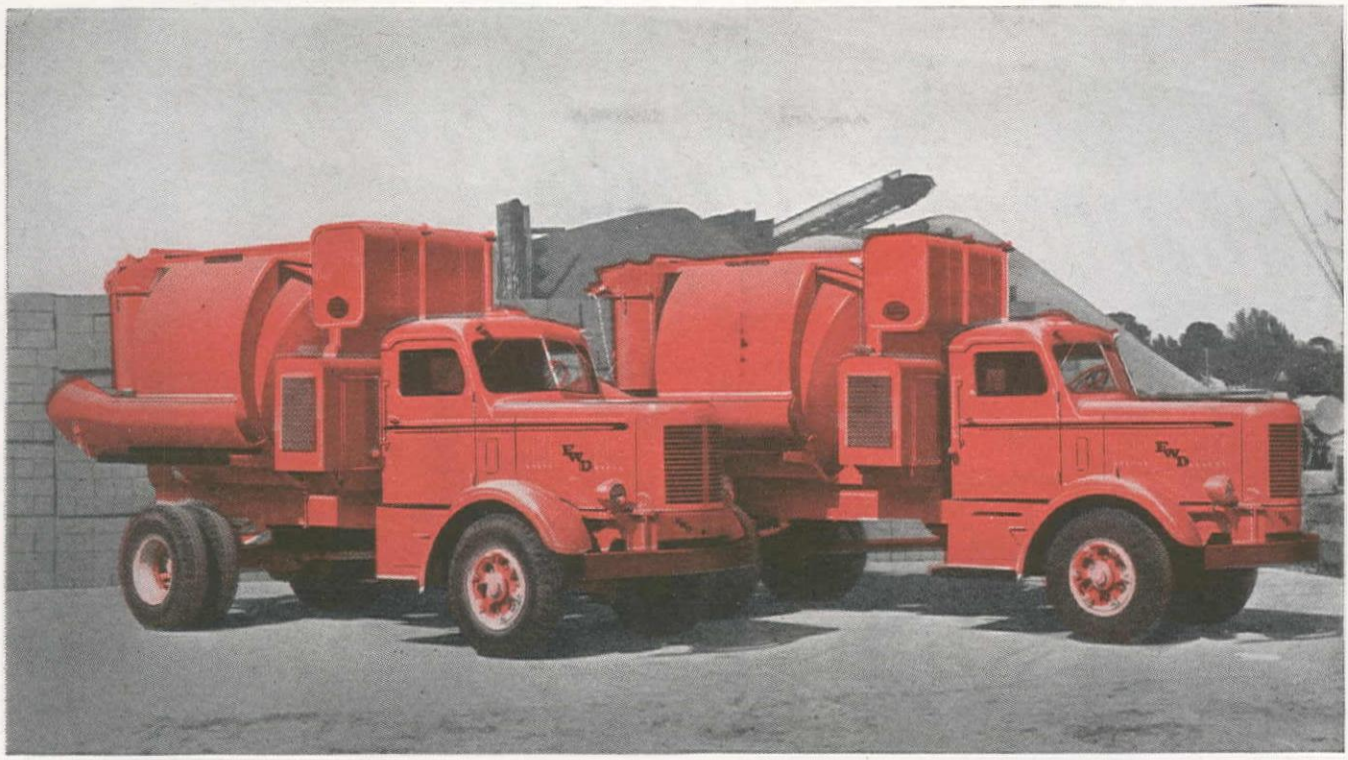
As is the case with our school and college installations throughout the country, the Stand is of unitized steel construction—a feature permitting *complete freedom for the designer in type, capacity, and future extension.* Our Grandstand Brochure gives full details—write for your copy!

PITTSBURGH • DES MOINES STEEL CO.

Plants at PITTSBURGH, DES MOINES and SANTA CLARA

Sales Offices at:

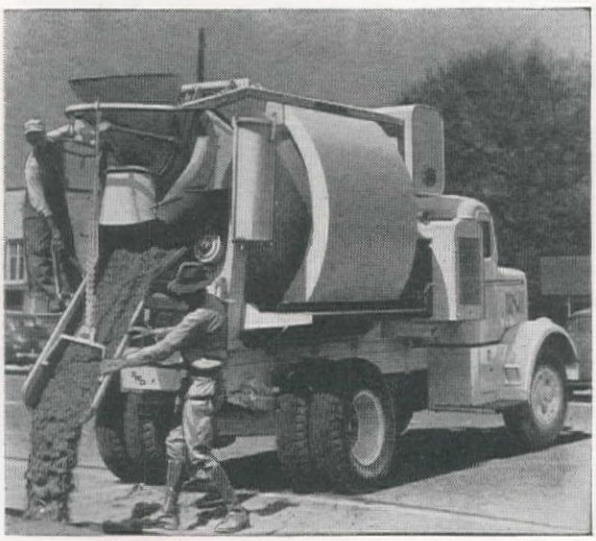
PITTSBURGH.....3420 Neville Island
NEW YORK.....Room 919, 270 Broadway
CHICAGO.....1224 First National Bank Building
DES MOINES.....921 Tuttle Street
DALLAS.....1225 Praetorian Building
SEATTLE.....528 First Avenue, South
SANTA CLARA, CAL.....627 Alviso Road



AT CONCRETE MIXING PLANTS

FWD TRUCKS DO MORE WORK

MOVE SWIFTLY TO POURING POINTS



At concrete plants, your hauling of cement, sand, gravel must be done fast, at low cost, to keep all operations profitably coordinated. Your mobile mixers must get through to the pouring points without delay, on or off the highway.

In these operations, FWD trucks, with four-wheel-drive power and traction, will prove their superior "going power", getting through to construction sites often inaccessible to ordinary trucks —keeping the concrete moving at a rate that saves time and makes money for you.

To speed up your concrete operations — to do more work profitably — put your mixers on FWD four-wheel-drive trucks.

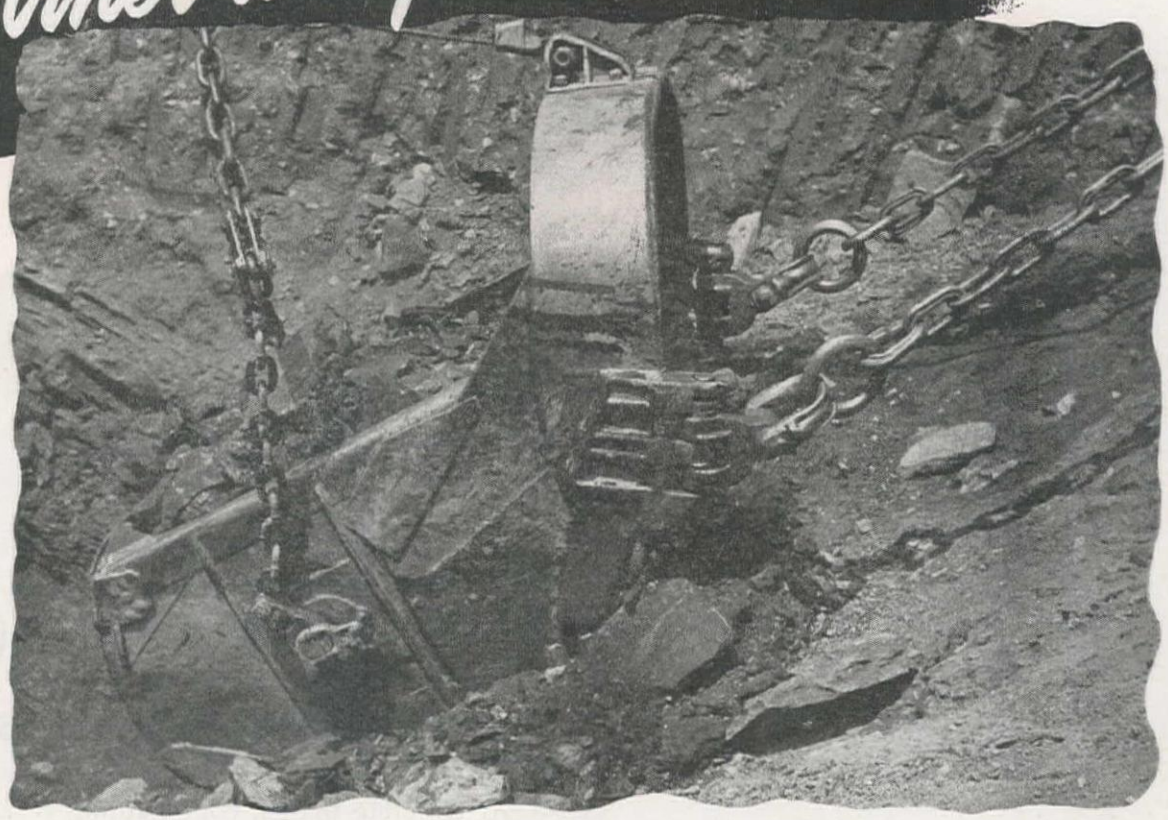
See your nearest FWD distributor or write for complete information.

America's Foremost Heavy-Duty Truck

THE FOUR WHEEL DRIVE AUTO COMPANY
CLINTONVILLE, WISCONSIN
Canadian Factory: Kitchener, Ontario
WORLD-WIDE SALES and SERVICE

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—Feenaughty Machinery Co., 1028 6th Ave., So., Seattle 2, Glenn Carrington & Co., 91 Columbia St., Seattle, and Feenaughty Machinery Co., 715 N. Division St., Spokane; WYOMING—Wortham Machinery Co., 517 W. 17th St., Cheyenne; ALASKA—Glenn Carrington & Co., Nome, Fairbanks, Anchorage.

No other dragline bucket



...can match the digging capacity of a PAGE AUTOMATIC!

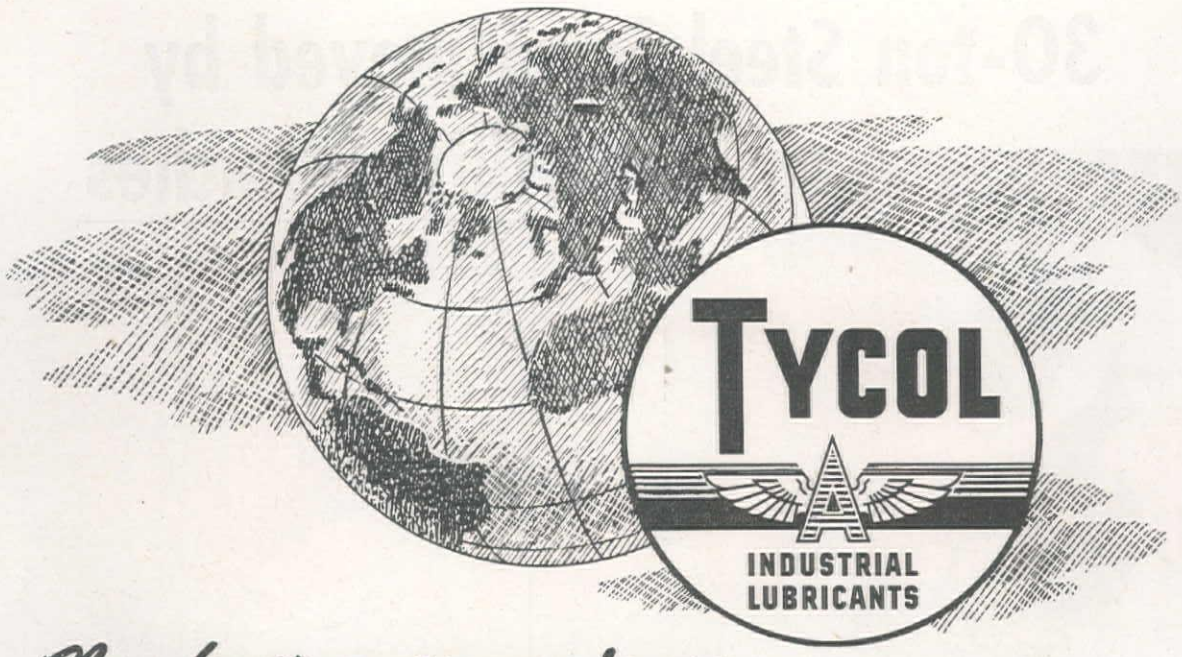
Page AUTOMATICS dig right in at the first pull of the drag rope and get a full load within one to three bucket lengths regardless of the depth—20 ft., 100 ft., or more. This means that most of your operations are under or near the end of the boom point where the minimum amount of power is required for hoisting the load.

Perfect balance of the AUTOMATIC assures positive control whether loading or dumping. Quick loading features of AUTOMATIC buckets mean less wear and maintenance on the bucket, cables, and the dragline as well as minimum operator fatigue.

Hundreds of dragline operators in all kinds of digging have found that their AUTOMATICS dig more yards at a lower cost per yard than any other buckets they have ever used. For all the facts, see your construction equipment distributor or write for big, new free booklet, "How to Get the Most Out of Your Page Automatic Dragline Bucket."

PAGE ENGINEERING COMPANY
Clearing Post Office
Chicago, Ill.

PAGE
DRAGLINE BUCKETS and WALKING DRAGLINES



Now for your convenience
...wherever you are

TYCOL INDUSTRIAL LUBRICATING OILS AND GREASES

All industrial lubricating oils and greases marketed by Tide Water Associated *everywhere* now bear unified brand names.

This great forward step was taken to aid engineers, purchasing agents and users wherever they are—to make easier the ordering and using of the complete Tide Water Associated line.

The famous name of Cycol becomes *Tycol*. Designations of each of the 170 different industrial oils and greases have been unified under the Tycol banner.

This change, however, does *not* affect the Associated automotive lubricants—Veedol, Tydol, and Cycol Motor Oils. Nor does it affect the *Avon* line of *specialty* oils and *by-products*.

For a comprehensive folder which lists in detail the new and former brand names, phone your Associated Representative, or fill in and mail the coupon below.

Remember, for *any* industrial oil or grease for *any purpose*—the name to remember is TYCOL.

TIDE WATER ASSOCIATED OIL COMPANY

Tide Water Associated Oil Company
Wholesale Department
79 New Montgomery Street
San Francisco, 20

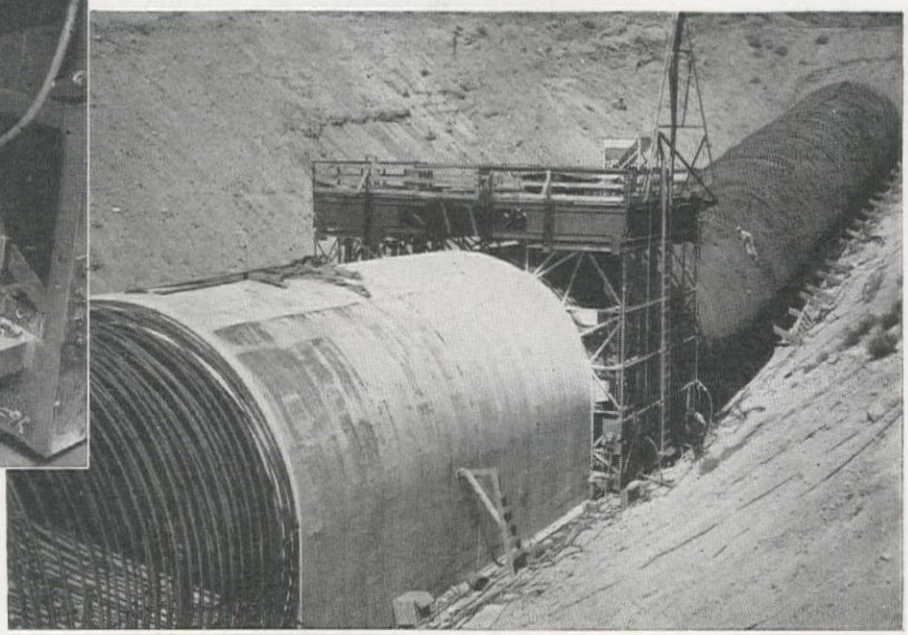
Gentlemen: Please send me complete information on your Tycol Industrial Lubricating Oils and Greases with a list of new and former brand names.

Name _____

Firm _____ *Position* _____

Address _____ *City* _____

30-ton Steel Form moved by CP Utility Winches



On the Columbia River Basin Project two huge concrete siphons are under construction. The reinforced concrete shell, 25 feet in diameter, two feet thick, is poured in a 60,000-pound movable steel form which straddles the siphon and runs on tracks. Two CP Air Winches pull the form from section to section, spotting it accurately at each location.

Powered with air, electric or gasoline motors, CP Utility Winches have a wide range of applications – single or multiple line hoisting . . . spotting cars . . . handling timber . . . erecting machines, boilers, structural steel, etc.

Precision control of the CP Utility Winch is provided through clutch and brake levers. The clutch lever enables the operator to vary drum speed, and "tease" the load by hauling it in, holding it momentarily or paying it out. To increase the versatility of the CP Utility Winch, a combination cathead and drum arrangement can be furnished. Write for Bulletin SP-2057.

Whenever air demand slackens, the engine speed of fuel-thrifty CP Portable Compressors is correspondingly reduced by automatic action of the CP Gradual Speed Regulator. This and other CP features effect fuel savings of 15% to 35%.

CP gasoline-driven compressors range in capacity from 60 to 315 c.f.m.; Diesel-driven from 105 to 500 c.f.m. Write for complete information.

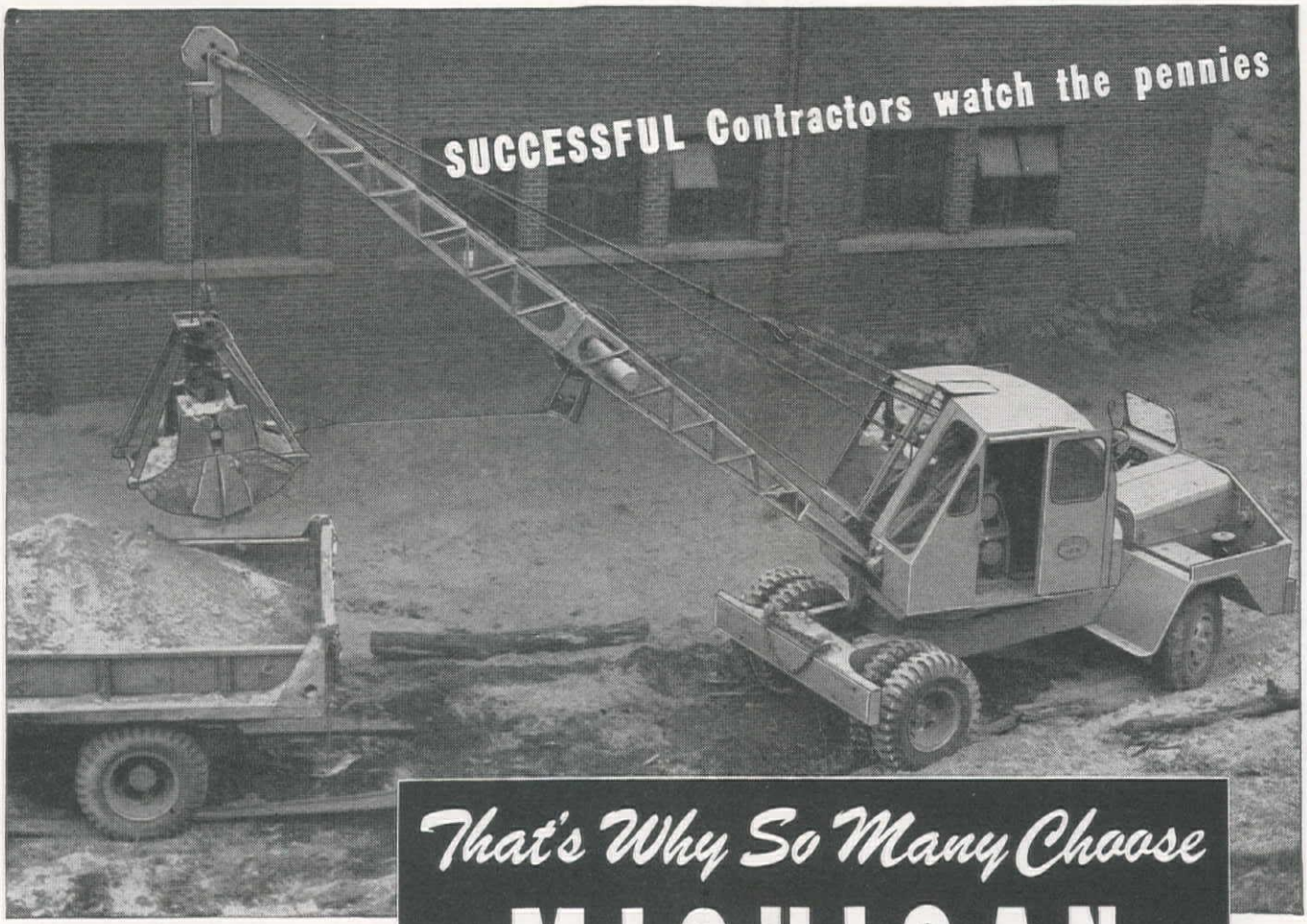
CHICAGO PNEUMATIC TOOL COMPANY

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

PNEUMATIC TOOLS • AIR COMPRESSORS • ELECTRIC TOOLS • DIESEL ENGINES
ROCK DRILLS • HYDRAULIC TOOLS • VACUUM PUMPS • AVIATION ACCESSORIES

Distributors

WESTERN MACHINERY CO., 760 Folsom St., San Francisco, Calif., Phone: EXbrook 4167; WESTERN MACHINERY CO., 500 North 16th St., Sacramento, Calif.; Phone: 2-1211; WESTERN MACHINERY CO., 5722 So. Santa Fe Ave., Los Angeles, Calif., Phone: LOgan 3371; BALZER MACHINERY COMPANY, 2136 S.E. Eighth Ave., Portland, Oregon; WESTERN MACHINERY CO., N. 808 Division St., Spokane, Washington; HALL-PERRY MACHINERY CO., 812 E. Iron St., Butte, Montana; Lomen Equipment Co., Inc., Seattle-Alaska.



That's Why So Many Choose

MICHIGAN

THE PIONEER AIR-CONTROLLED TRUCK-TYPE SHOVEL-CRANE

WESTERN EQUIPMENT CO.
Portland, Ore. - Eugene, Ore.

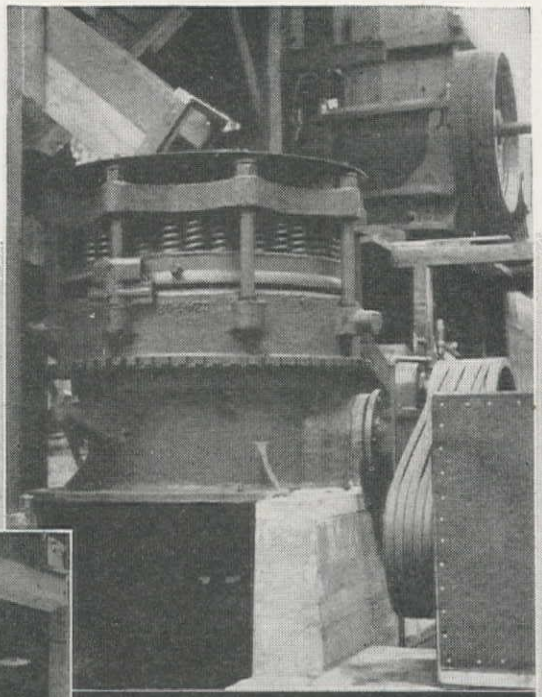
Noted for
OPERATING ECONOMY
•
SPEED ON THE ROAD AND ON THE JOB
•
DEPENDABILITY AND VERSATILITY

With contractors who keep a sharp eye on costs, MICHIGAN ranks "tops." They know that they can depend on MICHIGAN to deliver top-notch performance, day after day. They know that with MICHIGAN they can "come out on top" even on those small, scattered jobs that cannot be handled profitably with ordinary equipment . . . Get **all** the facts about MICHIGAN Mobile SHOVELS-CRANES—send for Bulletin WCN-18.

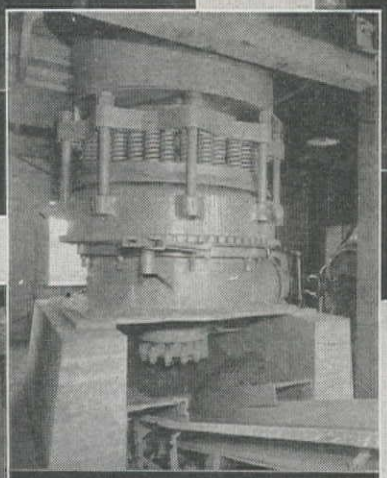
FINGER TIP AIR CONTROLS • 6 to 12 TON CRANES
• • • • 3/8 YD and 1/2 YD SHOVELS • • • •
FULLY CONVERTIBLE TO ALL STANDARD ATTACHMENTS

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

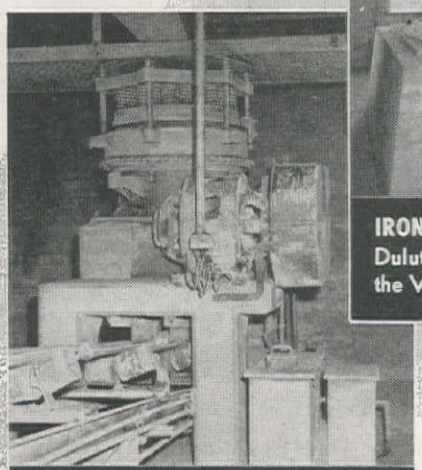
QUARRY PLANT—Arundel Corp., Baltimore, Md., operates six Gyrasphere Crushers of all sizes.



GRAVEL PLANT—Boston Sand & Gravel Co., Cambridge, Mass., operates this 36" Gyrasphere.



IRON MINE—Snyder Mining Co., Duluth, uses 48" Gyrasphere in the Virginia Mine, Eveleth, Minn.



CEMENT MILL — Diamond Portland Cement Co., Middle Branch, Ohio, uses a 24" Gyrasphere.

FINER CRUSHING

ENORMOUS TONNAGE

WIDER RANGE OF SIZES

IMPROVED PRODUCT

CONTINUOUS OPERATION

LOWER UPKEEP

TELSMITH

Gyrasphere SECONDARY CRUSHER

Send for descriptive Bulletin Y-30. Y-7

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

Mines Eng. & Eqpt. Co., 369 Pine St., San Francisco 4, Calif. Garlinghouse Bros., 2416 E. 16th St., Los Angeles 21, Calif.

Lee Redman Equipment Co. Phoenix, Arizona

Clyde Equipment Co. Portland 9, Ore. Seattle 4, Wash.

General Machinery Co. Spokane 1, Wash.

Gordon Russell, Ltd. Vancouver, B.C.

The K-12 Dragline shown here is reworking a ditch with typical Insley economical, trouble-free performance.

DITCHING BY INSLEY

More EVIDENCE of the job versatility that is yours when you buy Insley.

Let your local distributor show you "an INSLEY at work."

EXCAVATORS ★ INSLEY ★ CONCRETE EQUIPMENT

INSLEY MANUFACTURING CORPORATION • INDIANAPOLIS 6, INDIANA

FOR INSLEY SERVICE AND SALES IN YOUR TERRITORY

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CONSTRUCTORS EQUIPMENT CO.....3707 Downing St., Denver 5, Colorado

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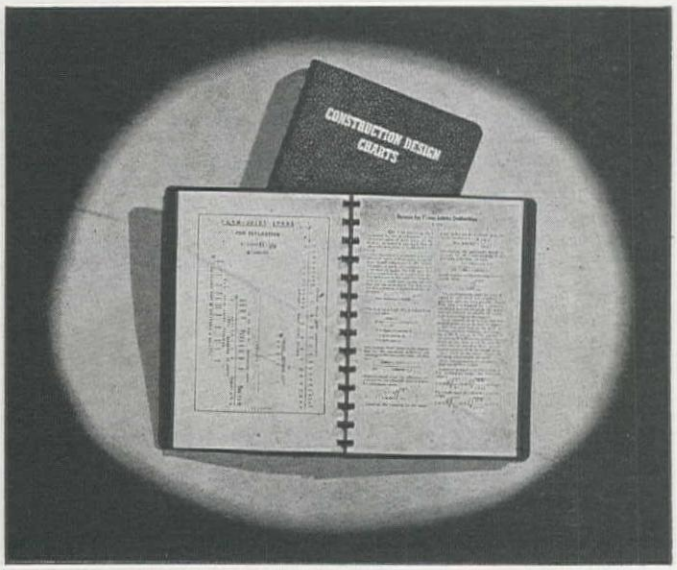

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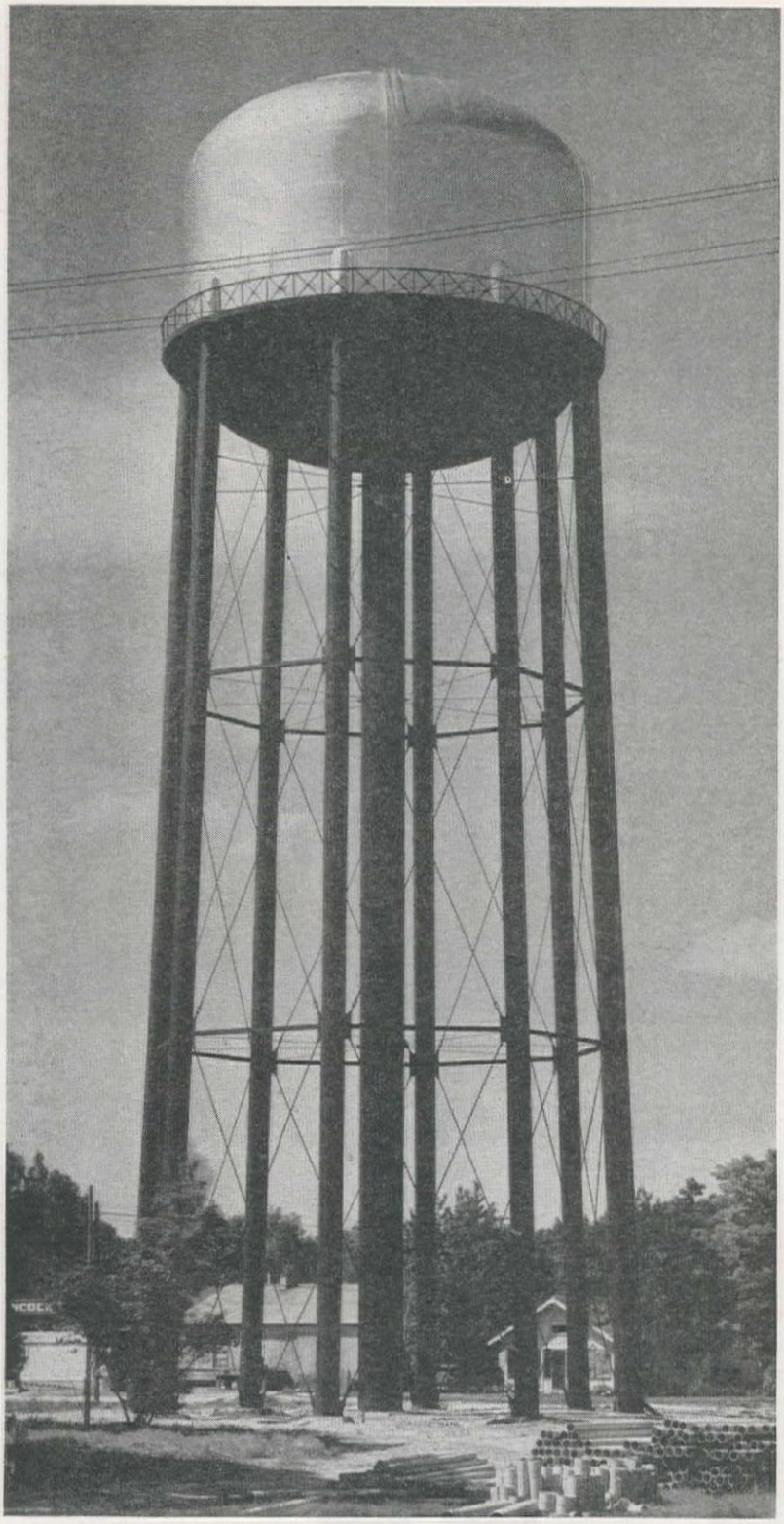

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GRAVITY MAINTAINS a uniform pressure in the water system serving the 5,000 residents of Ontario, Oregon. Part of a recent improvement program included the installation of the new Horton elevated tank shown at the left. It supplements an existing 100,000-gal. elevated tank.

Three centrifugal pumps of 200, 500 and 800 gpm capacity pump the water from the Snake River to supply the 1000 domestic users and 30 industrial users in Ontario. Fifteen miles of 6-in., 8-in., 10-in. and 12-in. distribution mains and five miles of 12-in. transmission mains are used throughout the system. The maximum consumption rate is 2,000 gpm and the minimum rate is 300 gpm. Pressure at the pumping plant is approximately 72 lbs. per sq. in. and the pressure throughout the distribution system remains uniform at 62 lbs. per sq. in. The city has a separate low pressure system which is used for irrigation.

When providing storage facilities for new municipal water distribution systems or when planning extensions to existing systems, write our nearest office for quotations on Horton elevated tanks.

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Chicago 4.....McCormick Bldg.	Philadelphia 3.....1700 Walnut Street Bldg.	Havana.....402 Abreu Bldg.
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January, 1948

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 23, No. 1

Christmas and Good Will

IT'S CHRISTMAS TIME as we sit down to write this month's editorial page and we're so full of the Christmas spirit (note that the word is spelled in the singular, not the plural) that we can't be mad at anyone, and we just can't find anything to write one of those "vitriolic" editorials, "written with a pen dipped in pure vinegar," to use the phraseology of two different correspondents, about. Even the hulking shadows of Mike Straus and Julius Krug, with their Authority plans to make over the Americans who live in Western watersheds, do not stir us to any harsh words. At Christmas time, the whole world looks good and we're "not mad at anyone!" So instead of a fighting tirade on something or other, we've decided to just write a series of short notes on interesting things which have come to our attention in recent days.

Water

We were in San Diego a few days ago to help celebrate the arrival there of water from the Colorado River, flowing through the new Navy-built Aqueduct. This was truly a joyous occasion for the rapidly growing city at the extreme southern end of our Pacific coast. We honestly believe San Diego has the finest climate, year in and year out, of any city in the West. It's in a beautiful location, it has tremendous possibilities from the standpoint of industry and commerce and is of tremendous importance as a defense base. To limit its future through lack of fresh water would be utterly criminal. Fred Pyle and other officials of the city have done wonders in years past to develop every possible drop of water in the watersheds to the east of the city, but in spite of everything they could do the supply became inadequate, and to have completed at last an aqueduct to bring water hundreds of miles from the Colorado is an achievement that the city and the state and every citizen of the West can rejoice in. The water will be expensive, but it will make it possible for one of the finest areas of the nation to proceed with an orderly, almost unlimited growth.

Airports

We went to San Diego by air, and we wish to compliment that city also on its airport. We didn't have time to examine all its facilities and aren't able to comment on the adequacy of its runways, or the size of its hangars or terminal, etc. But it is the one city we know that has had the foresight to place its air terminal, like its rail and bus terminals, in the center of the city. It's not a five-minute drive from the terminal to any hotel in the city, or to any of the office buildings or factories. And it isn't a five-minute walk to the beautiful city hall.

We couldn't help contrasting it with the municipal airport of San Francisco, where just a few hours before, we had boarded the United Air Lines plane that took us to San Diego. The great city by the Golden Gate is currently engaged in wasting twenty or more million dollars to build a monumental international airport on the mud flats along the bay shore, **fourteen miles** from the center of the city. And across the bay, the city of Oakland is doing the same thing, nearly as far away from its hub. Now we don't criticize the engineering layout or construction of either of these monstrous airports—both are superlative in that regard, and San Francisco is doing an outstanding job which we were happy to be able to write up some months ago in filling a vast area of waste land in the bay and making it into an airport. No, the engineers are doing their work splendidly, but whoever laid out the plan that put these two airports miles and miles from the people who wanted to use them was completely stupid and asleep. There was available on Treasure Island a site that would, like the case of wise San Diego, have been but a five minute drive from both San Francisco and Oakland. It would have been a real advantage to the metropolitan Bay area—but then we momentarily forgot there is no "metropolitan Bay area," there is only a group of childishly squabbling small towns fighting over crumbs while other coast cities accept the cake.

Well, as we said, we're not mad at anyone, but some day we're going to write a real editorial on this stupid airport planning business. We're going to point to Los Angeles, for instance, also developing a wonderful port, miles and miles from the people who want to use it, to Seattle and Tacoma, who being anxious to develop a great international field, placed it at a fantastically inconvenient distance from either city, and as the silliest example of which we are cognizant, Las Vegas, Nev., which with nothing but beautifully flat land everywhere about it, has its airport ten miles or more out in the desert.

Highways

Charley Upham, director of the American Road Builders' Association, is starting to beat the drums for another Federal-aid highway appropriation of $500,000,000 annually for many years to come, similar to the 3-year program mapped out in the "Postwar Highway Act of 1944," and we just want to tell Charley we're with him. The Federal government is spending lots of money for construction of all kinds, much of it good, some of it we believe wasteful, but there can be no question in our minds that the money spent for well-designed and carefully laid out highways is one of the finest investments it could make. You bet, Charley!

Incidentally, there's a lot of possible meaning in that phrase above, "carefully laid out highways," as was pointed out to us in a letter from a reader a few days ago. One of these times, when we're less filled with good will, and the supply of vinegar has been renewed, we intend to comment on that!

Road Builders

Speaking of Charley Upham reminds us that we had lunch a few days ago with Floyd Booe, our old friend, formerly with the Associated General Contractors in San Francisco. Floyd is making a survey for Charley, to see if there is need of setting up a Western office of the American Road Builders' Association. We don't know what Floyd will report, of course, but we'd like to stick our oars in to say **we** think there definitely is. Construction comes with increase of population, and in no section of the country is population increasing as it is in the West. And nowhere else is there such need for good roads. California has recently passed the Burns-Collier bill, assuring the state a much increased highway construction fund, but other Western states are greatly in need of organized help in putting over necessary programs. Some problem exists in each one, but for particularly critical problems where the Road Builders' could help, we believe, we point to Colorado, Oregon, Washington and Nebraska. That's our opinion, Charley and Floyd, for what it may be worth!

Bridges

One of the best belly laughs we had during the Christmas season was occasioned by reading on the "News Flashes" page of Western Machinery and Steel World, a San Fran-

(Continued on page 76)

Built to Outperform

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

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√ ¾-swing for greater work output in a Crawler Shovel...

√ Deeper jaws and higher operating speeds, for greater capacity in a Jaw Crusher...

...whether it's one of these things, or something else, you can buy any Austin-Western product with confidence that it will OUTPERFORM in ways that mean more work, better work—faster and cheaper.

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PORTABLE CRUSHING AND SCREENING PLANTS—Range in size from a mounted crusher to the magnificent Two-Unit and Three-Unit Plants. Illustrated is the new "101" with its jaw and roll crushers.

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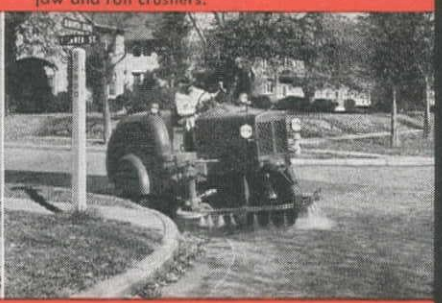
STATIONARY CRUSHING AND SCREENING PLANTS—Each, like this "agstone" and road rock plant, engineered especially for the job it has to do.



MODEL "40" SWEEPER—Compact, simplified, quick-dumping. May be had with right-hand or left-hand gutter broom, or both. Leaf Broom attachment also available.

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

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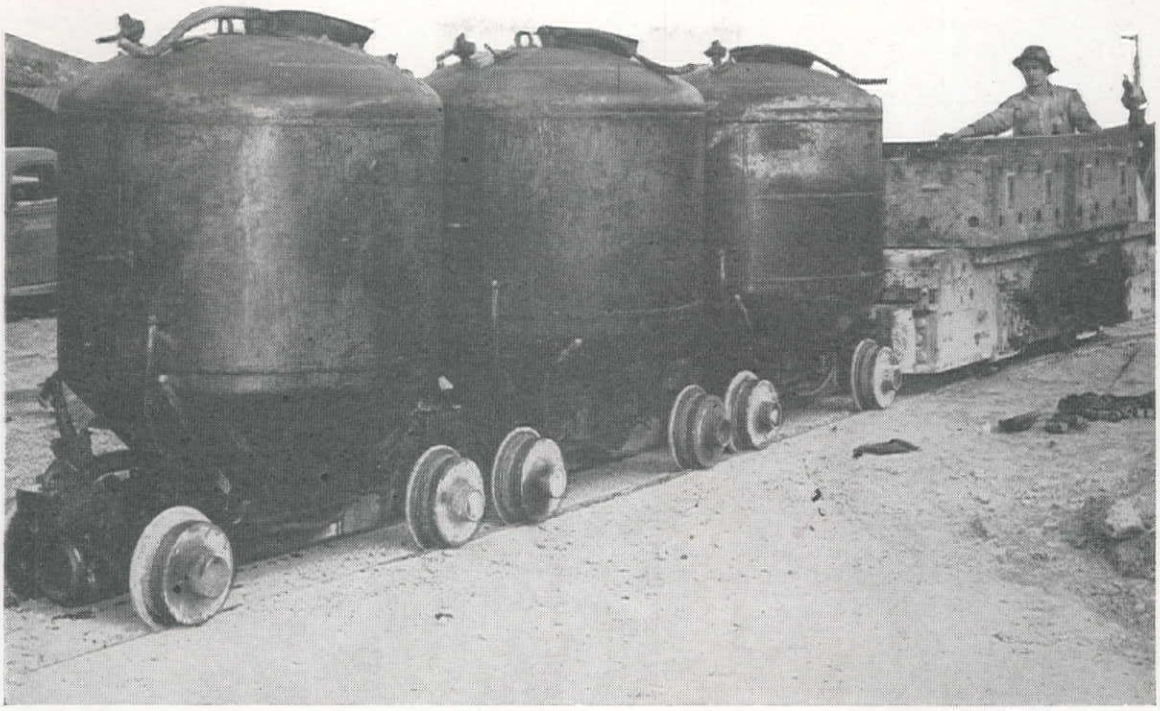
MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Billings*
MONTANA—WESTERN CONSTRUCTION EQUIPMENT CO.....*Missoula*
NEVADA—C. D. ROEDER EQUIPMENT COMPANY.....*Reno*
NEW MEXICO—N. C. RIBBLE COMPANY.....*Albuquerque*
OREGON—COLUMBIA EQUIPMENT COMPANY.....*Portland 14*
UTAH—WESTERN MACHINERY COMPANY.....*Salt Lake City 13*
WASHINGTON—COLUMBIA EQUIPMENT COMPANY.....*Seattle*
WYOMING—WILSON EQUIPMENT & SUPPLY COMPANY.....*Cheyenne*



KEMPER PNEUMATIC concrete placers, manufactured by M. F. Kemper Construction Co., of Los Angeles, employ new and simplified principles of pneumatic concrete handling to make tunnel lining, particularly holes of small diameter, easy and fast. At Grossmont Tunnel, being lined by the company for City of San Diego, trains of three 1½-cu. yd. placers are used.

Tunnel Lining—
Unique Equipment on San Diego Bore

Grossmont Tunnel, on San Diego's new El Monte main water trunk, is lined to 6-ft. inside diameter using newly developed form moving and concrete placing machinery by Kemper Construction Co., completing 100 ft. per day

SAN DIEGO has completed its new aqueduct from the Colorado River and water from that stream is now pouring into San Vicente reservoir, one of the units of the city's extensive municipal systems. Elsewhere in this magazine will be found a story of the civic celebration held on December 11 to commemorate this important event.

However, San Vicente reservoir is some 20 miles east of the downtown area of San Diego and up to the present time has had no outlet to the municipal distribution system. With the coming of the additional water, construction of a transmission main to the city's local distributing reservoirs is a prime necessity and four contracts have been let for that purpose. Three sections of the new line are constructed mostly of 68-in. reinforced concrete pipe and all three of these contracts are held by American Pipe & Construction Co. of Los Angeles, who have established a pipe making yard at El Cajon. The three sections of pipeline are, I — San Vicente reservoir to Lakeside, II — Lakeside to Grossmont tunnel, and IV — Grossmont tunnel to Alvarado filtration plant.

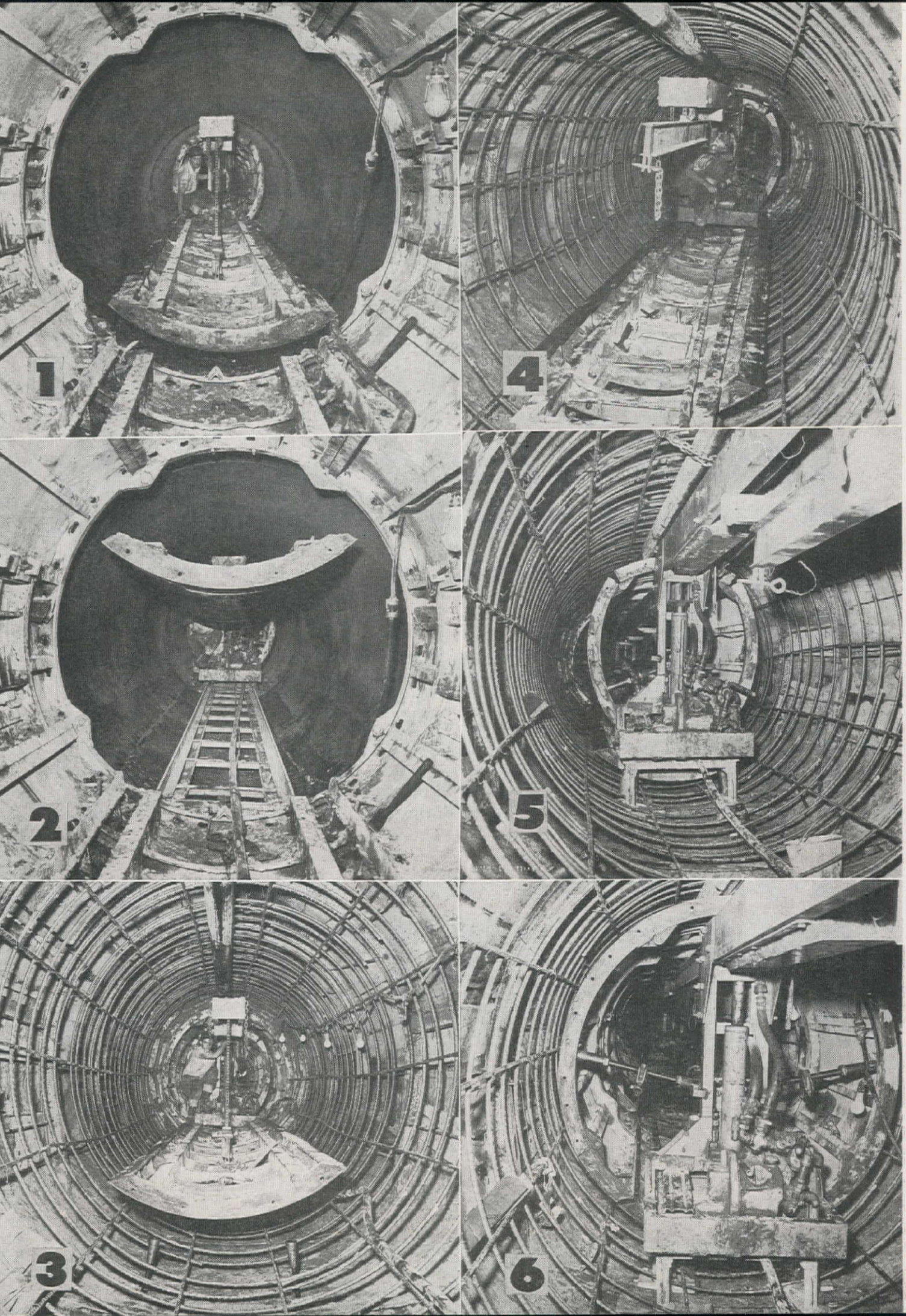
Tunnel section

Section III of the transmission main, known in its entirety as El Monte Pipeline, consists of a 6-ft. diameter reinforced concrete lined pressure tunnel, 6,292 ft. long, known as the Grossmont tunnel. The east or intake portal is located about ½ mi. west of the town of El Cajon from which portal the bore runs on a southwesterly tangent through the hills known as El Cajon Heights. The tunnel is designed on a plus grade of .00032, the invert elevation at the outlet portal being 2 ft. higher than at the intake portal, thus making the tunnel a portion of the downstream arm of a siphon crossing the El Cajon valley.

General contractor for the Grossmont tunnel was L. E. Dixon Co. of Los Angeles. The tunnel was driven through conglomerate and indurated clay to a pay line having a radius of 4 ft. 4 in. Good progress was made in the work with an average advance of 29 ft. per day.

More or less conventional tunneling methods were used. For about one-half of the length drilling was done with simple augur drills and for the remainder Gardner-Denver liners were used. A troublesome amount of water was encountered in the conglomerate requiring the continuous operation of a battery of small pumps. The tunnel was supported by 14-lb. steel H-beam ribs on 4-ft. centers, behind which 2-in. lagging supported the walls.

An interesting carloading development was employed back of the mucker. Instead of discharging directly into the cars, the mucker cast its material onto a conveyor belt operating on a wide gantry rail over the muck cars. The cars


1
2
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6

could then be moved into position beneath the discharge end and each loaded car pushed under the gantry while succeeding cars were being loaded. This eliminated the need for a complicated switching or "cherry picker" system for advancing empty cars to the mucker.

Tunnel lining

The subcontract for concrete lining of the tunnel was given to M. F. Kemper Construction Co. of Los Angeles, who had made an enviable record on lining some of the tunnels in the main aqueduct through the use of specially developed pneumatic concrete placing and form moving machinery.

The tunnel is lined to a finished circular diameter of 6 ft. The lining is by specification not less than 9 in. thick inside the inside flange of the H-beam tunnel supports. The total thickness of lining through the arch section therefore averages approximately 17 in. from inside surface to rock. The concrete is reinforced with ¾-in. preformed circular transverse bars on 10-in. centers varying form 7 in. inside the finished face at the top of the arch to 5 in. inside the final surface at the invert. Longitudinal steel is composed of ⅝-in. rods on 18-in. centers. Wherever practicable lagging and timber spreaders were removed before concreting in order to give a monolithic section binding against the rock walls. Concrete lining proceeded at the rate of 100 ft. per day and was concluded on December 24. Transition sections connecting the 68-in. pipe at each end of the tunnel with the 72-in. bore are presently under construction.

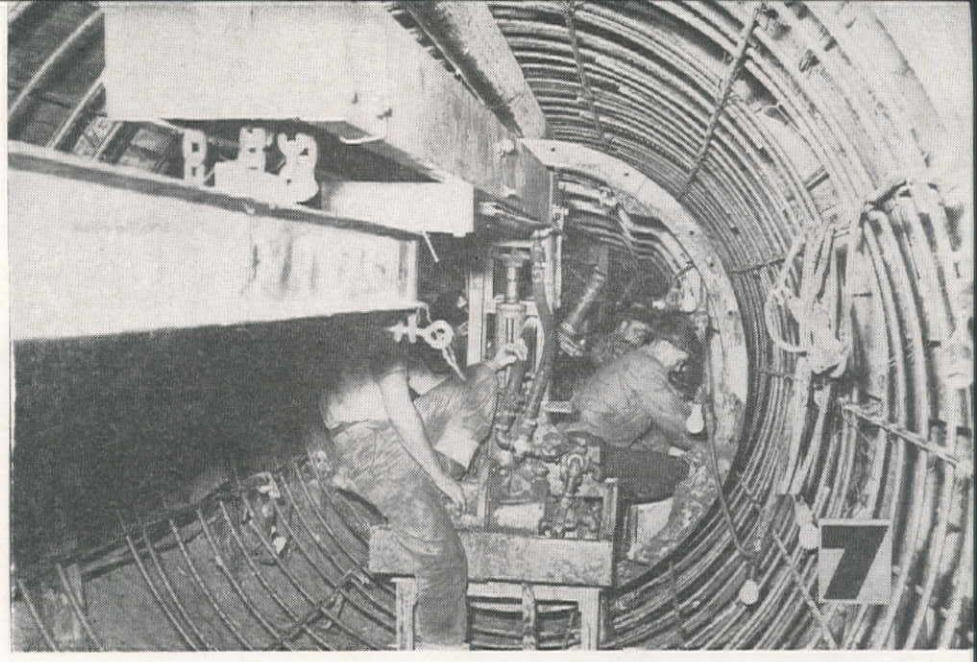
Special equipment

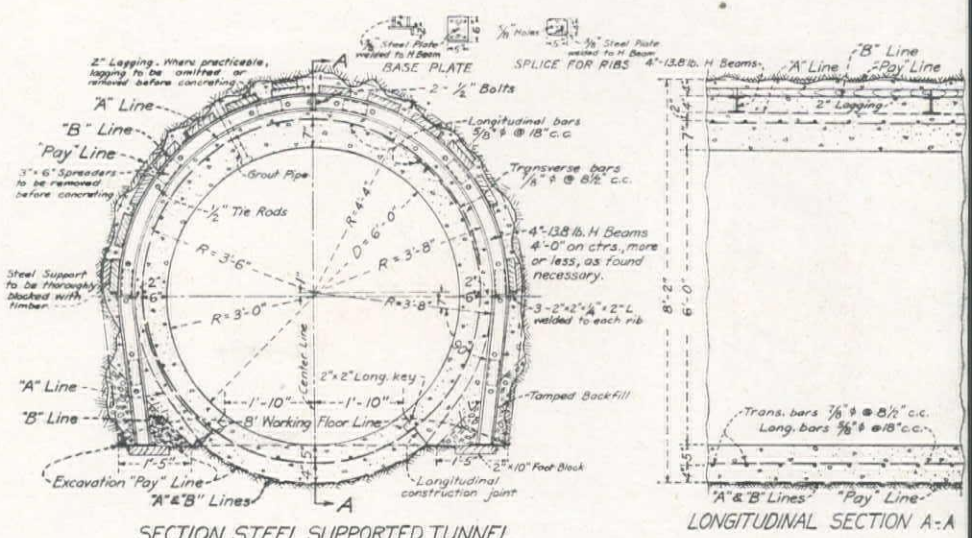
Of greatest interest in connection with the job is the special equipment designed by the Kemper firm. It is felt that the lining operation can best be described by a picture presentation and the pictures on these pages were selected to show the sequence of events in a complete pour. Photos 1 to 8 detail the method of advancing the lining forms, using a specially developed traveler type form mover operated entirely by air:

1. Collapsible steel forms are used; the arch form having two hinges near the top and two hinged flaps near the bottom. In moving, the lower flaps are folded against the upper portion of the form, which is then collapsed on the main frame of the rail traveler, as shown behind the operator; the invert form is then picked up by an air cylinder-roller chain hoist mounted on the forward end of the traveler.

2. An extendible track is then pushed forward over the area from which the invert form was lifted until it connects with the track already built in the next form section; the machine, carrying both arch and invert forms then passes over the extended track and through the forms already in place.

3. On reaching the forward end of the already placed forms the invert section is lowered into place on steel cone supports previously carefully set in the floor of the tunnel and securely bolted to them (reinforcing steel had been previously placed by the swing shift). The





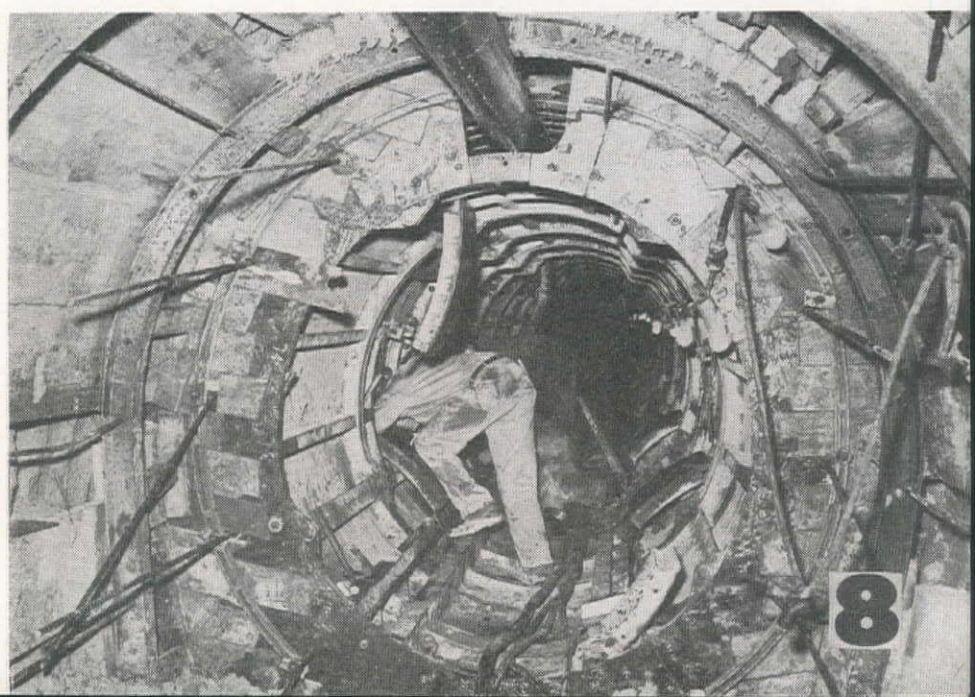
UNIT QUANTITIES

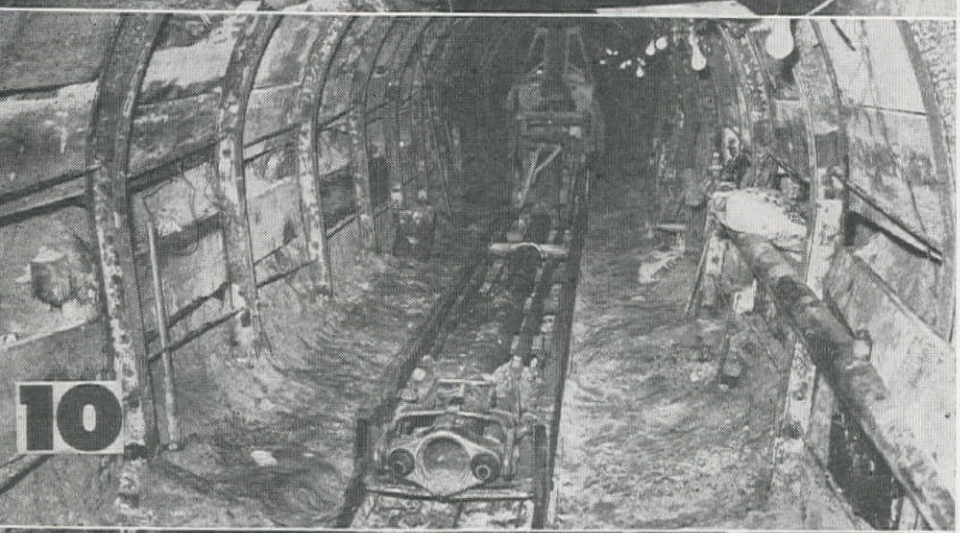
ITEM	QUANTITY
Excavation	2.13 cu.yds. per lin. ft.
Concrete	0.99 cu.yds. per lin. ft.

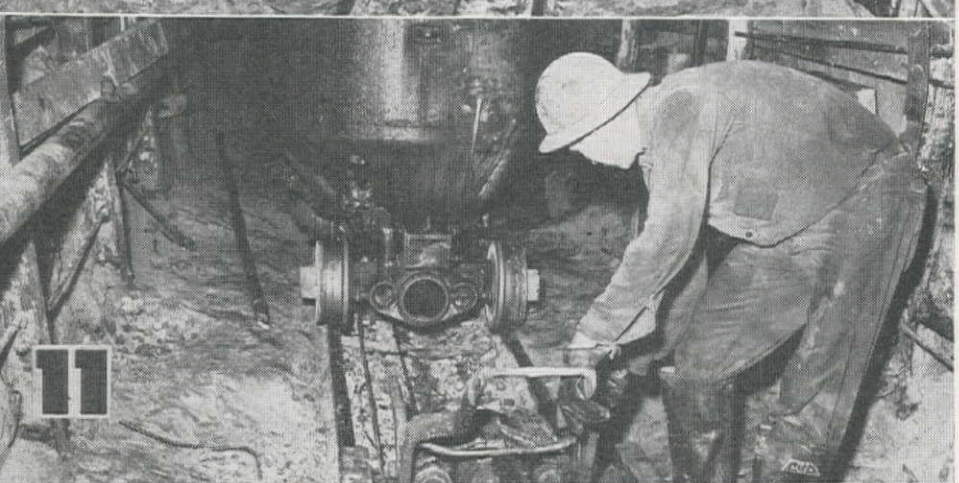
NOTES

Members of steel supports may be of dimensions, shapes and weights different from those shown.
Lap reinforcing hoops 40 diameters at quarter points. Stagger splices.
Lap longitudinal bars 40 diameters at splices.
Longitudinal bars to project 4'-0" beyond end of concrete at transverse construction joints.

CITY OF SAN DIEGO CALIFORNIA
WATER DEPARTMENT
DIVISION OF DEVELOPMENT & CONSERVATION
EL MONTE PIPE LINE
SECTION III, GROSSMONT TUNNEL
SECTIONS AND DETAILS
MAY 1946







cones are removed after the concrete has set, and the forms are advanced. The cone holes are then filled with hand-placed mortar.

4. When the invert form has been placed and secured to the cones the machine rolls forward onto the track in order to position the collapsed arch form. The discharge pipe from the concrete placing machine has already been put in place at the top of the arch and supported by chains from the steel tunnel ribs.

5. Advancing to the end of the already placed invert form, the machine is now ready to place the arch form. Clearly shown here is the completely pneumatic operation of the traveler, including air hoist, tugger engines and hydraulic jack.

6. The arch form is expanded into position by steamboat jacks, and the lower flaps dropped over the edge of the invert form.

7. The arch form is securely bolted to the invert form, after which the hydraulic jacks are lowered and the traveler is ready to return for the next 20-ft. form section.

8. After the last form section is placed a bulkhead of steel plates and 1 x 6-in. boards is placed to hold the concrete. Inspection doors are left open for observation purposes until the advancing concrete reaches each one in turn.

The drawing between Photos 7 and 8 illustrates a typical cross-section of the tunnel. As shown, a level working floor was left by the tunneling crew and the first operation of the lining contractor is to complete the circular excavation in the floor to permit placing of reinforcing steel.

Concrete placing

Photos 9 to 13 illustrate the concrete placing operation:

9. A batching and a mixing plant was established at the east or intake portal of the tunnel, being constructed on an elevated platform over the track. Aggregates are batched in a CMC weigh batcher and water is carefully proportioned at the mixer. A Ransome 1-cu. yd. mixer is used. The charge is 37% sand, 30% 1½-in. gravel and 33% 1-in. rock and pea gravel. To this is added 6 sacks of cement and 3½ oz. of Darex air entraining agent. This latter produces 3 to 4% of air entrainment and excellent workability in the concrete. The mixer discharges into a hopper from which the special cars are loaded on the track beneath. Two trains of three cars each shuttling to the pouring area keep the 1-cu. yd. mixer in steady operation.

10. This view shows the switching device as it sits on the tunnel track looking toward the discharge end. The large center opening is the discharge pipe and quick connecting joint. Two smaller openings with rubber gaskets are the air charging pipes.

11. As the 1½-cu. yd. capacity placers approach the switching device the operator makes a quick connection and locks the placer to the discharge pipe and air supply lines with the hand operated lever.

12. After the connection is made the charging cover on the placer is closed

and the operator discharges the concrete by means of air valves controlled by the lever in the foreground. Pressures up to 100 lb. per sq. in. can be developed inside the car.

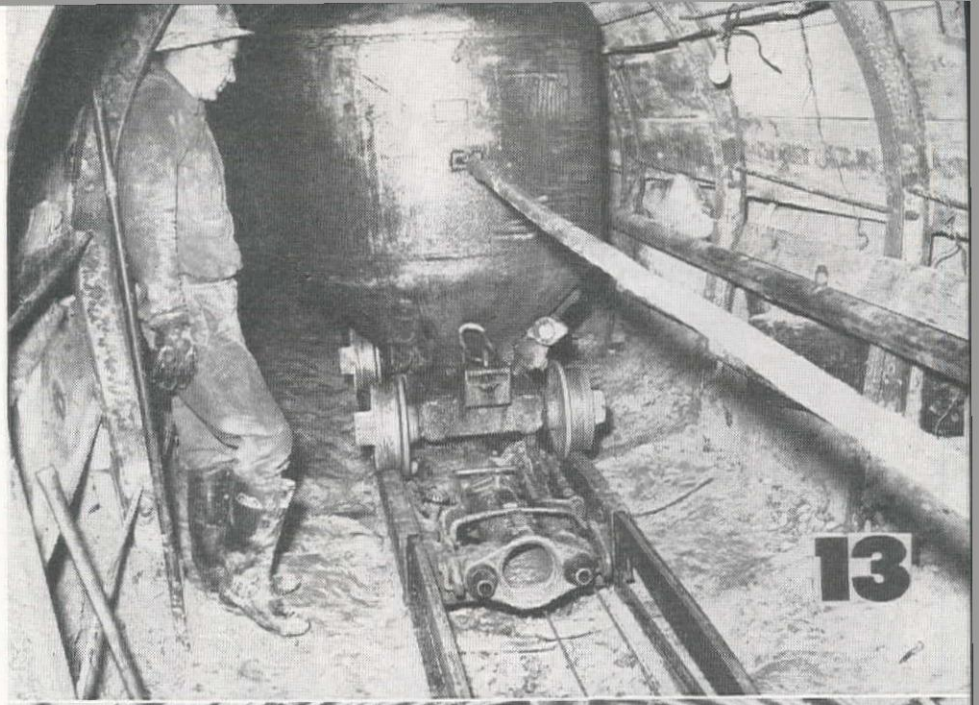
13. When the load of concrete is completely discharged the connecting clamp is released and the placer pulled a few feet back to allow a retractable set of rails activated by means of an air cylinder to move out of the switching device, forming a ramp. The placer is then pushed up this ramp and onto the switching device which supports it above the discharge pipe and air supply lines. The rails are then retracted and the second car in the train brought into place for discharge. This operation is repeated for the third car and when all three have been discharged the train is withdrawn and a second train enters. Two passing switches were made in the tunnel track at third points of the tunnel and in the earlier operations concrete trains passed on these switches. During concreting of the last third however empty and loaded trains were shunted on tracks outside the tunnel portal.

Personnel

14. The steel setting crew, which functioned at night, consisted of, l. to r.: W. T. Hodges, foreman; F. A. Powers; C. Wolfe; S. O. Hodges; A. O. McFadden; Frank Lunning; R. L. Stewart; Art Ramos; R. B. Kemper, superintendent.

15. Concrete pouring was carried on during the day shift and the crew consisted of, l. to r., back row: Andrew Gyure; Richard Darby, inspector for the City of San Diego; center, A. A. McLeod; J. W. Wells; H. S. Dyer; J. A. Dobbs; front row, John Birdwell, Jr.; Waldo Hankins, foreman; R. B. Kemper, superintendent.

The tunnel is being built by the city of San Diego, for which G. E. Arnold is water director. It was designed and is being constructed under the direction of Fred D. Pyle, hydraulic engineer, Paul Bierman, assistant hydraulic engineer and Carl Rankin, consulting engineer. Richard Darby is resident engineer on the job.

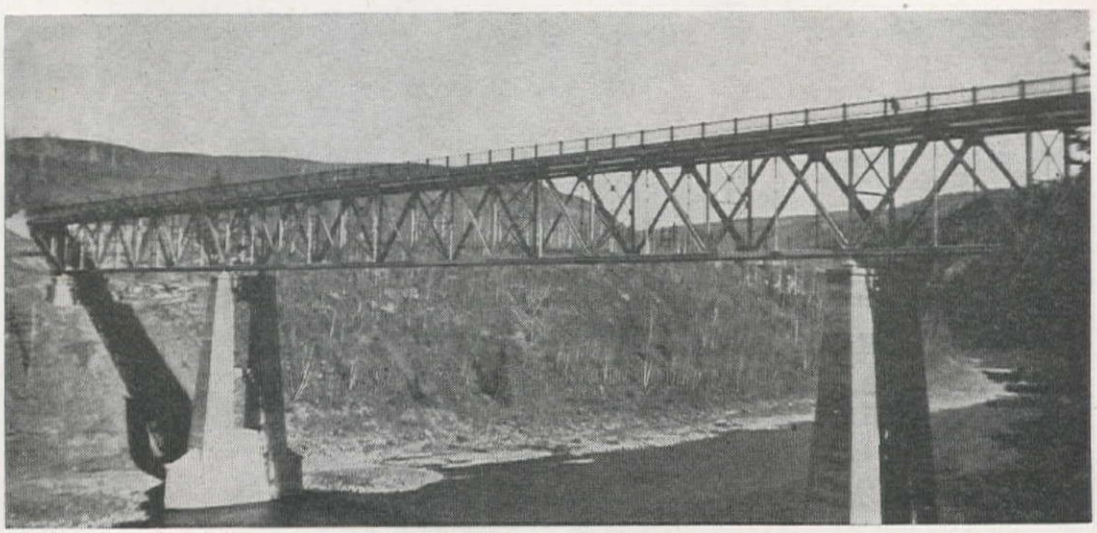


Notes on Construction Activities in Utah

CONSTRUCTION work on Standard Oil of California's new $5,000,000 pipe line from Rangely, Colo., to Salt Lake City and a $5,000,000 refinery in Salt Lake City is expected to start early in the spring. Bechtel Corp. of San Francisco will build the refinery and bids on pipe work will be called for about March. Construction work on the refinery proper is scheduled to get under way in June.

The Utah State Council of Carpenters (representing eight A.F.L. locals in Utah) has served notice on contractors that they will demand a pay boost from $1.62½ to $2.25 per hour when present contracts expire April 1. Negotiations will be started early in the year.

Hart Highway Links Alaska to Coast



RECENTLY-OPENED East Pine River Bridge on Hart Highway in British Columbia is 700 ft. long, with deck 18 ft. wide curb-to-curb. The roadway is 102 ft. above the stream, piers to support the continuous Pratt truss are 10 ft. into riverbed.

Opening of East Pine River bridge marks completion of one unit on direct highway connection from Pacific Coast to Alaska—Campbell-Mannix Construction firm making fast progress despite harsh weather and short working seasons

By F. H. FULLERTON
Vancouver, B. C.

OPENING OF the new bridge over the East Pine River on the John Hart Highway took place October 5, with almost a complete lack of ceremony. Ross Workman, engineer on the job for the British Columbia Department of Public Works, removed the chains from the bridge and a Commotion Creek Bus Lines unit drove across the bridge from one side, while Joe Corsbie of Peace River, Harry Giles, veteran Dawson Creek resident and two visitors from Vancouver, with the writer, drove across from the other side. A few residents in the district and a group of workmen composed the audience. This event, comparatively unnoticed, marked one of the most important steps in the construction of the new highway which will link the Peace River area and the Alaska Highway with the main highway system of British Columbia and will give Pacific Coast States direct access to Alaska.

The new Hart Highway, of which this bridge forms a vital link, is being constructed in several sections. This year Section B, from Commotion Creek, extending 57 mi. into the Canadian Rockies at Azouetta Lake will be graded, but it is not expected that gravel work will be completed until next spring. J. J. Lynch is resident engineer.

Construction contracts

The second major section is being built from Summit Lake to Azouetta Lake, a distance of 94 mi. In this section considerable difficulties have been encountered and construction consequently slowed. The 57-mi. Section B was originally awarded on a contract of $1,309,000 to Fred Mannix & Co., Ltd., Vancouver and Calgary, while Section A was awarded to the Campbell Construction Co., Vancouver, at a cost of $1,800,000. The two firms received the joint contract for the southern and northern approaches, the southern approach from Prince George to Summit Lake, a distance of 28 mi., being awarded on a contract of $524,600, while the contract for the northern approach from the East Pine River to Progress was placed on a bid of $330,000.

Subsequently the Campbell and Mannix organizations combined operations on this job under the name of the Campbell-Mannix Companies. At the last session of the British Columbia Legislature, faced with a general increase in costs of materials, labor, and equipment, the two companies secured a 20 per cent increase on the original contract price from the legislature. It is unofficially reported that a still further increase will be sought at the next session before the highway can be completed. Originally the project was expected to cost approximately $6,000,000.

There was already a highway from Prince George to Summit Lake. Regrading and some construction work on this highway will be necessary, and this also applies to a 40-mi. section from the East Pine River approach. There is also a gap of 40 mi. from the end of the East Pine approach to Dawson Creek still to be built. It is now definite that the highway will come in to Dawson Creek, but confusion exists as to the exact route to be followed.

Heavy grading

Construction of the new highway involves very heavy rock work through the Pine Pass. The specifications require that all grades will be under eight per cent and the curvatures are comparatively easy. The road bed is 30 ft. in width with a crushed gravel surface and an overall right-of-way of 88 ft. It is estimated that when the Hart Highway is completed more than 5,000,000 cu. yd. of excavation will have been undertaken, including 450,000 cu. yd. of rock cut, while six miles of culvert will have been laid. Approximately 450 men are employed by the Campbell-Mannix Companies on Section B, and four construction camps are maintained. All gravel for the highway is secured on the job, and the contractors are leaving approximately 10,000 cu. yd. of gravel in each quarry pit to use in maintenance work. The highway will follow the Pine Pass route through the Canadian Rockies. The highest point on the road on the west side is 3,015 ft. at Azouetta Lake. Construction in this territory can only be carried out from the latter part of April until the early part of November, as for the balance of the year the country is covered in deep snow, and in the mountainous section the season is even shorter.

Important bridge

The most important bridge on the highway is that just completed over the East Pine, near the junction of the Pine and Murray Rivers. This bridge is 700

ft. in length from abutment to abutment, with a concrete deck 18 ft. wide from curb to curb. The centre span is 280 ft. in length, flanked on each side by a 160-ft. span with a 50-ft. span at each approach. The design is of the Pratt truss type and is continuous throughout.

The main piers are about 10 ft. down in the shale rock formation of the riverbed and from the base of these piers to the top of the concrete is 132 ft.; the total height of the bridge above high water will be 102 ft.

The bridge was designed by the engineering branch of the British Columbia Department of Public Works, under the direction of the chief engineer. Following are some interesting statistics concerning the undertaking supplied by the department; 5,000 cu. yd. of rock excavation in the bank piers and abutments; 3,500 cu. yd. of concrete in the piers and abutments; 300 cu. yd. of concrete were used in the deck; 450 tons of structural steel were required for the superstructure and 50,000 lb. of reinforcing steel in the foundations and in the deck slab; some 25,500 sacks of cement were used.

The sub-structure of the bridge was undertaken by the Northern Construction Co. and J. W. Stewart, Ltd., while the superstructure was built by Dominion Bridge Co.

The cold weather of the north country, where the temperature goes down to 40 below zero, made the actual work hazardous, costly and difficult. Aggregate materials, for instance, had to be kept heated and the concrete held at a temperature of not less than 50 deg. Large quantities of coal were consumed in order to accomplish this end. To allow for variation in weather conditions allowance for an expansion of ten inches has been made in the bridge.

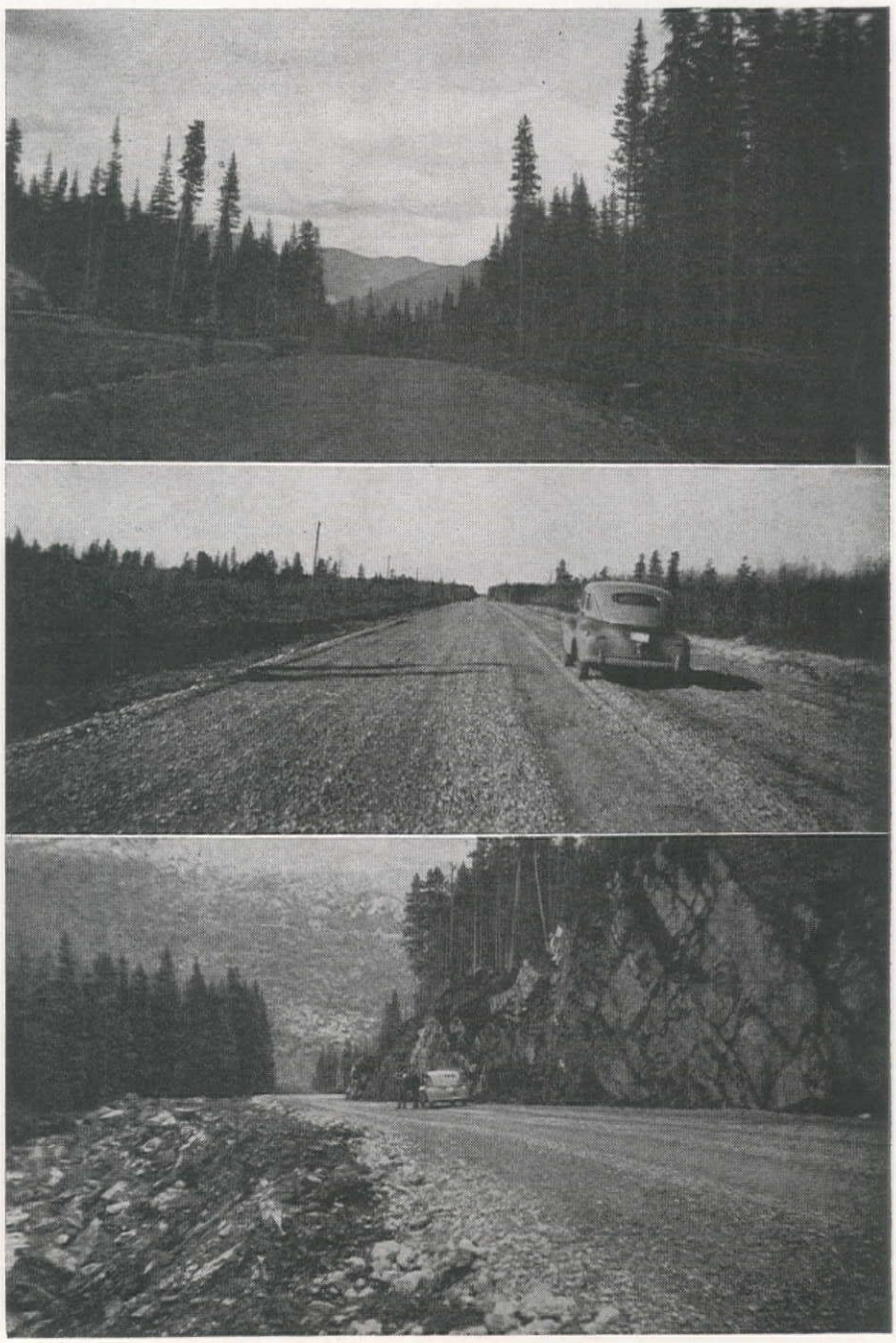
The two other major bridges on the highway are over the West Pine River and the 578-ft. span across the Parsnip River. A similar bridge on the Commotion Creek section of the highway is interesting in that it was assembled on the side and pushed out on the same basis as a Bailey Bridge.

A vital highway

The new Hart Highway holds great significance for British Columbia, and at the moment one of the greatest dreads of the residents of the Peace River Block is that either financial or political difficulties may arise which may hinder the immediate completion of this highway. Residents in the Peace River Block have lived so long on promises of completion of the Pacific Great Eastern Railway to the coast, and have intimate knowledge of several unfinished roads in central and northern B. C., that while they are jubilant over the construction work that has been completed, until the last mile of the new highway has been built they refuse to accept the fact that they have a direct link with the coast.

The new Hart Highway, as the Pine Pass route is called in honour of British Columbia's Premier John Hart, who started the project, will cut 1,000 mi. from the present highway route between Seattle and Alaska, and offers an alternative route in event of disruption of steamship services between ports in the west coast states and the northern territory. The British Columbia government has already reserved the passenger coach and freight trucking rights over the new route. The possibility is being considered that goods could be loaded in freight cars in California, Oregon and Washington points and brought to Vancouver by the Great Northern or Northern Pacific Railways. From this point the cars could be shipped by railway barge up Howe Sound and proceed up the Pacific Great Eastern Railway 340 mi. through central British Columbia to Quesnel. Here the freight could be transferred to motor trucks of the government-owned P. G. E. subsidiary for transfer over the new Hart Highway to Dawson Creek, and thence on up over the Alaska Highway to White Horse, Yukon, and Fairbanks, Alaska. The B. C. government has already announced that approximately $2,000,000 will be spent during the current year for the purchase of motor buses and trucks for the inauguration of a new passenger and freight service over this highway.

Apart altogether from the international potentialities of the new highway, from a freight standpoint the Hart Highway will provide access to central and coastal British Columbia for the vast coal resources, huge grain yields and the alfalfa and many other products of the Peace River Block, and will also make it possible for coastal firms to develop business with this section of British Columbia.



THREE VIEWS of the Hart Highway in sections where grading has been completed and gravel spread: top, near Camp 4; center, in the vicinity of Commotion Creek; bottom, near Summit, showing heavy rock grading required to complete this section.

Orange County to Expand Sewerage

Planned facilities will satisfy increasing demands of expanding population and industry in Southern California County—Over-all design calls for 15,000-ft. and 2,000-ft. outfalls, main treatment plant with 85 m.g.d. capacity and extensive trunk sewer system—Total cost will exceed $20 million

DEMAND FOR sewerage facilities for any region is directly dependent upon the residential and industrial growth of the region. If the growth is rapid and the development of sewerage does not keep step, the undesirable situation develops where inadequate existing facilities literally "burst at the seams" and an invitation is inadvertently extended for the subtle death-dealing potentialities carried in the sewage to begin their work.

Phenomenal growth of the entire Southern California region has created just such an increasing demand for more and better sewage disposal facilities. Of the mass of people moving to the 11 Western states, the proportion settling in Los Angeles County alone has constantly increased until by 1930, this was 2 out of every 5 with perhaps even greater proportionate increases during the last 17 years.

Population of the metropolitan area of Los Angeles has increased nearly 60 per cent since 1930, and as an indication of the future trend, it is noteworthy that one out of eight of all new businesses established in the United States since the close of the war has been located in Southern California. Of the Southern California region, the area most adapted to heavy residential and industrial growth is the coastal plainsland of Los Angeles County and its sister to the south, Orange County.

Because of the relatively high density of population already evident in Los Angeles Co., it is believed that the influx of new population will increasingly settle in Orange Co. Estimates of population growth clearly demonstrated the need for a comprehensive plan of sewerage works development for Orange Co.

Recognizing this need for an adequate sewerage plan to insure the value of the Orange Co. area as a future heavily populated industrial and agricultural area, the county's board of supervisors retained three consulting engineers, experts in their field, to carry out a survey of the problem. Consulting engineers A. M. Rawn, Charles Gilman Hyde and Franklin Thomas were commissioned to acquire the information fundamental to the planning and design of sewerage works, sewers, pumping plants, treatment works and outfalls to meet conditions of the next 20 years in Orange County.

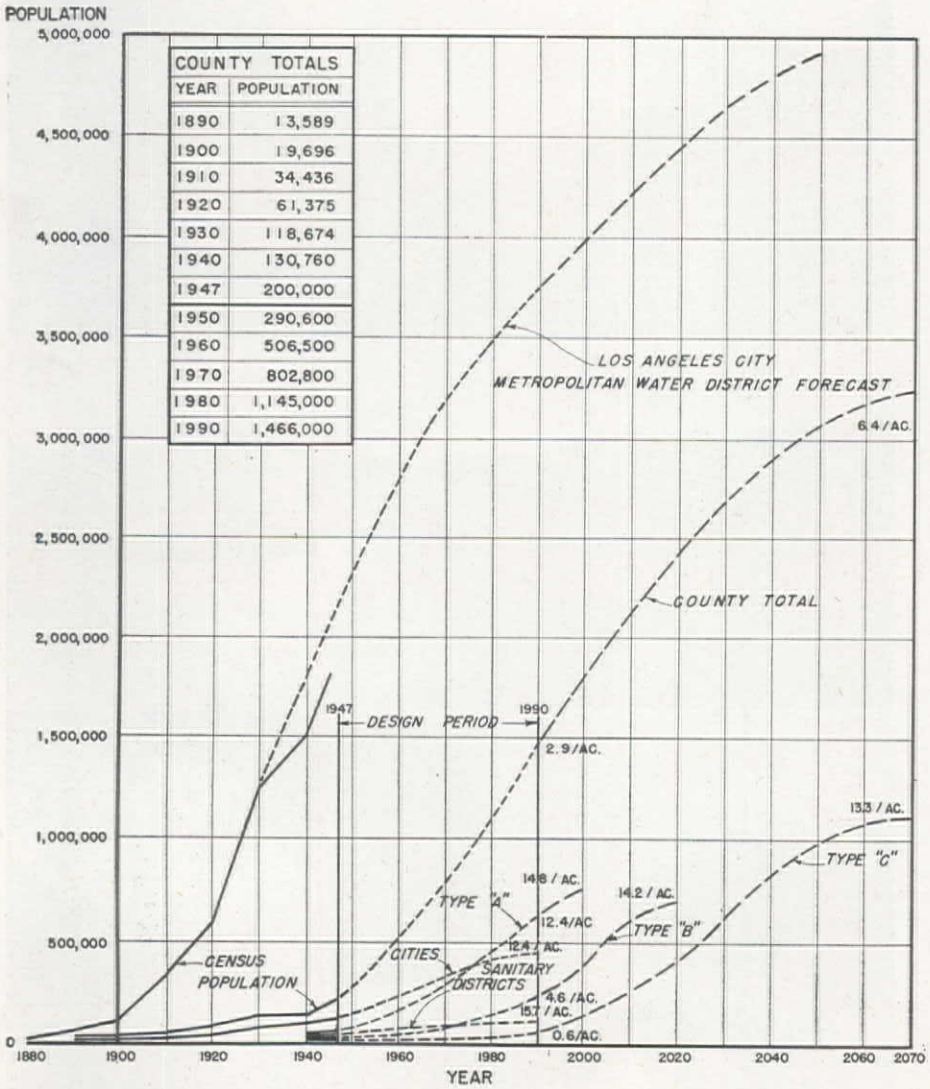
The engineers, with the help of a staff of technicians and the use of a considerable amount of office and laboratory equipment, compiled an impressive quantity of statistical data from which to draw its findings. Their final report embodies an analysis of all the factors known to affect the sewerage of the county and recommended the most suitable solution of the sewerage and sewage disposal problem.

Orange County officials will undoubtedly accept the engineers' recommendations, and following the required public election, proceed to carry out the development as outlined by the consultants. This article presents a brief description of the three sewerage systems recommended as the most practical, rational and economic means of solving the problem and some of the detailed reasoning which fostered the decisions of the engineers.

Division into districts

The area eventually to be served by a regional system must be divided into districts according to the special characteristics and needs of each. The principal factors influencing the delineation of these districts are the geography, topography, and natural drainage features of the areas needing sewerage.

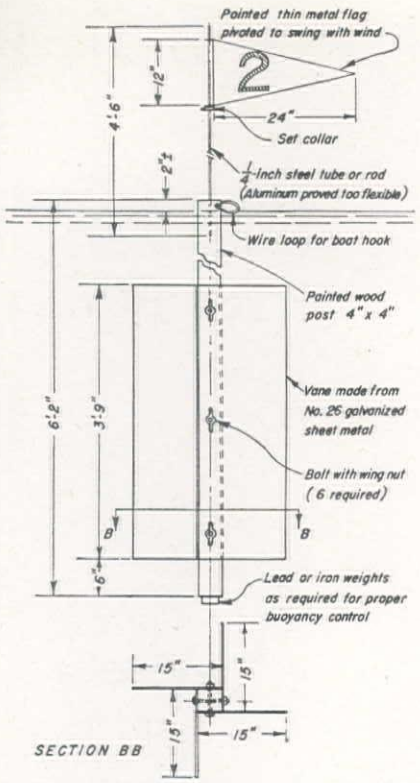
There are portions of three major drainage basins in the county, namely,



TYPE "A" AREA -- That considered to reach an average population density of 12.4 persons per acre by 1990 and 14.8 per acre by 2000.
TYPE "B" AREA -- That considered to reach an average population density of 4.6 persons per acre by 1990 and 14.2 per acre by 2020.
TYPE "C" AREA -- That considered to reach an average population density of 0.6 persons per acre by 1990 and 13.3 per acre by 2070.

POPULATION FORECAST
ORANGE COUNTY

GRAPH extending past population trends into the future shows incredible rate of growth, but was most dependable estimating method.



SIX FOOT FLOAT

FOR INDICATING DIRECTION OF UPPER CURRENTS

Center of Gravity: Approximately 3 feet below water surface

FOR STUDYING effect of coastal ocean currents, six-foot floats were utilized as representing a water depth corresponding to surface layer of a sewage field.

those of San Gabriel River, Santa Ana River and Aliso-Trabuco Creeks. Of these, the Santa Ana River basin is by far the largest and most important. The existing works are largely centered in this area in the north portion of the county.

The coast line of Orange County varies from long, flat sandy beaches in the northwest to abrupt cliffs in its central portion and again to stretches of beach at its southeasterly end. The southeastern portion is mountainous and in the foreseeable future it is not expected that its population will develop sufficiently to warrant sewerage.

To satisfactorily meet the natural limitations and population demands, it seems feasible for the present to limit sewerage to the coastal plain and the adjacent foothills, a relatively narrow strip of land along the coast from Dana Point south to San Clemente, and a small habitable area in Santiago Canyon. These sections divide logically into 10 districts, each sufficiently different from its neighbor to warrant its separation.

In the development of a comprehensive plan of sewerage, it is desirable to utilize existing works and structures as far as possible. In Orange County the cities of Anaheim, Fullerton, Orange and Santa Ana and the Sanitary Districts of Buena Park, Garden Grove, La Habra and Placentia, together with the U. S. Navy Lighter-Than-Air Base, are presently served by the Orange County Joint Outfall Sewer system. This system comprises collecting sewers, a sewage treatment plant, and an outfall into the ocean offshore from the mouth of Santa Ana River. Along the Orange County shore line to the south there are 7 independent sewage treatment plants in service. None of the existing systems is so constructed or located as to be economically suitable for a county-wide system. To integrate the previously mentioned 10 natural districts into an over-all system, the districts again divide logically into three sections. Each section would be best served by a separate sewerage system.

Natural divisions

Districts 1-8 comprise the heavily populated coastal plain and the adjacent foothills. This area can well be served by one large combined system. The topography is such that a major portion of the sewage from the area will flow by gravity to a point near the mouth of Santa Ana River and the remainder of the sewage can be easily and economically pumped. Therefore, for these districts a system is recommended comprising the necessary trunk sewers, interceptors, a primary sewage treatment plant near the mouth of Santa Ana River, and an ocean outfall extending 15,000 ft. from shore.

District 9 covers the narrow strip of land from Dana Point south. For this district, a system is recommended comprising main trunk sewers, pumping plants, a primary-type sewage plant in Prima Deschecha Canada, and an ocean outfall extending 2,000 ft. from shore.

District 10 is limited to the small area in Santiago Canyon. Here, an inland sewage treatment plant is envisaged employing Imhoff tank treatment followed by lagooning of the treated sewage for a period of 40 days prior to discharge into Santiago Creek.

The comparatively flat coastal plain in the northwestern half of Orange County covered by Districts 1-8 comprises the major area in which populations of great density and heavy industrial development will presumably occur. Therefore the sewerage problems in this area will be most acute. It is interesting to note the problems which faced the engineers in choosing the most suitable system for serving this area.

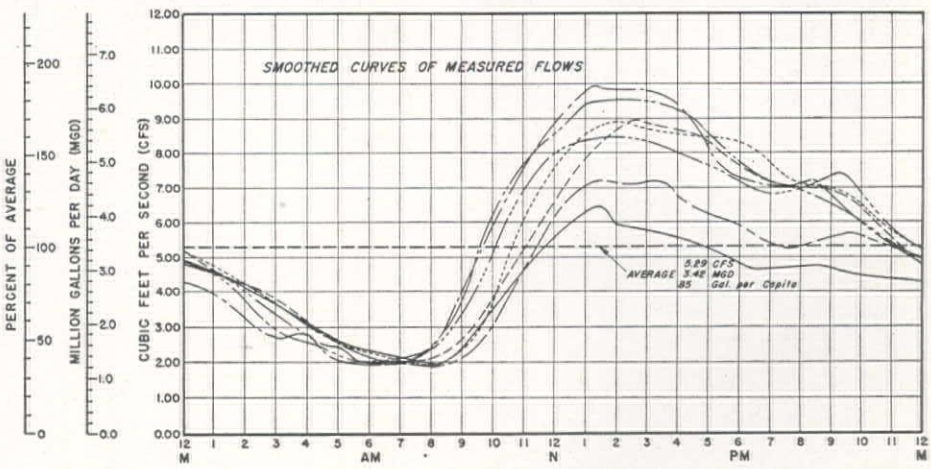
Protecting the shore

The 42-mi. shore line area skirting these districts includes some of the finest and already most heavily utilized beaches and recreational features found along the entire western coast of the Americas. Visitors come to this region from practically all of the population centers of Southern California and from many other more remote places. There is every indication that their number will continue to increase.

In recognition of the probable development of the shore areas, the proposed ocean outfall must be provided with characteristics to prevent the area from pollution and leave it safe and pleasant for use by bathers. At the present time, there are some locations where sewage effluent is being discharged directly into the ocean water. Other local systems provide insufficient lengths of outfalls, and combined with the undesirable effects of breaks in the outfalls and an ever-increasing volume of sewage flow, the problem is becoming serious.

Reliable information relative to the ocean currents was essential for designing the Santa Ana joint outfall sewer. Sewage discharged on the ocean floor rises to the surface where it forms a layer. Although this layer mixes and diffuses with the ocean waters so that all of its organic material and pathogenic bacteria will be rapidly destroyed, onshore currents will carry this surface layer shoreward. The outfall must be long enough and so located to guarantee that there will be no pollution of shore waters accessible to bathers.

VARIATIONS in daily sewage flow during the various days of the week were plotted on the basis of field gagings made at existing works. Population factor determined peak value for 1990 used in design of sewer sizes and treatment plant capacity.

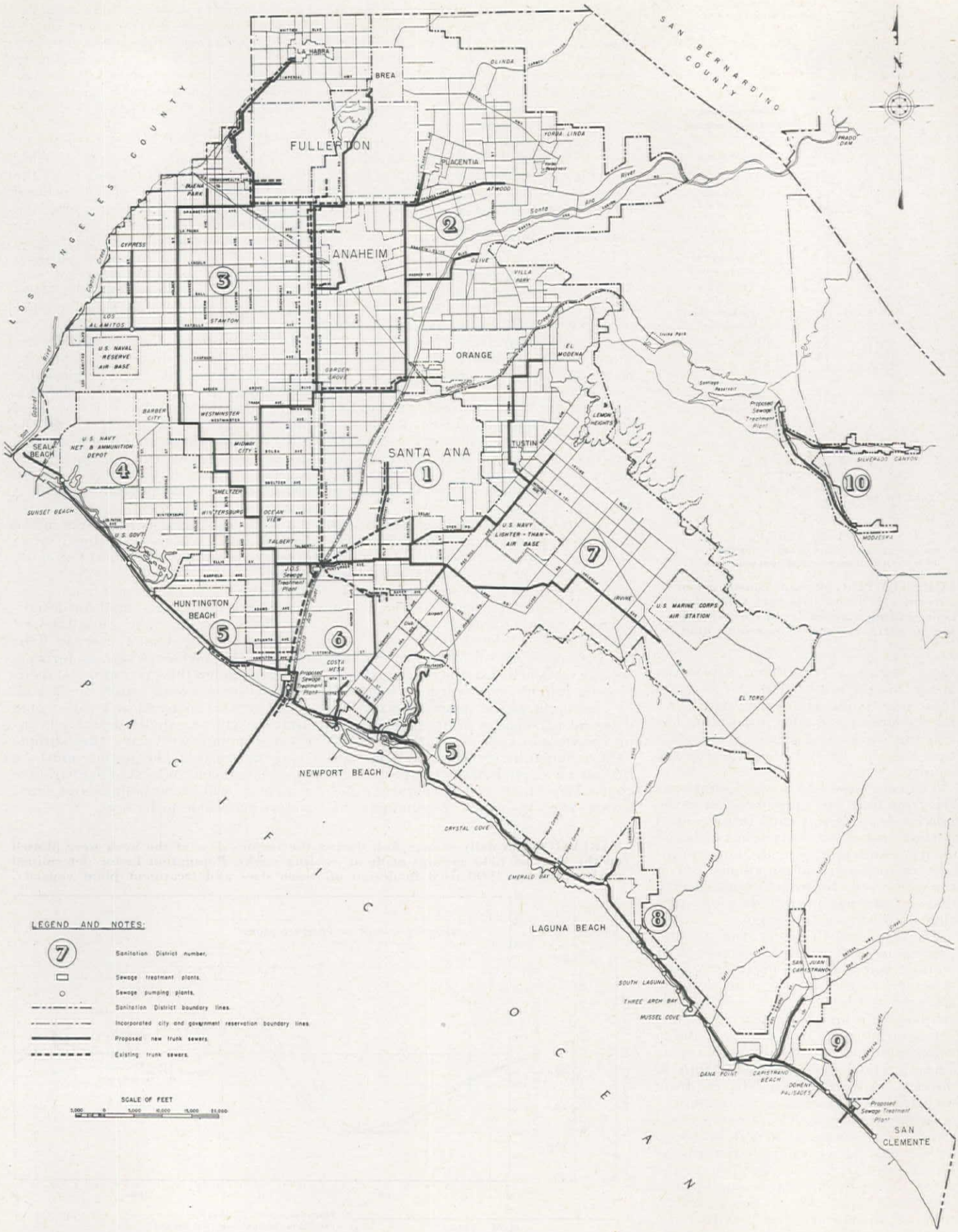


FLOW DATA								
Legend	Day	Date	Total MG	Aver CFS	Min. Rate MGD	Min. Rate CFS	Max. Rate MGD	Max. Rate CFS
	Sunday	February 17	2.75	4.26	1.24	1.92	4.19	6.46
	Monday	" 18	3.70	5.72	1.25	1.93	6.45	9.95
	Tuesday	" 19	3.73	5.77	1.25	1.93	6.19	9.56
	Wednesday	" 20	3.59	5.56	1.32	2.04	5.47	8.46
	Thursday	" 21	3.62	5.61	1.25	1.94	5.80	8.97
	Friday	" 22	3.52	5.45	1.32	2.04	5.80	8.97
	Saturday	" 23	3.03	4.69	1.21	1.88	4.65	7.20
		Averages	3.42	5.29	1.26	1.95	5.50	8.52

Population, 1946 (Sewered) 40,250
Per Capita Sewage Flow, Gal. per Day 85
Per Capita Water Consumption, Gal. per Day 116
Area in Acres 8,372
Gallons per Acre per Day, Sewage Flow 408
Population Density per Acre 4.8

WINTER SEWAGE FLOW

SANTA ANA LINE FEBRUARY 17-23, 1946



REGIONAL PLAN of sewerage for Orange County reconciles the various political entities, existing sewerage jurisdictions and physical obligations of geography and topography. These determined that 10 County Sanitation Districts would meet requirements. Districts 1-8 will be served by a single integrated system; Districts 9 and 10 will have individual systems.

A study and analysis of compiled wind data and determination of the effect of wind on currents, of the ocean currents offshore, of the ocean drift and of the movement of the sewage-sea mass above the outfall due to the hydraulic head of the rising volume of fresh water through the salt water of the ocean were required before finally determining the 15,000-ft. outfall length.

The most important current component is that resulting from the daily land-and-sea breeze which blows onshore during the day and offshore at night. This wind induces currents having a clockwise rotation with an exact daily cycle and having an estimated magnitude off the Orange County coast of about 33 ft. per min. This velocity continues throughout the day regardless of variations in the daily periodic winds.

The basis for the design of the outfall was finally obtained by mathematically combining the several current components due to tides, wind-induced currents, and the ocean drift. The pattern of the combined current movements during the 24-hr. day then resembles a spiral with the resultant current direction being onshore during the day and offshore during the night.

Six-foot floats considered as most nearly representing a depth of water corresponding to the surface layer of a large sewage field were used to illustrate the expected movement of the sewage. As a result of the predominating spiral-type current, if a float was released at a point 15,000 ft. seaward, the average time required before it would reach the breaker zone would be more than 24 hours. For certain times occurring a few hours of a few days each month, this period of travel would be reduced to a minimum limit of 5.5 hours, but this would occur only as a result of the high winds of the winter months when the beaches are not much used. Therefore, the 15,000-ft. outfall is considered practicable for continuous discharge of the sewage effluent.

For District 9, the plan for a different length outfall suggested itself as most economical and suitable. The spiral pattern of the typical ocean current suggested that a good method of sewage disposal would comprehend the storage of sewage effluent during the daytime when the currents are predominantly onshore with subsequent discharge through a relatively short outfall during the evening and night when wind and currents are offshore. This consideration determined that a 2,000-ft. outfall would suffice for the needs of the district if a reservoir with large enough capacity were provided for daytime storage. Thus, the short outfall could perform essentially the same function as the long outfall planned for Districts 1-8.

Suggested design

Construction of the outfalls will demand that excavation be carried through the beach sand and underlying rock out to a depth of about 30 ft. Beyond that point, the effect of wave action will be negligible and it will be feasible to rest the pipe on the ocean floor. The outfall would be laid on a rock mat placed on the ocean bottom beyond the 30-ft. depth, and also would be provided with side and top rock protection for its entire length. The initial section would be encased in concrete and completely buried beneath the ocean floor.

Cost-comparison curves were drawn to estimate the construction costs of reinforced concrete ocean outfalls, 30 to 150 in. in diameter. These curves were drawn after a careful study of the construction costs of existing ocean outfalls and of those now being built. On the basis of economy and the quantity of sewage to be discharged, the most suitable pipe was determined as 90 in. for the 4,200-ft. land section of the outfall and 78-in. pipe for the 15,000-ft. ocean section. This pipe is to be joined by semi-flexible metallic connecting joints.

All of the conventional methods of sewage treatment were studied to determine the most economical and satisfactory combination of collection, pumping, treatment and disposal works. Before the final recommendation was made, a comprehensive program of field work was carried out in order to supplement the available data.

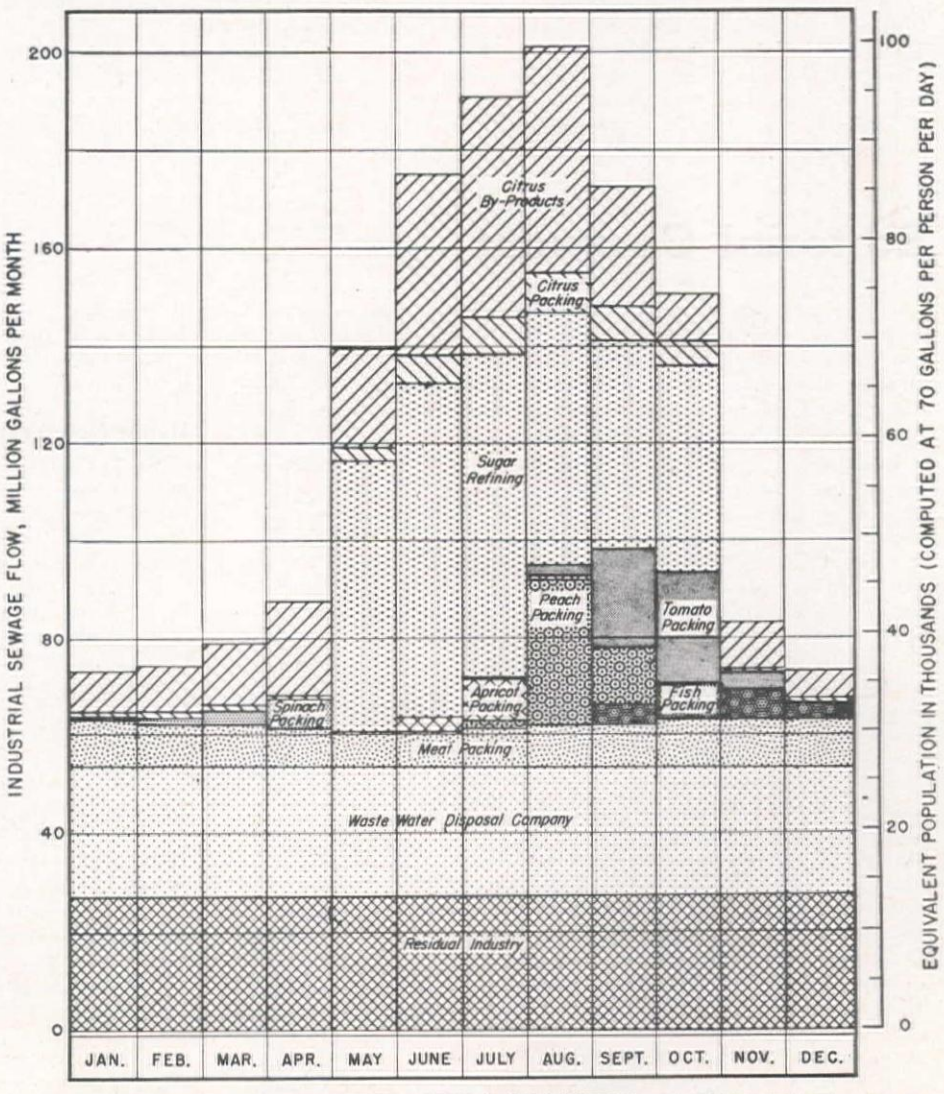
Measurement and samplings were made of flows of industrial sewage and wastes from 21 of the 29 major waste-producing industries of the county. Similar field studies were made of the existing sewage treatment plants within the county so that the quantity of domestic sewage flow could be estimated. Then the future daily quantities of sewage flow as of 1970 were computed on the basis of predicted populations, with the per capita sewage contribution assumed to remain the same as at present. Recommendation as to the main plant capacity was made from these estimates.

Gauge measurements

Field gagings were made by a variety of methods, but principally by means of the V-notch weir, and the Palmer-Bowlus flume. On occasions weir-boxes were employed, the sewage being pumped from a manhole into the box, returning by gravity to the sewer. Flows were also estimated on the basis of the time required to empty or fill sumps of measured volumes.

Results of the measurements showed that the industrial flow averaged about 4.1 million gal. per day, or in equivalent

INDUSTRIAL WASTES contributed to the sewers in Orange County contain such a large amount of organic material that they constituted a basic factor in design of the sewerage works. Graph shows comparative figures for industrial waste loadings.



SEWAGE FLOW VOLUMES FROM INDUSTRY ORANGE COUNTY 1947

terms, about 21.5 gal. per capita day. The strictly domestic sewage flow was found to average from 50 to 70 gal. per capita day. At many coastal places there is, in addition to the domestic flow, a steady percolation of ground water into the sewers which amounts to as much as 50 gal. per capita day.

Daily flow curves were then drawn on which were shown the maximum variations in flow likely to occur. The curves were extended to show the expected change in this per capita value throughout the period 1950 to 1990. The maximum rates expected to occur simultaneously during the peak month of August was determined to be 85 million gal. per day in 1970. This figure was then incorporated as the design capacity for the main treatment plant.

Industrial wastes

In the design of the plant, competent information concerning the character and composition of the sewage was considered almost as indispensable as that concerning quantities. The industrial wastes contributed to the sewers in Orange County contain such large concentrations of organic material that they constituted a basic design factor. The citrus by-products industry, beet sugar manufacture and fruit and vegetable processing and packing, all of which are seasonable, contribute the major portion of the industrial waste loadings. The sewage reaching the treatment plant will thus have three times the loadings or strength with respect to content of organic material than does ordinary domestic sewage.

Laboratory studies were conducted to study the amenability of the sewage to treatment by the method of chemical treatment or flocculation. Such means can effectively clarify the sewages to give a resultant effluent having a turbidity of about 30 parts per million. The same study determined that the processes of stirring and settling alone without chemicals, would effect a substantial classification of sewage to a degree intermediate between that effected by chemical treatment and that effected by plain subsidence.

Two types of treatment were considered for the main plant. A considered alternative plan was treatment by the activated sludge process, including chlorinization of the effluent, combined with a short 1000-ft. outfall. The type treatment determined to be the most economical and finally incorporated into the design consists of a primary treatment of plain subsidence for one hour with skimming and separate sludge digestion and open sludge drying beds combined with the 15,000-ft. ocean outfall. The cost of secondary treatment by this second plan is eliminated since the effluent can be transported sufficiently far out into the ocean water where it has an unlimited supply of dissolved oxygen available for completely oxidizing any amount of organic material. Moreover, this scheme has the greatest advantage of simplicity.

Specifically then the treatment plant to be located near the mouth of Santa Ana River comprises the functions of bar screening, grit removal, plain sedimentation and grease removal with separate sludge digestion and with chlorination of the inflowing sewage only in amounts needed to control odors. Some of the sludge digester gas would be converted on the site to power, which would in turn be used to operate the plant motors. The remaining gas would be converted in plant boilers to steam which would be employed for heating the digesters to expedite the processes of sludge digestion.

Cost and income

The digested sludge, after drying, will be sold as fertilizer to supply added revenue. There is also the need in Orange County for an additional supply of water, so studies were made to determine the feasibility of producing sewage effluent acceptable for use in irrigation. A study of the costs of such reclaimed sewage demonstrated this to be twice what it would cost to purchase additional water from the Metropolitan Water District of Southern California, so this plan was abandoned as impractical at present while the other means exist for supplementing the local water supply.

The initial total construction cost of this plant, with the design capacity of 85 m.g.d. corresponding to the year 1970, is estimated at about $2,128,000. Total cost of the trunk sewers for Districts 1-8 is estimated at $15,730,000. The outfall from the plant is estimated to cost $3,172,000. It is recommended that the project be financed by the sale of 40-yr. serial bonds following their authorization by the voters of the respective County Sanitation Districts.

Editorial Comment

. . . . . continued from page 63

cisco publication, that "The much-discussed proposals for additional vehicular and possibly rail crossings of San Francisco Bay continue to take more definite shape . . . The Toll Bridge Authority has approved two new crossings . . . The old Reber Plan for a mighty mole to stretch across the Bay has apparently again been scrapped . . ."

Presumably the reason the publication could make such a ridiculous statement is that it hasn't had its ear to the ground. For instance, it didn't read the full page support for the Reber Plan in the San Jose Mercury News of Dec. 7; it missed the full front-page blast in Pacific Rural Press early in December; it didn't hear about the strong supporting resolution passed by the powerful California Farm Bureau Federation convention in Long Beach in November; the vigorous support accorded the plan by San Francisco Progress, the house-to-house paper with the largest total circulation of any paper in the city, in its issues of Dec. 4, 11, and 18, were missed by the afore-mentioned publication; not being at Sen. Downey's press conference a few weeks ago, they didn't hear his again-expressed support; they didn't realize that a plan being considered by the city of Berkeley to fill in a huge area in the shallow portion of the Bay grew out of an address made in that city by Mr. Reber, explaining how the Plan would give it a vast new industrial and residential area; they didn't read California Engineer for December, where the student engineering publication at University of California went to great lengths to explain the details of the plan; they didn't hear that the students of San Rafael Junior College are constructing a model of the plan; admittedly they haven't had a chance to read the letter of support from Admiral Greenslade; and of course they weren't in on recent conferences we had with Walker Young, chief engineer of the Bureau of Reclamation and Gen. Wheeler, Chief of the Army Engineers, in which both expressed not support, but very great interest in, the Plan.

So their little "News Flash," even discounting the fact that it wasn't "news," really gave us a Merry Christmas.

Happy New Year

So you can see we really meant what we said about being mad at no one. We've enjoyed the Christmas season, and the whole past year, in fact. We're looking forward to a prosperous 1948 for the engineering and construction fraternities. There is no element now evident that can prevent it. The population growth of the West absolutely insures it. We'll have fun observing the Colorado River water fight, both upper and lower basins; the Bay crossing fight; the Colorado highway situation; the struggle between the foreign-type ideologies of Straus and Krug and the deeply American intentions of a majority of Congress (both parties); the continuing controversy over public power and private power companies; the wild writhing of little men in associations and bureaus trying to look big, and the calm efficiency of big men heading great projects without thought of personal advantage; the never-ending search for new sources of water in the West; the unpredictable advances of science; and this year, particularly, the great game of politics. We'll comment on various phases of these things as the year passes, and will endeavor to keep our readers informed about them to the best of our ability.

In closing, may we just say that we deeply appreciate the letters and statements of comment that we received from time to time about our work, and we urge others of our readers to let us know what they think about the subjects we talk about here, whether they agree or not. We're always happy to know how our readers feel.

CONSTRUCTION DESIGN CHART

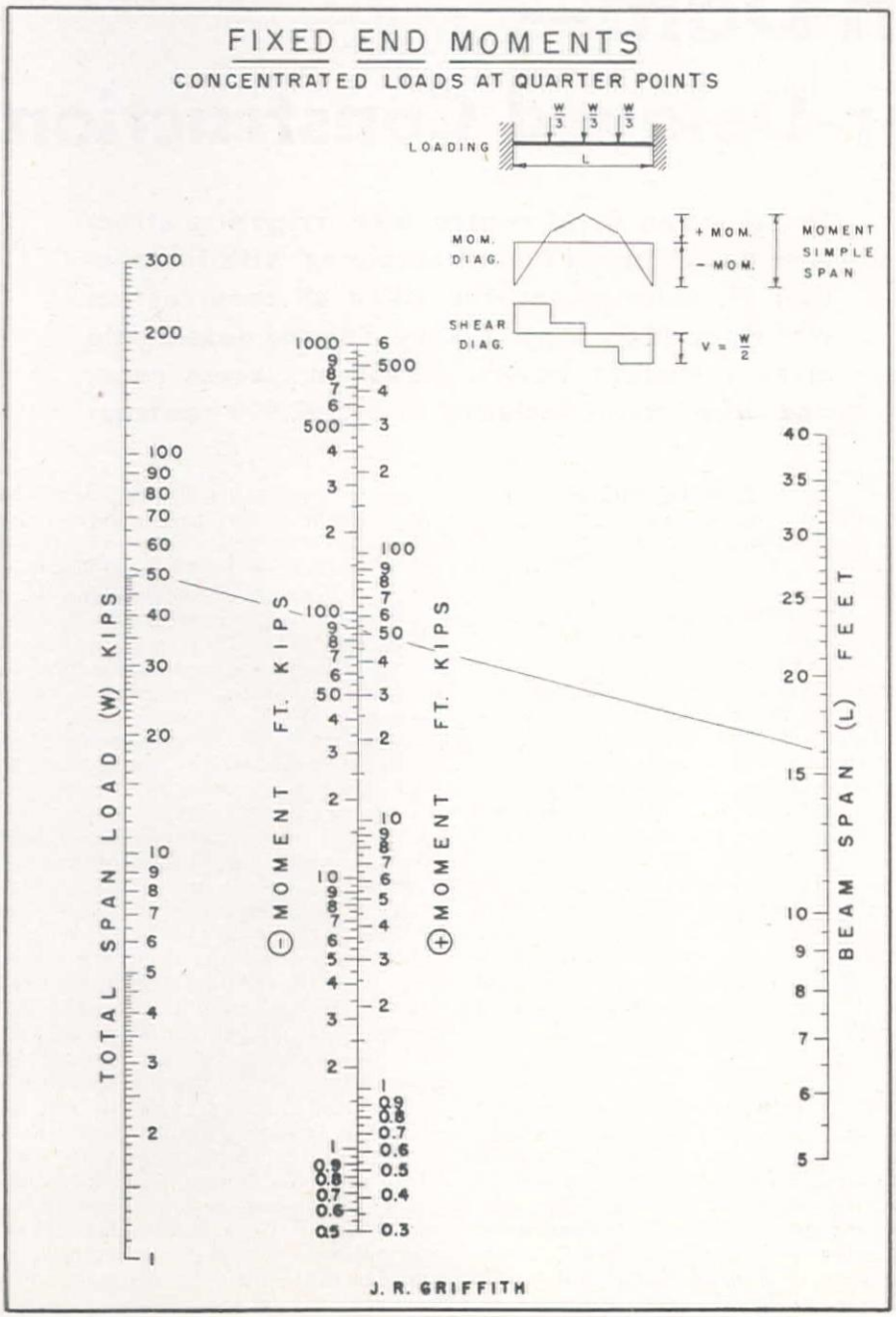
XCI . . . F.E.M., Beams With Quarter-point Loading

By JAMES R. GRIFFITH
Civil Engineer
Seattle, Wash.

THE ACCOMPANYING chart is the last one on fixed end moments to be presented, being one of a series of four companion charts on the same subject. Those loadings have been included which are most commonly encountered when analyzing a conventional building frame.

As the number of equal concentrations in a span increases, the condition of a uniformly distributed load is approached. Loads at the quarter points, as used on the accompanying chart, is about as small a division as is usually met in the conventional problem. Smaller divisions are frequently treated as if they were uniformly distributed.

A solution on the accompanying chart, as was true of the companion charts, is made by a straight line intersecting all three scales. In order to show the comparative moments, I have taken the same span and span-load assumed for demonstration in the use of the chart published in this magazine in July, 1946, issue which covered uniformly distributed loads. In that problem the span was taken as $L = 16$ ft., and the load at 3.3 kips per ft. Thus the total span-load would be $W = 3.3 \times 16 = 52.8$ kips. A solution line has been drawn on the accompanying chart for these same conditions, obtaining thereby the following values:



Maximum (—) Moment = 89 ft. kips
Maximum (+) Moment = 52 ft. kips
Simple Span (+) Moment = 141 ft. kips

The above values have been tabulated, along with those obtained from the previous F.E.M. charts by using the same span and span-load.

	Bending Moments, Ft. Kips		
	Fixed End		*Simple Span*
Loading Conditions	*Max. (—)*	*Max. (+)*	*Max. (+)*
Uniformly Distributed	70	35	105
Quarter Points.....	89	52	141
Third Points	95	47	142
Mid-Span	110	110	220

In order to check the values obtained from the accompanying chart, the results by formula are as follows:

Max. F.E.M. (—) Mom. $= \frac{5WL}{48} = \frac{5 \times 52.8 \times 16}{48} = 88$ ft. kips

Max. F.E.M. (+) Mom. $= \frac{3WL}{48} = \frac{3 \times 52.8 \times 16}{48} = 52.8$ ft. kips

Max. (+) Moment in Simple Span = 140.8 ft. kips

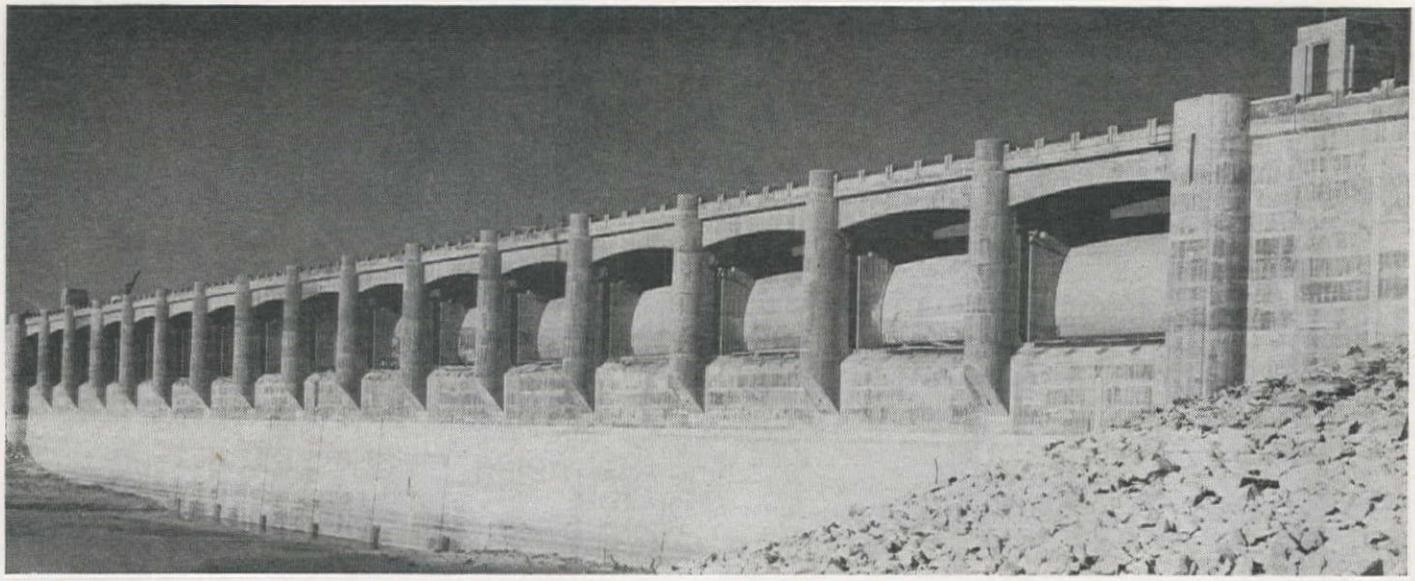
Comparing these results with those shown in the tabulation for quarter point loading as obtained from the chart, the results will be seen to be within a reasonable accuracy.

Utah Project Reported Unfavorably by Bureau

AN UNFAVORABLE REPORT on proposed construction of the Gooseberry project in San Pete Co., Utah, has been released by Assistant Secretary of the Interior, William E. Warne.

The plan called for construction of Mammoth Dam on Gooseberry Creek to impound 17,200 ac. ft. of water; 3 feeder canals 9.6 mi. in total length; a transmountain diversion tunnel 2.4 mi. long and a distribution canal 10.5 mi. long. The project plan would have made available 10,200 ac. ft. of middle and late season water for partial, supplemental irrigation of 21,800 acres of land now inadequately irrigated near Mt. Pleasant and Fairview, Utah.

Investigation of the project by the Bureau of Reclamation found it financially infeasible. Cost of constructing the project was estimated at $3,325,000, whereas the irrigation farmers on the project could repay $660,000, or only about 20 per cent of the cost, within the 40-year regular repayment period for Reclamation projects. In addition, necessary operation, maintenance and replacement expenses could not be met.



John Martin Dam—
Complete War-Delayed Construction

Combination flood control and irrigation structure on Arkansas River completed with installation of facilities omitted when all construction was stopped during the war—Taintor gates, gate piers, parapets, hoists, elevators, access road, and other items included in $1,302,640 contract

By A. E. NIEDERHOFF
Civil Engineer
Inyokern, Calif.

MORRISON-KNUDSEN Company, Inc. is now completing John Martin Dam (formerly Caddoa Dam) on the Arkansas River about 80 mi. below Pueblo, Colo. The dam, containing 7,000,000 cu. yd. of material, has a spillway section controlled by 16 Taintor gates, each gate 64 ft. long and 30 ft. high. Above the Taintor gates is a combined highway and crest gate operating bridge, 1,600 ft. long, which is open to the public and also permits access to gate piers, machinery, etc. The dam was under construction before and during the recent war but because of wartime shortages of steel the work was interrupted in 1943. Total cost of the project is $15,000,000 of which Morrison-Knudsen will receive $1,302,640 for their completion work. The U. S. Army District Engineer, Col. Henry F. Hannis, with offices at Albuquerque, New Mexico, is the contracting officer.

Completion work on the dam that remained to be done when construction was halted in 1943 consisted of placing 4,400 cu. yd. of reinforced concrete in 12 bridge spans totaling 888 ft. in length; construction of parapets for the entire length of 1,644 ft. of concrete dam; fabrication and installation of 16 Taintor gates; furnishing and installing servicing equipment, including a monorail hoist system extending the length of the 1,174 ft. of spillway section and terminating in storage chambers in the non-overflow sections of the dam. Additional items of work included an elevator inside the dam; stairs in pier houses; completion of installation of Taintor gate operating machinery; completion of spillway power and lighting system; completion of highway construction, including widening of an access road; construction of approximately 3 mi. of asphaltic roadmix surfacing and approximately 5½ mi. of guard rail.

Unit prices on the above work were higher than ordinary because of the isolation of the project from urban labor markets and from manufacturing centers. For instance, the price of concrete in place in the bridge amounted to $70.00 per cu. yd., while miscellaneous concrete in other parts of the structure cost $55.00 per cu. yd. Reinforcing steel, bent, and in place cost approximately $.09 per lb. Each Taintor gate, weighing 105 tons exclusive of operating machinery, cost $35,000. Even the electric elevator having a live load capacity of ½ ton, a speed of 150 ft. per min., and a travel distance of 103 ft. cost $23,600.

Steel Taintor gates

The Taintor gates being installed are believed to be the largest of their type yet erected. The moving portion of each gate weighs 145,400 lb., and the weight of trunnions, sills, seals and gate stop for each gate is 67,826 lb. Materials for the gates were fabricated by the American Bridge Company, at Ambridge, Pa., and were delivered to the site for assembly and erection. All assembly work, both shop and field, was performed by the electric weld method.

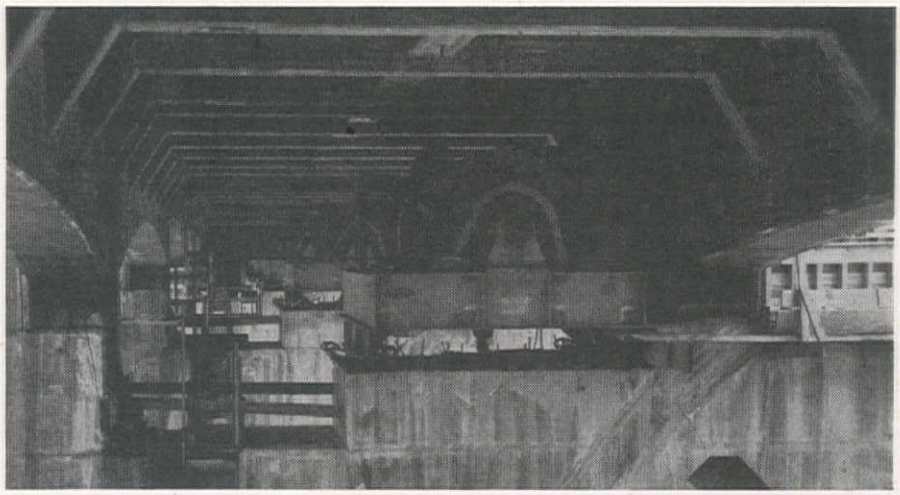
The framing of the Taintor gates was such that it lent itself easily to all welded construction of a comparatively light weight gate. The skin plate is supported on vertical but curved ribs which in turn are supported by an upper and a lower horizontal steel plate girder. These girders span the entire gate opening and are in turn supported by sector arms. A rigid connection is made between the horizontal girders and the sector arms. The sector arms transmit the water thrust to trunnion shafts anchored in the gate piers.

Side seals and spillway seals had been filled temporarily with sand and concrete before work was stopped in 1943. These plugs had to be removed and the recesses cleaned of all bituminous and other foreign material before the permanent metal seals were welded and grouted in place. Adjustment of the side seal angles and springs was made so as to provide uniform bearing on the side seal plates throughout the length of the seals. This adjustment was accomplished when the ambient temperature was between 65 and 75 deg. F. to prevent undue distortion and leaks. The spillway seal holders were carefully adjusted to bring the spillway seal to elevation 3840, to insure

even. continuous bearing of the Taintor gate seal plates throughout their length.

Trunnion shafts, castings, collars, etc. were already on the job when Morrison-Knudsen took over, so that considerable field work of fitting had to be done that ordinarily would be accomplished in the shop. The width of the thrust collars had to be determined in the field after erection of the Taintor gates and then dressed down to provide a snug fit between the trunnion shafts and the trunnion castings. The bushings were fitted to the trunnion shafts also after the shafts had been thoroughly cleaned with solvent of all protective grease and bituminous material placed on them in 1943. Prior to the tests and trials that were run, each trunnion bearing was thoroughly lubricated under pressure through permanent lubrication fittings.

After final erection, each gate was tested in the dry by raising and lowering it several times throughout its entire length of travel in order to demonstrate correct fitting of component parts and proper operation of the hoisting machinery. Before field painting, all joints and seals were water tested with a hose having a pressure of 30 p.s.i. at the nozzle. Because of the excellent workmanship and skill of the contractor on similar work there were very few adjustments that had to be made.



TAINTOR gate operating mechanism for John Martin spillway gates, and under side of the highway bridge spans atop the dam. Electric gate hoists are used throughout.

Taintor gate operating equipment

Each of the 16 Taintor gates were individually operated by electric motors driving through hoisting mechanism and lifting the gate by means of chains. The operating units were installed on the piers separating the gates and mounted just below the floor of the highway bridge. Each driving unit consisted of an electric motor, bevel gear speed reducer, and a brake. The hoisting units (two per each gate pier) consisted of a worm-gear speed reducer, spur gear reduction, bearings, shafts, sprocket, lifting chain and a structural steel base. Flexible couplings were used and great care was exercised to keep shafts in alignment and to provide for expansion and contraction.

A chain rack was installed for each hoisting unit in which the lifting chain was stacked when the gate was in the raised position. Since it was imperative that both ends of the 64-ft. gate be lifted simultaneously and evenly the lifting chain and attachments for each gate had to match in length within ¼ in. The length of chains was determined under a load of 15,000 lb. At shop assembly, all finished surfaces of the chains were cleaned and the connecting pins between links were coated with a chain lubricant. The remainder of the chain was also shop coated with a rust preventive compound.

Operating motors were totally inclosed, non-ventilated, high torque, high slip squirrel cage motors rated at 10 h.p. with a speed of 900 r.p.m. Motors were wound for the available current of 440-volts, 3-phase, 60-cycle.

Each hoist motor was provided with a reversing full-magnetic, full-voltage-starting type controller in a watertight case and remotely controlled from a push button station installed on the down stream parapet of the bridge.

Electrical brakes, floor mounted, were also enclosed in a watertight case. Limit switches were provided to prevent over-travel of the gate.

Tests and trials of the machinery included five complete raising and lowering operations without load and five more raising and lowerings after the lifting chains were attached to the gate.

LOWER GIRDER for one of the Taintor gates being placed by cranes. The two girders were first lowered into position, after which the pre-shaped skin plates were welded to them and the whole gate, including shafts, gears, collars, etc., fitted in place.

Spillway servicing equipment

Spillway servicing equipment included an electric monorail hoist and track having a lifting capacity of ten tons for raising or lowering crest bulkheads at a speed of 8 ft. per min., and having a horizontal travel speed of 250 ft. per min. in either direction. The hoist consisted of a wound rotor induction motor, electrical brake, mechanical load brake, speed reducer, drum and cables. The hoist frame is suspended from an I-beam track by one power trolley and one idler trolley. Two 5-ton hoisting blocks are suspended from the lifting cables. The operator's cage is weather proof and has a seating capacity of two men. A window is provided on each side of this steel cage so that the operator has an unobstructed view of the load and the hooks at all times.

Electrical equipment consists of a motor and electrically operated brake for the hoist, a 440-volt motor and electrically operated brake for the travel mechanism, control equipment, lights, current collectors, limit switches, wiring and connections. Reversing drum controllers enclosed in a watertight case similar to that described for the Taintor gates were provided for each motor. Three 250-watt flood lights were mounted on the hoist giving adequate illumination for night operation.

The monorail hoist contact rail system consisted of 3 aluminum rails supported on insulators with power connections to the power panel in one of the

pier houses. A supporting steel frame extended the entire length of the spillway section and into the bulkhead storage recesses in the non-overflow sections.

A structural steel lifting beam with four pick up hooks and two sheaves for lifting cables was furnished for handling the crest bulkheads. Also furnished by the contractor was a removable pivoted platform for servicing the Taintor gate drive shafts and bearings and miscellaneous metal ladders.

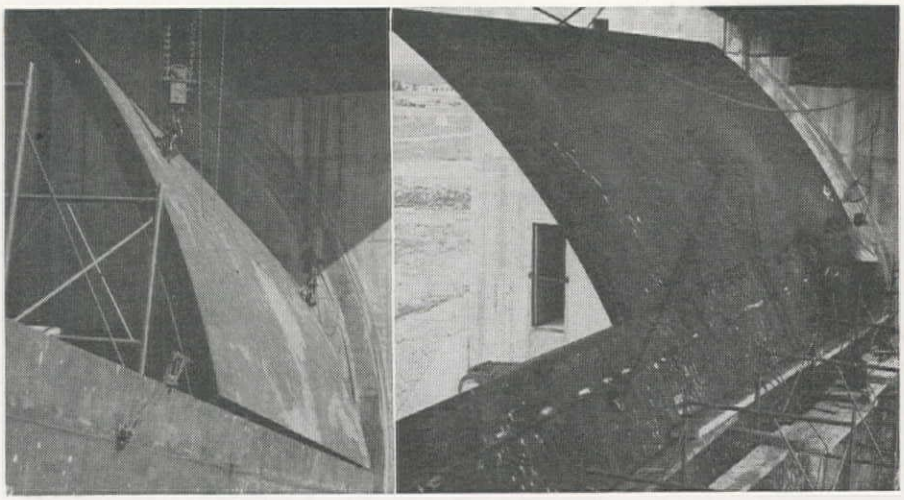
Elevator

The ½-ton capacity elevator in the north pier house was installed complete in a shaft provided for that purpose. Some cutting of existing beams, walls, and masonry was necessary for proper installation. The contractor furnished and installed the elevator car, guides, brackets, operating equipment, base, supporting beams, control and safety devices. The installation fully complies with the American Standard Safety Code for Elevators.

Lubricated guides for the car and counterweights consisted of planed steel tees, erected plumb and securely fastened with heavy steel brackets to the hoistway framing. The car frame consisted of riveted steel channels and angles enclosed in stretcher levelled steel of 14 gage for the wainscot and canopy panels. A bronze light fixture is provided inside the car. Two-speed, hollow metal doors complete with steel tracks, ballbearing hangers, and bronze groove threshold guides are provided. The car platform, made up of structural steel framework, supports a built up floor of sheet steel, double thickness of one inch hardwood flooring and a covering of battleship linoleum.

Sliding doors, two-speed, were provided at the three landings. The doors were hollow metal and provided a clear opening of 2 ft. 8 in. by 7 ft.

The elevator is equipped with a collective automatic control with push buttons in the car numbered to correspond with the several landings and with Up-Down push buttons at terminal landings. Interlocks prevent the opening of any door until the car has reached the respective landing zone. A self leveling device automatically brings the car to the proper elevation of the floor landings.



SKIN PLATE for the Taintor gates being lowered into place from bridge deck, left; section of plate being welded to upper girder by men on pipe scaffolding, right.

Completed dam

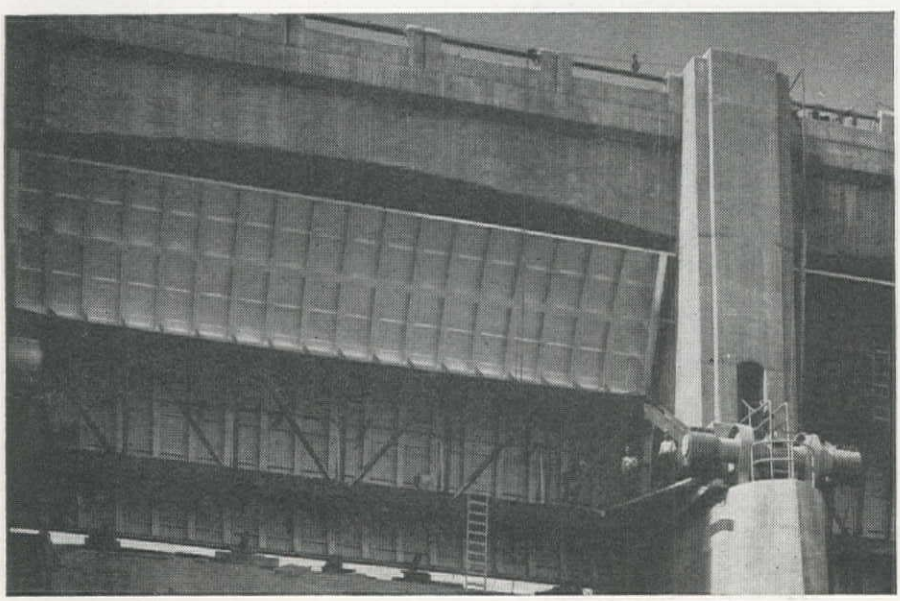
The dam consists of an earth fill structure 2,631 ft. long, a concrete section 1,644 ft. long and wing dams whose combined lengths total 14,000 ft. Its crest is 120 ft. above the valley floor. With a spillway crest at elevation 3840 the maximum water storage in the reservoir has been computed as 655,000 ac. ft. The concrete section of the dam is of gravity type with an ogee spillway section having spray walls, training walls and a stilling basin. The two non-overflow sections of the concrete dam flanking the spillway are each 235 ft. in length.

The reservoir formed by the impounded water will be 14.2 miles long with an average width of about 1.9 miles at maximum flood control level when storage capacity will be 683,260 acre-feet, and surface area will be 18,380 acres. The top 281,000 acre-feet of capacity between reservoir elevations 3851 and 3870, will be reserved for flood control, and the entire storage capacity of 402,000 acre-feet below elevation 3851 will be utilized for storage of irrigation water.

The concrete dam is provided with four 6 x 7½-ft. rectangular sluicing conduits and two 4 x 4-ft. regulating conduits, each controlled by two hydraulically operated slide gates in tandem. The discharge capacity of the conduits is 13,800 sec. ft. with the reservoir at maximum flood control pool. The discharge capacity of the overflow spillway section with Taintor gates open and reservoir at maximum elevation, is 639,000 sec. ft.

The project is designed to store water so as to control the outflow from the reservoir for any flood of record to not more than 10,000 cu. ft. per sec. at the dam. Water stored in the reservoir for irrigation will be released in a regulated flow to the areas which formerly were dependent upon the erratic natural stream flow. In addition, recreational development of the project will provide recreational facilities which will attract and be of benefit to inhabitants of a large area.

COMPLETED Taintor gate in place after field fabrication and connection to operating mechanism, as seen from downstream face of dam. Job is virtually complete now.



Explosion, Fire Wreck New Wyoming Gas Line

A SPECTACULAR BLAZE resulted when nearly 7,000,000 cu. ft. of natural gas went up in flames following explosion of the storage line of the Colorado-Wyoming Gas Co. two miles southwest of Cheyenne on Dec. 14. A 75-ft. section of newly installed 16-in. pipe was ripped and twisted by the blast.

The explosion took place at a point where the 16-in. pipe joins to a smaller 8-in. line which connects the company's reserve gas supply with the city's line. The gas company had been running pressure tests on the line for several days previous to the blast. Estimated pressure at the time of the explosion was 1,000 psi. The company had planned a maximum test of 1,050 psi. in preparation for maintaining a normal pressure of 900.

Montana Snow Facilities Expanded

Advance preparation found to be best way to meet highway snow menace in Montana — New housing for employees in key danger areas and added equipment will help in speeding removal of wind-blown drifts during the current winter

By RAY PERCY
Maintenance Engineer
Montana Highway Department
Helena, Montana

WINTER CAN break loose almost anytime after Labor Day in the mountain area of the West. The Montana Highway Department learned this fact years ago. To be in position to combat any condition that may swiftly develop, snow plows in Montana are placed in readiness and sanding material is stockpiled in all areas likely to be hit early in the season.

Snow removal operations are carried on continuously until a storm subsides and the road is placed in the best condition possible for travel. The worst snow areas in Montana are high barren sections where the wind can move a few inches of snow and cause more trouble than two feet of snow can in heavily timbered sections where the roadway is protected from the wind. Sanding operations are almost a continuous operation in some areas where wind conditions create ground storms by constantly moving snow across the road surface. Here, if the snow is allowed to settle, it would soon develop into ice.

Facilities at critical points

In the past years, snow removal in many of the critical sections has been badly handicapped due to lack of housing. This condition became increasingly difficult due to the difficulty of retaining personnel in isolated sections. The only means of solving this problem was to construct headquarters consisting of living quarters and garages at the critical points.

During the past season, the Highway Department constructed a sectionman's dwelling, a bunkhouse and a five-stall garage at Summit on U. S. Highway No. 2, 15 mi. west of Glacier Station. These same facilities were also constructed at Duck Creek, 8 mi. north of West Yellowstone. Constructed as well were a six-stall garage at White Sulphur Springs and Browning; a two-stall garage and living quarters on the Bozeman Hill between Bozeman and Livingston on U. S. No. 10; the same facilities on U. S. No. 191, 47 mi. south of Bozeman; a three-stall garage at Dupuyer on U. S. No. 89; and two-stall garages at Cascade on U. S. No. 91, at Townsend on U. S. No. 10 North and at Fairfield on U. S. No. 89.

These new installations, in addition to the existing headquarters, fairly well cover the bad snow areas of the state. The existing installations consisted of living quarters and garages at Boulder Hill, Kings Hill, Deep Creek, Monida and Saltese.

MONTANA Highway Department maintains twelve "Snogo" rotary-type snow plows for removal of drifts on important highways of the state. Shown in the photos below and at the top of the page is one of these machines in action on U. S. Highway 2, in vicinity of Browning. Light and Heavy V-plows are also used.

Equipment

A total of 201 light snow plows, 71 heavy V-plows with wings, and 12 rotary-type snow plows are ready to take to the road on short notice. Ninety-four sanding trucks are constantly ready for an emergency. These units are scattered through the ten districts of the State but are subject to transfer in the event of an emergency.

A force of four to eight men are assigned to the mountain passes. Their equipment generally consists of two light plows, one heavy V-plow, and sanding trucks. A rotary-type plow is stationed at strategic points where it would be accessible to any location on short notice.

The worst section is normally in Northwestern Montana in the Browning area where snow-fall is generally heavy and wind conditions are bad. With new housing facilities constructed at this point during the past season and with added equipment assigned to this location, the situation should be far better controlled than it has been previously.

San Diego Honors Builders of Its New Aqueduct From Colorado River

Water delivered to terminal reservoir at San Vicente Dam on Dec. 11 — Aqueduct designed by Bureau of Reclamation, constructed by Navy and will be operated by San Diego County Water Authority—Colorful ceremonies honor civic leaders and engineers responsible

IN COLORFUL day-long festivities, San Diego celebrated completion of its Colorado River aqueduct on Dec. 11. The civic holiday culminated a construction program which has been under way for more than two years, and a quest for water that has gone on unceasingly since the Franciscan Friars constructed the first stone dam on the San Diego River and a primitive irrigation ditch to irrigate the mission farms in 1769.

In the intervening years, the city of San Diego has purchased or built a system of reservoirs and pipe lines in the mountain watersheds to the east of the city which has resulted in the complete utilization of every drop of water produced there. In spite of this comprehensive and well-planned water development program, the wartime expansion of the city, due to the vast Naval establishments on its bay and numerous busy war industries, coming during a drought cycle, has not only used water to the limit of the system's productivity, but has lowered reserves in the reservoirs to critical levels. With the cessation of hostilities, the demand has reduced only slightly, and with the continuation of the drought, no improvement has been noted in this situation.

The system, including Morena, Barrett, Lower Otay, El Capitan, Cuyamaca, Henshaw, and Hodges Reservoirs, was capable of producing a safe yield of 26.6 mgd., considered adequate to serve a population of 202,000, which was the anticipated size of the city in 1940. San Vicente Reservoir (See *Western Construction News*, Nov., 1943), completed in 1943, was expected to add another 5.3 mgd. to the annual safe yield, which would be sufficient to serve an estimated 1950 population of 260,000.

Population growth

However, with the start of the war in 1939, population took an unprecedented jump forward, and had by 1942 surpassed the anticipated 1950 figure, and by 1946 had reached 362,000, exclusive of the tremendous military personnel. Water deliveries of 23.9 mgd. in 1941 shot up to 49.6 mgd. in 1946, and have only receded to 44.8 mgd. in 1947.

Obviously, it was an urgent necessity that additional supplies be developed. For a long time, the city's water department had been considering the Colorado River as a source for additional supply, to be developed in its ultimate plan, many years in the future. With that long distance consideration in view, the city had in 1926 filed for 155 sec. ft. of Colorado River water.

When the situation became so critical during the war, the Navy Department instigated investigations and set up emergency funds to construct a Colorado River Aqueduct to the city, in order to protect its operations in the area. Surveys and designs for the project were made by the Bureau of Reclamation, with R. B. (Dick) Ward, construction engineer in charge. His office studied two alternate routes for the conduit. One would connect to the aqueduct of the Metropolitan Water District of Southern California at the west portal of the San Jacinto Tunnel, and flow by gravity 71.1 mi. to the new San Vicente Reservoir of the San Diego system. The other proposal was to connect with the All-American canal in Imperial Valley, and by means of a pump lift, bring the water over the mountains. Because of the time element and construction economies, the first route was adopted, and the first construction contracts were let on May 18, 1945.

Authority organization

In order to take over financing, ownership and operation of the aqueduct after its completion by the Navy, a San Diego County Water Authority was organized on June 9, 1944, including other cities and agricultural areas in the county, as well as the city of San Diego. The city's Colorado River water rights were transferred to the Authority, and the whole area of the Authority was annexed to the Metropolitan Water District of Southern California, in order to share in the use of the District's aqueduct from Parker Dam to the San Jacinto Tunnel.

Under the terms of the merger with the Metropolitan District, the water rights of San Diego city and county were merged with those of the District; the Authority is to pay a special tax equal to the amount that would have been paid had the Authority been a member since the District was formed (to be paid over a 30-yr. period); the District will assume title to the northern half of the San Diego Aqueduct, and pay half of the construction cost.

It was the conclusion of this long and complicated series of events which the city celebrated on Dec. 11 with an outdoor luncheon at San Vicente Dam, honoring the engineers and construction men who had carried the aqueduct to its completion, and a dinner in a downtown hotel to honor the Authority directors and other civic leaders who had contributed through the years to the water development of the city.

At the luncheon, the keys to the physical properties of the aqueduct were turned over to J. L. Burkholder, general manager and chief engineer of the Authority, by Capt. Alden K. Fogg, (CEC) USN, under whose direction it was constructed. After the luncheon, those in attendance were taken in Navy crash boats on the lake behind San Vicente Dam to the outlet of the aqueduct tunnel, where Colorado River water was cascading into the reservoir at a rate of about 85 cu. ft. per sec.

At the dinner, addresses were made by Fred Heilbron, Chairman of the County Water Authority, E. A. Moritz, Regional Director of the Bureau of Reclamation at Boulder City, and Rear Admiral John J. Manning, Chief of the Navy's Bureau of Yards and Docks.

CAPT. ALDEN K. FOGG, right, Public Works Officer of Eleventh Naval District, under whose direction aqueduct was built, turns keys over to J. L. BURKHOLDER, General Manager of County Water Authority at outdoor luncheon ceremonies at San Vicente Dam.

Design and construction

The design and construction of the San Diego Aqueduct (discussed in *Western Construction News*, April, 1945; April and July, 1946; and May, 1947)

includes about 2 mi. of 96-in. concrete pipeline from the junction with the Metropolitan Aqueduct at the San Jacinto Tunnel, to an 1,800-ac. ft. regulating reservoir. From this basin, the line runs 69 mi. to San Vicente Reservoir through seven tunnels, totaling 4.4 mi. in length, and finished to an inside diameter of 6 ft., horseshoe section; and the balance in reinforced concrete pipe, 12.4 mi. of which is 72 in. in diameter, 21.7 mi. of 54-in. diameter, and 29.9 mi. of 48-in. diameter.

The tunnels and those sections of the pipeline in inaccessible terrain have been built to full ultimate capacity of 100 mgd., while the remainder is of sufficient size to convey but 50 mgd., with the remainder to be completed to ultimate size when demand indicates further need. About 10.3 mi. of the double-size line is presently completed, with the stub ends bulkheaded, pending the final construction.

Total cost of the new San Diego Aqueduct as completed is approximately $14,300,000, considerably under the original estimate of $17,000,000. Not included in this figure is about $2,000,000 for construction of 33 mi. of additional pipeline in the Oceanside-Fallbrook, and the La Mesa-Sweetwater extensions.

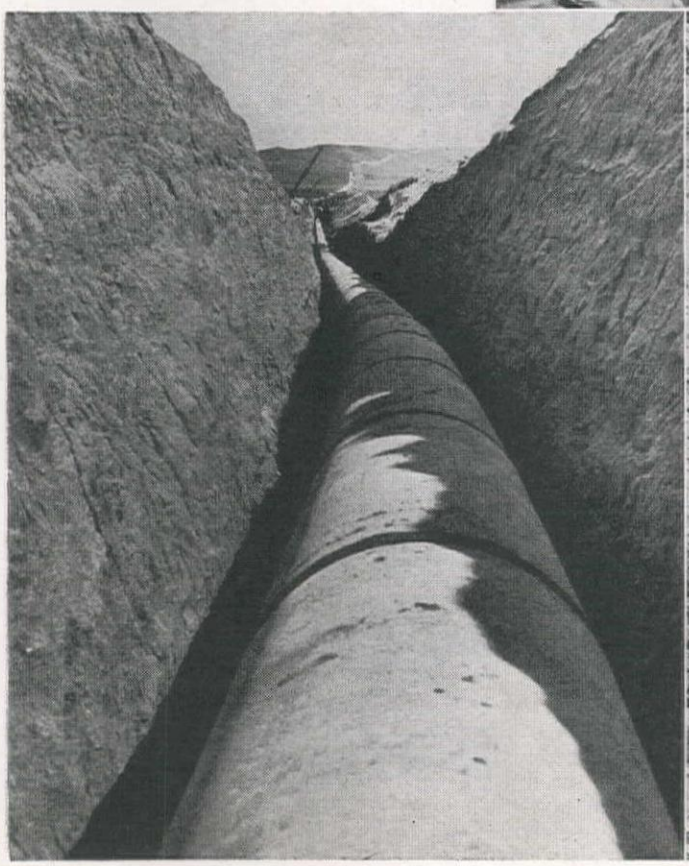
Additional extensions

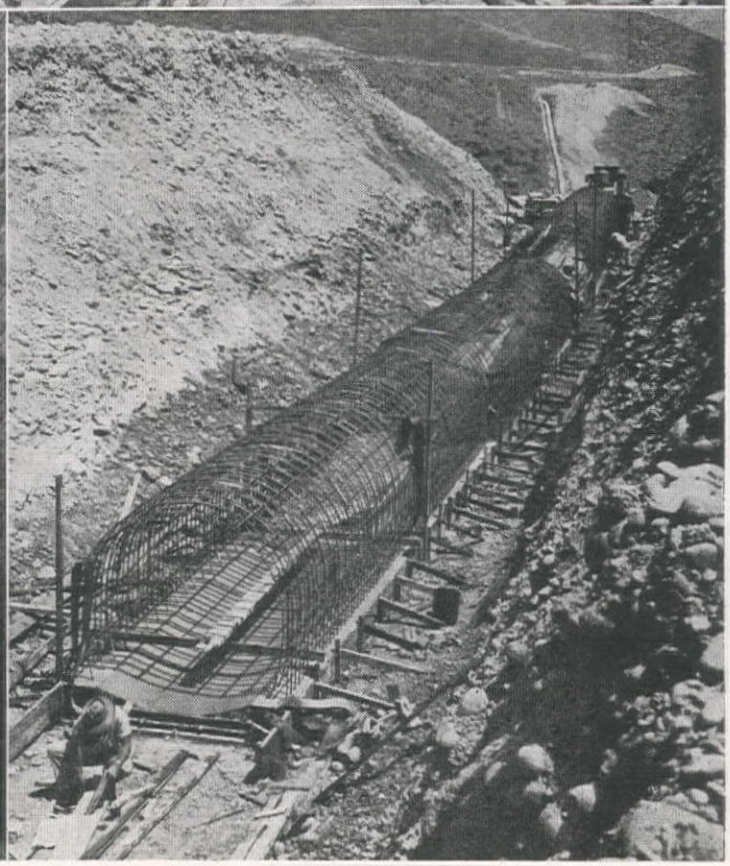
The Oceanside-Fallbrook line will be completed about Aug. 1, 1948, and will leave the aqueduct east of Fallbrook, and will deliver 5.2 mgd. to the two districts. It will be carried in 16-in. pipe as far as Fallbrook, and 14-in. pipe to Oceanside Wells. The total cost of the extension will approximate $700,000.

The 16½-mi. La Mesa-Sweetwater extension will flow from San Vicente Reservoir to Sweetwater Reservoir where, through arrangements with the California Water & Telephone Co., owners, it will be stored for the benefit of the municipalities of National City and Chula Vista. Enroute to Sweetwater, the Lakeside Irrigation District and the La Mesa, Lemongrove and Spring Valley Irrigation Districts will withdraw water. The line will start at San Vicente Dam as 39-in. pipe, but as water is withdrawn, will taper to 18 in. at Sweetwater. Estimated construction cost of this extension is $1,300,000, and it is believed it will be completed about April 1.

Principal personnel

Engineers and construction men who have played vitally important roles in San Diego's quest for water include J. L. Burkholder, general manager and chief engineer of the San Diego County Water Authority; Julian Hinds, general manager and chief engineer, and





CONSTRUCTION views taken during building of San Diego Aqueduct. Top, outlet portal of San Vicente tunnel, with unreinforced concrete arch lining; below, 48-in. concrete pipe in deep cut on southern end of the line; lower right, cast-in-place section at Firehill tunnel.

HONORED GUESTS at the civic dinner (top) included, l. to r.: San Diego's Mayor HARLEY KNOX; E. A. MORITZ, Bureau of Reclamation; ADM. J. J. MANNING, Chief of the Navy Bureau of Yards & Docks; EWART W. GOODWIN, Colorado River Association. At the luncheon, engineers honored included, l. to r.: CAPT. A. K. FOGG; J. L. BURKHOLDER; FRED RHODES, City Manager; G. E. ARNOLD, City Water Director; and COMDR. R. D. THORSON, resident engineer in charge of construction.

Franklin Thomas, vice-chairman of the Board of Directors, of the Metropolitan Water District of Southern California; Walter Cooper, late city manager of the city of San Diego, and Fred A. Rhodes, present city manager and former director of public works; G. E. Arnold, city water director; Fred D. Pyle, the city's hydraulic engineer and Paul Bierman, his assistant.

In charge of actual construction were E. A. Moritz, regional director of the Bureau of Reclamation; R. B. Ward, construction engineer for the Bureau and R. E. Burnett, his successor; Capt. Alden K. Fogg, Public Works Officer of the 11th Naval District; and Comdr. R. D. Thorson, resident engineer for the Navy.

Contractors included Guy F. Atkinson Co., S. A. Healey Co., Haddock-Engineers, Ltd., Concrete Pipe Constructors, United Concrete Pipe Corp., J. S. Barrett Co., M. F. Kemper Construction Co., and Grafe-Callahan Construction Co.

Western Construction News congratulates San Diego County on the successful conclusion of its long quest for water. The great aqueduct is a fitting monument to the thousands of engineers, construction men, and citizens who have searched so long, planned so diligently, and accomplished so magnificently.

Contractor Liable If Use of Unfinished Road Permitted

A DECISION handed down recently by the Nebraska Supreme Court illustrates the fact that contractors who permit use of highways which they are constructing by nearby residents are not relieved of responsibility. The decision followed an appeal by a farmer whose combine, being towed by a tractor over a stretch of road under construction, was struck and damaged by the contractor's roller. The farmer claimed damages. His claim was allowed when the court upheld the trial jury's view that the contractor's employee was at fault in the accident.

The rule of law applied in this case was: "Where a highway under construction or repair is being used permissively in a limited manner by adjacent residents, it must be kept and maintained by the contractor in a reasonably safe condition for the use of those driving thereon, who are at the same time required to exercise reasonable care under the peculiar circumstances and conditions confronting them by keeping a constant lookout and vigilant caution for obstructions incident to the progress and completion of the work."

This indicates that the contractor is required to permit nearby residents to use the road and that users do not always move along such highways at their own risk.

Bureau of Reclamation Attacked Twice in Idaho

TWO ATTACKS have been made upon the Bureau of Reclamation in Idaho recently, one coming from the city of Burley, which rejected a Bureau proposal for a 10-year electric power contract as a "squeeze play" move, and the other from Snake River water-users protesting the Bureau's failure to make a fiscal year 1949 request for funds for the proposed Palisades Dam.

Burley, through its city attorney, Kales E. Lowe, contends that the Bureau, which was requested to offer a new contract to replace one providing a maximum power load insufficient to meet the community's needs, has proposed an agreement which would supposedly save the city $17,000 yearly, based on 1946 consumption, but would work privation on Burley Irrigation District water-users, who share to the extent of 95.6 per cent in the profits.

Furthermore, Lowe asserts, no provision is made for "dump" power for space heating needs, one of the city's requirements covered by the present contract, which would normally run until 1952.

The city's attitude, Lowe said, is reflected in the fact that preliminary arrangements have already been made with Idaho Power Co., a privately owned utility, for power for space-heating if the necessary energy cannot be obtained from the Minidoka Project through the Bureau.

Burley officials also declare that the $17,000 "saving" is not real, inasmuch as the Bureau proposal calls for the reflection of this in the resale rates charged by the city. Thus, they contend, neither the irrigation district nor the city will benefit.

Lowe also asserts that the maximum amount of current which the Bureau proposes to allow the city, 5,000 kw., will not meet future needs if the city continues to grow during the next decade.

The water-users' complaint, voiced when the Bureau's failure to make the Palisades Dam appropriation request was brought up at an Idaho Falls meeting by Sen. Henry Dworshak (R.), stems from the Bureau's contention that allocation questions must be settled before the project can be launched. Canal companies which at present lease American Falls reservoir water, demand to buy it from the government, whereas the Bureau hopes to apportion part of it for use in reclaiming new land.

Portrait of a Successful Son

George Atkinson, active head of one of the nation's largest construction companies, and president of Northern California chapter of Associated General Contractors, is the fifth generation of a well-known construction family in California, Pennsylvania and England

By BETTY THOMPSON
San Francisco, Calif.

GEO. H. ATKINSON, president and general manager of Guy F. Atkinson Company, San Francisco, is one of the few sons ever to follow successfully in the footsteps of a highly successful father. Contrary to widespread belief, this is anything but an easy task. First, the son must convince those he deals with that he does not hold his job because of his name or his connections. Then, he must work doubly hard to prove himself able to follow in his father's footsteps and gradually to assume his share of the responsibilities. The brilliance with which George Atkinson has accomplished both of these feats is unmistakable proof of his ability.

He was born April 10, 1905, at Colorado Springs, Colo.—the fifth generation of what practically amounts to a construction dynasty. His grandfather and great-grandfather were contractors in Pennsylvania, and his great-great-grandfather followed the same profession in Yorkshire, England; while at the time of George's birth his father, Guy F. Atkinson, was well-started on his own outstanding career in the game.

Grew up in the field

Young George grew up in the field and in 1916, at the ripe old age of eleven, took on his first job—that of running the commissary during the summer on the Grapevine Highway project near Bakersfield, Calif. From 1921, he worked regularly during school vacations at everything from driving trucks to learning office routine.

In 1926, he graduated from Stanford University with an A.B. degree in Economics and a Phi Beta Kappa key. In July of the same year he married Mildred M. McKillican, and in August started business with his father, as a partner in the Guy F. Atkinson Co.

A partnership at the age of twenty-one undoubtedly drew comments of "pretty soft" from the envious — but there was more to it than met the eye. Guy F. was not the sort of man to indulge his son. He had sufficient respect for George's ability to let him shoulder the responsibilities of his position, but there was no salary to go with it. If a job made a profit, George had his share. If it didn't, the newly married Atkinsons were in for a spell of austerity living—and this happened more than once. They were good times, nonetheless, and George occasionally looks back rather wistfully to the days when he ran one job at first hand rather than a dozen or so by remote control.

He remained a partner until 1934, when the company was incorporated and he became vice-president. In 1938 he became general manager of the company, and in 1943 was named president as well. His father is still chairman of the board, retaining an active interest and voice in operations of the organization that bears his name.

At Grand Coulee, George Atkinson was general manager for Mason-Walsh-Atkinson-Kier Co. on the original $40,000,000 contract for construction of the low section of the dam. As general manager of the Guy F. Atkinson Co. he has had general supervision over the construction of Denison Dam in Texas, and of the Hansen Flood Control Dam near Los Angeles, the world's two highest rolled type earth filled dams, as well as Mud Mountain Dam, the world's highest earth and rock filled dam. During World War II, the Guy F. Atkinson Co. performed much of the Army building construction program in the Aleutians, and in a joint venture completed the Roosevelt Navy Base at Long Beach, Calif., plus work on the Hanford atomic plant and other important war projects. In conjunction with the Willamette Iron and Steel Corp., they built many millions of dollars worth of ships for the Navy.

Imaginative ideas

When George Atkinson joined the company he brought with him a host of new ideas that met with varying receptions from his father. Although the two men have always worked well and closely together, their outlooks are somewhat dissimilar. Guy F. is a genial, uninhibited contractor of the old school with a rather orthodox approach to a new job. George is personally more reserved. He has what amounts to a genius for administrative organization and a fingertip knowledge of all the latest developments in machinery and techniques, plus the imagination to use this knowledge in devising new working methods. For example, the Atkinson bid on Hansen Dam was low by several hundred thousand dollars, largely because George foresaw the potentialities of the newly developed Tournapull, a tractor with wheels.

GEORGE H. ATKINSON

Naturally, the opposing viewpoints of father and son sometimes resulted in clashes of opinion, but since the two were always frank in presenting their views, any conflict was out in the open and once settled, immediately forgotten. This frankness, however, was sometimes a bit difficult for an outsider to understand. One evening a newly hired general superintendent sat in on the preliminary discussions regarding bids for a project coming up. When he finally got home he said to his wife, "Well, it would have been a wonderful job—but the partnership broke up tonight!" He was amazed, the next day, to discover everything going along as usual.

Dam "Big Top"

Although Grand Coulee ranks with the biggest of the jobs with which George Atkinson has been associated, the construction of Mud Mountain Dam at Enumclaw, Wash., is remembered as presenting an extremely difficult problem that was solved most ingeniously. The dam was to be built across a canyon 90 ft. wide at the bottom, 150 ft. wide at the top, and 600 ft. deep. The rock walls rose 230 ft. vertically, and the dam was to be 425 ft. high. "It was," says George, "like working between skyscrapers."

With the project fairly well under way, it was discovered that the borrow pit material intended to be used for the main earth fill wouldn't pack on account of excess moisture, complicated of course by the consistently wet climate. George gives credit to his father for the idea that saved the day, but it was he who had to sell his job organization on the belief that it would work, with the result that the old circus phrase, "under the big top" took on a new meaning.

The Atkinsons ordered the world's largest tent, especially designed to be suspended from highlines, and to fit the contour of the canyon walls at each of three elevations. Once the tent was installed, the wet material which had been processed in a special drying plant, was placed under the cover of the tent and work proceeded on a twenty-four hour schedule to a successful conclusion.

Some more big jobs

The latest Atkinson job to present a problem is the Los Angeles ocean out-

fall sewer at El Segundo, Calif. It is being laid in sections of pipe 100 ft. long and 12 ft. in diameter, each section weighing 500 tons. These have to be specially cast, launched, and towed 20 mi. up the coast, sunk in correct position, and rested on foundations on the bottom—being fitted within a quarter of an inch. When this was first attempted the placing cables broke under the impact of the waves and the surge of the ocean. The solution was found in flooding the sections and then setting them into final position under water.

Recently, the Atkinson Company has been a joint venturer in the construction of military housing at Okinawa, and under the Truman Aid plan, it is one of three companies resurfacing and making usable all the highways, airports, and railroads in Greece. They are actively engaged on the first contract for McNary Dam, and on the large Mills Field Airport at San Francisco. In both of these jobs, another of George Atkinson's firm convictions is paying off. That is his belief in the importance of always maintaining a permanent corps of key personnel rather than having to round them up for each new project. He feels that once you get a good job manager, you should keep him with you by providing him with steady work.

Fair with employees

Atkinson is noted for his exceptional fairness in dealing with his employees as well as his interest in their welfare. It was he who initiated the company's bonus system, in which neither of the Atkinsons nor the other directors may participate. Shortly after the war ended, one of the superintendents decided to go into business on his own. When he submitted his resignation, Atkinson said, "Well—you'd have had a bonus of—(stating the amount) if you had worked until the end of the year—so here's a check for two-thirds of it, covering the time you were with us." The man, incidentally, is now back with the company.

No one on the Atkinson payroll works harder than the president. A three-telephone man, he talks daily with the superintendent of almost every job in progress except those in Greece and Okinawa where he must rely upon cables. His time is so closely scheduled that appointments are kept on the fly, literally as well as figuratively, for during a recent twenty-eight hour period he had conferences in San Francisco, New York, Chicago and back in San Francisco again. Hard as he drives himself, however, he never loses his sense of proportion. Not long ago the company missed out on a job in which he was particularly interested, and in which long hours had gone into preparation of the bid. Fifteen minutes after the disappointing news came through, one of the staff walked into his office and said, "It sure is too bad about that job." Atkinson looked up in honest perplexity. "Which job?" he asked. It already had been erased from his mind.

Some relaxation

George Atkinson plays a bit of golf and volleyball for relaxation, generally with his family, and busy as he is takes time out each year to act as a delegate to the Annual Conference of the Methodist Church. He is following the path of his father, who in 1939 was national president of the Associated General Contractors, for George is now both president of the Northern California Chapter of A.G.C. at San Francisco, and is the chairman of the Heavy and Railroad Division of the national organization. He has four children and the eldest, Duane, has just made him a very youthful grandfather. It's a bit early to tell which of his three sons is going to carry on the contracting tradition for the sixth generation, but it's a pretty sure bet that the Guy F. Atkinson Co. will operate under Atkinson leadership for considerable time to come.

Funds Advanced for Construction of Rural Electrification Facilities

RURAL ELECTRIFICATION Administration has approved loans to numerous Western power agencies in recent weeks. The loans provide funds for purchase, construction, or installation of generating facilities, transmission or distribution lines and general system improvements to serve farms and other rural establishments. Contracts will be let as soon as materials become available to the various projects.

Arizona

To Graham County Electric Cooperative, Pima, $222,000 for purchase and installation of a 1,000 kw. generating unit, and completion of previously approved construction; to Duncan Valley Electric Cooperative, Inc., Duncan, $430,000 for the purchase of 20 mi. of existing facilities and two 150 kw. generating units, also construction of 100 mi. of new line.

Kansas

To Victory Electric Coop., Inc., Dodge City, $272,000 for construction of 236 mi. of distribution lines; to Northwest Electric Coop. Assn., Inc., Bird City, $310,000 for 145 mi. of new lines and completion of previously approved construction.

Montana

To Marias River Electric Coop., Shelby, $100,000 for system improvements.

New Mexico

To Columbus Electric Coop., Columbus, $150,000 to construct 70 mi. of line; to Continental Divide Electric Coop., Inc., Gallup, $280,000 for 196 mi. of new lines.

Texas

To Cook County Electric Coop. Assn., Muenster, $300,000 for 209 mi. of line; to Comanche Electric Coop. Assn., Comanche, $340,000 for 297 mi. of line and completion of previously approved work; to Hall County Electric Coop., Memphis, $150,000 for 128 mi. of line; to Kimble Electric Coop., Junction, $55,000 for general system improvements; and to Erath County Electric Coop. Assn., Stephenville, $390,000 for construction of 310 mi. of new lines.

Utah

To Dixie Rural Electric Assn., St. George, $20,000 for 4 mi. of new line and completion of earlier work.

Washington

To Public Utility District No. 1, Okanogan, $400,000 for construction of 219 mi. of line.

Wyoming

Garland Light & Power Co., Powell, $83,000 for system improvements and 30 mi. of line; to Riverton Valley Electric Assn., Riverton, $167,000 for system improvements and 99 mi. of line.

November Construction At New Higher Level

NEW CONSTRUCTION put in place during November 1947 is estimated at $1,253 million, a less than seasonal drop of 5 per cent from the revised October figure, and a gain of 27 per cent over November 1946, the Construction Division, Department of Commerce, has announced.

Total new construction during the first 11 months of 1947 is estimated at $11,613 million, a gain of 29 per cent over the corresponding period last year.

New private construction in November, estimated at $963 million, as against the revised October figure of $977 million, showed a far less than seasonal drop of 1 per cent. Of this total, private residential construction (exclusive of farm) was $525 million, a contra-seasonal gain of 2 per cent over October. November private non-residential building is valued at $290 million, also a contra-seasonal increase of 3 per cent above October.

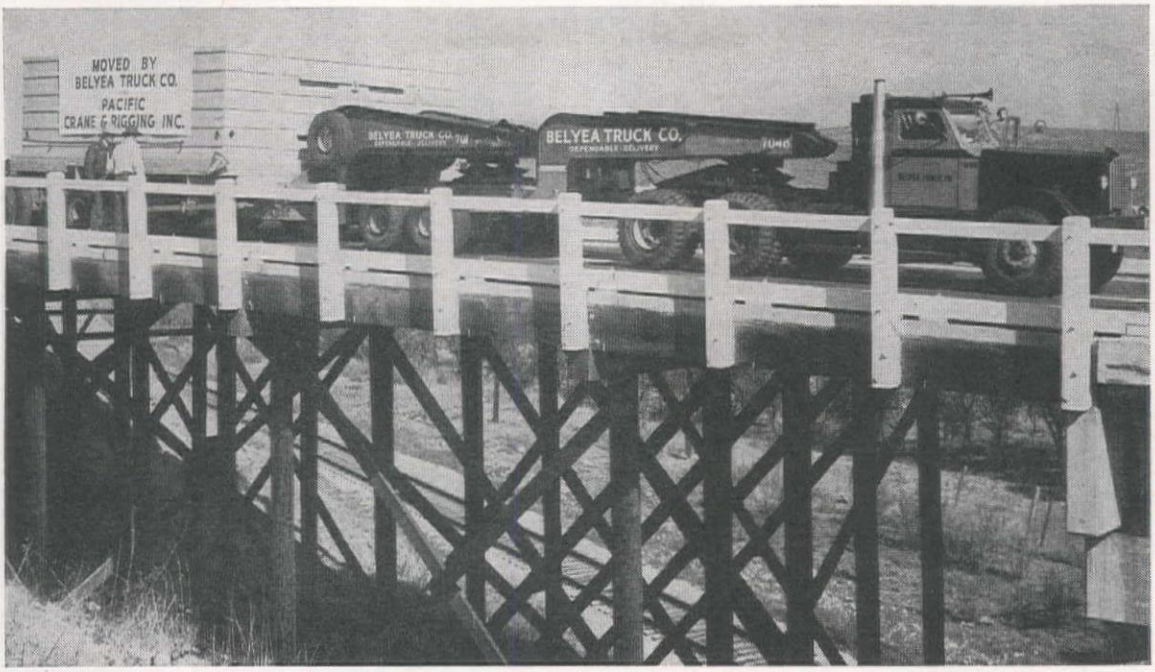
Privately financed public utility construction in November totalled $121 million, a drop of 5 per cent from October.

In public construction, revised figures show a notable contra-seasonal increase in October over September, and a less than seasonal drop from the latter month in November. New public construction in November, estimated at $290 million, was 15 per cent below the revised October figure. Public residential construction in November, at $7 million, was $3 million off from the previous month, and public non-residential building totalling $51 million was only $1 million below October.

Public highway construction in November amounted to $130 million, 19 per cent below October.

New conservation and development construction in November is estimated at $37 million, $8 million less than in October.

Truck Delivers Huge Palomar Mirror



CRUCIAL STRUCTURE enroute to Palomar Mt. was the Galivan Overhead, timber stringer approach and concrete piling bridge near San Juan Capistrano. To minimize chances of disaster, effective weight distribution was needed.

Truck-trailer transport was only possible means for moving 40-ton reflector from Pasadena to summit of Palomar Mt. near San Diego—Total of 58 tires supporting load distributed gross weight so that timber stringer bridge crossing was accomplished without a visible tremor

THE 200-IN. mirror for what will be the largest reflecting telescope in the world, has after years of polishing and other years of delay due to the war, finally reached the observatory on the top of Mt. Palomar, near San Diego, Calif., where it will become a part of the great astronomical instrument.

Truck-trailer transport was the only possible means for moving the 200-in. mirror from the California Institute of Technology at Pasadena, where grinding and polishing have been underway for over ten years, to the summit of Palomar Mountain.

The distance was 160 mi. It would be necessary for the transporting units to move over city streets, state highways, country roads and mountain grades. The highways could be selected so there would be no risk of damage to them, because of the width and weight of the vehicles and load but what about the numerous bridges en route? Would they take it?

Bridge inspections

Decision rested with the Division of Highways' bridge department of the California Department of Public Works. Scouting trips were made over the route and all structures were inspected carefully. The verdict was that extra precautions would have to be taken before attempting to cross the Galivan Overhead, "Bridge 55-04," located on Highway 101, near San Juan Capistrano.

Bridge 55-04 consists of a timber stringer approach and concrete piling structure over railroad tracks. The timber spans are 19 ft. long and the second from the north was declared the possible source of trouble.

The problem was: How to minimize chances for disaster when the timber stringer bridge was subjected to a gross weight of approximately 72 tons? The weights would consist of a 6-wheel truck tractor, a "jeep" trailer with eight wheels, a primary trailer with eight wheels and the "payload" of 40 tons. The payload had an intrinsic value of $600,000 and inestimable worth as it might be irreplaceable.

Conferences between state highway bridge engineers, engineers representing California Institute of Technology, sponsors of the entire project, the Belyea Truck Company to which the hauling job was entrusted and the Fruehauf Trailer Company, manufacturers of the trailers to be used, resulted in the decision that the best safeguard lay in getting additional wheels under the load carrying the trailer at the time of the crossing.

Additional bearing wheels

The conferees agreed that, difficult as the job might be to accomplish, it could be done. This is how it was done; Two 4-wheel dollies with eight tires were constructed in advance. When the caravan reached a point ahead of the bridge crossing, the trailer carrying the mirror was elevated with jacks. One dolly was inserted on each side and attached by bolts to an I-beam "outrigger" that had been welded to the trailer frame.

With the dollies in place, there were 32 tires under the trailer, 16 under the jeep and 10 under the tractor, a total of 58 tires supporting the gross load. The out-to-out width of rubber was 24 ft. 9 in.

Crossing the bridge was accomplished without a visible tremor.

Prior to the load being placed on the structure, R. G. Wagner, associate bridge engineer for the state had placed strain gauges beneath the bridge to measure span deflection, if any. They indicated a depression of one-quarter inch for the center span and 5/32 in. at the second span from the north, regarded as the crucial point. In other words, the timber stringer bridge took 72 tons at about 4 m.p.h. and gave but a fractional part of an inch.

Spreading the load

Eye witness engineers said this demonstration proved conclusively that, with sufficient tires, proper axle spacing and weight distribution, bridges are capable of supporting the same gross loads as are the highways of which they

ENGINEERS INSPECT installation of dolly beneath primary trailer. Two 4-wheel dollies constructed in advance and attached by bolts to an I-beam "outrigger" welded to the trailer were estimated to relieve the trailer load by more than 7 tons.

are a part. The test was of a timber structure, not the highest type of bridge on California highways.

It was estimated that the outrigger dollies relieved the weight on the trailer by approximately 15,000 lb.

The Fruehauf trailer that carried the load was of the lowbed type with drop frame construction. For better weight distribution, when hauling extremely heavy loads, it is coupled to a jeep.

The load in this instance was not exceptionally heavy, amounting to only forty tons. When climbing the grade to the summit of Palomar Mountain, the jeep was removed. This was done to shorten the overall length in negotiating switchbacks as two pusher trucks were coupled on to provide adequate power on the 6 per cent grades.

Irrigation and Flood Control Plan Approved for Rio Grande Valley

A PROPOSED PROGRAM of irrigation and drainage development in the Middle Rio Grande Valley of New Mexico, outlined in a report sponsored by the Bureau of Reclamation, has been approved by Secretary of Interior J. A. Krug. The program has been coordinated with flood and sediment control development proposed by the Army Engineers.

The coordinated comprehensive development includes a plan for the rehabilitation and extension of the existing and related drainage systems in the Middle Rio Grande Conservancy District and the construction of three sediment and flood control reservoirs, major drainage works, and channel rectification and levee improvement to control sedimentation and flooding in the Middle Rio Grande Valley. The plan also provides for the incorporation of plans for collateral improvements by other agencies besides the Bureau of Reclamation and the Corps of Engineers.

The report delineating details of the program has been sent to the Governors of New Mexico, Colorado, Texas, and their official designees under the Flood Control Act of 1944, and to the Secretary of the Army for review and comment prior to submitting it to the President and the Congress.

On present price bases, the program would involve expenditure of $95,499,000. It is estimated that $16,766,000 would be reimbursable irrigation and drainage developments by the Bureau of Reclamation. The balance would be flood and sedimentation control and fish and wildlife developments which are not reimbursable to the Treasury.

The area involved includes the long, narrow valley between the Colorado-New Mexico State line and the backwater of Caballo Reservoir in New Mexico. Aggradation of the bed of the Rio Grande by heavy sedimentation has caused a downtrend in irrigation since 1880. As another result of sedimentation, the water table has been rising and many thousands of water-logged lands have been abandoned, crop yields on those still in cultivation have been reduced, and flood damage has been increasing. This condition has also made it impossible for New Mexico to deliver water to Texas under term of the Rio Grande Compact, and at the same time be able to continue present irrigation uses of water.

Major features of the recommended plan are to rehabilitate and extend the irrigation and drainage systems of the Middle Rio Grande Conservancy District, including the El Vado Dam and reservoir; to construct Chamita, Chieflo, and Jamez Dams and reservoirs for flood and sedimentation control; to provide levees for local flood protection; channel rectification of the Middle Rio Grande and the Blue Water floodway project. Reclamation development would provide adequate irrigation and drainage for 85,000 ac. of crop land.

New High Voltage Line Safety Law Emphasized

A LAW PENALIZING any employee who operates construction equipment within 6 ft. of high voltage lines was passed recently by the California legislature. This law also penalizes the employer who requires an employee to so endanger himself and his fellow workers. Such violators are subject to immediate arrest and punished by a maximum fine of $500 and 6 months in jail.

The new statute was enacted in recognition of the prevalence of this type of hazard. During the past two years in California alone, 124 men were disabled and 47 killed by coming into contact with overhead high voltage lines. Well-defined precautions, such as those outlined in the new law, might have saved these men.

Provisions and importance of the law are being publicized in an all-out campaign by the state of California Division of Industrial Safety. A folder issued by the Division suggests four steps that should be taken to avoid accident involving overhead electrical lines.

1. Make advance inspection of route of travel and area of operation. Determine accurately the location and height of all high voltage lines.
2. Do not attempt to move or raise electric wires for any reason.
3. Make sure that the equipment will have at least 6 ft. clearance from any high-voltage line. Allow for possible bouncing of equipment due to unevenness of terrain. If necessary, tie down boom and other swinging parts to ensure the 6 ft. clearance while traveling by or under these lines.
4. When in doubt as to safety of these operations, contact the local power utility immediately.

OPA says "Keep Records"

RECORDS AND DOCUMENTS relating to commodities and services decontrolled by OPA now must be preserved until Nov. 9, 1949. It was previously required that such documents falling under the purview of OPA maximum price regulations be preserved for a period of one year until Nov. 9, 1947. This period was extended for two years at the request of the Department of Justice in order to enable it to proceed with the prosecution of suits transferred to its jurisdiction when OPA was discontinued.

MASTER MECHANIC

Universal Welding Jig Developed for Shop Use

Adjustable fixture which will rotate in any direction on bearing mounted spindle found to increase production through better positioning of work and lessening fatigue of the welding operator

By A. P. CHILDRESS
Senior Welder, The Guiberson Corporation
Dallas, Texas

A UNIVERSAL welding fixture was designed some months ago to hold metal parts upon which welding is to be done, at any angle and in such a manner that they may be rotated either clockwise or anti-clockwise. This is accomplished through the use of a spindle mounted on ball bearings. The device has resulted in increased production and better appearance of welds made in the shop of The Guiberson Corporation, where the writer is senior combination welder.

The ball bearing mounting of this spindle is insulated from fixture to assure easy and positive operation at any welding range and speed with all weights of materials or parts. Three square head set screws for holding parts for fixtures are located in the spindle. These set screws also act as the positive connector for welding, eliminating the possibility of any arc spots.

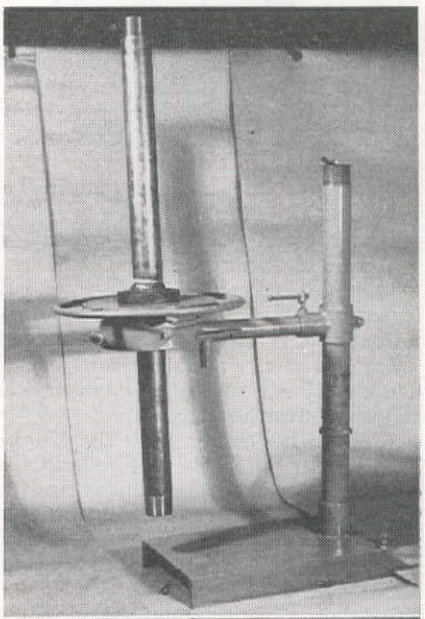
In addition, the insulation arrangement of the fixture allows the operator to use any amount of current at any angle or speed without drag in the fixture.

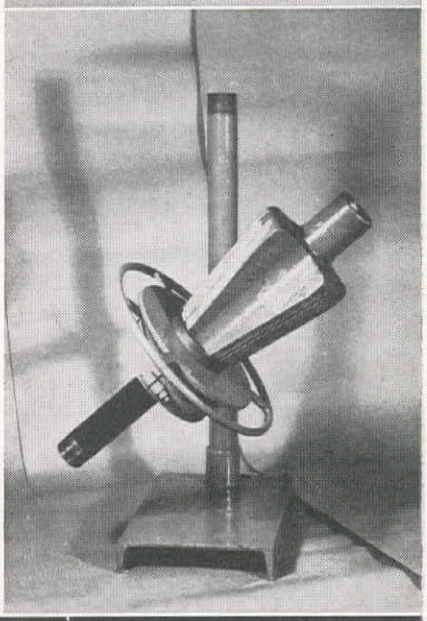
This fixture may be adjusted up or down to assure minimum fatigue to operator while welding, and making the fixture adaptable to either standing or sitting working positions resulting in uniform smooth welding and increased production.

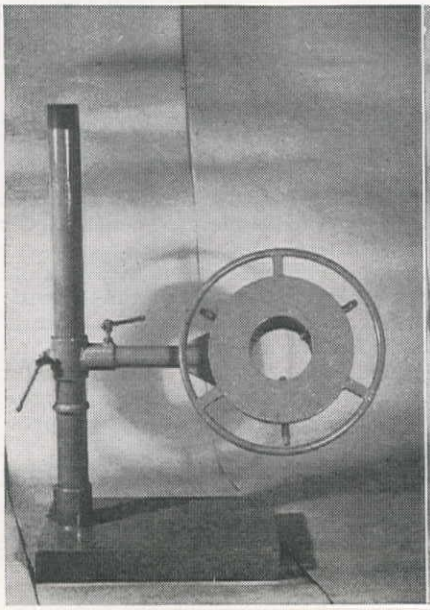
Over forty per cent of the equipment in the shop requires some welding operation, of which 76 operations may be done in this fixture, with part sizes ranging from one to 16 inches in diameter. Most of the welds call for an inspection free of arc spots and hydrostatic tests of from 3,000 to 5,000 lb.

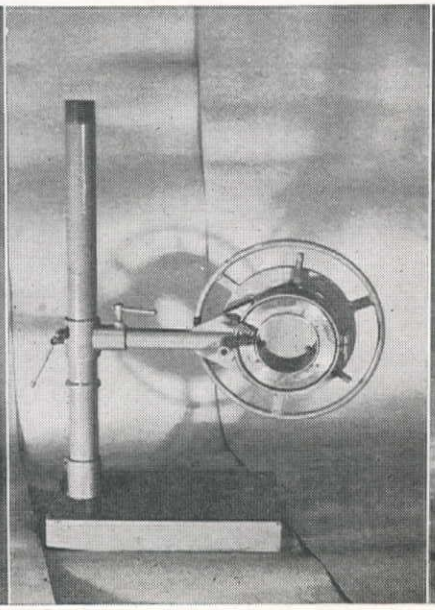
The shop has used two of these machines for the past eight months and finds that welding speed has been increased 100 per cent or more on all parts welded in this fixture. These parts range from miscellaneous tools to production parts, dies, gears, and rubber molds.

Data and illustrations in this article are from a study submitted to The James F. Lincoln Arc Welding Foundation in its recent $200,000 Design-For-Progress Award Program for reports and advances and improvements made by the applications of arc welding in design, fabrication, construction and maintenance.









MASTER MECHANIC

Where They're Working:

MASTER MECHANICS reported on the job in the West include:

Pat O'Rourke, with Barrett & Hilp of San Francisco on construction of 34 repeater stations between Sacramento and the Oregon line for the Pacific Telephone & Telegraph Co.;

Frank Ryan, with the Dorena Construction Co. on construction of Dorena Dam near Cottage Grove., Ore., and **Leo Ryser,** assistant master mechanic on the job;

Ira Bashaw, with Morrison-Knudsen Co. on relocation of the Feather River Highway near Storrie, Calif.;

Richard L. Striker, with the Kuckenberg Construction Co. of Portland, Ore., on construction of a highway and railroad between Gates and Detroit, Ore., under a $2,000,000 contract;

Andy Anderson, N. M. Ball & Sons of Berkeley, Calif., contractors for the grading and bituminous surfacing of 6.3 mi. on Rt. 20 in Trinity Co.;

Wayne Selby, with Peter L. Ferry & Son on levee construction along the Sacramento River near Yolo, Calif.;

Sal Mauro, with A. Teichert & Son, Inc., on a state highway construction job easterly from Pine Grove, Calif.;

Bill Halloway, with Fredrickson & Watson Co. of Oakland, Calif., on grading and plant-mix surfacing of 10 mi. of highway near Westwood, Calif.;

R. M. Thompson, with Fredrickson Bros. of Emeryville, Calif., on their highway job near Jackson;

E. J. LeHaie, with Utah Construction Co. on construction of a dam across the Mokelumne River near Pioneer, Calif., and a power house for the Pacific Gas & Electric Co.

American Rope Makers Seek New Fiber Sources

MANILA FIBER, or abaca, is still the number one hard fiber used by American rope makers. The Philippine Islands, with their world famous Manila hemp, are yet the largest single source of abaca fibers. But with a negligible supply of raw materials available now in the United States, large and small cordage makers alike are looking to the East Indies, Africa, India and Middle America for their basic fibers.

Abaca is also grown commercially in Sumatra, Honduras, Guatemala, Costa Rica and Panama. Production in the western hemisphere, which was developed principally during the war, totaled about 50,000,000 lb. in 1946, compared with half that amount in 1945.

The Manila fiber comes from a banana-like plant. Unlike hemp fiber, which is stripped from the plant stem, the fiber is obtained from the structural system of the leaf. It is the strongest natural fiber and is able to withstand abrasion more successfully than the others. Sisal, the number two fiber in the cordage industry, makes a rope of good quality but not as durable as manila. Millions of pounds of sisal are used in the manufacture of binder and baler twine.

American rope makers get most of their sisal from Mexico, Cuba, Haiti and British East Africa with a small amount coming from the Bahamas. The Dutch East Indies, an important pre-war source, have not yet assumed their former position in the world fiber market.

The soft fibers that provide American homes and industries with practically all the twine they use are hemp and jute. These are not as strong as the hard fibers and are softer to the touch. Both fibers are used to secure large bundles, bags and bales, while jute is also processed into Hessian cloth or burlap.

The important sources of hemp are Italy, Middle America and China. Practically all of the world's jute crop grows in the new Moslem state of Pakistan and is sent to the Middustan city of Calcutta for processing into yarn and burlap.

Cordage manufacturers also use limited quantities of other plant fibers for special ropes and twines or products that are not in general demand. One of these fibers, called coir, is made from the husks of coconuts. Coir consumed in the United States comes from India and the Islands of the Pacific. It is a weak fiber but has remarkable buoyancy and does not rot as easily as other fibers.

Gasless Motor? Here's One to Look Into!

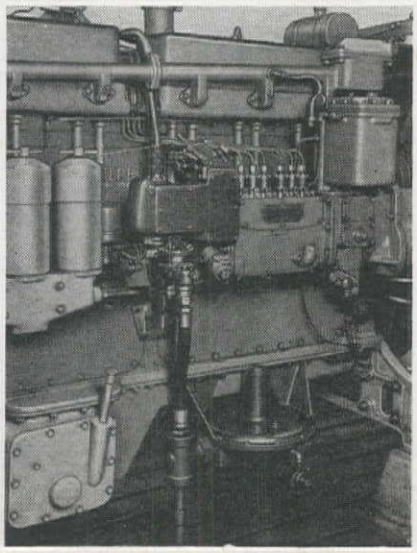
TWO FORMER airplane mechanics have developed an air processing mechanism which they are convinced will eliminate the gasoline tank, fuel line and carburetor. J. J. Riley and A. L. Riley, brothers in Minneapolis, Minn., claim the device will revolutionize automobile travel.

The device uses hydrogen and oxygen to power a motor. Air is chemically processed in two tanks where the water vapor is removed, leaving pure oxygen and hydrogen.

Diesel Engine Attachment Allows Switch Over to Natural Gas Use

AN ATTACHMENT for use with Diesel engines which allows switch over to natural gas operation is of particular interest to engine users in areas where natural gas can be obtained at low cost. In industrial areas, where "dump gas" rates prevail during the summer months, the low cost gas can be used and the change back to Diesel fuel operation can be readily made for operation during the balance of the year. The ease with which the change-over can be made makes it practical to use the cheapest fuel the situation permits.

LEFT SIDE of the Diesel engine equipped with attachment showing how natural gas enters the air induction system through the air cleaner to assure mixing of gas and air. Pressure regulator, special governor, and injection pump group are placed on right side of the motor.



The attachment, manufactured by the Caterpillar Tractor Co., Peoria, Ill., is designed for service with the company's Diesel D13000 engine. It consists of special precombustion chambers, modified fuel injection pumps for precise metering of minute quantities of Diesel fuel, a special governor control assembly for interconnected fuel injection pump and gas throttle valve, and the necessary gas lines and pressure regulators.

With the attachment installed, the engine is started on Diesel fuel alone and a single manually operated control lever is used to switch over to natural gas operation with pilot Diesel fuel ignition. The governor-controlled gas throttle valve regulates the quantity of natural gas drawn into the engine cylinder and the modified fuel injection pumps meter the Diesel fuel, timed for positive ignition of the high-temperature, high pressure air-gas mixture.

Maintenance problems are minimized since use of pilot Diesel fuel ignition eliminates magnetos and spark plugs, items susceptible to the elements. Installation of the new unit can be made at the factory or in the field.

NEWS OF WESTERN CONSTRUCTION

JANUARY, 1948

Construction Values for New Year Will Advance 20 Percent

NEW CONSTRUCTION in 1948 probably will reach $15.2 billion. This figure, a joint estimate of the Department of Commerce and the Department of Labor, represents a 20 per cent gain over the $12,665 million expected in 1947. About three-fourths of the 1948 total, or $11,375 million, will be privately financed, the remaining $3,825 million will be publicly financed, according to the Government estimate.

Private residential building (excluding farm) will again be the largest single component. It will be valued at $6 billion, an increase of 25 per cent over the $4.8 billion total expected in 1947.

Expenditures for private nonresidential building will rise slightly to $3,250 million as compared with $3,165 million in 1947. The probable increases in commercial building and in miscellaneous nonresidential building (churches, theaters, hospitals, etc.) will be largely offset by a sizeable decrease in industrial building.

The greatest boost to privately financed nonresidential construction will come from the increased expenditures for public utility enterprises. These will probably total $1,625 million, as compared with $1,315 million in 1947. The various public utilities, especially telephone, light and power, and gas, are striving to overcome the backlog of need created during the period of war restrictions and to expand commensurately with the large postwar demand arising from the high levels of industrial operation and of home building.

Most of the 1948 increases in publicly financed construction will stem from advances in nonresidential building, in highway construction, in sewer and water construction, and in conservation and development. Nonresidential building, reflecting large public hospital and educational programs, will probably reach $850 million as compared with $500 million in 1947. Highway construction is expected to advance 26 per cent to $1.5 million in 1948. Sewer and water construction is expected to total $375 million, and conservation and development $475 million, each registering a substantial gain over 1947.

The preceding figures are based on the following assumptions:

1. That no serious recession in general economic activity will take place in 1948;

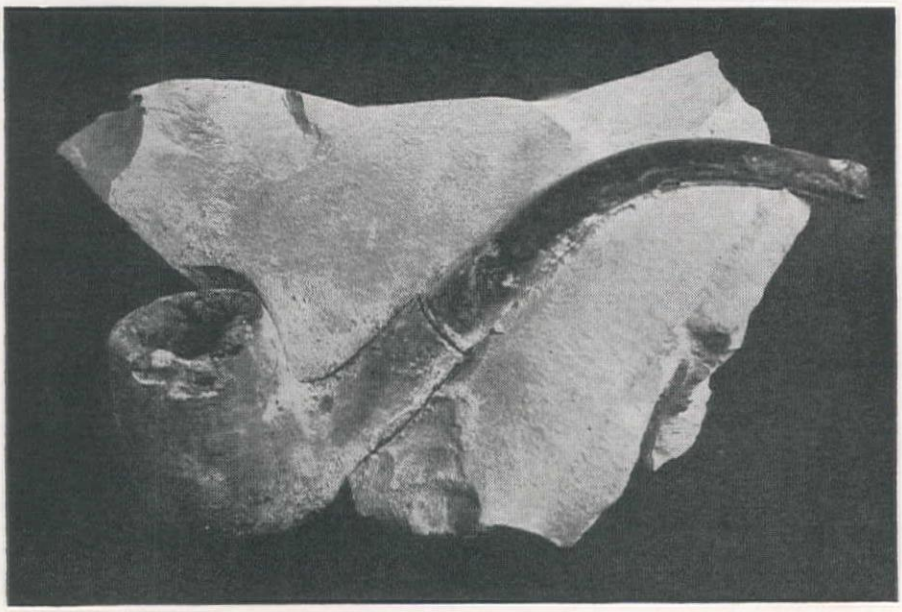
2. That construction costs will rise only moderately above current levels; and

3. That construction will be started on a total of 950,000 privately financed family dwelling units during 1948.

It is realized that there is a possibility that construction costs may rise more rapidly than has been assumed. If they do the increases might well get out of hand and become so large as to contribute to a sharp drop in the volume not only of private housing but various other classes of construction as well.

NEW TYPE REINFORCING FOUND IN AQUEDUCT TUNNEL LINING

WHEN A SECTION of the tunnel lining was ripped out of San Jacinto Tunnel of the Metropolitan Water District of Southern California recently, in connection with the guniting and lining repair program currently under way in the bore, this pipe was discovered imbedded in the concrete, where it had doubtless fallen from the lips or the pocket of one of the tunnel workers at the time the original work was performed.
Photo courtesy "Aqueduct News."



Seattle Hospital Specs Ready Soon

FINAL PLANS and specifications for the 300-bed Veterans' Hospital to be built in Seattle are now being prepared, Colonel L. H. Hewitt, District Engineer, Seattle District, Corps of Engineers, has announced. It is expected that bids will be invited in May, 1948. The Seattle architectural and engineering firm of Naramore, Bain, Brady, and Johnson prepared the preliminary design drawings and is now preparing the working drawings and specifications for the project under the direction of the Corps of Engineers.

Approximately five million dollars have been earmarked for construction of the hospital. The dominant structure, in the park-like layout, will be the general medical hospital building of eight

floors above a full basement. The building will be of modern architectural design with a reinforced concrete frame and will be earthquake-proof and fireproof. The facing of the building will be of either Wilkeson sandstone, the type used on the Capitol building in Olympia, or of a light colored brick. The plan also calls for five auxiliary buildings and extensive landscaping to tie the structures together and provide a park with wooded and grass areas, shrubs, and flower beds.

The project will be built on the 44-ac. Jefferson Park site on Beacon Hill which was donated by the City of Seattle for this purpose. The site is approximately 3 mi. from downtown Seattle and faces on Beacon Ave., Columbian Way and Alaska St.

Bids to Be Advertised on Western Reclamation Projects This Month

INVITATIONS TO BID will be issued by the chief engineer of the Bureau of Reclamation on various construction projects in the West in the near future. The projects and date of issue of the invitation are listed below:

About Jan. 15 invitations to bid will be issued for construction of 30 mi. of transmission line from Coolidge Dam to Eloy, Ariz., using wood poles; for the Muddy Ridge Tunnel, 2,870 ft. long and about 4,000 ft. of canal on the Riverton Project, at the confluence of the Wind and Big Horn rivers near Pavillion, Wyo.; for 36 mi. of wood pole transmission line from Glendo to Lusk, Wyo. and 16.5 mi. of similar line from Medicine Bow to Hanna, Wyo.; and for earthwork, structures and lining of two wasteways on the Coachella Canal near Indio, Calif.

About Jan. 20 bids will be invited on the fabrication of five 22-ft. diameter welded plate steel penstocks for Davis Dam on the Colorado River west of Kingman, Ariz. On Jan. 23 two projects will be advertised: earthwork lining and structures on 13.6 mi. of the Delta-Mendota Canal near Tracy, Calif.; and about 69 mi. of wood pole transmission line between Yakima and Denton City, Wash. On Jan. 26, the construction of the Adams 60-cfs. pumping plant on the Klamath Project near Merrill, Ore. will be advertised for bid.

Other projects probably to be advertised within the next two months, but for which dates have not yet been set, include: the Hungry Horse concrete arch dam and power plant (the dam will be 520 ft. high and 2,100 ft. long) near Coram Mont.; two pumping plants on the Roza Division of the Yakima Project near Sunnyside, Wash., and approximately 14 mi. of laterals at the same place; four residences and garages near Yuma, Ariz.; steel pipeline and structures near Provo, Utah; equalizing reservoirs, pipelines and structures near Ogden, Utah; 6½ mi. of 78 to 84-in. high pressure concrete pipe near Mecca, Calif.; a lateral system on the Riverton Project near Pavillion, Wyo.; and earthwork lining and structures on 17.2 mi. of the Friant-Kern Canal near Porterville, Calif.

Additional early projects include: Cedar Bluff Dam, an earthfill structure on the Smoky Hill River near Hays, Kans.; 12.5 mi. of the Cambridge Canal near Cambridge, Neb.; earthwork, lining and structures for 10 mi. of the Horsetooth Feeder Canal, including a diversion dam on the Big Thompson River, a 1-mi. tunnel, 12 concrete siphons and other structures near Loveland, Colo.; 38 mi. of 115-kv. transmission line from Cheyenne to Pine Bluffs, and 45 mi. of similar line from Gering to Alliance, Neb.; and erection of 15 prefabricated residences at Narrows Dam government camp near Fort Morgan, Colo.

Camp Stoneman Barracks To House Army Families

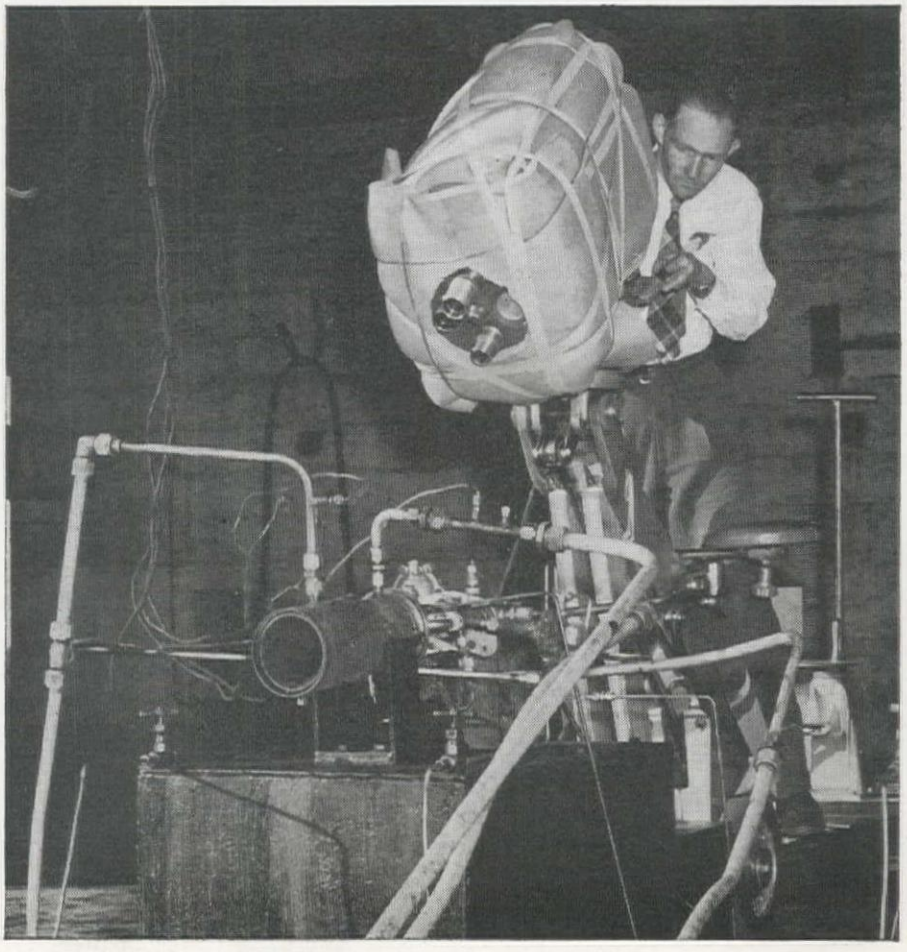
CONVERTING the existing barracks into apartments at Camp Stoneman near Pittsburg, Calif., will solve the housing problems for 64 Army families this month. Existing materials have been utilized in the conversion of these barracks supplemented by the use of additional materials as necessary.

Charles MacClosky Co., engineers and general contractors of San Francisco, hold the prime contract for this project amounting to $166,000. Plumbing and heating work is being installed by the D & S Plumbing Co. of Pittsburg, electrical work by Engineering Design Co. of San Francisco, and painting work by Frank L. Anderson of Southgate, Calif.

This work is being performed under the supervision of the U. S. Army Engineers, for whom Col. S. N. Karrick, C. E., is District Engineer and Mr. Bartell the resident engineer. C. K. Moseman, a member of the contractor's firm, has acted as project manager with Charles Forrest as assistant.

CAMERA SET-UP VIEWS DANGEROUS ROCKET TESTING OPERATIONS

TELEVISION CAMERA set up in test pit allows close-up viewing of the static firing of high-thrust rocket motors from a remote observation room. The test, which took place at proving grounds of the Aerojet Engineering Corp., Azusa, Calif., proved television applicable for close-up observation of hazardous operations of industry. Sponge rubber pads wrapped around camera minimized vibration caused by firing of rockets. In this photo, ARTHUR PICKLES, Aerojet engineer, sights camera before rocket firing. General Electric Co. furnished the wartime-developed image-orthicon camera.



WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—Reclamation was given $31,939,000 in the final action of Congress before it went home for Christmas. That sum constitutes the fund supplied to take care of the supplemental needs which came to light when Mike Straus and his associate, J. A. Krug, the Interior adventurers, cancelled the contracts for work pending in the Central Valley and elsewhere in the West. Obviously the cancellations, while embarrassing to the problem children of the Interior, were designed to put the quick squeeze on Congress; and, you may be assured, Congress did not like it.

The technique and psychology of the men who run the Reclamation affairs here in Interior is not understandable. It just doesn't make sense to believe that they can think that such actions make Congress friendly, whether the Congressmen and Senators come from their side of the tracks or from elsewhere. It is self-explanatory that Congress very definitely and sharply declined to give Mike and his cohorts any freedom of action in spending for particular items. Congress will **not** permit them to use the funds as they see fit, which means that they might switch them from the presumed purpose to some purpose Congress never even remotely imagined when it supplied the money.

Apparently the day is gone when Mike and his ilk can do as they please in a lordly way with the funds from the tax treasury, and in effect tell the Congress and the people to go to that place from which there is no pleasant return without a burning sensation. As the present position stands, Congress will continue to earmark what it provides for specific purposes; and to contravene the orders of the Congress might mean very uncomfortable experiences for those who break the law. There is a definite sign at Christmas time that the arrogant days typified by the Ickes' administrative methods are in the limbo of the past.

No great billion projects

The word here is that in the budget hearings ahead, during the opening months of 1948, the Congressional Appropriation Committees, and the Members of the Congress will further tighten the restrictions around Mike and Julius by imposing legal precision in the way they may spend the nation's money in point of the time involved. Those grandiose and heroic gestures of billions to be spent on a Reclamation WPA, dear to hearts of Mike's group, will undoubtedly be slowed down.

You will recall that the Reclamation group announced it would be a perfect complement to the Marshall Plan for the Interior Department to spend $2,000,000,000 or more dollars to bring 6,000,000 new western acres into bearing to provide 28,000,000 tons of food for the Europeans and others who are to be relieved. The program got some momentum when Congressman Walt Horan, Republican of Washington, a very attractive person induced the Interior Department to present its plan to the Joint Committee on the Economic Report, by mid-December.

The initial proposal included 33 new projects, not yet authorized by Congress. Aside from the drain on the treasury—so desperately taxed by the ERP—the plan proposed would wipe out all Reclamation laws for the duration so that everything could be given top speed during the "emergency."

Emergencies needed!

What would the Strauses and the Krugs and the rest of the eager beavers, who are impatient with the democratic methods of restraint, do without these "emergencies"! Their idea would be to bring the vast acreage into practical use completely by 1952. There would be huge new power developments, (unrestrained in administration under the "emergency"), justified by the presumed need for irrigation pumping.

Aside from the fact that even some Reclamation engineers do not find many new projects feasible, the plan would almost make imperative "force-account" and "cost-plus-fixed-fee" contracts, that grand old carnival of Government spending, when the patriots in the Departments embark on mass production in construction without help from the outside.

It may seem as though this plan might be superficially popular in the West, judging by the enthusiasm with which it was hailed by the subcommittee headed by Sen. Watkins, the Republican from Utah. But it is decidedly unpopular with the rest of the Senators and Congressmen who have no regional connection with the plan. The whole program has been regarded with suspicion by the rest of the Congress, and is chiefly considered as a sort of blackjack devised to club Congress to supply big money for the Reclamation crowd while Congress is all snarled up with its troublesome ERP problem.

The funds supplied before Congress went home for the Holidays are to be spent in the Central Valley, Columbia Basin, Colorado-Big Thompson, and Davis Dam projects. Roughly, Central Valley will get $12,000,000 new funds; Columbia Basin, $14,000,000; Big T, $3,000,000; and Davis Dam, in the interest of the Mexican water treaty, $3,000,000. Work naturally will go ahead where it has been interrupted, and will continue without interruption where future stoppage was announced.

Congress mainly will attend to the Marshall Plan when it gets back in 1948. It is not expected the final crystallization of the program will come into form until April. There is expected to be very active opposition to price, wage, and rationing controls at home. Much of the reaction of Congress depends upon what they find back home when they are visiting the folks during the holidays.

The Marshall Plan

Of the 225 Congressmen who crossed the Atlantic this summer to investigate conditions in Europe the most sensible report was made by the Committee for Investigating Conditions in Western Europe. This report emphasizes that Europe's troubles are not chiefly the result of physical destruction, but stem mainly from deterioration of the traditional mechanisms of social cooperation and Government. The habit of sabotage which grew up during the war has been hard to break, and plays right into the hands of the Communists.

Left-wing leaders seized the booty when the Germans moved out and now possess the great wealth which often is used to finance Communist activities in the countries which are centers of disturbance. Communism, as a social philosophy is the best organized and best financed system in Europe.

The monetary standards are almost uniformly shaky; livestock is considered the best medium of exchange. France is assumed to have approximately $4,000,000,000 in hidden gold which cannot be found. German money has no worth at all in international trade. The British have a plethora of money, but cannot buy much of anything. Their foreign investments have virtually been wiped out, they do not enjoy much revenue from their usual sources of income, and living standards in Britain have gone down. The Dutch are without their Indonesian market and Indonesian sources of production, and no longer have the market in Germany upon which they largely depended. Poland needs manufactured products which Russia cannot supply; and Russia has no need for the food products which Poland and her neighbors can supply.

All competent observers tell you that the aid we will give to Europe is a pure gamble, but we must take the chance, hoping our action will prevent an infectious chaos. The aid should be divided into three categories: capital goods, which should be financed by the International Bank; raw materials and agricultural machinery, to be financed by the Export-Import Bank; food, fuel, fertilizer, which cannot be paid for if there is any hope that advances in the other two categories are to be repaid.

Almost invariably the investigating Congressmen will tell you that they do not believe we should give anything away for nothing, particularly if the governments of the countries which are the beneficiaries handle the donations. It is suggested that local foreign currencies should be placed in the hands of reputable trustees, headed by an American, in each case, to avoid the perpetuation of an unhealthy fiscal situation, and to make local resources available to

cover local expenditures for use of labor, sand, stone, service, etc., for rehabilitation. Practically all observers urge that no dollars be given Europeans to purchase food, fuel, fertilizer; they insist we buy the actual commodities and send them to Europe. It is most often suggested an advisory council on foreign aid should be formed consisting of the secretaries of various government departments, but they should have nothing to do with the actual administration of aid. This is to be the job of a single operating agency in corporate form, with a bi-partisan directorate, able to avoid red tape. Almost every government source opposes the interposition of the State Department in the relief machinery in any form. Many also urge that we have missed the boat in effective propaganda, making our own type of civilization attractive to other peoples.

Air Force testing site

The Army Air Forces are looking for a site to use as a research center to develop supersonic speed planes for national defense. The Army has employed a civilian engineering firm to scout the possible locations, where the undertaking will least disturb the existing civilian economy. The suggestions which have had most consideration thus far are: the Upper Missouri Basin, with the great dams at Fort Peck, Fort Randall, Garrison, and Oahe; also, a spot in Arizona, near the Glen Canyon Dam, upstream from Hoover Dam on the Colorado River. The third place frequently suggested is a site near the proposed St. Lawrence seaway power dam, in upper New York state.

It is a fundamental necessity that the center be located close to a supply of at least 1,000,000 hp. of electrical energy. The electricity is required to operate the largest wind tunnel ever built. It also will be necessary to have the permanent diversion of vast quantities of water. The Army people unofficially have approved the site near Glen Canyon Dam on the Colorado. But the Western water users are reported to be strenuously opposed to the location of the undertaking where it will absorb such a huge quantity of power, which they claim is needed for commercial and social purposes in the region now developing. The Missouri River people, in the Upper Basin, on the other hand, are favorably inclined to the location of the center on the Missouri River. The Congressional delegations from the states in that area are becoming active in the matter.

It is suggested that the location of the center would greatly strengthen the Pick-Sloan Plan for the development of the entire river program, and discourage further civilian control, such as, for instance, the proposed Missouri Valley Authority.

Rationing

Incidentally, the word in the Capitol is that when and if rationing comes, which is expected without much question, electric power will be rationed. The present acute and growing shortage of fuel is expected to assure rationing of power in due time.

We are told here that the oil companies are using petroleum and crude oil to make fuel oil, now; but that this concentration upon the production of fuel means that you will suffer definite shortage of gasoline next summer. There will apparently be an inevitable rationing of gasoline. The entire power and transport fuel situation will be thoroughly investigated by the House Interstate and Foreign Commerce Committee in the hearings which will be continued during the early part of 1948.

Miscellaneous legislation

Although the House Appropriations Committee has very meticulously pointed out that it cannot bind future Congresses to spend specific sums of money on a long-range program, there are signs that the Congress plans some long-range legislation. For instance: extension of the 40-year repayment provisions for irrigation facilities; a bill making compromise provisions, changing the present 160-ac. limit of farms eligible to receive Reclamation water service; and it appears quite certain that the Rockwell bill, H. R. 2873, will be adopted, which will reduce power costs on interest rates and extend power repayment provisions on Reclamation projects.

The Bureau of Reclamation has another dodge to establish permanent title to water rights. Along the Missouri it is offering new water users a rental contract which prevents the water users from acquiring title to the works or to the water rights. The D'Ewart bill, H. R. 3194, has been proffered in the House to legally limit such contracts.

Under a recent ruling of the Supreme Court, truck drivers, though they spend only the smallest part of their time hauling goods in interstate commerce, are exempt from the overtime provisions of the Federal Wage-Hour Law. This means that the employers are not compelled to pay time and a half, or double time, after the drivers have worked 40 hours in a week. The truck drivers, under the ruling, go under the regulations of the Interstate Commerce Commission.

The Panama Canal, etc.

Twelve years from now the Panama Canal will be inadequate for normal peacetime uses. The President's message suggested the Canal be made a sea-level waterway, as a defense against atomic bombs. It will take $2,500,000,000 to make the improvements and alterations regarded as necessary by the experts. The sum is so huge, that even in these times of interstellar totals, it has been suggested this project should be the sole public works undertaking when the job is launched. This would naturally arrest the St. Lawrence seaway project. The Canal is dear to the heart of the Navy, while the St. Lawrence project is an Army program, for national defense. It is urged that the Navy has been obliged to limit the size of its capital ships by the measurement of the present locks in the Canal. Even some commercial ships are not able to negotiate the waterway.

There is a strong probability that the next Congress early in the session will pass a 1948 Flood Control **Authorization** Bill, which will program a great number of projects, but will not **appropriate** a penny for the projects. The authorization always precedes the appropriations; but the appropriation frequently does not comply with the authorization. And often the appropriation lags behind the authorization by years. During the FDR wartime period the Flood Control and Rivers and Harbors authorizations finally totalled billions without any real chance of consistent appropriations.

Another election year bill which may come out with a flourish is a House and Senate document which will apparently modify repayment provisions on reclamation projects for irrigation and power costs. Probes of the Federal Power Commission, Reclamation Bureau, and the Rural Electrification Administration also may make a stir, although such probes will be purely prospective.

We hear here that the Missouri Basin Inter-Agency Committee in January will launch a campaign to familiarize the average person more definitely with the approved Pick-Sloan Plan. It is proposed to make clear its value from the agricultural standpoint, as well as what it means in terms of highways and airports, game and fish protection, forestation, land and water resources, irrigation, power, flood control, stream pollution, and similar programs. All this is preliminary to the introduction of the 6-year plan, to cost $2,000,000,000, which will be placed before Congress late in January.

The Washington Society of Engineers recently awarded to Nathan C. Grover its rare engineering award in recognition of his distinguished services to the profession. Mr. Grover for many years was chief hydraulic engineer of the U. S. Geological Survey. Mr. Grover was the second to receive the award during the 38 years of the existence of the Society. At the age of 80, Mr. Grover is still active as a special consultant to the chief hydraulic engineer of the Survey.

Road building equipment is one of the categories of machinery to be supplied to Europe under the Marshall Plan. Highway equipment is short in this country. The postwar program has been hampered by the scarcity, according to the American Road Builders' Association. It is suggested the foreign program may cause machinery shortages to increase, and prices to rise.

Bids to Be Called Soon for Spokane Veterans Hospital

COLONEL L. H. HEWITT, District Engineer for the Seattle district Corps of Engineers, has announced that February 24 is the tentative date on which bids will be opened for the construction of a Veterans' Administration Hospital at Spokane, Wash. It is expected that plans and specifications will be available

for distribution to prospective bidders early this month.

The project will comprise a 200-bed hospital consisting of a main hospital building, powerhouse and laundry building, 6 auxiliary buildings, roads, walks, parking areas and accessory utilities. All buildings except the three auxiliary buildings will be of brick veneer.

Approximately 18 months will be allowed for completion of the hospital and appurtenant structures. The principal building will be 8 stories high above the basement and will be earthquake and fire proof.

Portion of Canol Pipeline At Alberta to Be Salvaged

EIGHTY MILES of the 596-mi. Canol Pipeline is now being salvaged by a trucking company in Lethbridge, Alberta, who purchased the line from War Assets Corporation for a sum reported to be in the vicinity of $700,000. The line was built during the war to supply the Whitehorse refinery from Norman Wells.

It is expected to require about 18 months to tear up and move the pipeline. A crew of 175 men will be employed. Many of the bridges are out and it is proposed to use the frozen rivers to operate the trucks in hauling the salvaged line.

Total cost of the Canol project when built was $134,000,000.

Army Engineers Recommend Costly Dam And Reservoir on Pend Oreille River

RECOMMENDATION for a multiple-purpose project at Albeni Falls on the Pend Oreille River in Idaho has been made in a report issued by the Army Corps of Engineers at Portland, Ore. The favorable report followed investigation of the conditions at Clark Fork and Pend Oreille Rivers and Pend Oreille Lake.

The proposed project at Albeni Falls calls for construction of a dam and reservoir to normal elevation of 2062 ft. The dam site is located approximately midway between the towns of Newport in Washington and Priest River in Idaho. Estimated cost would be about $27,000,000 for construction and $100,000 annually for operation.

The project would provide desirable regulation of Pend Oreille Lake, together with local flood control and conservational and recreational benefits. Additional benefits would be realized in navigable reaches of the Columbia River by virtue of increased channel depths during low water period.

The plan envisions addition of 251,000 kw. of urgently needed firm capability to the regional system of existing and authorized power projects. This would be accomplished by using the stored water in three 14,200-kw. units proposed at Albeni Falls and in downstream plants in existence or already authorized by Congress.

The valuable recreational potentialities of Pend Oreille Lake would not be damaged by the proposed project. Rather, they would be materially enhanced by the lake regulation to be provided.

No Takers for Loveland Tunnel Bid Invitations

NO BIDS WERE received Dec. 17 on the project to drill the first 2,000 ft. of the Loveland Pass tunnel, Colorado's State Highway Engineer Mark U. Watrous announced.

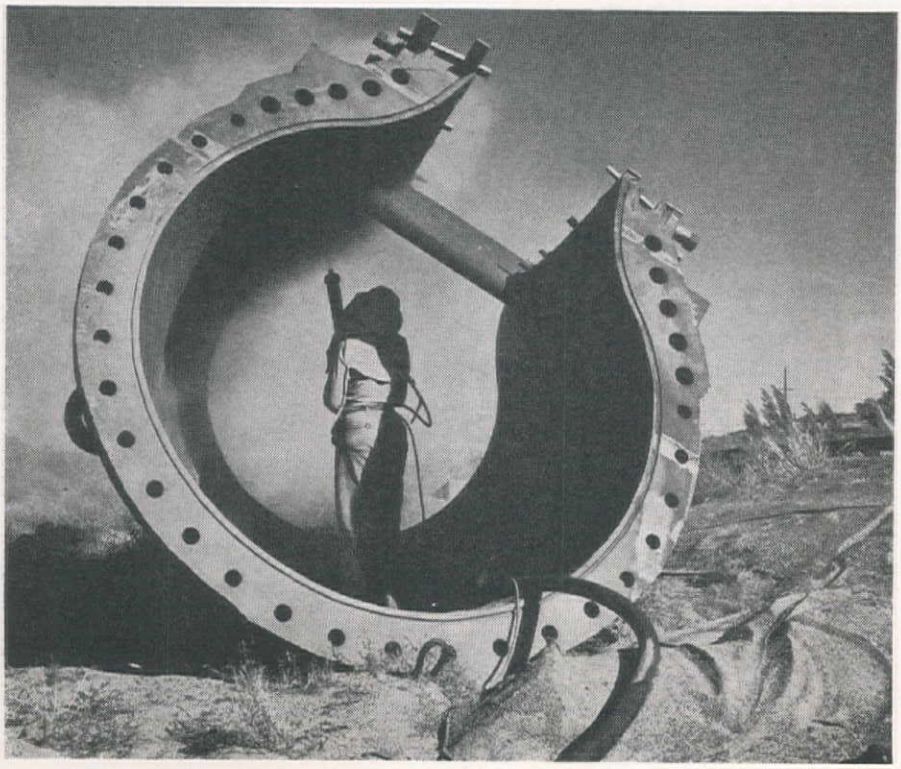
It was the second time that bids had been invited on the project. Last September, when it was advertised the first time, only one bid was received. That bid was not opened because of a policy of the Public Roads Administration which requires competitive bidding. Estimates, based on information obtained from the bidder, however, indicated the total cost of the tunnel would be about ten million dollars.

In both instances, the Highway Department made every effort to interest tunnel contractors in the project, and representatives of several firms inspected the pioneer bore and conferred with officials of the Department. Officers of the Colorado Contractors Association likewise brought the project to the special attention of their members.

Watrous said the Highway Department will continue studies in an effort to find a better alternate route, either over Loveland Pass or in some other vicinity. In the meantime, he said, work will be started early next year to improve the present highway over the Pass.

CASTING READIED FOR POWERFUL GRAND COULEE GENERATING UNIT

HUGE STEEL CASTING is one of 16 sections of turbine scrollcase being readied at Grand Coulee Dam in eastern Washington for installation in generating Unit No. 9. The units, rated at 108,000 k.v.a., are the world's most powerful. Bureau of Reclamation workman is sandblasting the inner surface preparatory to coating with a rust resisting paint.



Grand Coulee and Bonneville Power Demand Hits New High

THE HIGHEST hourly demand for power in the history of generation at Bonneville and Grand Coulee dams was recorded between the hours of 10 and 11 a. m., November 19. At that hour, the two plants were supplying the region with 1,473,000 kw., or more than half of the area's power requirements.

Not only are demands upon these Federal systems of the Pacific Northwest at a maximum, but also the resources of all utilities in the area are taxed to a limit. A new all-time instantaneous peak of 2,727,000 kw. was reached November 12 on the interconnected systems of the Pacific Northwest Power Pool's western division.

With the maximum capability of the western part of the Power Pool estimated a 2,853,000 kw., there remained but 126,000 kw. of unused power resources in the area at the time of the November 12 peak.

Western AGC Chapters Hold Annual Convention Meetings

Northern Calif.

AN AGGRESSIVE program resisting the growth of "day labor" force account methods of construction was promised by members of the Northern California A.G.C. chapter at an all-day conference at the Palace Hotel in San Francisco, Dec. 5.

The issue was raised by Gardiner Johnson, chapter attorney, who claimed that local governments are already using the increased funds available for highway construction under California's recently enacted Collier-Burns Highway Act as a cloak behind which to set up excessive budgets using force account labor. The chapter's legislative committee will collect necessary facts and figures to notify all members as well as public officials of the limitations of the act in a move to check the growth of force account in California.

A warning that early action was needed to prevent a serious water and power shortage in California was sounded in the address by R. S. Calland, acting regional director of the Bureau of Reclamation's Region II, Sacramento. He stated that the Bureau is making efforts to speed work on projects designed to combat the shortage, especially on additional canals and the Shasta, Friant and Keswick dams of the Central Valley project. He also told of definite proposals placed before Congress for two projects planned for inclusion in the Central Valley program. One is Monticello Dam to supply irrigation water for Solano Co., and the other is the American River development comprising a 1,000,000-ac. ft. dam at Folsom and canals and power house.

Commodore L. N. Moeller, superintending civil engineer of area Nos. VI and VII for the Bureau of Yards and Docks, revealed that $59,400,000 has been authorized for Navy construction in the 11 Western states alone. Major projects to be financed by these funds were described as facilities and test ranges near Ventura, Calif., costing $16,500,000, development and construction at the White Sands Proving Grounds in New Mexico, $7,000,000, and facilities and housing at Inyokern, Calif., $4,000,000.

Colonel Dwight E. Johns, Division Engineer for the South Pacific division of the Corps of Engineers, disclosed that the Engineers are ready to take bids and let contracts on work aggregating $11,000,000 on 31 separate jobs before Feb. 1. This sum is chiefly for river and harbor and flood control work in California.

H. C. Maginn, chairman of the military affiliation committee for the chapter, and Lt. Colonel A. D. Chaffin, Jr., executive officer for the San Francisco office of the Corps of Engineers collaborated to outline in detail the plan for the chapter to sponsor an Army construction reserve unit. The members indicated their agreement with the plan by voting unanimously to cooperate with the Army in every way to make the program a success.

George T. McCoy, State Highway Engineer, told the contractors that projects costing about $11,390,000 will be advertised during the first three months of 1948 in California. He also stated that the Division of Highways is continually working to simplify the procedure of receiving bids and awarding contracts and of modifying the Standard Specifications to obtain the best end-result in construction.

At the labor forum, it was emphasized by Peter G. Jacobsen, attorney for the Utah Construction Co., that the Taft-Hartley law definitely applies to the construction industry. Contractors who transport equipment or materials across state lines are liable to terms of the law. It was brought out that an amendment now adopted gives the A.G.C. board of directors the power to manage labor relations for individual members of the chapter.

Prof. Clement Wiskocil from the University of California and Assistant Professor C. H. Oglesby from Stanford University described the optional course which has been established at these two schools to point men toward the construction industry rather than exclusively engineering. The courses are designed to make the student construction- and cost-conscious rather than all design-conscious, as it was aptly stated by Oglesby.

Intermountain

THE ANNUAL business meeting of the Intermountain Branch of A.G.C. was held at Springville, Utah, the town known as the "Birthplace of Contractors," early in December. The principal speaker was Dr. O. Meredith Wilson, who spoke on the subject of free enterprise. It was announced that the Intermountain Branch was the second in the country to execute an agreement with the Army to sponsor a construction reserve unit. The committee appointed to activate the unit consisted of Toby Larsen, Verl Whiting, Richard Reed and Ed Dorland. Ellis Barker was given support for the office of National Director, District No. 3, building classification.

Officers nominated for 1948 were: President, Ellis Barker and Perce Young; vice-president, Edward Clyde and Carl E. Nelson; secretary-treasurer, G. M. Paulson and V. C. Mendenhall; director, heavy, W. W. Gardner and G. M. Wheelwright; director, building, Frank B. Bowers, Rolf Christiansen, Ed Dorland and Mark B. Garff.

Resolutions included one in opposition to force account methods in the Reclamation Bureau as well as city, county and state governments; one opposing legislation patterned after the Wagner-Ellender-Taft Bill; and another opposing any national tripartite arrangement for the handling of jurisdictional disputes. It was announced that the annual banquet would be held in the Hotel Utah, Salt Lake City, January 24, with William Jeffers as speaker.

San Diego

THE ANNUAL Christmas party of the San Diego Chapter of A.G.C. was held on December 13 at the El Cortez Hotel in San Diego. It was particularly noteworthy in that it was held, almost to the day, twenty years after granting a charter to the San Diego group. I. C. (Jack) Curry was general chairman for the affair, assisted by Lou Butterfield, Cecil Grove and Bruce Hazard, president of the Chapter.

About 350 persons attended the well-organized affair, which included dinner, entertainment and dancing. Honored guests included Mayor Harley Knox and other officials of the City and County of San Diego, Captain A. K. Fogg, Public Works Officer of the Eleventh Naval District, M. F. Kemper, president of the Southern California Chapter, and M. A. Mathias, secretary-manager of the San Diego group.

Special committees were: Entertainment, headed by Andrew Baird; decorations, headed by David Bell; and reservations, headed by Douglas Clarke.

OBITUARIES . . .

John J. Hughes, 86, early-day railroad engineer and contractor in the Northwest, died in Beverly Hills, Calif. on Nov. 3. Beginning his career as a surveyman for the Great Northern Railroad through North Dakota and Montana, Mr. Hughes made the survey for the Spokane Falls & Northern Railroad in company with John F. Stevens and E. J. Roberts. He was chief engineer on the Kalispell cut-off, was associated with John F. Stevens as a construction engineer during the driving of the Cascade tunnel, and later became a partner in the contracting firm of Winters, Boomer and Hughes.

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William H. Galvani, 84, died at Seaside, Ore., on Oct. 23. A native of Russia, Mr. Galvani arrived in the northwest in 1882 when he became construction engineer for the Oregon Railroad and Navigation Co. He joined the staff of the Pacific Power and Light Co., Portland, in 1910, and at the time of his retirement in 1924 was in charge of property, rights-of-way, and taxation. After his retirement he moved to Seaside where he served three terms as mayor.

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Tom Gogo, excavating and sewer contractor in Los Angeles, Calif., died of a heart attack Sept. 24 at one of the regular monthly meetings of the South Pasadena Masonic Lodge. At the time of his

death, Gogo had approximately three-quarters of a million dollars worth of work under construction for the Los Angeles County Sanitation Districts.

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Howard L. Cooper, 50, retired Navy hydraulic engineer, was killed instantly Nov. 20 at Denver, Colo., when his car skidded out of control on an icy street and crashed into a tree. He was a veteran of both world wars and had retired from the Navy as a captain less than a month before the accident. During World War II, he supervised the building of a motor torpedo base at Tobaga, Panama, and later supervised the building and commanded the Buckner Bay naval base on Okinawa.

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Charles A. Strong, 64, president of Strong & Macdonald, Inc., Tacoma, died in Tacoma on Dec. 13. A graduate of Stanford University, Mr. Strong had been engaged on many major construction and engineering projects in the Northwest. Prior to forming a partnership with Stuart Macdonald in 1920, Mr. Strong had served as superintendent for the Tacoma Dredging Co. During World War II he supervised construction of several large projects including a major army establishment in Oregon.

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W. Leonard Smith, 53, territorial highway and airport engineer for Alaska, died in Seattle on Sept. 30. Prior to his appointment as highway engineer, Mr. Smith had served for many years as engineer in charge of operations for the Hammond Consolidated Mining Co. at Nome, Alaska. In addition to his position as highway and airport engineer, he also was active as chairman of the Territorial Board of Road Commissioners and head of the Alaska highway patrol.

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Steen Hanson, 88, retired general contractor at Denver, Colo., died Nov. 7 of a heart attack at his home in Denver. He will be remembered for many churches, schools and houses which he built throughout Colorado.

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James McFarland, 51, administrative assistant to R. H. Baldock, Oregon state highway engineer, died in Salem, Ore., Nov. 26. An employee of the state highway commission since 1919, McFarland was well known to every one who called at the state highway engineer's office.

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Thomas Donohoe, 44, attorney of Seattle and Alaska, and partner in the De-Long Engineering Construction Co. of Seattle, died in Roseburg, Ore. on Nov. 2, while enroute to California.

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Weston L. (Johnny) Walker, 58, engineer with the Los Angeles Co. Flood Control District and a resident of Glendale, Calif., took his own life Dec. 16.

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C. S. McConihey, 77, civil engineer in the office of the Tacoma city engineer, died in Tacoma, Nov. 17. At one time he had been an instructor at the College of Puget Sound, Tacoma.

SAND AND GRAVEL FOR POTHOLES DAM PRODUCED IN HUGE BORROW PIT

POTHOLES DAM, one of the major structures of the Columbia Basin Irrigation Project in eastern Washington, is about 3½ mi. long, and will have a maximum height of 207 ft. above bedrock. The huge earthfill structure is under construction by Lytle Construction Co., Green Construction Co., and Amis Construction Co., who jointly hold a $9,359,011 contract. The dam is constructed of compacted clay, sand and gravel, being worked below in the pit by an International tractor with Heil dozer.

California Contractor Agent for China Surplus

THE CENTRAL Bank of China, now National Government of China owning agency of all Pacific surplus property, has appointed the Vinnell Corporation of California as exclusive sales agents to sell $300,000,000 worth of supplies and equipment.

This material to be sold is surplus to China's own needs and will be disposed of through spot sales on 16 Pacific islands. No priorities are required. Sales are to be made in volume lots and buyers must be prepared to make purchases of $1,000,000 or more. Since buyers attending the sale must have Naval clearance, they may obtain assistance in securing such clearance through the Los Angeles office of the Vinnell Corp., according to A. S. Vinnell, president.

Both the construction, and the warehousing and freight handling divisions of the Vinnell organization have handled major undertakings in the Pacific and the Orient for a number of years.

Materials which are being sold on the Pacific islands include a variety of supplies and equipment which China cannot use, Vinnell pointed out. Plane service is available to the islands on which spot sales will be held.

NEW BOOKS...

FIELD PRACTICE—by Elwyn E. Seelye. Published by John Wiley & Sons, Inc., 440 4th Ave., New York 16, N. Y. 297 pages, 5 x 8¼. Price $4.50.

The purpose of this third volume in a series of data books for civil engineers prepared by the author is to enable the inspector or field engineer to brief himself as to the essentials in the inspection and supervision of the work which he is to undertake. It is designed as a handbook from which the field engineer can quickly obtain the basic data which he will require, such as field tests for concrete, asphalt and soils, specifications for size, quality and other properties of construction materials, and check lists for such work as concrete, bituminous paving, steel, welding and timber. Complete information is given for inspecting pile driving, and a section of the volume provides the data a construction surveyor requires. Report forms for the inspector are presented so arranged that the report becomes not only a progress report but also an inspector's checking list. Photographs for the identification of building stone and timber are included.

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ARCHITECTURAL CONSTRUCTION, by Theodore Crane, C.E., M. A. Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, N. Y. Ill., 413 pages, 6½ x 9½. Price $6.00.

The book is concerned with making the initial and basic selection of structural elements, and with aiding the designer in choosing the most appropriate

structural system and secondary structural elements for any building as governed by geographical location, site conditions, type of occupancy, equipment and architectural design. It furnishes a procedure for determining the most suitable type of such elements. A comprehensive treatment of structural types with emphasis on the newer designs is furnished. The book fills the void between a descriptive study of materials and types of construction, and the final design of individual beams, columns, and other structural elements.

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AIR CONDITIONING—By Herbert Herkimer and Harold Herkimer. Published by the Chemical Publishing Co., Brooklyn 2, N. Y. 692 pages, 6 x 9. Price $12.00.

The subject matter of this book written for engineers and workers in a fast growing industry has been carefully selected to give well-balanced and systematic training to students of air conditioning engineering, and to help engineers and other technical men to solve their problems in designing and repairing equipment, selecting materials and estimating costs. It provides the required information on all phases of air conditioning, e.g., estimation, sales, promotion, installation, supervision, service, etc. It reviews the laws of chemistry and physics associated with air conditioning, and then goes on to the practical aspects of the industry, such as equipment, materials and costs. Problems with their solutions, as well as tables and illustrations, are included.

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VESTED INTERESTS AND THE RISING TIDE OF GOVERNMENT—By Robert V. Edwards. Printed privately by the Times-Mirror Printing House, Los Angeles, Calif. 266 pages, 6 x 8½. Price, $3.50.

The author depicts the struggle for man's freedom carried out over a long period of history by series of attacks against various forms of vested interests and various inflexible conditions of social and economic life which were stopping the free play of man's creative and intellectual abilities. Then he portrays the different forms of harmful vested interests today opposing the welfare of the people, and it is against those interests that the book is directed. It is claimed that the American people now face an ugly vested interest, proven by the author to be the jack-in-office who has been "getting away with" the assumption that he, and not the People, must rule this land. This is a book for the student, for the man-in-the-street, for the straight politician, and for the philosopher.

PERSONALLY SPEAKING

Jesse E. Williams, former district engineer in charge of Federal-aid highway work in New Mexico, heads the delegation of eight Public Roads Administration engineers who are aiding the government of Turkey in planning and constructing a national system of modern highways. The mission, which left New York for Turkey on Nov. 29, was sent in response to a request from the Turkish government through the Department of State for assistance in improving its highways under the Turkish Aid Program provided by the Act of May 22, 1947.

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Hover V. Noland, Walla Walla, has been elected president of the newly formed Washington Electrical Contractors Association. Other officers include **J. M. Hooper,** Seattle, first vice-president; **Everett Hindman,** Bellingham, second vice-president; and **T. Ralph Neilson,** Seattle, secretary-treasurer. Members of the executive board include **Ralph H. Eker,** Pasco; **Arthur Seigal,** Seattle; **Don Willingham,** Everett; **Keith O'Dell,** Yakima; and **A. G. Neill,** Snohomish.

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John L. Stackhouse, assistant construction engineer with the Washington state highway department at Olympia, has been elected president of the Tacoma section of the American Society of Civil Engineers. Other officers to serve during 1948 include **Arthur Johnson,** vice-president; **Roy L. Greene,** director; and **Fred D. Langdale,** secretary-treasurer.

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A western lumberman, **A. J. Glassow** of Bend, Ore., was elected president of the National Lumber Manufacturers Association at its 45th annual meeting of stockholders and Board of Directors at Chicago. Glassow, who succeeds **C. Arthur Bruce** of Memphis, Tenn., has had a long and distinguished career in the lumber manufacturing industry. He is at present vice-president and general manager of Brooks, Scanlon, Inc., Bend, Ore.

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Karl Kohler, regional engineer in the Portland office of the Soil Conservation Service, was elected chairman of the Pacific Northwest section of the American Society of Agricultural Engineers at the annual meeting of the section held in Spokane. Other officers include **J. B. Rodgers,** first vice-chairman; **J. R. W. Young,** second vice-chairman; **Curtis V. Edwards,** third vice-chairman; and **A. G. Mayer,** secretary-treasurer. Rodgers is head of the agricultural engineering department at Oregon State College, Corvallis; Young is head of the agricultural engineering department at the University of British Columbia, Vancouver; Edwards is an equipment dealer in Yakima, Wash., and Mayer is manager of the farm development department of the Washington Water Power Co., Spokane.

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R. W. (Bob) Lyman has been appointed assistant manager of the Seattle chapter of the Associated General Contractors. He succeeds **Clarence Todd,** who was appointed manager of the Tacoma chapter. Lyman has been connected with the apprentice training service of the U. S. Department of Labor.

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J. L. Franzen, city manager of Salem, Ore., has been elected president of the mid-Willamette Valley section of the Professional Engineers of Oregon. **F. O. McMillan,** Corvallis, was elected vice-president; **Robert T. Stanley,** Salem, was elected secretary-treasurer. Officers were elected at the first formal meeting of the newly organized section.

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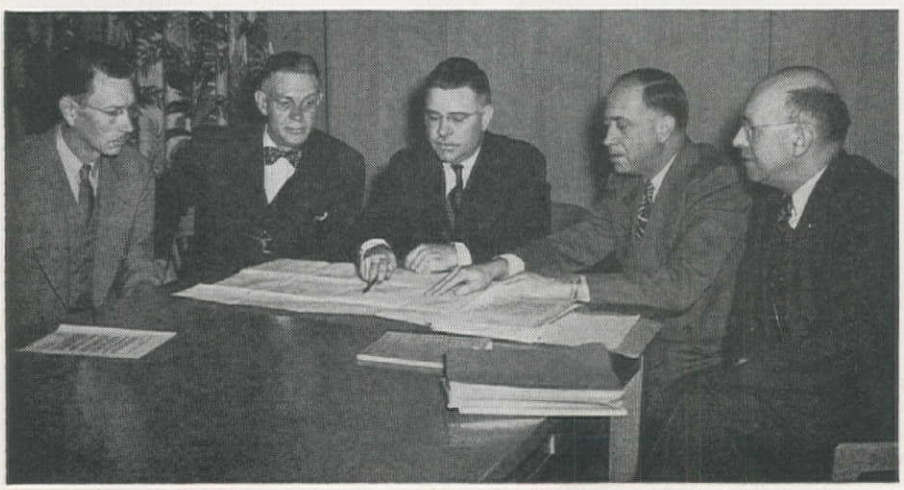
Frank J. Walsh, civil engineer and for more than 17 yr. industrial engineer for the Tacoma Chamber of Commerce, retired

MEMBERS of the convention committee plan features of the American Concrete Institute meet to be held in Denver Feb. 23-26. L. to r., STEPHEN H. POE, Bureau of Reclamation, convention publicity; E. W. THORSON, Portland Cement Association, chairman of convention committee; O. O. PHILLIPS of R. J. Tipton & Associates, Inc., exhibits; ROBERT F. BLANKS, U.S.B.R., vice-president of the Institute; H. S. MEISSNER, U.S.B.R., program chairman.



from that position on Dec. 31. During World War I, Walsh was superintendent of sewer construction and later general superintendent for Hurley-Mason Co., contractors for Camp Lewis. After the war he became a member of the contracting firm of Albertson, Cornell Bros., and Walsh, which undertook construction work in western Washington and Oregon.

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Merrick J. Roper, civil engineer-inspector for the Seattle board of public works, was retired from active service in December after nearly 30 yr. of work for the city. He had for years handled payrolls and employer records of contractors engaged in public works construction for the city.

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H. C. Thompson, Bethlehem Pacific Coast Steel Corp. engineer in Seattle, has been elected president of Local No. 16, Technical Engineers & Architects Association (AFL), state-wide organization in Washington. Other officers elected for 1948 include **Harold Rowley,** vice-president; **Vern Kershner,** secretary; **Detmer Andersen,** treasurer; and **Claude Bradley,** trustee. **Harry Hanscom, Paul Sannons, Milton H. Peterman, Orville Fields** and **John J. Nelson** were elected members of the executive board.

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Gilbert C. Drake, John Vertrees, A. A. Brownson, D. Magnetti, Emil F. Gehri, Elmer Taft, M. R. Murray, and **Richard Greiner,** all engineers with the Bureau of Reclamation, have been transferred from Coulee Dam, Wash., and the Columbia Basin project to the Hungry Horse project at Columbia Falls, Mont. **Alex Ketchem,** also an engineer with the Bureau of Reclamation project, has been transferred from the Cascade dam in Idaho to the Hungry Horse dam.

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Earl O. Mills, city planning consultant of St. Louis, has been retained as consultant for the formation of a long range metropolitan plan to be prepared for the city of Seattle. A full time director of planning and technical assistants will be employed by the Seattle planning commission of which **Clyde Grainger** is chairman.

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Alvin C. White and **H. V. Jorgensen** have organized a new firm to practice civil engineering in Seattle. White was formerly north district road engineer for King County, and Jorgensen has been highway engineer with the Public Roads Administration, serving as resident engineer on the Alaska highway during the war.

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Charles H. Williams, for 18 yr. city engineer and water superintendent and for the past year water superintendent for the city of Olympia, Wash., has resigned from the latter position. He will serve as resident engineer in charge of construction of a water system for the city of Westport, Wash.

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James B. (Jim) Warrack, well known building contractor of Seattle and Alaska and first president of the Seattle chapter of the Associated General Contractors of America, has again been elected president of the chapter to serve during the twenty-fifth anniversary year of the chapter's history. Warrack served his first term as president in 1922 when the organization, then known as the Master Builders' Association of Seattle, affiliated with the AGC and became the Seattle chapter. His election to the post of chapter president this year is a recognition of his continuous service to the construction industry during the past quarter century. Other officers of the chapter to serve under Warrack this year will include **James Cawdrey,** first vice-president; **Elmer Edwards,** second vice-president; **P. D. Koon,** secretary; and **Cliff Mortensen,** treasurer.

JOHN L. SPRINGER, Western Highway Institute president, and DR. JOHN S. WORLEY, professor of transportation at the University of Michigan, study a map of the proposed interstate highway system. Worley, an authority on highway economics, was in San Francisco for a conference with officers of the newly-formed agency devoted to research in the field of vehicle planning and highway planning.

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W. W. Brenner, former division engineer on the Bureau of Reclamation's Gila Project in Arizona, has assumed duties as construction engineer for the Heart River Unit of the Missouri Basin Project in North Dakota. He will direct construction activities on the Heart Butte and Dickinson dams and other pertinent works of the unit.

W. W. BRENNER

Charles L. Wartelle, city engineer of Seattle since 1938 resigned his position Dec. 31, to retire from active service for reasons of health. He had been connected with the engineering department of the city of Seattle since 1907 with the exception of five years from 1933 to 1938 when he served as chief engineer for Washington for the Public Works Administration. During his service with the city, he held virtually every position in the department at one time or other, advancing from draftsman to estimator, chief draftsman, and district engineer.

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Frank Wade is president of the Yaquina Bay Dock & Dredge Co., Inc., a newly formed organization at Newport, Ore., which has been organized to undertake harbor improvement and dock construction work. Other officers of the firm include **Tom Chamberlain,** vice-president; **Marvin Brain,** secretary-treasurer; **Beryl Smith** and **Barney Ehrlich,** members of the board of directors.

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Expansion of the faculty personnel in the Civil Engineering Department at the University of Colorado, Boulder, includes the engagement of **Warren W. DeLapp** as assistant professor. DeLapp secured his doctor's degree from the University of Minnesota where he taught mechanics and kinematics for seven years. Other new members of the department are **William L. Sutherland,** instructor; and **Terry Triffett** and **Richard C. Leonard,** part-time instructors. Enrollment in the College of Engineering at the University has increased to a record 2,600.

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Harold J. McCoy has been elected president of the Spokane section of the American Society of Civil Engineers. Other officers who will serve the section during 1948 include **Allen S. Janssen,** first vice-president; **L. V. Douns,** second vice-president; and **William A. Hill,** secretary. **Robert E. Tobin** and **J. B. Barber** were elected as Associated Engineer representatives.

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Luther H. Lincoln, home builder and lumberman of Oakland, Calif., is the new president of the East Bay General Contractors and Builders Association. Other officers who will serve with Lincoln are **P. Royal Haulman,** vice-president; **Theodore H. Lapham,** secretary-treasurer, and **J. A. Stinson,** executive manager.

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Cecil C. Arnold, consulting engineer of Seattle, has been retained by the Prosser, Wash., city council to prepare a master plan for improvements at the municipal airport including clearing, drainage, and lighting.

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Mike P. Davidson, county engineer of Okanogan County, Washington, resigned that position on Dec. 31. Davidson served with the Washington state highway department before being appointed Okanogan county engineer.

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Norman J. Farrell is the new supervisor of the San Bernardino National Forest. He transferred to San Bernardino Jan. 1 from supervisorship of the Shasta National Forest after 15 years of service with the U. S. Forest Service. This will be a return to familiar country for Farrell since he

spent six years in southern California on the Cleveland National Forest. **Robert E. Jones** takes over as supervisor of the Shasta by promotion from assistant supervisor of the Plumas National Forest in California. He has done outstanding work in fire control and timber management during his 21 years with the Forest Service.

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N. F. McKay, resident engineer in district 5 for the Washington state highway department, has been transferred to the Yakima district headquarters and appointed district construction engineer. He succeeds **Val Rinehart,** who has been transferred to highway department headquarters in Olympia.

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A testimonial dinner was given Dec. 17 in Redding, Calif., by Bureau of Reclamation employees honoring Construction Engineer **Irving C. Harris** prior to his retirement on Dec. 31. In retiring, Harris rounds out more than 47 years of distinguished public service as a pioneer for development in the field of electric power generation and transmission. Some of the "firsts" in which he participated include operating the first three-phase power plant in the United States near Redlands, Calif., and work on the first 16,500-volt generator, the first steel tower transmission line, and the first steam turbine unit to be installed west of the Mississippi. Since 1941, his professional talents have been devoted to superintending the power installations at Shasta Dam.

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Capt. E. B. Keating, who has been public works officer at the Bremerton, Wash., navy yard for the past four years, has been assigned to duty with the materials division office in Washington, D. C. He has been relieved at Bremerton by **Capt. H. W. Johnson,** who has been transferred from the naval air station at Quonset, R. I.

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P. E. L. Moase, who was elected president of the B. C. Building Contractors' Association at the recent annual meeting, is president of the Moase Construction Co., Ltd., Vancouver, B. C. **Charles Wilson** of Nanaimo was elected vice-president of the association for the ensuing year.

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Cecil L. Longson has been named as the first city manager at Menlo Park, Calif., following the decision by residents to adopt the city manager type of local government. Longson is former director of public works at Burlingame and city engineer at Redwood City. He is being replaced at Redwood City by **Glen M. Jain.**

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Edmond F. Marum, with the Bureau of Reclamation from 1937 to 1943 on dams and transmission lines design and for three years with the civil engineer of the Navy on design and maintenance, is now operating private offices in Tucson, Ariz., as a civil engineer.

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Lt. Comdr. E. H. Bernstein, commander of the Coast and Geodetic Survey boat Hodgson for the past year, has been transferred to a survey of the tidal and current studies along the Pacific Coast. **Lt. Comdr. W. H. Bainbridge,** formerly executive officer of the survey ship Explorer, has been assigned to command of the Hodgson. The crew of the Hodgson will spend the winter making a hydrographic survey of the Willamette River between Oregon City and Salem, using shallow draft launches.

JOHN A. BLUME

John A. Blume, consulting structural engineer, is the newly elected president of the Structural Engineers Association of Northern California. He is an associate member of the American Society of Civil Engineers and, in his private practice as structural engineer, he has designed many buildings of various types of construction in the West and in Saudi Arabia. His office has also prepared drawings for wharves, transmission towers and industrial buildings and has made investigations of special stress and earthquake problems. Other officers elected were **Jesse Rosenwald,** vice-president, and **A. W. Anderson, Henry J. Degenkolb** and **John E. Rinne,** directors.

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George Gagon, consulting engineer of Payette, Idaho, has been appointed engineer for the University of Idaho, a new post created to meet the need of current new construction and deferred maintenance and repairs to the university physical plant.

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G. L. Sterling, secretary-manager of the Kittitas Reclamation District, has been elected president of the Washington State Association of Irrigation Districts. Other officers of the association include **J. A. Weber,** Quincy, first vice-president; and **Clifford Kail,** Tieton, second vice-president.

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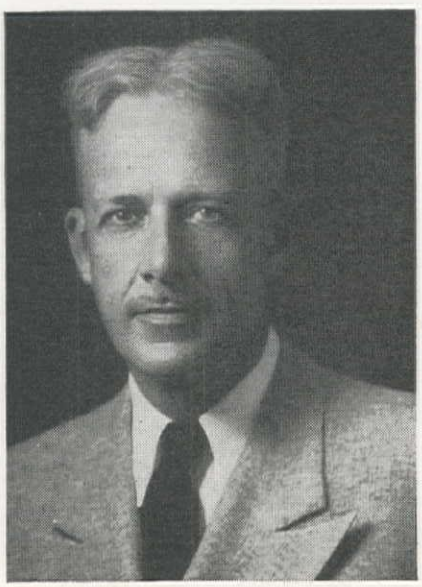
STEVE BARNES



Charles Baker has been re-elected president of the Everett, Wash., construction council, and **Paul Odegard,** general contractor of Everett, has been re-elected vice-president. **Roy Sievers** was elected secretary-treasurer, and **D. J. English** was re-appointed executive secretary. Trustees re-elected by the council membership include **George Duecy, Hugo Sigismund, George Newland, Ole Sather,** and **Roy Sievers.**

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Neil Kingston, Prince Rupert, B. C., has been appointed managing director of Northwest Construction Limited, Prince Rupert. He succeeds **James Hutchison,** who retired due to ill health.

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Gwynne D. LeGro has been appointed county engineer of Wahkiakum County at Cathlamet, Wash. He succeeds **C. L. Plymale,** who resigned recently to return to the Washington state highway department at Olympia where he was employed before becoming county engineer in 1944.

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Frank A. Metcalf, Juneau, Alaska, has been appointed territorial highway engineer to succeed the late W. Leonard Smith.

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Archie French, assistant city engineer at El Dorado, Kans., has been appointed assistant city engineer of Corvallis, Ore. In becoming assistant to **V. L. Goodnight,** city engineer of Corvallis, French succeeds **Bob Kyle,** who was recently appointed city engineer of North Bend, Ore.

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L. C. Hollister, former vice-president, is the new president of the Structural Engineers Association of Central California. **A. A. Sauer** is the new vice-president. **D. C. Willett, A. H. Brownfield** and **R. W. Hutchinson** have been elected as directors.

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F. O. McGrew, who served as city engineer of Coos Bay, Ore., from April until November last year, has returned to his former position with the Portland district, Corps of Engineers.

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Harry J. C. Berg, chief clerk for the Tacoma department of public utilities, has been appointed office manager for the water and light divisions of the city. He succeeds the late **Jack O'Brien.**

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Stephenson B. (Steve) Barnes was elected president of the Structural Engineers Association of Southern California for 1948 at the association's Dec. 3 meeting in Los Angeles. He is a member of the American Society of Civil Engineers and has been operating his own office in Los Angeles as a structural engineer since 1934. **Harry W. Bolin,** principal structural engineer of the State Division of Architecture, was elected vice-president, and **Lewis K. Osborn,** designing structural engineer of Kistner, Curtis and Wright, is the new secretary-treasurer. Members of the board of directors are **Richard W. Ware, George E. Brandow, L. T. Evans, Harold P. King** and **Donald F. Shugart.**

Capt. C. F. Ganong, U. S. Coast Guard, was elected president of the Seattle post of the American Society of Military Engineers. Other officers elected to serve the post during 1948 include **C. M. Howard,** first vice-president; **Max K. Bitts,** second vice-president; **Hanford Thayer,** secretary; **Walter Davidson,** treasurer; and **E. C. Carlson,** director at large.

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Lt. Col. George N. Kibler has been appointed post engineer at Fort Lewis, Wash., having been transferred from the district engineer's office at Cincinnati, Ohio. **Maj. A. W. Van Stockum,** post engineer at Camp Beale, Calif., until the closing of that station, has been appointed engineer property officer at Fort Lewis.

* * *

William R. Seeger, former project manager of the engineering office of Clyde C. Kennedy, San Francisco, has recently been appointed Assistant Chief Engineer of the Marin Municipal Water District at San Rafael, Calif.

* * *

F. G. Eric Peterson, Northern California structural engineer, has been appointed a member of the City Planning Commission of the city of El Cerrito, Calif.

* * *

Arthur P. Cramer, until recently the resident manager at the San Francisco office of Timber Structures, Inc., has resigned to enter the contracting business.

* * *

Jess D. Gilkerson has been appointed city engineer of Long Beach, Calif., to fill the vacancy created by the death of **George E. Baker.** He has been associated with the Long Beach engineering department since 1924.

* * *

Glen M. Jain is now city engineer on a full-time basis for Redwood City, Calif. He replaces acting city engineer **Cecil Longson.**

* * *

R. H. Baumberger, until recently city manager at Mill Valley, Calif., began new duties as city manager of Boulder, Colo., on Jan. 1.

* * *

William Rehus, who until recently was a field engineer for the Idaho Power Co., is now operating a building design and planning office in Winnemucca, Nev.

* * *

Bob G. Kyle, formerly assistant city engineer for Corvallis, Ore., has been appointed city engineer for North Bend, Ore. He succeeds **R. L. Cavanaugh** who will retire on Jan. 1, after 33 yr. of service as city engineer of North Bend.

* * *

W. E. Warburton, civil engineer at Namaimo, B. C., has been appointed municipal engineer at Penticton, B. C., succeeding **Arthur Evans,** who recently resigned.

* * *

Leland A. Storch is the new county engineer for Tuolumne Co., Calif. He succeeds **B. H. Maynard.**

* * *

Harza Engineering Co. of Chicago, specializing in the design of dams, hydroelectric projects, foundations and port facilities, has opened an office in Seattle. **James R. Metcalf** has been appointed western manager in charge of the Seattle office. **Leroy F. Harza,** president of the firm, is a member of the consulting board for McNary dam and has served as consultant for the city lighting departments of both Tacoma and Seattle.

* * *

Frank R. Creedon, formerly federal housing expediter, has taken over the duties of construction project manager for the General Electric Co. at the Hanford atomic energy works, Richland, Wash.

* * *

John G. Little, San Francisco structural engineer, has been appointed consulting engineer for the Golden Gate Bridge and Highway District as successor to the late **Leon H. Nishkian.**

* * *

Horace A. Taylor, construction engineer for the irrigation division of the Columbia Basin project, Bureau of Reclamation, has resigned to accept a position on the engineering staff of J. A. Terteling & Son, general contractors of Boise, Idaho. Taylor had been with the Bureau of Reclamation since 1930 and on the Columbia Basin project since 1935 with the exception of the war years when he commanded an engineer battalion in Europe.

* * *

Walter O. Schwarz has been appointed Clark County (Washington) engineer with headquarters at Vancouver. He succeeds the late **Bernard Morris.**

* * *

Hollis Kerr, construction engineer with the General Construction Co., has been transferred from the Portland office of the construction company to the home office in Seattle.

* * *

Samuel B. Morris, general manager and chief engineer of the Los Angeles Department of Water and Power has been named to the Colorado River Board by Governor Earl Warren. He succeeds **E. F. Scattergood,** deceased.

SUPERVISING THE JOBS

E. J. DeChand and **John T. Murphy** are day and swing shift superintendents respectively, and **A. H. Steiner** is the project manager for the Dorena Construction Co., Cottage Grove, Ore., for work on the earthfill Dorena Dam on the Row River 2 mi. below Dorena. **Aubrey Horn** is the chief engineer and **W. L. Reid** is the general foreman. **A. J. Henry** is superintendent of the crusher plant and **W. A. Blanton** and **Cecil Nelson** are the day and swing shift foremen. **William Rives** is the carpenter superintendent and carpenter foremen are **D. P. Shiepe, Marshel Ward,** and **Norton Stone. Glenn Roper** is rigger foreman. **A. Ballangue** is the labor foreman, and **Lin Young** and **William Goss** are the shop foremen. Shovel foreman is **Del Miller,** and cat foremen are **A. R. Richardson** and **D. C. "Slim" Yates. Vern A. Glascock** is office engineer. **P. T. Pulley** is the office manager. **Fred W. Bales** is paymaster, **Louis Hershberger** is purchasing agent, and **E. S. McCandliss** is the camp manager. Work has been under way now for six months under a $7,737,000 contract.

* * *

E. H. Dougherty is superintendent for Fredrickson Bros., Emeryville, Calif., on their highway job near Jackson. **Bill Slate** is superintending construction of the four bridges included as part of the contract. Foremen on the job are **Fred Butler,** in charge of grading, **R. M. Thompson,** master mechanic, **L. D. Gentry,** carpenter work, and **Emil Swanson,** in charge of powder operations. **Bill McNutt** is the hot plant superintendent. Resident engineer for the state is **E. L. Craun.**

* * *

F. J. Piche is job superintendent for A. Teichert & Son of Sacramento for construction of the state highway in Amador Co., Calif., between 3.7 mi. east of Pine Grove and the North Fork of the Mokelumne River. **Dave Hanney** is grade foreman, **Oscar Nelson** is powder foreman, and **M. A. Younger** is the supervisor in charge of structures and forms. **C. J. Phillips** is head oiler and **Jim Phillips** is office manager. **George Barry** is resident engineer for the state with **"Red" Atherstone** and **Dick Vandenburg** acting as his assistants.

* * *

T. E. Irving and **Ernest E. Frost** are general and assistant superintendents for N. M. Ball & Sons, Berkeley, Calif., contractors for grading and bituminous surfacing on 6.3 mi. of Rt. 20 in Trinity Co. **N. MacKenzie** is engineer for the contractor. **L. G. Gill** is the oiling foreman. **J. B. Nichols** is pipe foreman, and **T. F. Prince** is clearing operations foreman. **E. J. Collins, Jr.,** is the office manager. **P. F. Duffy** is resident engineer for the state on the job, **Kenneth Elder** is his assistant, while **Earl Weaver** is office engineer.

* * *

Carl Larson is the superintendent for Morrison-Knudsen Co., Boise, contractors for relocation of the Feather River highway near Storrie, Calif., for the state and the Pacific Gas and Electric Co. **W. J. Dackenwall** is the project manager for the contractors, and general foremen are **Jim Dunn** and **Bill Ricker. Fred Blame** is the blasting operations superintendent and **Charlie H. Nelson** is the powder foreman. **R. A. Warren** is electrician on the job and **E. M. Kast** is carpenter foreman. **John Woodward** is resident engineer for P. G. & E.

* * *

Hill Lind is the superintendent for Kuckenberg Construction Co., Portland, Ore., who have the $2,000,000 contract for construction of the highway and railroad between Gates and Detroit, Ore. Shovel and

truck foremen on the job are **L. Mace, William Abel, Peter Maddock, Edward Pinkston,** and **Luther McCabe.** Powder foremen are **N. P. Menald, R. Mortenson,** and **J. L. Myers. E. A. Anderson** is powder foreman, **J. R. Wilcox** is labor foreman, **B. S. Beisel** is lubrication foreman, and **Jens Faukald** is in charge of the culvert construction. **E. C. Larkins** is office manager and **C. E. Boleen** and **W. H. Reifschneider** are timekeepers. **Glenn Cunningham** is shovel operator. **W. C. Struble** is resident engineer for the state.

* * *

Lee Arnold is supervising the construction of the J. C. Penney Co. store at Santa Ana, Calif. for MacDonald, Young & Nelson, Inc., San Francisco contractors. **Paul Black** is general foreman and **R. W. "Dick" Graber** is labor foreman. **Oliver Twigg** is office engineer and manager. **Tom Martinson** is foreman for the Bethlehem Steel Co. on their portion of the contract. **J. A. Kline** is superintending the electrical work for Els Hokin & Galvin, contractors.

* * *

F. J. "Hux" Huxtable is superintendent for T-S Construction Engineers, Inc., Los Angeles, on erection of the Westinghouse Electric Bldg. at 6th and St. Paul in Los Angeles. **Joe W. Collins** is carpenter foreman and **M. Moya** is labor foreman. **C. Melvin** is engineer for the contractors and **Jack A. Greene** is office manager. The contract is for about $700,000 and completion time is 50 weeks.

* * *

John Franks is job superintendent for the Franks Dredging Co., Mission Beach, Calif., who have the $289,440 contract for dredging the Mission Bay Causeway and De Anza Cove at San Diego, Calif. **George Dyson** is the dredge captain, **M. H. Robertson** is levee superintendent, and **W. J. Cox** is chief electrician. **H. W. Sessions** is purchasing agent for the project.

* * *

Harold Shaffer is the job superintendent for M. P. Hunter, Seattle, Wash., on the $274,000 contract for general work on the tunnel between the boiler plant building and the Health Sciences Building at the University of Washington in Seattle. **Swan Dahlberg** is the tunnel superintendent and **John Young** is concrete foreman. **Al Roles** is the office manager.

* * *

H. W. "Spike" Eliason is general superintendent for H. Earl Parker, Inc., Marysville, Calif., on stripping the abutment for Pine Flat Dam 27 mi. east of Fresno on the Kings River. **"Slim" Alt** is the job superintendent. Alt is also superintending the construction of Big Dry Creek Dam near Fresno for the Parker Co., and **Charles Rowe** is his assistant.

* * *

Hal Merriam is superintendent for Del R. Beebe Construction Co., Fallon, Nev., on construction of a warehouse and machine shop for the University of Oregon at Eugene. **Howard Merriam** is carpenter foreman and **Ivan Merriam** is labor foreman on the $100,000 job.

* * *

R. J. Curtis is superintending the improvement of 6.5 mi. of U. S. Highway No. 66 between Albuquerque and Moriarty in New Mexico for W. T. Bookout Construction Co., Las Vegas, contractors for the $754,288 job. **C. J. Willhoite** is general auditor on the project.

A. M. HARSH

A. M. Harsh is superintendent for Fredrickson & Watson Construction Co., Oakland, Calif., for grading and plant-mix surfacing on 10 mi. of highway near Westwood. **Claude Smalley** is the plant foreman and **Les Christman, Pete Pace** and **John Naur** are grading foremen. **W. V. Galbraith** is the office engineer. **Clyde Deen** is labor foreman, **Oscar Norberg** is powder foreman, and **Gene Burkhart** is grease foreman. **Harry Milner** is the resident engineer and **Bill Borden** is his assistant.

* * *

Lloyd J. Brown is superintendent and **Conley L. Hendren** is project manager for Barrett & Hilp, San Francisco, contractors for the construction of 34 repeater stations on 8-mi. centers from Sacramento to the Oregon line for the Pacific Telephone & Telegraph Co. **P. G. Dunn** is superintending construction of the access roads to each station and **W. B. Stone** and **J. J. Mullen** are road foremen. **H. A. Bambauer** and **John Watson** are rock crushing superintendent and foreman, respectively. **Pat O'Rourke** is the master mechanic, and **Ralph Owens** is in charge of equipment transportation. Carpenter foremen are **George Beutler, Ralph Beutler, A. W. Pomeroy** and **John Vernor.** Road foremen are **R. J. Whatley, W. B. Mulligan** and **King Walters,** and **Cliff Adsit** is the paymaster, **Ray Pearl** is the resident engineer for Pacific Telephone & Telegraph Co.

* * *

T. K. Thompson is supervising construction of the reinforced concrete building being erected for Bekins Van & Storage Co. on Long Beach Blvd. in Compton, Calif., by the Harvey Nichols Co., Los Angeles. **C. F. "Scotty" Johnson** is foreman. Raymond Concrete Pile Co. are completing their contract for driving 300 piles for the sub-foundation, and Dimmit & Taylor, Los Angeles, are doing the excavating work.

* * *

Frank Sheldon is general superintendent for Milton Kaufman, Inc., on all work on housing projects in the Norwalk district of Los Angeles Co. **Jack Supple** is superintendent on the first part of the contract currently nearing completion and **Roy Block** is carpenter superintendent. Work will soon begin on the second subdivision of 248 four-room frame and stucco homes.

* * *

L. A. "Doc" Morgan is superintendent for Taylor-Wheeler Commercial, Inc., Fresno, Calif., on construction of a $119,405 wood frame, stucco exterior gymnasium building at Parlier, Calif. **Jerome Snow** is general manager on the project, and **C. H. "Bud" Gorham** is assistant general manager. **T. L. Quarles** is general superintendent for the contractor.

* * *

R. L. Hawkins is superintending construction of the 1,100-ft. tunnel at Flathead River, 9 mi. southeast of Columbia Falls, Mont., for contractor Guy F. Atkinson Co., South San Francisco, Calif. **Carl Nelson** is tunnel superintendent on the $643,400 project.

* * *

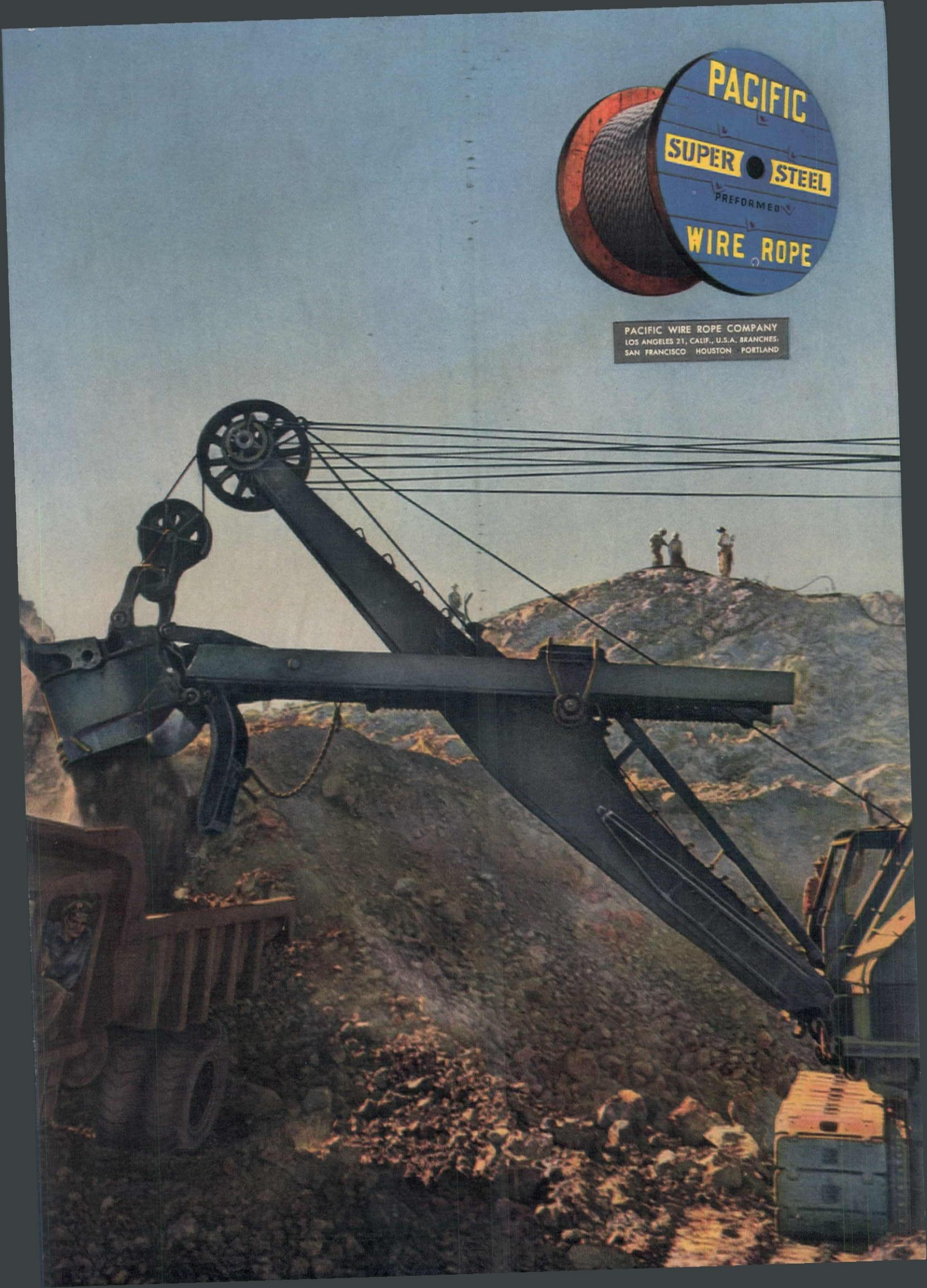
C. E. Epps is superintendent and **Marlin K. Hecht** is general foreman for W. C. Smith Co., Inc., of Long Beach, Calif., on construction of the north boundary storm drain pump station for the city of Long Beach. The contract calls for an expenditure of about $350,000.

* * *

Thomas J. Doyle is project superintendent for the Utah Construction Co., Ogden, on construction of the dam across the Mokelumne River near Pioneer, Amador Co., Calif., the West Point Power House project, and the power house for Pacific Gas & Electric Co. **E. C. Evans** and **C. A. Harlacker** are the assistant superintendents and **George Graham** is the company's engineer. **A. W. Lundberg** is the carpenter superintendent and **"Red" Hanton** is in charge of the batch plant. **Ivar Paulson** is managing the powder operations, **Roy Cummings** is in charge of reinforcing steel work, and **M. J. DiBattista** is the office manager. **Cliff Nelson** is timekeeper.

Field forces on the project for P. G. & E. are **J. E. Cooney** as project superintendent, **George Thatcher** as project engineer, **T. L.**

J. J. LYNCH, resident engineer for Campbell-Mannix Companies, joint venture firm building Section B of the Hart Highway, connecting Vancouver, B. C., and the Pacific Coast with Peace River and the Alaska Highway. (See story, page 70, this issue.)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SAN FRANCISCO HOUSTON PORTLAND

Johnston, field engineer and **Neal Smith**, office engineer. **James W. Ralston** is in charge of engineering layout. **C. M. Andrews** is inspector for the West Point Power House, and **Frank MacAvliffe** is chief of party.

* * *

F. W. Riddle and **H. A. Ellinger** are superintendents for the R.E.M. Construction Co., Eugene, Ore., on construction of the piers and abutments for the Willamette River crossing near Jasper, Ore. **Sig Moe** is the project manager. **Paul Haxby** is carpenter foreman, **Sam Ganten** is excavating foreman, and **A. L. Hamm** is steel foreman. The $195,950 contract involves construction of 6 abutments and 7 piers and 7,500 cu. yd. of excavation.

* * *

I. R. Kline is resident engineer for Stone & Webster Engineering Corp., Los Angeles, on construction of the Redondo Steam Station at Redondo Beach, and **James R. Leonard** and **Harry Roscoe** are field engineers. **Hugh F. Flynn** is field engineer for Macco Corp. on their portion of the contract.

* * *

Royal Richardson is superintendent for the C. B. Lauch Construction Co., Boise, Ida., on erection of a 200-unit apartment building in Boise. **L. A. Sawdy** is general foreman on the job and **Phil Blessinger** is purchasing agent. Cost of the building is estimated at $2,000,000.

* * *

G. M. Wehile is superintendent and **H. E. Rearden** is assistant for Fred J. Maurer & Son, Eureka, Calif., on construction of canal structures of the Tracy-Mendota Canal, part of the Central Valley Project in California. **John Boykin** and **W. H. Holmes** are carpenter foremen. **W. E. "Swede" Hall** is equipment foreman, **Roy Speny** is lubrication foreman, and **Harry Quinlivan** is labor foreman.

* * *

Ed Crawford is project manager on erection of the second section of the Marine View Homes being built for Marine View, Inc., in the hills of San Pedro, Calif., by the Haddock Co. **Ed Stones** is field superintendent and **Dwight Matthias** is engineer on the project. **Van Grosse** is concrete foreman and **Paul Burquist** is carpenter foreman.

* * *

William Yarnell, Sr., is job superintendent for Fred J. Early, Jr., Co., Inc., San Francisco, on construction of the $214,000 sewage plant at the Camarillo State Hospital in Ventura Co., Calif.

* * *

C. E. Archer is superintending construction of the Quines Creek and Cow Creek bridges on Highway 99 near Azalea, Ore., for Sleeper Heyes, contractor. **S. B. Lewis** is the carpenter foreman. **Harry Teel** is resident engineer for the state.

* * *

Ernie W. Leppert, formerly in a key capacity for Macco Construction Co. on Coronado Island, is now project manager for William Radkovich Co., Inc., on additional construction on the Basilone Homes, veteran housing project at Pacoima, Calif.

* * *

James Nicely is superintendent for Allied Contractors, Inc., of Los Angeles on the erection of 70 homes and 15 duplexes on Long Beach Blvd. **Frank Stark** is the carpenter foreman and **W. P. Peters** is the labor foreman.

* * *

R. C. Browning is superintendent on construction of the new addition for Proctor & Gamble at Long Beach, Calif. He recently supervised a similar project for the same company at Dallas, Texas. The contractor is H. K. Ferguson Co. of Cleveland, Ohio.

* * *

Jacob L. Friedman is superintendent for the Crown Construction Co., Phoenix, who are building 275 houses for personnel at 32nd St., between Thomas and Indian School Rds. **Lee Gillem** has the contract for cement work on the job.

* * *

Ed Ekrem is supervising the construction of a $2,000,000 hospital at Selah, Wash., for the General Construction Co. of Seattle. Completion of the building is scheduled for August, 1949. Ground was broken late in October.

* * *

E. R. Stevenson is superintendent for Harry I. Hamilton Co., Eugene, Ore., on construction of a warehouse and electric shop for Allen Hamilton in Eugene.

* * *

H. E. Morse is superintendent for L. G. Shalz, Chico, Calif., on construction of the jail addition at Oroville, Calif.

* * *

H. Eggleston is plant superintendent for Draper & Adams Co. of Red Bluff, Calif., at their sand and gravel plant in Red Bluff.

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3. The preforming process reduces the tendency of Lang Lay wire rope to loop and squirm—thereby making it possible to utilize the many basic advantages of Lang Lay for more purposes.
4. As the wires and strands are shaped to the normal form they occupy in the rope, there is less turning and twisting . . . less wear . . . longer life.

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UNIT BID SUMMARY

Dam . . .

Colorado—Arapahoe County—Corps of Engineers—Earthfill

Wunderlich Contracting Co., Jefferson City, Mo., was awarded a contract by the Corps of Engineers, Denver, at $7,995,125 for the construction of embankment and spillway canal for the earthfill Cherry Creek Dam and Reservoir, on Cherry Creek near Sullivan, approx. 6 mi. southeast of Denver. Time allotted for completion is two years. The following submitted unit bids:

(A) Wunderlich Contracting Co..... $7,995,125
(B) Mittry Bros. Construction Co..... 8,227,145
(C) Western Contracting Co..... 8,884,827
(D) S. J. Groves & Sons Co., Bowen & McLaughlin, C. F. Lytle Co., Green & Amis Construction Co..... 9,359,011
(E) Guy F. Atkinson, Bressi & Bevanda, W. E. Kier Construction Co., A. Teichert & Sons, Inc..... $ 9,482,542
(F) Hunkin-Conkey Construction Co., Shofner, Gordon & Hinman..... 9,734,451
(G) Peter Kiewit Sons Co..... 9,890,140
(H) G. M. Brewster & Son, Inc..... 10,874,090
(I) Engineer's estimate 8,125,180

(1) Lump sum, diversion and care of water.
(2) Lump sum, removal of existing structs.
(3) Lump sum, clear and grub dam site.
(4) 307,000 cu. yd. stripping.
(5) 165,000 cu. yd. common excav.
(6) 3,000,000 cu. yd. spillway excav.
(7) 2,733,000 cu. yd. embankment in Zone 1.
(8) 2,063,000 cu. yd. embankment in Zones 2 & 3.
(9) 7,100,000 cu. yd. embank. in Zones 1-A & 4.
(10) 460,000 cu. yd. upstream and downstream blankets.
(11) 1,500 cu. yd. compacted impervious backfill.
(12) 7,500 cu. yd. compacted pervious backfill.
(13) 2,000,000 sq. ft. additional rolling.
(14) 93,000 cu. yd. coarse sand and gravel.
(15) 73,200 cu. yd. riprap.
(16) Lump sum, Piezometers, settlement gauges.
(17) 10,500 lin. ft. 12-in. perf. pipe.
(18) 570 lin. ft. 12-in. pipe.
(19) 2,550 lin. ft. collector pipe.
(20) 9 ea. 10-ft. manholes.
(21) 50 lin. ft. manhole height in excess of 10 ft.
(22) Lump sum, install hydrostatic pressure cell system.
(23) 350 lin. ft. pressure relief and well screen sect.
(24) 400 lin. ft. pressure relief well casing sect.
(25) 14 ea. pressure relief fitting assemblies.
(26) 150 lin. ft. addtl. length of risers.
(27) 150 lin. ft. addtl. length of valve box and stem extension.
(28) 75 acres soil prep.
(29) 75 acres seeding.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	$25,000	$60,000	$170,000	$151,500	$33,000	$64,888	$25,000	$75,000	$145,256
(2)	$55,000	$17,000	$165,000	$75,750	$60,000	$75,916	$65,000	$30,000	$341,321
(3)	$2,500	$58,000	$15,000	$8,350	$20,000	$136,276	$125,000	$140,000	$14,156
(4)	.15	.90	.40	.303	.50	.30	.25	.36	.168
(5)	.50	.40	.50	.38	.35	.56	.25	.58	.403
(6)	.59	.27	.35	.38	.47	.45	.35	.34	.341
(7)	.37	.45	.41	.467	.52	.48	.59	.55	.514
(8)	.37	.45	.41	.456	.52	.49	.54	.64	.459
(9)	.37	.40	.41	.47	.52	.44	.49	.58	.341
(10)	.25	.36	.25	.15	.14	.25	.25	.30	.151
(11)	5.00	2.00	4.00	10.60	6.00	8.00	5.00	5.00	9.923
(12)	4.00	1.50	4.00	7.60	1.50	5.70	2.50	4.00	6.954
(13)	.01	.02	.02	.021	.016	.01	.02	.03	.041
(14)	3.50	5.00	3.65	3.80	3.75	4.50	6.00	5.00	3.542
(15)	5.50	6.00	7.80	7.75	4.50	8.50	7.00	8.00	5.909
(16)	$20,000	$44,500	$150,000	$120,584	$45,000	$91,018	$130,000	$65,000	$39,258
(17)	4.00	3.50	15.20	5.23	4.50	6.00	3.50	4.00	3.30
(18)	4.00	3.50	2.60	4.20	4.25	5.70	15.00	5.00	3.53
(19)	10.00	11.00	24.00	24.30	25.00	20.90	13.00	25.00	9.21
(20)	400.00	350.00	900.00	350.00	300.00	303.00	500.00	300.00	215.75
(21)	25.00	15.00	100.00	29.00	30.00	30.00	50.00	50.00	16.50
(22)	$10,000	$32,500	$55,000	$25,755	$15,000	$64,222	$50,000	$15,000	$8,933
(23)	10.00	30.00	30.00	22.70	50.00	50.00	25.00	25.00	6.39
(24)	9.00	25.00	28.00	22.70	18.00	50.00	25.00	22.00	4.38
(25)	150.00	150.00	340.00	212.00	200.00	500.00	700.00	300.00	375.97
(26)	5.00	10.00	6.10	18.50	12.00	10.00	25.00	10.00	11.88
(27)	5.00	12.00	2.50	3.80	6.00	10.00	15.00	5.00	5.01
(28)	855.00	$1,200	$1,000	$1,360	$1,400	906.00	600.00	$1,800	430.76
(29)	100.00	$1,200	35.00	180.00	250.00	350.00	400.00	700.00	15.36

North Dakota—Grant County—Bur. of Recl.—Earthfill

C. F. Lytle Co., Sioux City, Iowa, and Green Construction Co., Des Moines, Iowa, submitted the low bid of $2,360,743 to the Bureau of Reclamation at Bismarck, North Dakota, for the construction of the Heart Butte Dam and Dike and the relocation of State Hwy. No. 49. The principal features involved in the construction are an earthfill dam across the Heart River, a combined spillway and outlet works through the dam on the right abutment, an earthfill dike approx. 1.5 mi. southwest of the dam site, and the construction of 7.5 mi. of hwy. The dam will be approx. 1,850 ft. long at crest and will have a maximum height of 124 ft. above the river channel. Time allowed for completion is 975 days. The following unit bids were submitted:

(1) C. F. Lytle Co. & Green Construction Co. $2,360,743
(2) Northwestern Engineering Co..... 2,640,997
(3) Morrison-Knudsen Co., Inc..... $2,737,340
(4) Utah Construction Co..... 2,751,792
(5) S. J. Groves & Sons Co..... 2,988,001

SCHEDULE—PART I
HEART BUTTE DAM

Lump sum,		(1)	(2)	(3)	(4)	(5)
	Div. and care of R. dur. const. and unwatering foundations	$55,000	$86,500	$110,000	$55,300	$50,000
106,000 cu. yd.	Exc., stripping borrow areas	.27	.30	.30	.25	.40
360,000 cu. yd.	Exc., all classes, in open cut	.73	.85	.40	.78	.95
203,000 cu. yd.	Exc., all classes, for found.	1.05	.73	.80	.68	.55
1,142,000 cu. yd.	Exc. earthfill	.30	.42	.51	.49	.40
52,000 cu. yd.	Exc. sand and gravel	.80	1.00	1.00	1.20	1.25
1,200 cu. yd.	Trenches for test apparatus	3.50	6.75	8.00	3.20	3.00
125,000 lbs.	Furn. and drive steel sheet piling	.14	.22	.15	.17	.11
9,500 cu. yd.	Proc. riprap from source "A"	4.00	7.90	4.50	5.00	6.50
10,000 cu. yd.	Proc. riprap from source "B"	2.00	5.50	4.75	4.15	7.50
10,000 cu. yd.	Proc. riprap from source "C"	2.50	5.75	5.00	4.55	7.50
1,129,000 cu. yd.	Earth fill in dam and dike embank	.125	.22	.12	.26	.15
8,500 cu. yd.	Tamping earth fill	8.45	3.40	2.30	3.75	5.00
11,000 cu. yd.	Rockfill on downstream slope of dam em.	.30	.68	2.40	1.00	1.50
52,000 cu. yd.	Sand&grav. on upstr. sl. of dm.&.dk. emb.	.20	.88	.12	.20	.40
26,000 cu. yd.	Pl. riprap on up slope of dam embank	1.00	1.15	2.00	1.20	5.00
3,500 cu. yd.	Pl. dumped riprap	.50	1.15	1.40	1.20	4.00
10,000 cu. yd.	Backfill	.45	.75	1.90	.84	1.50
660 lin. ft.	Furn. 6-in. dia. sewer pipe	1.70	3.00	4.20	2.00	2.00
650 lin. ft.	Furn. 8-in. dia. sewer pipe	2.00	3.40	4.40	2.40	2.50
1,100 lin. ft.	Furn. 12-in. dia. sewer pipe	3.00	4.50	4.90	4.15	3.50

(Continued on next page)

P. & J. ARTUKOVICH OF LOS ANGELES TEAMS 'EM UP FOR PROFIT

Lorain owners P. & J. Artukovich of Pittsburg and Los Angeles, Calif. have created a "well-balanced" working combination from the complete Lorain line. Their four Lorains take them into a wide range of work requiring capacity, lifting ability or mobility.

Their 1¾ yard Lorain-80 dragline is shown digging a trench for a 72" water line between Walnut Creek and Pittsburg, Calif. Travel conditions on this job demanded crawler mounting. For high speed travel and work versatility, their two Lorain TL-20 rubber-tire Moto-Cranes and 20-ton Lorain Moto-Crane Model MC-414 take over and boost profits on other jobs.

Your Thew-Lorain Dealer can help you build your shovel-crane fleet to meet any job conditions—today and tomorrow!

THE THEW SHOVEL CO., LORAIN, OHIO

75 DIFFERENT LORAIN STYLES

That's right! When you go to your Thew-Lorain Distributor to select a new Lorain, you can choose from 75 different Thew-Lorain styles—in the "TL-20", "41", or "820" series. Yes, you have a choice of 75 different combinations in front end mounting and capacities for any job you will tackle. And you get the proved quality of Thew-Lorain products in any model.

THE THEW SHOVEL CO.
LORAIN, OHIO

See Your THEW **Lorain** *Dealer*

BUNTING TRACTOR CO., Inc. *Boise, Twin Falls, Gooding, Fairfield, Burley, Carey, Idaho La Grande, Oregon*
CATE EQUIPMENT CO. . . . . . *Salt Lake City 4*
CENTRAL MACHINERY CO. . . . . *Great Falls and Havre, Mont.*
COAST EQUIPMENT CO. . . . . . *San Francisco 3*
A. H. COX & COMPANY . . . . . *Seattle 4, Wash.*
P. L. CROOKS & CO., INC. . . *Portland 10, Ore.*
LE ROI-RIX MACHINERY CO. . . . *Los Angeles 11*
LIBERTY TRUCKS & PARTS CO. . . . . . *Denver 1*
MOUNTAIN TRACTOR CO. . . . . . *Missoula and Kalispell, Mont.*
LEE REDMAN EQUIPMENT CO. . . . *Phoenix, Arizona*
SANFORD TRACTOR & EQUIPMENT CO. . . *Reno, Nev.*
TRACTOR & EQUIPMENT CO. . . . . . *Sidney, Mont.*
Branch: Miles City Equip. Co., Miles City, Mont.
WORTHAM MACHINERY CO. . . . . . *Cheyenne, Wyo., Billings, Mont. Branches: Sheridan, Greybull, Casper and Rock Springs, Wyo.*

110	lin. ft.	Furn. 6-in. dia. sewer pipe	3.00	2.35	4.40	1.20	1.75
15,900	bbl.	Furn. and handling cement	6.00	6.75	6.00	6.00	5.50
1,850	cu. yd.	Conc. in inlet struct, incl. plug	48.00	46.75	65.00	65.50	70.00
1,150	cu. yd.	Conc. in gate chamber and shaft	50.00	47.25	70.00	47.50	60.00
4,100	cu. yd.	Conc. in conduit and cut-off collars	52.00	41.00	65.00	46.50	75.00
950	cu. yd.	Conc. in stilling basin floor	44.00	34.40	55.00	37.00	45.00
1,075	cu. yd.	Conc. in stilling basin walls	51.00	48.00	80.00	75.00	85.00
40	cu. yd.	Conc. in hoist house	100.00	60.75	115.00	90.00	190.00
620	cu. yd.	Conc. in parapet and terminal wells	95.50	36.50	85.00	81.00	70.00
1,686,000	lb.	Furn. and pl. reinf. bars	.139	.13	.12	.135	.13
530	lin. ft.	Furn. and pl. metal sealing strips	5.00	2.00	2.00	1.90	1.50
66	lin. ft.	Placing rubber water stops	5.00	2.70	1.50	1.70	3.00
2,100	sq. ft.	Furn. and pl. joint filler	1.20	1.00	.65	2.45	1.00
420	sq. yd.	Dampproofing conc.	3.00	1.00	1.35	1.40	1.50
120	sq. yd.	Special finishing of conc. surf.	20.00	20.25	7.00	24.00	7.50
Lump sum,		Constr. hoist house	$2,700	$1,000	700.00	950.00	$4,000
1,860	lin. ft.	Erect cable guardrail	2.00	1.35	4.00	3.75	2.25
78,400	lb.	Inst. hi pres. gates & cast-met. cond. li.	.15	.20	.10	.11	.10
5,000	lb.	Inst. cont. app. & piping for hi-press g.	.25	.25	.50	.75	.65
30,000	lb.	Inst. spillway air vents	.15	.13	.20	.19	.40
400	lb.	Inst. stan. pipe, ftgs & v. less 6-in. dia.	1.00	.50	.34	.46	.30
12,000	lb.	Inst. stan. pipe ftgs & v. 6-in. & larger	.50	.16	.14	.24	.30
35,000	lb.	Inst. trashrack metalwork	.15	.15	.06	.17	.07
200	lb.	Inst. pipe handrailing	.80	1.35	.50	1.00	.50
6,000	lb.	Installing misc. metalwork	.60	.20	.70	.70	.40
200	lin. ft.	Furn. & inst. elect. met. cond.	4.00	1.50	1.35	2.25	1.30
100	lb.	Furn. & inst. elec. cond. & gr. wires	10.00	1.35	3.40	2.30	1.25
1,200	lb.	Installing elect. apparatus	1.00	2.00	.34	1.84	2.00

SCHEDULE—PART II
RELOCATION OF STATE HIGHWAY NO. 49

			(1)	(2)	(3)	(4)	(5)
166,800	cu. yd.	Excav., all classes, for roadway	.40	.34	.40	.37	.50
450	cu. yd.	Excav., all classes, for culverts	2.30	3.00	2.00	2.00	2.50
3,000	cu. yd.	Backfill for pipe culverts	5.00	2.00	2.70	4.40	5.00
25,000	sta. cu. yd.	Overhaul of roadway matl.	.02	.04	.025	.03	.03
700	M. gal.	Watering	4.00	3.50	2.00	2.45	3.00
900	roller hrs.	Rolling roadway embankments	9.00	5.50	5.40	9.00	5.00
44	lin. ft.	Rem. & relay 1-in. dia. reinf. conc. pipe	3.00	3.00	3.25	3.00	3.00
1,182	lin. ft.	Furn. & lay 24-in. dia. rein. conc. pipe	7.50	5.50	7.70	7.00	7.50
242	lin. ft.	Furn. & lay 30-in. dia. reinf. conc. pipe	10.50	7.00	10.40	10.00	10.00
166	lin. ft.	Furn. & lay 48-in. dia. reinf. conc. pipe	20.50	15.00	19.50	18.00	20.00
112	lin. ft.	Furn. & lay 60-in. dia. reinf. conc. pipe	35.00	22.00	29.00	30.00	30.00
552	lin. ft.	Furn. & lay 18-in. dia. corr. metal pipe	6.00	3.50	5.00	3.65	4.50
16,300	cu. yd.	Gravel surfacing	1.00	2.00	1.90	1.30	3.00
378	sta. of 100 ft.	Finishing roadway of highway	18.00	8.00	16.00	10.00	25.00

Power . . .

California—Various Counties—Bur. of Recl.—Power Line

J. & J. Construction Company, Oklahoma City, Okla., submitted the low bid of $1,313,497 on Schedule No. 1, and $1,498,020 on Schedule No. 2 before the Bureau of Reclamation at Parker Dam, Calif. The transmission line is to be a 161-kv., 3-phase, single-circuit, wood-pole, H-frame-type, approximately 123 mi. long, from the substation at Parker Dam, to a point northwest of Yuma, Ariz., at which point an interconnection will be made with the existing 161-kv. transmission line which connects the Gila substation and the substation at All-American Canal Drop No. 4, Davis Dam Project. The line is designed for light loading conditions of no ice and a wind pressure of 9 lbs. per sq. ft. at 30° F. Unit bids submitted are as follows:

SCHEDULE I

(1) J. & J. Construction Co. $1,313,497
(2) Electrical Constructors 1,339,557
(3) C. - L. Electric Co. $1,555,817
(4) Donovan Construction Co. 1,791,030

SCHEDULE II
(Using hollow copper conductor)

(1) J. & J. Construction Co. $1,498,020
(2) Electrical Constructors $1,741,768

SCHEDULE I

		(1)	(2)	(3)	(4)
Lump sum,	clear land and right-of-way	$80,000	$10,500	$8,000	$30,402
10	Const. type HS struct. with 50-ft. poles	339.00	327.00	292.00	620.00
41	Const. type HS struct. with 55-ft. poles	339.00	331.00	299.00	631.00
145	Const. type HS struct. with 60-ft. poles	341.00	336.00	318.00	643.00
599	Const. type HS struct. with 65-ft. poles	356.00	341.00	350.00	643.00
106	Const. type HS struct. with 70-ft. poles	377.00	347.00	363.00	667.00
27	Const. type HS struct. with 75-ft. poles	377.00	360.00	416.00	697.00
1	Const. type HS struct. with 80-ft. poles	402.00	467.00	505.00	760.00
1	Const. type HA struct. with 55-ft. poles	353.00	331.00	307.00	691.00
2	Const. type HA struct. with 60-ft. poles	355.50	336.00	317.00	702.00
8	Const. type HA struct. with 65-ft. poles	365.00	341.00	345.00	702.00
2	Const. type HA struct. with 70-ft. poles	393.00	347.00	371.00	727.00
1	Const. type HA struct. with 75-ft. poles	395.50	360.00	422.00	757.00
1	Const. type HTR struct. with 60-ft. poles	381.00	465.00	458.00	810.00
1	Const. type HTR struct. with 65-ft. poles	381.00	470.10	466.00	817.00
2	Const. type HTR struct. with 70-ft. poles	411.00	476.00	492.00	842.00
4	Const. type HTR struct. with 75-ft. poles	411.50	489.00	546.00	874.00
2	Const. type HST struct. with 55-ft. poles	364.00	331.00	338.00	870.00
7	Const. type HST struct. with 60-ft. poles	374.00	336.00	349.00	896.00
1	Const. type HST struct. with 65-ft. poles	374.00	341.00	364.00	959.00
1	Const. type HSB struct. with 55-ft. poles	376.00	350.00	320.00	659.00
2	Const. type HSB struct. with 60-ft. poles	377.00	355.00	348.00	670.00
8	Const. type HSB struct. with 65-ft. poles	377.00	360.00	350.00	670.00
2	Const. type HSB struct. with 70-ft. poles	403.00	366.00	383.00	695.00
1	Const. type HSB struct. with 75-ft. poles	404.00	379.00	436.00	712.00
1	Const. type 3A struct. with 55-ft. max. pole length	314.00	345.00	281.00	770.00
2	Const. type 3A struct. with 60-ft. max. pole length	330.00	350.00	298.00	784.00
8	Const. type 3A struct. with 65-ft. max. pole length	330.00	355.00	338.00	784.00
2	Const. type 3A struct. with 70-ft. max. pole length	351.00	367.00	375.00	808.00
1	Const. type 3A struct. with 75-ft. max. pole length	351.00	369.00	454.00	846.00
1	Const. type 3AB struct. with 55-ft. max. pole length	317.00	345.00	278.00	770.00
2	Const. type 3AB struct. with 60-ft. max. pole length	333.00	350.00	295.00	784.00
8	Const. type 3AB struct. with 65-ft. max. pole length	333.00	355.00	314.00	784.00
1	Constr. type 3AT struct. with 55-ft. max. pole length	386.00	350.00	328.00	912.00
1	Const. type 3AT struct. with 60-ft. max. pole length	401.00	355.00	350.00	925.00
2	Const. type 3AT struct. with 65-ft. max. pole length	402.00	360.00	385.00	925.00
1	Const. type 3T struct. with 55-ft. max. pole length	687.00	580.00	484.00	$1,034
2	Const. type 3T struct. with 60-ft. max. pole length	737.00	585.00	502.00	$1,046
3	Const. type 3T struct. with 65-ft. max. pole length	737.00	592.00	546.00	$1,046
1	Const. type 3TX struct. with 55-ft. max. pole length	685.00	575.00	644.00	$1,102
1	Const. type 3TX struct. with 60-ft. max. pole length	735.00	580.00	661.00	$1,115

(Continued on next page)

MR. CONTRACTOR: When you arrange with your distributor to buy construction equipment, LET C.I.T. FINANCE THE TRANSACTION. It's good business to conserve your working capital for operating purposes. By keeping your funds liquid you can take advantage of every opportunity to effect savings when buying materials and supplies.

C.I.T. WILL FURNISH FUNDS, any amount at reasonable cost, for purchases of almost every type of construction equipment you use. You can combine the total cost of several purchases in one easy-to-liquidate obligation. Let the equipment help pay for itself out of operating savings and increased efficiency.

Repayment can be arranged on terms to suit your needs. Select the equipment you need, tell us how you want to pay for it and the balance to be financed. Any office listed below will handle all financing details for you and, when you obtain delivery, a C.I.T. check will complete the transaction. Get in touch with us for terms and full information or send for NEW booklet on our financing service.

"The mark of leadership"

C. I. T. CORPORATION

Industrial and Equipment Financing

One Park Avenue	One N. La Salle St.	66 Luckie Street N. W.	660 Market St.	416 W. 8th Street
NEW YORK	CHICAGO	ATLANTA	SAN FRANCISCO	LOS ANGELES

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

2	Const. type 3TX struct. with 65-ft. max. pole length	735.00	585.00	703.00	$1,115
1	Const. type 3DE struct. with 60-ft. max. pole length	504.00	341.00	638.00	954.00
1	Const. type 4SWT struct. with 55-ft. max. pole length. compl. with air-break switch	$2,350	$1,271	$2,066	$1,421
1	Const. type 4SWT struct. with 60-ft. max. pole length, compl. with air-break switch	$2,350	$1,281	$2,173	$1,484
1	Const. type 4SWT struct. with 65-ft. max. pole length, compl. with air-break switch	$2,350	$1,291	$2,278	$1,547
200	Assembling and attaching X-brace	30.00	23.00	30.00	32.00
84	Const. single guy without strain insulator	45.00	100.00	32.00	56.50
269	Const. double guy without strain insulator	53.00	114.00	58.00	81.00
61	Const. single guy with wood strain guy insulation	50.00	111.00	36.00	66.00
200	Const. double guy with wood strain guy insulator	60.50	114.00	60.00	90.00
614	Furn. and place plate anchor	43.75	59.00	46.00	37.50
50	Furn. and place grouted anchor	22.00	30.00	38.00	31.00
50	Furn. and attach guy wire protector	6.50	5.00	10.00	9.00
3,000	Furn., assem. and att. suspens-insul. assem. with 11 insul. units	41.60	58.00	71.00	53.00
132	Furn., assem. and att. suspens-Insul. assem. with 12 insul. units	46.61	61.00	77.00	56.00
105	Furn., assem. and att. tension-insul. assem. with 13 insul. units	51.62	212.00	83.00	76.00
123	Furn. and stringing 477,000-circ. mil steel reinf. alum. cond.	$3,705	$4,648	$5,924	$4,581
500	Furn. and attach vibration damper for aluminum cond.	8.00	9.00	18.00	17.50
51	Att. 50-lb. hold-down weight for suspension insul.	3.50	7.00	26.00	30.50
78	Att. 100-lb. hold-down weight for suspension insul.	5.00	7.00	30.00	52.00
18	Att. 135-lb. hold-down weight for suspension insul.	6.00	7.00	35.00	64.00
51	Att. 180-lb. hold-down weight for suspension insul.	11.00	7.00	60.00	85.00
3	Att. 235-lb. hold-down weight for suspension insul.	21.00	7.00	100.00	108.00
123	Furn. and string two 3/8-in. galv.-steel overhead ground wires	772.50	655.00	$1,121	$1,988
300	Placing fence ground rod and grounding fences	3.00	4.00	8.00	9.00

SCHEDULE II

		(1)	(2)
Lump sum, clear land and right of way		$79,487	$13,500
36	Const. type HS struct. with 55-ft. poles	317.00	331.00
170	Const. type HS struct. with 60-ft. poles	319.00	336.00
722	Const. type HS struct. with 65-ft. poles	334.00	341.00
174	Const. type HS struct. with 70-ft. poles	355.00	347.00
70	Const. type HS struct. with 75-ft. poles	355.00	360.00
1	Const. type HS struct. with 80-ft. poles	380.00	467.00
1	Const. type HA struct. with 55-ft. poles	331.00	331.00
2	Const. type HA struct. with 60-ft. poles	333.50	336.00
8	Const. type HA struct. with 65-ft. poles	343.50	341.00
2	Const. type HA struct. with 70-ft. poles	371.00	347.00
1	Const. type HA struct. with 75-ft. poles	373.50	360.00
1	Const. type HTR struct. with 60-ft. poles	359.00	465.00
1	Const. type HTR struct. with 65-ft. poles	359.00	470.00
2	Const. type HTR struct. with 70-ft. poles	389.00	476.00
4	Const. type HTR struct. with 75-ft. poles	389.50	489.00
2	Const. type HST struct. with 55-ft. poles	342.00	331.00
7	Const. type HST struct. with 60-ft. poles	352.00	336.00
1	Const. type HST struct. with 65-ft. poles	352.00	341.00
1	Const. type HSB struct. with 55-ft. poles	354.00	350.00
2	Const. type HSB2 struct. with 60-ft. poles	467.00	355.00
8	Const. type HSB struct. with 65-ft. poles	355.00	360.00
2	Const. type HSB struct. with 70-ft. poles	381.00	366.00
1	Const. type HSB struct. with 75-ft. poles	382.00	379.00
1	Const. type 3A struct. with 55-ft. max. pole length	292.00	345.00
2	Const. type 3A struct. with 60-ft. max. pole length	308.00	350.00
8	Const. type 3A struct. with 65-ft. max. pole length	308.00	355.00
1	Const. type 3A struct. with 70-ft. max. pole length	329.00	367.00
1	Const. type 3A struct. with 75-ft. max. pole length	329.00	369.00
1	Const. type 3AB struct. with 55-ft. max. pole length	295.00	345.00
2	Const. type 3AB struct. with 60-ft. max. pole length	311.00	350.00
8	Const. type 3AB struct. with 65-ft. max. pole length	311.00	355.00
1	Const. type 3AT struct. with 55-ft. max. pole length	364.00	350.00
1	Const. type 3AT struct. with 60-ft. max. pole length	379.00	355.00
2	Const. type 3AT struct. with 65-ft. max. pole length	380.00	360.00
1	Const. type 3T struct. with 55-ft. max. pole length	665.00	580.00
2	Const. type 3T struct. with 60-ft. max. pole length	715.00	585.00
3	Const. type 3T struct. with 65-ft. max. pole length	715.00	592.00
1	Const. type 3TX struct. with 55-ft. max. pole length	663.00	575.00
1	Const. type 3TX struct. with 60-ft. max. pole length	713.00	580.00
2	Const. type 3TX struct. with 65-ft. max. pole length	713.00	585.00
1	Const. type 3DE struct. with 60-ft. max. pole length	482.00	341.00
1	Const. type 4SWT struct. with 55-ft. max. pole length, compl. with air-break switch	$2,350	$1,271
1	Const. type 4SWT struct. with 60-ft. max. pole length, compl. with air-break switch	$2,350	$1,281
1	Const. type 4SWT struct. with 65-ft. max. pole length, compl. with air-break switch	$2.350	$1,291
200	Assem. and attaching X-brace	30.00	23.00
84	Const. single guy without strain insulator	45.00	100.00
269	Const. double guy without strain insulator	53.00	114.00
61	Const. single guy with wood strain insulator	50.00	111.00
200	Const. double guy with wood strain insulator	60.50	114.00
614	Furn. and place plate anchor	43.75	59.00
50	Furn. and place grouted anchor	22.00	30.00
50	Furn. and attach guy wire protector	6.50	5.00
3,600	Furn., assem. and attach suspension-insulator assem. with 11 insul. units	40.60	56.00
132	Furn., assem. and attach suspension-insulator assem. with 12 insul. units	45.61	59.00
105	Furn., assem. and attach tension-insulator assem. with 13 insul. units	50.62	212.00
123	Furn. and string 300,000-circulator mil hollow copper conductor	$5,385	$7,024
51	Attach 50-lb. hold-down weight for suspension insulators	3.50	7.00
78	Attach 100-lb. hold-down weight for suspension insulators	5.00	7.00
18	Attach 135-lb. hold-down weight for suspension insulators	6.00	7.00
51	Attach 180-lb. hold-down weight for suspension insulators	11.00	7.00
3	Attach 235-lb. hold-down weight for suspension insulators	21.00	7.00
123	Furn. and string two 3/8-in. galvanized-steel overhead ground wires	772.50	655.00
300	Place fence ground rod and grounding fences	3.00	4.00

Irrigation . . .

Oklahoma—Jackson County—Bur. of Recl.—Lateral and Sublaterals

Pannell Construction Co., Helena, Arkansas, submitted the low bid of $288,730 to the Bureau of Reclamation at Altus, for the construction of earthwork and structures for the Ozark Laterals 4.6 and 15.2 and Sublaterals. The work is located near Altus. The following submitted unit bids:

(1) Pannell Construction Co. $288,730
(2) Stamey Construction Co. 323,710
(3) Byrd-White Construction Co. 331,505
(4) Pennington-Winter Construction Co. $389,246
(5) Oklahoma Paving Co. 415,367
(6) Martin K. Eby Construction Co. 460,662

	(1)	(2)	(3)	(4)	(5)	(6)
61,000 cu. yd. excav. for laterals	.45	.50	.50	.53	.60	.76
50,000 sta. cu. yd. overhaul	.05	.05	.05	.06	.12	.08

(Continued on next page)

25,000 cu. yd. compacting embank.	.12	.20	.20	.30	.30	.08
15,000 cu. yd. excav. for drainage channels and dikes	.35	.30	.40	.53	.60	1.00
16,000 cu. yd. excav. for structs.	.90	1.00	1.25	1.00	1.15	2.00
14,000 cu. yd. backfill	.35	.40	.50	.90	1.00	1.00
8,000 cu. yd. compacting backfill	1.00	1.25	1.25	1.30	1.60	4.50
2,500 sq. yd. dry-rock paving	5.00	4.50	4.50	6.00	6.50	2.50
1,700 cu. yd. concrete in structs.	60.00	80.00	78.00	90.00	95.00	85.00
2,550 bbl. furn. and handling cement	3.50	3.50	3.75	4.00	4.00	4.00
138,000 lb. furn. and placing reinf. bars	.15	.14	.15	.17	.19	.11
36 M.B.M. furn. and erect timber in structs.	350.00	200.00	200.00	300.00	3.50	300.00
168 lin. ft. laying 18-in. diam. conc. pipe	2.00	1.25	1.50	2.50	2.50	5.00
2,096 lin. ft. laying 24-in. diam. conc. pipe	2.00	1.50	2.00	3.50	3.50	6.00
1,200 lin. ft. laying 30-in. diam. conc. pipe	3.00	1.25	2.50	4.00	4.75	10.00
544 lin. ft. laying 36-in. diam. conc. pipe	5.00	2.50	3.00	5.00	5.00	11.00
352 lin. ft. laying 42-in. diam. conc. pipe	5.00	3.25	3.50	6.00	7.00	12.00
125 lin. ft. laying 48-in. diam. conc. pipe	6.00	6.00	5.00	6.50	7.50	14.00
36,700 lb. installing gates	.15	.15	.15	.30	.33	.20
5,600 lb. installing misc. metalwork	.20	.20	.20	.30	.30	.30
400 lb. furn. and place metal water stops	.25	.40	.50	.50	.50	.40

Oregon—Jefferson County—Bur. of Recl.—Laterals and Sublaterals

Adler Construction Co., Madras, was low before the Bureau of Reclamation at Bend, with a bid of $414,736 for the construction and completion of the earthwork and structures for laterals M-58 and M-61 and sublaterals of the Deschutes project. The work is situated near Madras. The following unit bids were submitted:

(1) Adler Construction Co. $414,736
(2) Geo. B. Henly Construction Co. 435,930
(3) J. A. Terteling & Sons, Inc. 581,124
(4) Morrison-Knudsen Co., Inc. $536,179
(5) W. C. Bauman Co. 612,047
(6) Spencer Webb Co., Warner & Jeske 641,617

	(1)	(2)	(3)	(4)	(5)	(6)
430,000 cu. yd. excavation, common, for laterals	.35	.40	.39	.35	.60	.60
5,000 cu. yd. excavation, rock, for laterals	2.25	3.00	5.00	3.00	3.65	3.00
185,000 sta. cu. yd. overhaul	.04	.03	.03	.05	.05	.04
17,000 cu. yd. compacting embankment	.35	.60	.84	.90	.50	1.00
24,500 cu. yd. excavation, common, for structs.	1.20	.80	1.25	1.25	1.70	2.00
100 cu. yd. excav., rock, for structs.	9.00	5.00	7.00	5.00	10.00	5.50
12,500 cu .yd. backfill	.60	.60	.31	.60	.48	.70
4,200 cu. yd. compacting backfill	1.50	2.00	1.50	2.75	1.30	2.00
700 sq. yd. dry-rock paving	3.50	3.50	5.60	3.00	4.50	5.50
800 cu. yd. riprap	2.80	5.00	2.80	3.00	3.00	10.00
2,300 cu. yd. conc. in structs.	44.00	44.00	66.00	75.00	65.00	65.00
260,000 lb. furn. and place reinf. bars	.12	.12	.155	.15	.16	.14
100 sq. ft. furn. and place elastic filler in joints	2.00	2.00	1.40	2.50	1.50	.70
30 lin. ft. placing rubber water stops in joints	1.50	3.00	1.40	5.00	1.00	1.40
6,500 lb. furn. and place metal water stops in joints	.30	.24	.37	1.00	.52	.60
140 M.B.M. furn. and erect timber in structs.	165.00	150.00	196.00	225.00	184.00	200.00
2,900 lin. ft. furn. and lay 18-in. diam. conc. pipe	3.30	5.00	3.71	3.70	3.85	4.75
500 lin. ft. furn. and lay 30-inch diam. conc. pipe	7.50	7.00	7.10	8.20	6.90	9.00
1,550 lin. ft. furn. and lay 24-in. diam. conc. pipe	4.50	6.00	5.21	5.20	5.15	6.40
270 lin. ft. furn. and lay 36-in. diam. conc. pipe	10.30	12.00	10.58	12.60	10.50	12.00
190 lin. ft. furn. and lay 48-in. diam. conc. pipe	17.50	14.00	18.03	18.75	16.50	18.00
29,000 lb. install gates and misc. metalwork	.15	.22	.21	.30	.20	.30
30,000 lb. erecting structural steel	.08	.03	.035	.10	.12	.14

Highway and Street . . .

Oregon—Klamath County—State—Grade and Surf.

Rogers Construction Co., Portland, submitted the low bid of $769,233 before the State Highway Commission, Salem, for construction on the East Diamond Lake Junction-Lobert Section of The Dalles-California Highway. The work involves 3.0 mi. of grading, and 38.9 mi. of surfacing and oiling for the oil mat surface course, and requires furnishing of approx. 3,000 cu. yd. crushed material in stockpiles. Unit bids follow:

(1) Rogers Construction Co. $769,233
(2) E. C. Hall and J. C. Compton 897,674
(3) Newport Construction Co. $1,053,328
(4) McNutt Bros. 1,162,479

	(1)	(2)	(3)	(4)
Lump sum, clearing and grubbing	500.00	$3,000	$5,000	$12,600
50 cu. yd. struct. excav., unclassified	2.00	3.00	2.50	4.00
46,000 cu. yd. gen. excav., unclassified	.20	.35	.50	.30
146,000 yd. sta. short overhaul	.02	.02	.02	.02
1,350 yd. sta. long overhaul	.50	.50	.50	.50
2.99 mi. finishing roadbed and slopes	100.00	500.00	500.00	$1,000
350 lin. ft. 18-in. corr. metal pipe	3.00	4.50	4.00	3.65
50 lin. ft. salv. culvert pipe	2.00	2.00	2.00	3.00
5,000 cu. yd. salv. surf. materials	.50	.50	1.00	2.00
186,000 cu. yd. material in subbase	1.16	1.32	1.85	1.50
106,000 cu. yd. 2-in. - 0-in. material in base	2.05	2.45	2.50	3.10
44,000 cu. yd. ¾-in. - 0-in. material in base and shoulders	2.05	2.45	2.70	3.40
10,000 M. gal. sprinkling	2.50	2.25	3.50	5.00
38.89 mi. prep. of base	100.00	100.00	100.00	300.00
30,400 cu. yd. furn. and placing aggregates	2.85	3.70	4.16	4.50
1,000 ton furn. and placing RC-3 asph. in binder course	30.00	32.00	32.50	42.00
2,000 ton furn. and placing 151-200 asph.	30.00	30.00	31.50	40.00
560 ton furn. and placing RC-3 or emuls. asph. in seal coat	30.00	32.00	32.50	45.00
1,170 cu. yd. ¾-in. - ½-in. crushed matl. in stockpile	2.10	2.45	2.22	5.00
1,170 cu. yd. ½-in. - ¼-in. crushed matl. in stockpile	2.10	2.45	2.22	5.00
660 cu. yd. ¼-in. - 0-in. crushed matl. in stockpile	2.10	2.45	2.22	5.00

Montana—Lewis & Clark County—Bur. of Reclam.—Relocation

Union Construction Co., Inc., Great Falls, submitted the low bid of $202,039 to the Bureau of Reclamation for the earthwork, structures, and surfacing involved in the relocation of county roads in the vicinity of the Canyon Ferry Unit of the Missouri Basin Project. Surfacing will be gravel or crushed stone. Concrete cattle guards and culverts and timber pile bridges are involved. Unit bids were as follows:

(A) Union Construction Co., Inc. $202,039
(B) H & R Construction Co., Inc. 207,371
(C) S. J. Groves & Sons Co. 211,914
(D) McLoughlin, Inc. 226,570
(E) L. A. Woodward Construction Co. $227,341
(F) Otis Williams & Co. 241,504
(G) Nilson Smith Construction Co. 258,797
(H) S. Birch & Sons Construction Co. 285,953

(1) 8,200 cu. yd. excav., all classes, for roadway (sta. "A" 0 plus 42.84 to "A" 17 plus 50).
(2) 171,700 cu. yd. excav., all classes, for roadway (sta. "A" 17 plus 50 to 483 plus 65.8).
(3) 9,900 cu. yd. excav., common, in borrow pits.
(4) 146,800 sta. cu. yd. overhaul.
(5) 1,000 M. gal. watering.
(6) 300 roller hour rolling embankments.
(7) 940 cu. yd. excav., common, for structs.
(8) 770 cu. yd. excav., rock, for structs.
(9) 2,100 cu. yd. backfill.
(10) 2,100 cu. yd. compacting backfill.
(11) 1,330 cu. yd. riprap.
(12) 1,950 sq. yd. dry-rock paving.

(Continued on next page)

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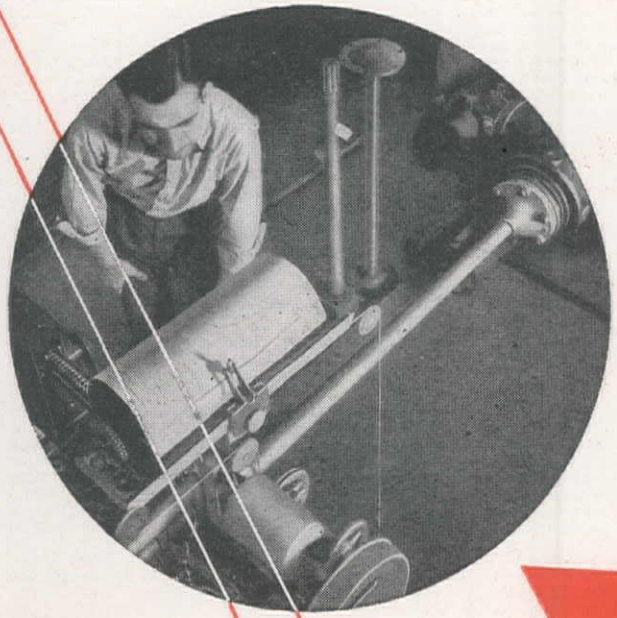

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(13) 206 lin. ft. furn. and laying 12-in. diam. conc. pipe.
(14) 92 lin. ft. furn. and laying 15-in. diam. conc. pipe.
(15) 463 lin. ft. furn. and laying 16-in. diam. conc. pipe.
(16) 292 lin. ft. furn. and laying 24-in. diam. conc. pipe.
(17) 432 lin. ft. furn. and laying 30-in. diam. conc. pipe.
(18) 662 lin. ft. furn. and laying 36-in. diam. conc. pipe.
(19) 410 lin. ft. furn. and laying 42-in. diam. conc. pipe.
(20) 512 cu. yd. concrete in culverts.
(21) 750 bbl. furn. and handling cement.
(22) 51,400 lb. furn. and placing reinf. bars.
(23) 2,300 lin. ft. furn. and driving timber piles.
(24) 40 M.B.M. furn. and erect. timber in bridges.
(25) 13,600 lin. ft. furn. and const. wire cable gd. fence.
(26) 19,960 ton gravel or crusher stone surf.
(27) 455 sta. of 100 ft. finishing roadway.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	1.00	1.35	.37	1.25	1.25	1.35	1.25	1.50
(2)	.22	.275	.33	.30	.33	.40	.42	.30
(3)	.22	.22	.29	.30	.33	.50	.42	.50
(4)	.02	.02	.01	.01	.02	.02	.02	.02
(5)	2.00	1.50	2.00	1.50	2.00	2.50	3.00	4.00
(6)	8.00	4.50	6.00	8.00	6.00	9.00	6.00	10.00
(7)	2.00	1.50	2.50	3.00	2.00	2.00	2.00	2.50
(8)	3.00	3.50	3.00	5.00	4.00	3.50	3.00	8.00
(9)	2.00	1.00	1.00	1.00	.60	.50	.90	3.00
(10)	2.00	1.00	1.00	1.00	.60	1.00	.90	1.50
(11)	3.00	2.50	5.00	5.00	4.00	3.00	3.00	2.75
(12)	4.00	4.50	5.00	3.00	4.00	3.00	4.00	5.50
(13)	2.00	3.00	2.70	2.50	2.50	2.20	2.50	3.00
(14)	3.00	3.50	3.52	3.00	3.00	2.85	3.00	4.00
(15)	3.50	4.00	4.80	4.00	4.00	3.50	4.00	5.00
(16)	5.00	6.00	6.50	6.00	6.00	5.00	5.00	7.00
(17)	7.00	8.00	8.88	7.50	9.00	7.00	8.00	10.00
(18)	10.00	10.00	12.15	10.00	11.00	9.00	10.00	13.00
(19)	15.00	12.00	15.50	12.50	15.00	11.50	13.00	17.00
(20)	52.00	45.00	50.00	55.00	50.00	50.00	55.00	70.00
(21)	5.00	4.50	5.50	6.00	6.00	4.40	6.00	6.00
(22)	.15	.15	.11	.15	.15	.115	.13	.16
(23)	2.50	2.00	2.20	3.00	2.00	2.50	2.25	3.00
(24)	250.00	240.00	300.00	325.00	250.00	250.00	270.00	280.00
(25)	1.25	1.65	1.00	1.50	2.00	1.50	2.00	3.00
(26)	1.25	1.25	1.25	1.20	1.20	2.00	1.80	1.75
(27)	15.00	12.00	10.00	20.00	10.00	6.00	15.00	16.00

California—Santa Cruz County—State—Grade and Pave

Earl W. Heple, San Jose, was low before the Division of Highways at Sacramento, with a bid of $1,373,652 for the construction of a Hwy. between Rob Roy Junction and Morrissey Ave. in Santa Cruz, about 7.7 mi. in length to be cleared and grubbed, portions to be graded and structural steel and reinforced concrete freeway structures to be constructed. Bridge ties are to be furnished by the Southern Pacific Railroad Co. and railroad rails and metal fence posts are furnished by the State. The unit bids submitted were as follows:

(1) Earl W. Heple.....$1,373,652
(2) A. Teichert & Sons, Inc. & Granite Construction Co..... 1,385,525
(3) Guy F. Atkinson Co..... 1,393,557
(4) George Pollock Co..... 1,465,994
(5) Parish Bros. $1,467,561
(6) Morrison-Knudsen Co., Inc..... 1,493,695
(7) Frederickson & Watson, and M. & K. Corp. 1,667,587

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
400 cu. yd. removing concrete	10.00	5.00	2.50	10.00	4.50	6.00	9.00
40 acres clearing and grubbing	430.00	$1,000	565.00	650.00	450.00	600.00	700.00
500 ea. removing trees, size 1	5.00	15.00	7.50	2.50	15.00	15.00	9.50
100 ea. removing trees, size 2	15.00	40.00	19.00	30.00	35.00	70.00	35.00
35 ea. removing trees, size 3	50.00	100.00	63.00	75.00	100.00	150.00	83.00
14 ea. removing trees, size 4	100.00	200.00	95.00	150.00	400.00	300.00	240.00
395,000 cu. yd. roadway excav.	.265	.47	.33	.65	.35	.40	.47
24,550 cu. yd. struct. excav.	2.00	3.00	3.00	2.50	3.50	3.00	3.77
6,500 cu. yd. struct. backfill	2.00	2.00	1.90	2.00	2.50	2.50	4.00
4,250 cu. yd. ditch and channel excav.	1.25	1.70	1.25	1.50	2.00	2.00	1.50
65,500 sq. yd. compacting original ground	.10	.05	.07	.10	.08	.04	.05
2,700,000 sta. yd. overhaul	.005	.01	.01	.01	.0075	.01	.0088
108,000 sq. yd. prep. slopes (slope ero. prot.)	.10	.10	.08	.25	.11	.08	.11
20 tons fertilizer (slope erosion prot.)	100.00	75.00	95.00	100.00	90.00	90.00	90.00
5,000 lb. west. rye grass seed (slope ero. prot.)	.30	.25	.32	2.00	.26	.50	.26
90 tons straw (slope ero. prot. & underdr.)	60.00	50.00	52.00	60.00	50.00	80.00	49.00
Lump sum, dev. wat. sup. & furn. wat. equip.	$5,000	$3,500	$3,200	$3,800	$10,600	$10,000	$8,000
11,000 M. gal. applying water	1.50	1.50	2.25	2.00	1.40	2.00	1.60
Lump sum, shoofly trestle	$15,000	$15,000	$14,500	$10,000	$18,000	$23,000	$20,000
23 ea. Redwood covers for drop inlets	50.00	15.00	12.50	10.00	35.00	25.00	16.00
10,647 cu. yd. Class "A" P.C.C. (structs.)	60.00	48.00	51.70	48.00	54.00	50.00	63.00
410 cu. yd. Class "A" P.C.C. (footing blks.)	25.00	30.00	20.00	48.00	30.00	20.00	34.00
298 cu. yd. Class "A" P.C.C. (arch ribs)	80.00	120.00	120.00	200.00	130.00	210.00	130.00
1,989 lin. ft. conc. railing	6.50	6.00	6.30	6.90	7.00	8.00	8.60
832,500 lb. furn. struct. steel	.105	.10	.12	.09	.11	.12	.1108
832,500 lb. erect struct. steel	.022	.03	.035	.03	.032	.03	.031
1,300 lb. misc. iron and steel	.30	.40	.50	.20	.35	.30	.60
5 ea. frames and gratings, type 2	100.00	120.00	75.50	100.00	100.00	100.00	95.00
2 ea. frames and gratings, type 3	175.00	200.00	145.00	140.00	200.00	150.00	150.00
8,825 lin. ft. furn. treated timber piling	1.20	1.25	1.40	1.00	1.20	1.75	1.40
243 ea. driving treated timber piles	75.00	40.00	56.00	25.00	55.00	55.00	98.00
11,610 lin. ft. furn. steel piling	2.30	2.00	2.35	2.10	2.52	2.50	2.75
259 ea. driving steel piles	75.00	50.00	88.00	25.00	65.00	95.00	98.00
26 ea. steel pile splices	25.00	25.00	31.50	30.00	35.00	25.00	30.00
597 sq. yd. deck waterproofing	3.00	2.50	3.20	1.35	4.00	2.00	4.10
540 cu. yd. sacked concrete riprap	30.00	25.00	25.00	30.00	30.00	40.00	37.00
8.5 mi. new property fences	$1,300	900.00	$1,385	$1,000	$1,050	$1,200	960.00
650 lin. ft. 12-in. R.C.P. (std. str.)	2.10	2.50	2.10	2.25	2.40	2.25	2.10
230 lin. ft. 15-in. R.C.P. (std. str.)	2.65	3.00	2.50	2.75	2.90	3.00	2.65
1,650 lin. ft. 18-in. R.C.P. (std. str.)	3.25	3.80	3.25	3.50	3.35	3.75	3.45
70 lin. ft. 21-in. R.C.P. (std. str.)	4.25	4.70	4.50	4.30	4.00	5.00	4.35
1,100 lin. ft. 24-in. R.C.P. (std. str.)	5.25	5.70	5.50	5.25	5.00	6.00	5.50
305 lin. ft. 30-in. R.C.P. (std. str.)	6.25	7.00	6.50	7.20	7.00	7.00	6.60
2 lin. ft. 36-in. R.C.P. (std. str.)	10.00	15.00	12.50	32.50	12.50	15.00	50.00
240 lin. ft. 48-in. R.C.P. (extra str.)	15.00	16.00	15.00	16.70	15.25	16.00	16.70
380 lin. ft. 30-in. R.C.P. (1750-D)	6.75	7.00	6.75	7.30	9.00	7.00	6.60
680 lin. ft. 8-in. C.M.P. down drs. (16 ga.)	1.50	1.60	1.60	1.25	2.60	2.00	1.50
694 lin. ft. 12-in. C.M.P. (16 ga.)	2.25	2.20	1.90	1.60	2.10	2.50	2.00
310 lin. ft. 18-in. C.M.P. (16 ga.)	3.00	2.80	2.75	2.25	3.25	3.25	2.85
170 lin. ft. 21-in. C.M.P. (16 ga.)	3.50	3.50	3.00	2.50	3.60	3.50	3.30
230 lin. ft. 24-in. C.M.P. (14 ga.)	4.00	4.50	4.10	3.00	5.00	4.50	4.20
60 lin. ft. 30-in. C.M.P. (14 ga.)	5.00	5.00	5.00	3.25	6.55	5.00	4.90
81 lin. ft. 6-in. C.M.P.	1.25	1.30	1.25	1.10	1.50	1.60	2.50
378 lin. ft. 6-in. perf. metal pipe underdrains	1.25	1.50	1.25	2.50	1.50	1.10	1.65
700 lin. ft. 8-in. perf. metal pipe underdrs. (16 ga.)	1.50	2.00	1.45	3.00	1.75	1.50	1.65
190 cu. yd. filter material	5.00	5.50	4.50	3.00	5.50	5.00	7.00
13 ea. spillway assemblies	32.50	30.00	31.50	25.00	30.00	30.00	41.00

(Continued on next page)

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4 ea. downdrain pipe anchors	50.00	20.00	12.50	15.00	10.00	10.00	21.00
52 lin. ft. salvaging exist. pipe culverts	1.25	1.00	1.50	1.50	2.00	1.50	1.50
52 lin. ft. relaying salvaged C.M.P.	1.25	1.00	.60	1.50	2.90	1.50	2.00
1,300 sq. yd. wire and rock mattress	3.00	9.00	6.90	10.00	12.00	9.00	11.75
1,841,000 lb. furn. bar reinf. steel	.064	.06	.06	.05	.07	.065	.063
1,841,000 lb. placing bar reinf. steel	.02	.02	.026	.03	.024	.025	.032
234 lin. ft. rubber water stops	2.00	4.00	2.60	1.50	3.50	3.00	3.70
887 lin. ft. steel railing	7.00	7.50	8.30	6.60	7.60	7.00	8.00
Lump sum, electrical conduit	$3,000	$2,000	$1,500	$2,600	$2,000	$3,000	$3,500

California—San Bernardino County—State—Grade and Surf.

Westbrook & Pope, Sacramento, submitted the low bid of $743,959 to the Division of Highways, Sacramento, for the grading and plant-mixed surfacing of 4.3 mi. of road between City Creek Bridge and 0.7 mi. east of Plunge Creek. The work includes a bridge to be constructed across East Fork City Creek. The unit bids were as follows:

(1) Westbrook & Pope $743,959
(2) Bressi-Bevanda Constructors, Inc. 793,154
(3) Morrison-Knudsen Co., Inc. 920,658
(4) Winston Bros. Co. 935,511
(5) Matich Bros. and L. A. & R. S. Crow ..... $ 971,671
(6) J. E. Haddock Ltd. 987,775
(7) Claude Fisher Co., Inc. 1,119,341
(8) Guy F. Atkinson Co. 1,238,531

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
15 cu. yd. removing concrete	5.00	4.00	10.00	30.00	10.00	15.00	5.00
Lump sum, removing existing bridge	$1,000	$1,000	$2,000	$1,000	750.00	750.00	$1,000
58 ac. clearing and grubbing	700.00	250.00	200.00	350.00	250.00	500.00	500.00
655,200 cu. yd. roadway excav.	.49	.52	.69	.69	.70	.59	.82
14,500 cu. yd. ditch and channel excav.	1.00	1.00	1.00	1.50	1.75	2.25	2.00
7,060 cu. yd. structure excav.	3.00	2.50	4.00	2.70	5.00	3.40	4.00
1,950,000 sta. yd. overhaul	.007	.005	.0075	.01	.01	.01	.01
110 ton straw (slope protection)	65.00	60.00	45.00	65.00	70.00	65.00	125.00
3,800 lb. seed (slope protection)	.10	.40	.20	.45	.75	.65	.25
132,000 sq. yd. compacting slopes	.05	.10	.05	.05	.06	.22	.10
570 cu. yd. rock slope protection	5.00	5.00	5.00	2.50	10.00	25.00	6.50
Lump sum, dev. wat. sup. & furn. wat. equip.	$10,000	$20,000	$25,000	$32,000	$25,000	$19,000	$28,000
19,000 M. gal. apply water	1.25	1.50	1.50	1.70	1.50	1.70	2.30
225 sta. finishing roadway	5.00	15.00	15.00	15.00	15.00	20.00	30.00
39,000 lin. ft. wire mats (erosion protec.)	.55	.70	.50	.70	.75	1.30	.65
650 ton paving asphalt (P.M.S.)	20.00	20.00	23.00	23.00	20.00	20.00	25.00
13,000 ton mineral aggregate (P.M.S.)	3.75	3.50	4.00	4.10	4.50	4.90	4.50
46 ton liq. asph. RORC-5 (seal coat)	25.00	30.00	40.00	32.00	30.00	25.00	35.00
560 ton screenings (seal coat)	5.00	5.00	6.00	6.00	5.00	6.50	6.50
11 M.F.B.M. treated Douglas fir timber	200.00	300.00	300.00	320.00	400.00	420.00	350.00
650 cu. yd. Class "A" P.C.C. (structs.)	60.00	80.00	92.00	60.00	65.00	90.00	83.00
105 cu. yd. Class "A" P.C.C. (arch ribs)	150.00	230.00	210.00	250.00	200.00	340.00	300.00
85 ea. monuments	5.00	5.00	6.00	6.00	5.00	7.75	7.00
362 lin. ft. concrete railing	6.00	10.00	11.00	9.00	10.00	15.00	9.00
13,000 lin. ft. metal plate guard railing	2.00	2.40	2.25	2.80	3.50	3.20	3.00
120 ea. culvert markers	5.00	5.00	5.00	4.00	5.00	4.65	7.00
90 ea. guide posts	5.00	4.50	5.00	4.00	5.00	3.50	7.00
34 lin. ft. 18-in. C.M.P. (16 ga.)	2.50	3.60	2.50	3.00	3.00	2.50	3.25
3,120 lin. ft. 24-in. C.M.P. (14 ga.)	3.50	4.50	3.65	4.00	4.50	3.70	4.50
260 lin. ft. 30-in. C.M.P. (14 ga.)	4.00	6.50	4.65	5.00	5.50	4.65	6.00
730 lin. ft. 30-in. C.M.P. (12 ga.)	5.50	7.00	5.75	6.00	6.50	6.25	7.50
96 lin. ft. 30-in. C.M.P. (10 ga.)	7.00	8.00	8.00	7.00	8.00	7.60	8.50
330 lin. ft. 30-in. C.M.P. (8 ga.)	8.00	12.00	11.00	8.50	10.00	9.00	10.00
500 lin. ft. 36-in. C.M.P. (12 ga.)	7.00	9.00	8.00	7.50	8.00	7.50	9.00
180 lin. ft. 36-in. C.M.P. (10 ga.)	8.00	10.00	10.00	8.50	9.00	9.00	10.00
640 lin. ft. 36-in. C.M.P. (8 ga.)	10.00	12.00	12.00	10.00	11.00	10.75	12.00
160 lin. ft. 42-in. C.M.P. (12 ga.)	9.00	11.00	9.50	9.50	9.00	9.00	10.50
168 lin. ft. 42-in. C.M.P. (10 ga.)	10.00	12.00	11.00	11.50	11.00	11.00	13.00
400 lin. ft. 42-in. C.M.P. (8 ga.)	12.00	14.00	13.00	13.00	13.00	13.00	14.00
260 lin. ft. 48-in. C.M.P. (8 ga.)	17.00	18.00	16.00	17.00	17.00	15.00	18.00
66 lin. ft. 54-in. C.M.P. (12 ga.)	15.00	14.00	15.00	15.00	15.00	13.00	16.50
206 lin. ft. 54-in. C.M.P. (8 ga.)	20.00	19.00	20.00	21.00	18.00	18.00	20.00
324 lin. ft. 60-in. field assem. plate culv. (38-17)	35.00	30.00	31.00	28.00	30.00	28.00	35.00
266 lin. ft. 132-in. or 135-in. field assem. plate culv. (No. 1 gal.)	80.00	90.00	104.00	87.00	100.00	94.00	120.00
720 lin. ft. 8-in. perfo. met. pipe underdr. (16 gal.)	1.25	2.00	1.50	2.00	1.50	1.60	2.00
110 cu. yd. filter matl.	5.00	6.50	7.00	7.00	6.00	9.00	5.00
650 lin. ft. 8-in. C.M.P. down dr. (16 gal.)	1.25	2.00	1.50	2.00	1.50	1.60	2.00
135,000 lb. furn. bar reinf. steel	.06	.06	.07	.07	.07	.07	.07
135,000 lb. placing bar reinf. steel	.04	.03	.03	.04	.04	.03	.04
88 ton liq. asph., SC-2 (prime coat)	20.00	22.00	25.00	20.00	25.00	20.00	25.00
Lump sum, misc. items of work	$8,000	$3,500	$5,000	$2,500	$2,500	$4,000	$4,000

Bridge and Grade Separation...

California—Sacramento County—State—Superstructure

Judson Pacific-Murphy Corp., Emeryville, was low before the Division of Highways at Sacramento, for the construction of the superstructure for a bridge across Three Mile Slough about 4.3 miles south of Rio Vista. The bid price was $542,914. The following unit bids were submitted:

(1) Judson Pacific-Murphy Corp. $542,914
(2) J. H. Pomeroy & Co., Inc. 592,136
(3) A. Soda & Son $598,797
(4) George Pollock Co. 619,315

	(1)	(2)	(3)	(4)
25 cu. yd. struct. excav.	5.00	5.00	6.00	6.00
343 cu. yd. Class "A" P.C.C. (struct.)	59.00	52.00	45.00	60.00
150 cu. yd. Class "A" P.C.C. (counterweight)	100.00	88.00	40.00	50.00
2,489,000 lb. furn. struct. steel	.112	.13	.14	.13
2,489,000 lb. erect. struct. steel	.0365	.03	.03	.0508
79,000 lb. furn. bar reinf. steel	.06	.07	.07	.06
79,000 lb. placing bar reinf. steel	.015	.025	.02	.021
73,000 lb. open steel floor	.17	.30	.21	.20
3,700 lb. sheet metal hoods	.75	1.00	.80	1.35
Lump sum, signs	275.00	$1,000	$1,500	300.00
45,000 lb. counterweight sheaves and bearings	.55	.65	.60	.55
27,500 lb. counterweight and operating ropes and fittings	.465	.70	.53	.50
29,000 lb. counterbalance chains	.21	.47	.22	.22
19,000 lb. machinery	.96	1.00	1.00	1.00
Lump sum, emergency generator	$3,637	$3,500	$4,453	$3,300
Lump sum, traffic gates	$3,735	$5,000	$4,153	$3,600
Lump sum, misc. operating units	$11,012	$8,000	$7,280	$11,000
Lump sum, control house	$13,121	$7,000	$16,005	$8,000
Lump sum, electrical equipment	$23,196	$24,000	$28,335	$25,000

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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 $75,000 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.

CONTRACTS AWARDED

Large Western Projects . . .

Marshall, Haas & Royce of San Mateo, Calif. was awarded a $879,245 contract on Schedule No. 2 for the construction of asphalt protective mat for Dike No. 1, Station 5140 plus 50 to Station 5150 plus 00 and for embankment and protective mat from Station 5150 plus 00 to end of the dike. **Claude Fisher Co., Ltd.,** and **L. A. & R. S. Crow,** both companies of Los Angeles, Calif., will build the $916,930 Dike No. 2 on Schedule No. 3. The work is located approx. 3 mi. northeast of Mecca and 5 mi. northeast of Indio in Riverside County, Calif. Time allowed for completion is 450 days. The Bureau of Reclamation at Coachella, Calif., awarded the two contracts that are part of the Boulder Canyon Project, Arizona-California-Nevada Coachella Valley Flood Protection, All-American Canal System.

Henry Carlson of Sioux Falls, South Dakota, and the **Lovering Construction Co.** of St. Paul, Minnesota, were awarded the $5,244,854 contract by the District Engineer, Omaha, Nebraska, for the construction of a Veterans Administration 200-bed general medical hospital at Grand Island, Hall County, Nebraska.

Lord & Bishop, Sacramento, Calif., and **M. J. B. Construction Co.,** Stockton, Calif., were awarded a $1,394,374 contract by the Division of Highways at Sacramento, for the construction of 6.3 miles of hwy. and bridges and grade separation structures between Mariposa Rd. south of Stockton and the Calaveras River north of Stockton, and between D St. and Route 4, Stockton in San Joaquin County, Calif.

Stanley H. Koller, Crockett, Calif., was awarded the contract on his bid of $486,185 to the City Council of Martinez, in Contra Costa County, Calif., for the construction of a water treatment plant and pumping plant that will consist of a spray nozzle aeration system, twin settling basins, three flocculation tanks, four rapid sand filters, wash water tank, filtered water basin and filter building. The pumping station will contain the pipe gallery, offices, chemical dosing room, chemical storage room, chlorinator room, transformer room, elevator, etc.

Bell, Braden, Barker & Gilvin of Amarillo, Tex., will construct the $746,129 water supply line in Amarillo. About 62,000 ft. of 36-in. concrete pipe will be laid. The City Council of Amarillo made the award.

Zoss Construction Co., Hollywood, Calif., will build the $1,710,000 Veterans Tubercular Hospital in San Fernando. The general construction also includes roads, walks, grade and drain plumbing, electrical work, etc.

Peter Kiewit Sons Co. of Longview, Wash., was awarded a $884,596 contract by the Department of Highways at Olympia, Wash., for the construction of 1.1 mi. of highway on Primary State Hwy. No. 1, from the Kalama River to Longview Wye, Section 1, Cowlitz County. Time for completion is 450 days.

Robert E. McKee, Santa Fe, New Mexico, was awarded a contract by the U. S. Atomic Energy Commission at Santa Fe, in the amount of $1,805,462 for the construction of six brick and tile buildings known as Community Center Development Group No. 2, at Los Alamos in Santa Fe County, New Mexico.

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C. F. Lytle Company of Sioux City, Iowa and **Green Construction Co.**, Des Moines, Iowa, were awarded the $2,360,743 contract by the Bureau of Reclamation, Bismarck, North Dakota, for the construction of the Heart Butte dam, Grant County, North Dakota. A unit of the huge Missouri Basin project, the dam is to be located on the Heart River about 18 mi. south of

Glen Ullin, and will provide for irrigation and flood control. The earthfill structure will rise about 125 ft. above the river bed and will have a crest length of 1,850 ft. About 1,129,000 cu. yd. of earth and rockfill will be required for the embankment. A combination spillway, with a glory hole intake, and outlet works is to be constructed at the right abutment of the dam.

Monson Bros., San Francisco, Calif., will build the $1,225,000 addition to the telephone exchange bldg. in Berkeley, Calif., for the Pacific Telephone & Telegraph Co. of San Francisco. The addition will be three stories and basement, 84 by 142 ft., of reinforced concrete and structural steel.

MacDonald Bldg. Co., of Tacoma, Wash., was awarded $2,644,142 for the construction of a five-story, 500-bed, male ward hospital to be called Western State Hospital. The reinforced concrete building will be erected in Fort Steilacoom, Wash. The State Department of Public Institutions located at Olympia, Wash., made the award.

R. J. Horties of San Diego, Calif. will build the $1,722,000 motel construction project at El Cajon and La Mesa Blvds., La Mesa, for the San Diego Realty Co. The project calls for the construction of a two-story, reinforced concrete main bldg., and motel units of wood frame and stucco. The plans also provide for a swimming pool, tennis courts and a separate motel office bldg.

Bechtel Corp., of San Francisco, Calif., will build the $5,000,000 oil refinery unit at Salt Lake City, Utah, for the Standard Oil Company of California, San Francisco. The design capacity of the initial unit is 25,000 barrels per day. Facilities for the processing of the crude oil into gasoline, fuel oil, etc., will also be constructed.

E. S. & N. S. Johnson, Fullerton, Calif., were awarded a $819,448 contract by the Division of Highways at Sacramento, Calif., for the construction of two reinforced concrete bridges and approx. 0.5 mi. grade and surface of approaches across Agua Caliente Creek and across Buena Vista Creek, one mi. west and four mi. south of Warner Springs in San Diego County, Calif.

Utilities Construction Co. of Nashville, Tenn., will build the $318,280 transmission line for the Bureau of Reclamation, Denver, Colo. The line is approx. 40 mi. long and is located between Sterling and Sidney. It will pass through Nebraska and Logan Counties in Colorado and through Cheyenne County, Nebraska. The transmission line will be a 115-kv., 3-phase, 60-cycle, single-circuit, wood-pole, H-frame type line.

Highway and Street . . .

Arizona

YAVAPAI CO.—**Vinnell Co.**, 1145 Westminster Ave, Alhambra—$252,324 for 1.3 mi. grade, and drain of Wickenburg-

Kingman Hwy., approx. 43 mi. northwest of Wickenburg and 3 mi. northwest of the Santa Maria River bridge site—by State Highway Department, Phoenix. 12-1

California

NEVADA CO.—**H. Earl Parker,** 12th & F Sts., Marysville—$177,635 for 3.7 mi. grade and surf. betw. Kingvale and ½ mi. west of Fox Farm; betw. Donner Summit and 1 mi. east; and at Flycasters Curve, approx. 4.5 mi. east of Truckee—by Division of Highways, Sacramento. 12-17

RIVERSIDE CO. — **Peter Kiewit Sons Co.,** 442 Post St., San Francisco—$339,458 for 4.1 mi. grade and surf., betw. Whitewater Point and 0.5 mi. north of Palm Springs—by Division of Highways, Sacramento. 12-18

SHASTA CO. — **Fredrickson Bros.,** 1259 65th Ave., Emeryville—$588,829 for 5.3 mi. grade and surf., betw. Tower House and Schilling—by Division of Highways, Sacramento. 12-18

SAN JOAQUIN CO. — **Lord & Bishop,** Box 812, Sacramento, and **M. J. B. Construction Co.,** Elks Bldg., Stockton—$1,394,374 for 6.3 mi. grade and pave and constr. of bridges and grade separation structs.—by Division of Highways, Sacramento. 12-8

Colorado

MONTEZUMA CO.—**Floyd Haake,** 1201 Sierra Vista, Santa Fe, N. Mex.—$92,594 for 0.8 mi. gravel surf. and curbs and gutters, State Hwy. Nos. 10 and 106, Cortez—by State Highway Department, Denver. 12-22

Idaho

BONNEVILLE CO. — **Barnhart & Wheeler,** 326 Monroe Ave., Pocatello—$85,235 for 6.8 mi. grade, drain, base and surf. of Osgood Rd. and 0.9 mi. of Osgood Rd. spur—by Bureau of Highways, Boise. 12-10

BONNEVILLE CO. — **Carl E. Nelson,** Box 397, Logan, Utah—$409,641 for 7.5 mi. of street improvements in Improvement District No. 19, Idaho Falls—by City Council, Idaho Falls. 12-5

BUTTE CO. — **Aslett Construction Co.,** Twin Falls—$113,823 to gravel 4.9 mi. from Howe northwest and 15.4 mi. of State Hwy. No. 22, betw. Howe and Howe Junction—by Bureau of Highways, Boise. 12-1

CANYON CO. — **Triangle Construction Co.,** Box 2617, Boise—$64,581 for 5.2 mi. grade and surf. of Idaho-Oregon Hwy. from Caldwell west—by Bureau of Highways, Boise. 12-10

CUSTER CO.—**Aslett Construction Co.,** Twin Falls—$233,356 for 9.1 mi. oil of Lost River Hwy., betw. Challis and Grandview—by Bureau of Highways, Boise. 12-1

Montana

LEWIS & CLARK CO.—**S. J. Groves & Sons Construction Co.,** Minneapolis, Minn.—$633,466 for plant mix paving of streets, etc., in improvement district No. 160, Helena—by City Council, Helena. 12-11

MISSOULA CO.—**F. & S. Contracting Co.,** Box 4, Butte—$118,553 for grade, drain and surf. of Sections "F" and "G" of Bonner-Ovando Rd.—by State Highway Commission, Helena. 12-17

SANDERS CO. — **McCarthy & Schultz,** Veradale, Wash.—$99,302 for 5.4 mi. grade, drain and surf. of Perma-Hot Springs Rd.—by State Highway Commission, Helena. 12-17

New Mexico

BERNALILLO CO. — **W. T. Bookout Construction Co.,** Box 298, Las Vegas—$754,288 for 6.5 mi. grade, drain, four conc. box culverts, surf. and seal coat of U. S. Hwy. No. 66, betw. Albuquerque and Moriarty — by State Highway Department, Santa Fe. 12-1

CATRON CO. — **Skousen Construction Co.,** Springer Bldg., Albuquerque—$276,653 for grade, drain, 5 multiple conc. box culv. and bitum. top course surf. of 16.5 mi. U. S. Hwy. No. 60, betw. Red Hill and Quemado—by State Highway Department, Santa Fe. 12-1

Oregon

WASCO CO.—**T. W. Thomas,** Portland—$286,315 for 7.1 mi. grade on Clear Creek forest boundary section of Warm Springs Hwy. — by State Highway Commission, Salem. 12-1

Washington

CLARK CO.—**J. J. Badraun,** 109 No. 122 St., Seattle — $213,054 for 0.4 mi. clear, grade, drain, surf. and steel and conc. struct. over tracks of the Northern Pacific Railway Co., on Secondary State Hwy. No. 1-T, Vancouver Lake vicinity—by Department of Highways, Olympia. 12-24

COWLITZ CO.—**Peter Kiewit Sons Co.,** Box 491, Longview—$884,596 for 1.1 mi. clear, grub, drain, base course surf., and pave Primary State Hwy. No. 1 from Kalama River to Longview, Wye, Section 1—by Department of Highways, Olympia. 12-2

GRANT AND DOUGLAS COS.—**Erickson Paving Co.,** 1550 No. 34th St., Seattle—$329,566 for 3.9 mi. grade, drain, base and pave Primary State Hwy. No. 10 from Trinidad easterly — by Department of Highways, Olympia. 12-2

GRAYS HARBOR CO.—**Goetz & Brennan,** Seaboard Bldg., Seattle—$300,089 for 2.5 mi. clear, grub., drain, grade, ballast and surf. of Primary State Hwy. No. 9, Hoquiam to end of pavement—by Department of Highways, Olympia. 12-24

KING CO.—**Asphalt Paving & Engineering Co.,** Box 106, South Tacoma—$83,206 for 3.2 mi. of clear, grub, grade and asphaltic conc. pavement, West Valley Hwy.—by Department of Highways, Olympia. 12-2

SKAGIT CO.—**Dawson Construction Co.,** 1030 C St., Bellingham—$156,929 for 7.6 mi. constr. of mine to market rd. in Cascade River vicinity — by Department of Highways, Olympia. 12-2

Wyoming

CROOK CO.—**Northwestern Engineering Co.,** Box 1392, Rapid City, So. Dak.—$209,492 for 6.1 mi. grade, drain and 5 reinf. conc. culverts on Hulett-Aladdin Rd.—by State Highway Commission, Cheyenne. 12-22

GOSHEN CO.—**Hopkins & McPherson,** Box 977, Laramie — $113,958 for 5.3 mi. grade, drain, surf, etc. of Torrington-West Rd. — by State Highway Commission, Cheyenne. 12-22

PARK CO.—**W. E. Parling, Inc.,** Meeteese—$82,660 for 2.9 mi. grade, drain, base course surf., oil treatment and stone chip

seal coat of Cody-South Fork Rd. — by State Highway Commission, Cheyenne. 12-22

Bridge & Grade . . .

Arizona

MARICOPA CO.—**Lee Moor Contracting Co.,** Bassett Tower, El Paso, Tex.—$327,459 for removal of existing bridge decks and constr. steel girder deck and roadway appr. at hwy. crossings over New River and Agua Fria River, northwest of Phoenix—by State Highway Department, Phoenix. 12-1

California

SAN DIEGO CO.—**E. S. & N. S. Johnson,** 112 E. Wilshire Ave., Fullerton—$819,448 for two reinf. conc. bridges and grade and surf. of approaches, near Warner Springs—by Division of Highways, Sacramento. 12-19

Montana

BIG HORN CO.—**W. P. Roscoe & Co.,** Billings—$99,957 for 0.5 mi. grade and surf. and constr. steel and conc. bridge on Hardin-Crow Agency Rd.—by State Highway Commission, Helena. 12-17

MISSOULA CO. — **Cahill-Mooney Construction Co.,** Box 398, Butte—$57,966 for four treated timber pile bridges and one steel and conc. span over Clearwater River on Section "G" of Bonner-Ovando Rd.—by State Highway Commission, Helena. 12-17

PRAIRIE CO. — **W. P. Roscoe & Co.,** Billings — $144,770 for steel and conc. bridge over Fallen Creek and widen Northern Pacific Railroad overpass on Terry-Glendive Rd.—by State Highway Commission, Helena. 12-17

PRAIRIE AND CUSTER COS.—**Walter Mackin,** Billings—$61,562 for revision and widening of 9 treated timber pile bridges on Miles City-Terry Rd.—by State Highway Commission, Helena. 12-17

VALLEY CO. — **L. V. Lockwood,** Box 227, Glasgow—$109,730 for eight treated timber pile bridges on Glasgow-Hinsdale Section of Glasgow-Malta Rd.—by State Highway Commission, Helena. 12-17

Utah

DAVIS CO.—**Young & Smith Construction Co.,** Beacon Bldg., Salt Lake City—$147,756 for two timber and two conc. bridges on U. S. Hwy. 91 betw. Clearfield and Weber Co. line—by State Road Commission, Salt Lake City. 12-10

Washington

CLALLAM CO.—**Paul Jarvis, Inc.,** 1070 West Ewing St., Seattle—$367,703 for 1.7 mi. clear, grade, surf. and two steel and conc. bridges over Sol Duc River on Primary State Hwy. No. 9, Snider's Ranger Station east and west, McDougal Creek Revision—by Department of Highways, Olympia. 12-24

LINCOLN CO.—**F. R. Hewett & Co.,** Box 46, Parkwater—$188,091 for 12.6 mi. grade, drain, surf. and two reinf. conc. slab bridges on Primary State Hwy. No. 7, Lamona to Harrington—by Department of Highways, Olympia. 12-24

Wyoming

CARBON CO.—**Taylor & Allard,** Pinedal—$56,094 for substruct. for bridge over North Platte River at Saratoga and one culvert on Walcott-Saratoga Rd.—by State Highway Commission, Cheyenne. 12-22

SHERIDAN AND JOHNSON COS.—**Forgey Construction Co.,** Townsend Bldg., Casper—$509,667 for 6.9 mi. grade, drain and surf. and constr. one bridge on Sheridan-Buffalo Rd.—by State Highway Commission, Cheyenne. 12-22

Airport . . .

Utah

CARBON CO. — **Whiting & Haymond,** Springville — will construct the Carbon County Airport at Price—by County Airport Commission, Price. 12-5

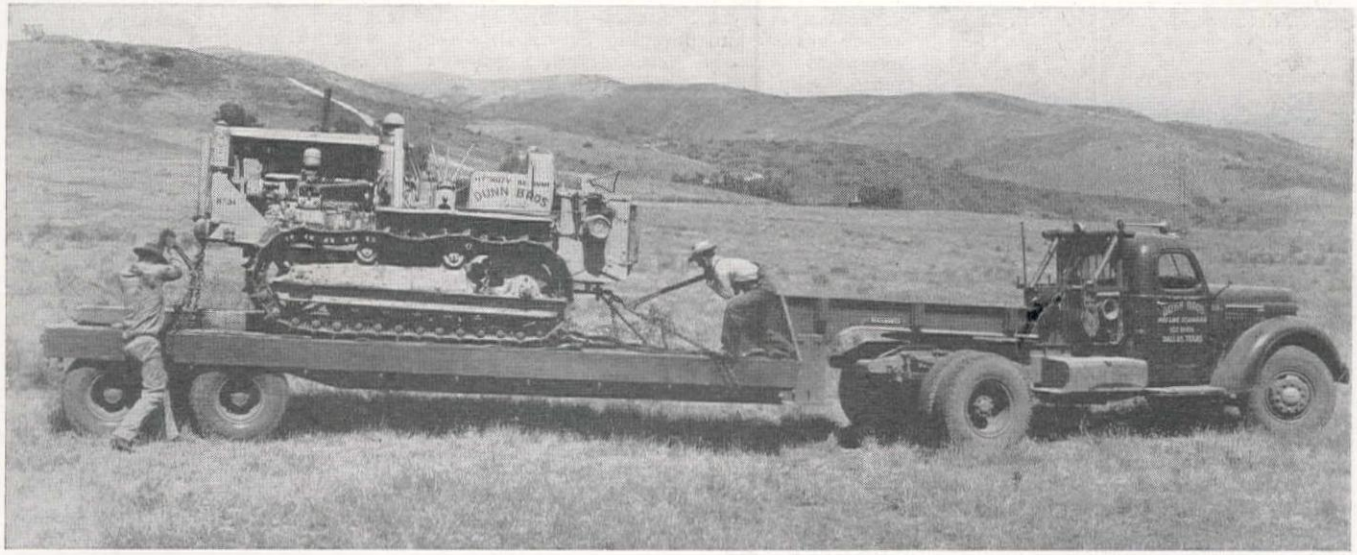
Water Supply . . .

California

ALAMEDA CO.—**W. Lenkeit Construction Co.,** 24 California St., San Francisco—$133,376 to install 24-in. welded steel water main, Campbell St., Oakland—by East Bay Municipal Utility District, Oakland. 12-12

COLUSA CO.—**E. T. Haas Co.,** Box 411, San Mateo—$58,853 to install water system using asbestos cement pipe, Arbuckle—by City Public Utility District, Arbuckle. 12-16

CONTRA COSTA CO.—**Stanley H. Koller,** 1694 Pomona St., Crockett—$486,185



TRAILMOBILES HAULED EQUIPMENT

ON BIGGEST INCH PIPE LINE

The BIGGEST INCH pipe line which will deliver 305 million cubic feet of natural gas daily from the Permian Basin and Texas Panhandle to California represents one of the most stupendous pipe line jobs ever attempted. Not only was the pipe the largest which has ever been used for such a line, but the type of terrain which had to be traversed included a crossing of the Colorado River; country where the water table was within 18" of the surface, which meant cave-ins and slogging; desert country where the sand was so fine and fluent that it was difficult to keep trenches open. In some areas the country was flat as a pancake; in other areas grades were so steep that strings of tractors were chained together to make operation safe.

The job of hauling and stringing the pipe was handled by Dunn Brothers of Dallas, Texas, whose slogan "It Must Be Dunn", may be neatly reflected in the fact that this tremendous undertaking will be finished two years ahead of time. The picture above shows one of their TRAILMOBILE Low-Beds which were used in hauling tractors and bulldozers over some of the roughest country to be found in this hemisphere. It is the kind of service where trailers have to take anything that comes—and that is when you want TRAILMOBILES.

THE TRAILMOBILE COMPANY

BERKELEY, CALIFORNIA

TRAILMOBILE

LOS ANGELES · BERKELEY · SACRAMENTO · SANTA ROSA · FRESNO · SAN JOSE · BAKERSFIELD · STOCKTON · OGDEN · SEATTLE
HONOLULU · SANTA BARBARA · PORTLAND · EUREKA · SAN DIEGO

for complete water treatment and pumping plant in Martinez—by City Council, Martinez. 12-26

Texas

POTTER CO.—**Bell, Braden, Barker & Gilvin,** Herring Hotel, Amarillo—$745,129 to install approx. 62,000 ft. of 36-in. conc. pipe supply line in Amarillo — by City Council, Amarillo. 12-9

Sewerage . . .

California

KERN CO.—**Beebe & Powers,** 2284 Lakeside, Reno, Nev.—$223,375 to expand sewer and sewage disposal plant, installing approx. 7,800 ft. of sewer, two parallel settling tanks and altering existing chlorination system, Inyokern—by Bureau of Yards & Docks, Washington, D. C. 12-3

KERN CO. — **Haddock-Engineers, Ltd.,** 1616 So. Greenwood Ave., Montebello — $73,202 for vitrified clay pipe sewers, house connections, etc., Inyokern — by County Sanitation District, Inyokern. 12-18

LOS ANGELES CO.—**J. S. Barrett,** 1300 Coast Highway, Newport Beach—$218,224 for 2.9 mi. of sewer pipe installation, Zastrow Ave., Los Angeles—by County Commission, Los Angeles. 12-5

LOS ANGELES CO. — **MacDonald & Kruse and R. R. Hensler,** 816 Allen Ave., Glendale—$280,479 for sanitary sewers on Whitsett Ave., betw. Kittridge and Moorpark Sts., Los Angeles—by City Council, Los Angeles. 12-17

SACRAMENTO CO.—**Downer Co., Inc.,** 305 E. Weber Ave., Stockton—$74,176 for sewage system and pumping plant, Altos Acres and Norwood Acres, North Sacramento — by City Council, North Sacramento. 12-17

VENTURA CO.—**Hermann Co.,** 417 So. Hill St., Los Angeles—$254,612 to remove old machinery from sewage treatment plant, remodel existing screening plant and structs., and constr. two sedimentation basins, etc., Ventura — by City Council, Ventura. 12-5

Oregon

UMATILLA CO.—**Lord & Co.,** Portland —$113,039 to install sewer system in Freewater—by City Council, Freewater. 12-12

Washington

KING CO. — **Arcorace & Co.,** Seattle — $521,486 for 24th Ave. N.E. trunk sewer project, Seattle — by Board of Public Works, Seattle. 12-5

Waterway . . .

Oregon

BENTON CO. — **Ramsey Construction Co.,** Corvallis—$81,510 for bank protection works along the left bank of Willamette River at Half Moon bend, approx. 4 mi. northeast of Corvallis—by District Engineer, Portland. 12-13

Canada

BRITISH COLUMBIA—**B. C. Bridge & Dredging Co., Ltd.,** 544 Howe St., Vancouver, B. C.—$174,474 to dredge the north arm of the Fraser River—by Department of Public Works, Vancouver, B. C. 12-12

BRITISH COLUMBIA—**B. C. Bridge & Dredging Co., Ltd.,** 544 Howe St., Vancouver, B. C.—$58,000 to dredge the Nicomen Slough on the Fraser River—by Department of Public Works, Vancouver, B. C. 12-12

Dam . . .

North Dakota

GRANT CO.—**C. F. Lytle Company,** Box 206, Sioux City, Iowa and **Green Construction Co.,** Masonic Temple Bldg., Des Moines, Iowa—$2,360,743 for Heart Butte dam to be located approx. 18 mi. south of Glen Ullin—by Bureau of Reclamation, Bismarck. 12-16

Irrigation . . .

California

RIVERSIDE CO. — **Claude Fisher Co., Ltd.,** 2455 E. 55th St., Los Angeles and **L. A. & R. S. Crow,** 4760 Valley Blvd., Los Angeles—$916,930 on Schedule 3 for construction of Dike No. 2, approx. 5 mi. northeast of Indio, Boulder Canyon Project, Ariz.-Calif.-Nev. Coachella Valley Flood Protection, All-American Canal System. 12-10

RIVERSIDE CO. — **Marshall, Haas & Royce,** Box 411, San Mateo—$879,245 on

Schedule 2 for constr. of asphalt protective mat, for Dike No. 1, Station 5140 plus 50 to Station 5150 plus 00 and embankment and protective mat from Station 5150 plus 00 to end, approx. 3 mi. northeast of Mecca —by Bureau of Reclamation, Coachella. 12-10

New Mexico

QUAY AND SAN MIGUEL COS.—**J. A. Terteling & Sons, Inc.,** Box 1428, Boise, Idaho—$93,220 for bridges and drainage inlets, Station 22 plus 00 to Station 3063 plus 38.8, Conchas Canal, betw. Tucumcari and Conchas City—by Bureau of Reclamation, Tucumcari. 12-1

Power . . .

Arizona

MARICOPA CO.—**Corbin & Davis Electric Co.,** 623 So. 2nd Ave., Phoenix—$43,857 for power line, transformer, and switching stations, Phoenix—by City Council, Phoenix. 12-1

Colorado

DOUGLAS CO.—**E. A. Reither,** Aitkin, Minn.—$56,229 for labor only on 269 mi. of transmission line to serve 191 consumers —by Mountain View Electric Association, Limon. 12-1

Colorado
Nebraska

VARIOUS COS.—**Utilities Construction Co.,** Nashville, Tenn.—$318,280 for 115-kv. transmission line, power transmission lines to consist of 3-phase, 60-cycle, single circuit wood-pole line about 40 mi. long — by Bureau of Reclamation, Denver, Colo. 12-8

Idaho

BUTTE CO.—**C-L Electric Co.,** Pocatello —$42,998 labor only for constr. and rehabilitation of 87 mi. line to serve 78 members—by Lost River Electric Cooperative, Mackay. 12-1

Montana

McCONE CO.—**Hi-Line Construction Co.,** Wolf Point—$49,066 for 102 mi. of line to serve 583 consumers—by McCone County Electric Cooperative, Inc., Circle. 12-1

Nebraska

ADAMS CO. — **Elliott Construction Co.,** Sunderland Bldg., Omaha — $80,945 for labor only on 45 mi. of transmission line—by Central Nebraska Public Power & Irrigation District, Hastings. 12-1

Oregon

LANE CO.—**Carlson Electric Co.,** Lebanon—$124,000 for constr. of 66 kv. transmission line betw. Springfield and Cottage Grove—by Mountain States Power Co., Lebanon. 12-3

Building . . .

California

ALAMEDA CO.—**Cahill Bros.,** 206 Sansome St., San Francisco—$1,000,000 for theater bldg. on east side of Broadway between 12th and 13th Sts., Oakland—by Louis Kaliski, Oakland. 12-5

ALAMEDA CO.—**Monson Bros.**, 475 6th St., San Francisco—$1,225,000 for reinf. conc. and struct. steel addition to telephone exchange bldg., Berkeley—by Pacific Telephone & Telegraph Co., San Francisco. 12-10

ALAMEDA CO. — **Swanstrom & Stahl**, 2034 Hoover Ave., Oakland—$114,652 for exterior and interior remodeling of bank bldg. at 96th Ave. and East 14th St., Oakland—by American Trust Co., Oakland. 12-3

AMADOR CO.—**Lawrence Construction Co.**, 3020 V St., Sacramento—$100,000 for frame and stucco telephone exchange bldg., Jackson — by Pacific Telephone & Telegraph Co., San Francisco. 12-15

BUTTE CO.—**L. G. Shalz**, Rt. 1, Box 22, Chico—$307,000 for reinf. conc. and frame, one-story elementary school bldg., Chico—by City Elementary School District, Chico. 12-15

CONTRA COSTA CO. — **J. A. McNeil Co., Inc.**, 436 11th St., Oakland—$136,350 for reinf. concrete Catholic school bldg., Seal Bluff Rd., near Bacon St., Concord—by Archbishop of San Francisco, San Francisco. 12-19

FRESNO CO.—**Franceschi Construction Co.**, Box 528, Fresno—$165,944 for cafeteria bldg., high school, Fresno—by City High School District, Fresno. 12-17

FRESNO CO. — **Trewhitt-Shields & Fisher**, Box 586, Fresno—$217,900 for public school bldg. at Del Mar and Ashland Aves., Fresno — by Board of Education, Fresno. 12-10

KERN CO.—**Guy E. Hall**, 310 30th St., Bakersfield — $683,000 to convert former govt.-owned bldgs. into 300 apartment units, Bakersfield—by Public Housing Authority, San Francisco. 12-8

LOS ANGELES CO.—**Alda Corporation**, 1308 Shattos St., Los Angeles—$549,750 for eight frame and stucco, two-story, 68, 54, 44, and 36-room apartment bldgs., Stocker-Crenshaw Village, 4100 Buckingham Rd., Lennox—by self. 12-9

LOS ANGELES CO.—**V. O. Brunzell Co.**, Box 432, Gardena—$147,949 general contract for four frame and stucco agricultural school bldgs., Clarence W. Pierce School of Agriculture, Canoga Park—by County Board of Education, Los Angeles. 12-19

LOS ANGELES CO.—**J. F. Burrell & Son**, 518 W. 17th St., Long Beach—$118,300 for conversion of steel frame hangar bldg. into armory bldg., Naval Base, Terminal Island — by Bureau of Yards & Docks, Washington, D. C. 12-15

LOS ANGELES CO.—**Ray Gerhart**, 334 So. Greenwood Ave., Pasadena—$106,793 for basement addition to laboratory bldg., Pasadena—by Board of Supervisors, California Institute of Technology, Pasadena. 12-19

LOS ANGELES CO.—**Griffith Co.**, 1060 So. Broadway St., Los Angeles—$482,200 for reinf. conc. two-story and basement public service administration bldg. at Lake St. and Magnolia Ave., Burbank—by City Council, Burbank. 12-4

LOS ANGELES CO. — **Haddock Engineers, Ltd.**, 1616 So. Greenwood Ave., Montebello — $207,333 for naval reserve armory in Huntington Park—by Bureau of Yards & Docks, Washington, D. C. 12-1

LOS ANGELES CO.—**Stolte, Inc.**, 3156 Wilshire Blvd., Los Angeles—$266,776 for reinf. conc. high school gymnasium bldg., Montebello Senior High School, Montebello—by City Unified School District, Montebello. 12-11

LOS ANGELES CO.—**Zoss Construction Co.**, Box 1167, Hollywood—$1,710,000 general contract for reinf. conc. and steel tubercular hospital at Veterans Administration Hospital, San Fernando—by Veterans Administration, Washington, D. C. 12-22

SAN BERNARDINO CO. — **Haddock Engineers, Ltd.**, 1616 So. Greenwood Ave., Montebello—$168,862 for Naval Reserve armory bldg., at San Bernardino — by Bureau of Yards & Docks, Washington, D. C. 12-5

SAN DIEGO CO.—**R. J. Horties**, Bank of America Bldg., San Diego—$1,722,000 for two-story motel bldg. and separate units, La Mesa—by San Diego Realty Co., San Diego. 12-15

SAN FRANCISCO CO.—**Barrett & Hilp**, 918 Harrison St., San Francisco—$200,000 for steel and conc. office bldg., 200 ft. by 200 ft., at 25th and Connecticut Sts., San Francisco—by Hiech and Moran, San Francisco.

SAN FRANCISCO CO. — **Central California Construction Co.**, 116 Erie St., San Francisco—$301,000 for part steel frame and corr. metal siding processing plant, Evans Ave. and Phelps St., San Francisco —by G. B. Torre & Sons, San Francisco.

SAN FRANCISCO CO.—**Haas & Rothschild**, 274 Brannan St., San Francisco—$186,820 for wood frame and reinf. conc. church bldg. addition, Geary and Franklin Sts., San Francisco—by Hamilton Square Baptist Church, San Francisco. 12-22

SAN JOAQUIN CO.—**D. W. Nicholson**, 1701 San Leandro Blvd., San Leandro—will build the Tesla Substation, near Tracy

—by Pacific Gas & Electric Co., San Francisco. 12-5

SAN MATEO CO.—**Joseph Bettencourt,** 422 San Anselmo Ave., San Bruno—$99,875 for reinf. conc., one-story bank bldg., San Mateo Ave. and Jenevieve Ave., San Bruno —by American Trust Co., San Francisco. 12-15

SAN MATEO CO.—**Monson Bros.,** 475 6th St., San Francisco—$103,730 for two reinf. conc. and steel shop bldgs., Jefferson Union High School, 6996 Mission St., Daly City—by Board of Education, Daly City. 12-8

SANTA CLARA CO.—**Cahill Bros.,** 206 Sansome St., San Francisco—$350,000 for four-story, brewery bldg. addition, San Jose—by Wieland's Brewery, San Jose. 12-5

SANTA CRUZ CO.—**Henry Arian Construction Co.,** 4142 Geary Blvd., San Francisco—$166,719 for naval reserve armory at De La Vega Park, Santa Cruz—by Bureau of Yards & Docks, Washington, D. C. 12-11

SOLANO CO. — **Affiliated Engineers & Contractors,** Chamber of Commerce Bldg., Sacramento—$119,980 for four-classroom addition to school bldg., Dixon—by City Elementary School District, Dixon. 12-4

TULARE CO. — **Taylor-Wheeler Commercial, Inc.,** 420 Safford Ave., Fresno—$226,000 for 12-classroom elementary school bldg., Roosevelt Elementary School, Tulare—by County Elementary School District, Tulare. 12-10

Colorado

MESA CO.—**Newstrom-Davis & Co.,** 2000 W. 8th Ave., Denver—$282,229 for brick, conc. and steel joists, two and three-story, epileptics' bldg., Grand Junction—by Board of Directors, State Home Training School for Mental Defectives, Grand Junction. 12-12

Idaho

BLAINE CO.—**Johnson Construction Co.,** Ketchum—will construct the new theatre bldg. in Ketchum—by Hilliard D. Hicks, Ketchum. 12-5

BONNEVILLE CO. — **Arrington Construction Co.,** Box 881, Idaho Falls—$180,000 for 60 by 130 ft. brick structure for Catholic Church, Idaho Falls—by Pastor of Catholic Church, Idaho Falls. 12-12

TWIN FALLS CO.—**A. D. Bobier Construction Co.,** 235 7th Ave. E., Twin Falls —$100,000 for church bldg. at Ninth Ave., Twin Falls — by Baptist Minister, Twin Falls. 12-5

Montana

SILVER BOW CO.—**Carson Construction Co.,** Box 1153, Helena—$475,108 general contract for masonry, 16-classroom, gymnasium, auditorium, shop, offices and grade school bldg., Butte — by Board of Education, Butte. 12-9

YELLOWSTONE CO. — **Reidesel Construction Co.,** Billings—$293,740 general contract for 12-room elementary school bldg., Billings — by Board of Education, Billings. 12-12

Nebraska

HALL CO.—**Henry Carlson,** Sioux Falls, So. Dak., and **Lovering Construction Co.,** Guardian Bldg., St. Paul, Minn.—$5,244,854 for 200-bed general medical hospital at Grand Island — by District Engineer, Omaha. 12-18

New Mexico

SANTA FE CO.—**Robert E. McKee,** Box 1706, Santa Fe—$1,805,462 for Community Center Development Group No. 2, six brick and tile bldgs., Los Alamos—by Atomic Energy Commission, Santa Fe. 12-5

Oregon

CLACKAMAS CO.—**Henry Mason,** Portland—$250,000 for construction of a church school, Oregon City — by Pastor of St. John's Parish, Oregon City. 12-9

Utah

SALT LAKE CO.—**Bechtel Corp.,** 220 Montgomery St., San Francisco, Calif.—$5,000,000 for refinery unit for distillation of crude oil and facilities for processing of crude oil into gasoline, fuel oil, etc., Salt Lake City—by Standard Oil Company of California, 225 Bush St., San Francisco, Calif. 12-5

UTAH CO.—**Paul Paulson,** Springville—$336,200 general contract for new grade school bldg. in Provo—by City Board of Education, Provo. 12-17

Washington

COWLITZ CO. — **Quoidbach Construction Co.,** Longview—$274,038 general contract for construction of Catlin school bldg., Kelso—by Board of Education, Kelso. 12-1

KING CO.—**Nelse Mortensen & Co.,** 1021 Westlake North, Seattle—$1,367,466 for reinf. conc., two-story Jr. High School Bldg., at East 110th St., Seattle—by Shoreline School District No. 412, Seattle. 12-3

KING CO. — **Henrik Valle Co.,** 407 3rd Ave. W., Seattle—$998,996 general contract for reinf. conc. L-shaped art bldg., University, Seattle—by Board of Regents, University of Washington, Seattle. 12-16

PIERCE CO. — **MacDonald Bldg. Co.,** 1517 So. Tacoma Way, Tacoma—$2,644,142 for reinf. conc., five-story, 500-bed, male ward hospital at Fort Steilacoom—by State Department of Public Institutions, Olympia. 12-3

YAKIMA CO.—**H. Halvorson Construction Co.,** First National Bank Bldg., Salem, Ore.—$188,270 general contract for one-story, conc. school bldg. addition, Benjamin Franklin Jr. High School, Yakima—by City School District No. 7, Yakima. 12-17

Miscellaneous . . .

California

SACRAMENTO CO.—**A. Teichert & Son,** Box 1133, Sacramento—$168,727 for curbs, gutters, sidewalks, sewer and water systems, grade and pave. Garden and Coloma Terraces, Sacramento—by City Council, Sacramento. 12-3

PROPOSED PROJECTS

Sewerage . . .

California

ALAMEDA CO.—Irvington Sanitary District, 103 Mission St., Irvington, plans to construct a sewage treatment and disposal plant to serve the Irvington-Mission San Jose districts. A bond issue in the amount of $120,000 was recently approved.

Tunnel . . .

California

PLUMAS CO.—The Pacific Gas & Electric Co., San Francisco, will call for bids shortly for the clearing of 34,236 ft. of tunnel at the Rock Creek hydroelectric plant development on the Feather River. The plant is scheduled for completion in 1950.

Building . . .

California

ALAMEDA CO. — Hunt's Foods, Inc., Hayward, plans to spend approx. $1,000,000 for alterations to the existing plant and to construct a warehouse and cold storage addition to the plant at Walnut and B Sts., Hayward.

SAN FRANCISCO CO. — The Security Investment Co., San Francisco, will build a $4,000,000 wholesale jewelers bldg. at the corner of Eddy and Larkin Sts. in San Francisco. The building will be nine stories and will include a basement garage. The construction is to be of cement block and glass.

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Carl R. Olson, a veteran of nearly 15 years' experience with the HENRY J. KAISER CO., Oakland, Calif., has been named vice-president of four companies within the Kaiser family: Permanente Cement Co.; Standard Gypsum Co. of California; Permanente Steamship Corp., and Glacier Sand and Gravel Co. Prior to this advancement, Olson was progressively salesman, sales manager, and general manager of the four companies. In addition he assisted in the initial development of various other Kaiser activities including appliances, iron and steel sales, export sales and traffic.

☆ ☆ ☆

George Sherman has been designated as Southern California representative for the RICHKRAFT CO., Oakland, Calif., producers of a complete line of building papers. Sherman previously worked in the Bay area as sales engineer for the KOHLER CO.

☆ ☆ ☆

Herman F. Haven has been appointed Western Division Parts Manager for CATERPILLAR TRACTOR CO., Peoria, Ill. The new appointee has advanced through many supervisory positions since joining the company in 1942 as an order interpreter. His previous position was as manager of the Parts Publications Division. Haven succeeds **Eldon Mason** who resigned to become general parts manager for HOLT BROS., Stockton, Lodi and Tracy, Calif., distributors for Caterpillar Co. products.

☆ ☆ ☆

Y.T. Leftwich, western representative for the GALION IRON WORKS & MANUFACTURING CO., Galion, Ohio, will retire from active duty shortly. He will continue as consultant to Galion and to **Rex Price,** Galion's representative in the Southwest district. Leftwich, well-known in the road machinery industry, has been with the Galion company for twenty-five years.

☆ ☆ ☆

J. Carl Bowen has been appointed as West Coast sales and service manager by the Machinery Division of DRAVO CORP., Pittsburgh, Pa. He will be in charge of sales and service for the heating and air conditioning appliances of the company, and will make his headquarters in San Francisco. His territory includes Washington, Oregon, California, Arizona, Utah, Nevada, Idaho, and the western parts of Wyoming and Montana.

☆ ☆ ☆

Theodore C. Combs, until recently the assistant general sales manager for TIMBER STRUCTURES, INC., San Francisco, at the Portland, Ore., headquarters, is now resident manager in San Francisco for the company.

☆ ☆ ☆

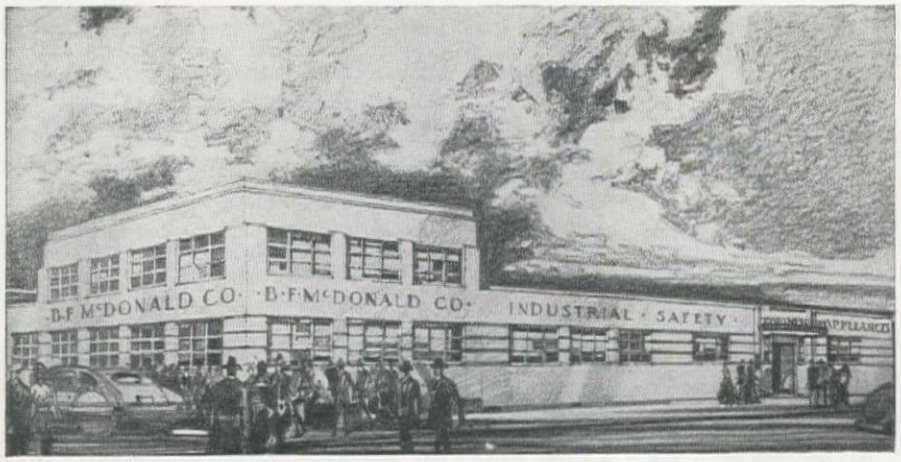
Ross Miller has been appointed as Western regional manager by GAR WOOD INDUSTRIES, INC., Wayne, Mich. He was formerly manager of Gar Wood's San Francisco branch. His region consists of the Mountain and Pacific states, west Texas, British Columbia and Alaska. Miller will continue to make his headquarters in San Francisco. The new manager of the San Francisco branch is **W. H. Lingner,** formerly assistant branch manager.

☆ ☆ ☆

Ray Perin, of the IRA G. PERIN CO., San Francisco distributors for Elwell-Parker industrial trucks, has been elected president of the 14-yr. old Materials Handling Association of Northern California. He served with the Goodyear Rubber Co. at their British plant during the war and joined the Ira Perin company upon his return.

☆ ☆ ☆

Ralph I. Peterson has been appointed as San Francisco representative for the U. S. STEEL SUPPLY CO., San Francisco



RECENTLY PURCHASED by B. F. McDONALD CO. is the entire block fronting on Hoover St. between 51st and 52nd Sts., in Los Angeles, a property the company has been occupying for several years under lease. Plans have been made to enlarge and rearrange the facilities in the plant to permit increased manufacturing space.

steel warehousing subsidiary of U. S. Steel Corp. Peterson, a recent member of the Supply Co.'s Chicago district sales force, has had more than 20 years' experience in the warehouse business in Chicago.

☆ ☆ ☆

Emmett M. Goodbar has been appointed division superintendent of maintenance at the Pittsburg, Calif., plant of COLUMBIA STEEL CO. He has served as shop foreman and master mechanic for the company, and early in 1947 was named assistant superintendent of maintenance.

PACIFIC NORTHWEST

Ralph Winship has been appointed manager of sales for the Washington division of the COLUMBIA STEEL CO. with headquarters in Seattle. Winship has been associated with Columbia as a salesman since 1930.

☆ ☆ ☆

George Childs, formerly assistant western division manager for FIRESTONE TIRE & RUBBER CO. in Portland, has been appointed vice-president in charge of tire sales for the AUTOMOTIVE EQUIPMENT CO., Portland, and L. A. COURTEMANCHE, McMinnville, Ore.

☆ ☆ ☆

CRAMER MACHINERY CO., Portland, Ore., announce they will construct a new office and warehouse building on S. E. Stark St., between 10th and 11th Streets in Portland. The building will be 100 x 100 ft., of the latest design reinforced concrete with timber trussed roof and glass brick front, and will cost $35,000. Removal of old buildings and excavation has been started.

☆ ☆ ☆

ALGER TIRE CO., Tacoma, has been appointed Seiberling tire distributor for Pierce County, Wash. **C. E. Alger** has operated the company for 3½ yr., and has complete facilities for recapping and repairing.

☆ ☆ ☆

B. W. Mitchell has been appointed manager of sales for the Oregon division of the COLUMBIA STEEL CO. with headquarters in Portland.

☆ ☆ ☆

LOGGERS & CONTRACTORS MACHINERY CO. of Portland has begun construction of a new warehouse at Portland, Ore. The building, which is being built by Stein Bros., will be 90 by 180 ft., one story, of heavy mill construction with concrete flooring.

☆ ☆ ☆

WORTHINGTON PUMP AND MACHINERY CORP., Harrison, N. J., are now using a new two-story, 8,500 sq. ft. reinforced concrete building in Seattle, Wash., as a general sales office and head-

quarters for specialists on Worthington air conditioning and refrigeration, meters, and construction equipment. The building will also serve Worthington's dealer organization as a warehouse for smaller pumps and compressor units and parts.

☆ ☆ ☆

INTERMOUNTAIN

GATES RUBBER CO., Denver, Colo., has announced plans for building a new warehouse to cost between 1 and 1½ million dollars. The new structure, 200 x 300 ft. with four floors and basement, will provide 2 million sq. ft. of additional floor space for the company. Basic construction will be of concrete. The new building is needed since the company utilized all of its available warehouse space for stepped up production during the war.

☆ ☆ ☆

Charles E. Weeks was recently appointed as Assistant to the Operating Vice-President of SOUTHERN ALKALI CORP., Corpus Christi, Texas. He has been associated with the firm since it was established in 1934. Prior to this appointment, he was serving as auditor for the alkali producing firm.

☆ ☆ ☆

AMONG THE MANUFACTURERS

R. J. Nymberg of Detroit, Mich., has accepted the position of general sales manager of the HERCULES STEEL PRODUCTS CORP., Galion, Ohio, manufacturers of hydraulic hoists, bodies, and other automotive equipment. Nymberg, previously associated with GAR WOOD INDUSTRIES, INC., Wayne, Mich., will have charge of sales and advertising of Hercules automotive products and will be assisted by an enlarged staff of sales engineers and district representatives.

☆ ☆ ☆

John L. Beard has been promoted to manager of the small products division of AMERICAN HOIST AND DERRICK CO., Saint Paul, Minn. He will direct sales and merchandising for his division. Products covered by the small products division include drop forged fasteners for wire rope, blocks and sheaves, and winches.

☆ ☆ ☆

W. G. Frome has been elected vice president of the ATLAS POWDER CO., at a recent meeting of the board of directors in Wilmington, Del. Frome was formerly located as general manager for the Giant Division of the company with offices in San Francisco, and transferred four years ago to Wilmington. He continues as a director for the company and as general manager for the explosives division of the entire company.

☆ ☆ ☆

H. WENZEL TENT & DUCK CO., St. Louis, manufacturers of waterproof tarpaulins for the construction industry, have embarked on an extensive advertising campaign to inform contractors of the company's continuing policy of distributing exclusively through contractor equipment dealers located in all the principal cities. These dealers carry ample stocks of the company's tarpaulins and windbreaks to meet contractors' requirements and are able to make immediate delivery.

☆ ☆ ☆

Lee S. Coulter has been named as manager of the Industrial Sales Division of AMERICAN HOIST & DERRICK CO., St. Paul, Minn., according to announcement made by **Stanley M. Hunter,** vice president in charge of sales. Coulter, an eighteen year veteran with American Hoist, will direct sales and merchandising for his division through the company's worldwide sales organization.

☆ ☆ ☆

J. G. Van de Loo, formerly assistant manager of customer relations division of R. G. LeTOURNEAU, INC., Peoria, Ill., has joined the ANDREWS AGENCY of Milwaukee as vice president. In his new capacity, Van de Loo will continue to serve his former company as account executive on the LeTourneau account. He will also contribute to the other industrial and construction equipment accounts in which the agency specializes.

☆ ☆ ☆

THE THEW SHOVEL CO. of Lorain, Ohio, manufacturers of shovels and cranes, has declared a dividend of $1.50 per share on its outstanding shares of common stock. This brings the total 1947 dividends to $3.50 per share, compared with total 1946 dividends of $2.50 per share. **C. B. Smythe,** company president, announced that the net sales for the first ten months of 1947 were 90 per cent ahead of the same period for 1946.

☆ ☆ ☆

DRAVO CORP., of Pittsburgh, Pa., announces the appointment of **William H. Collins** as director of advertising. Collins comes to Dravo from the Scott Paper Co. of Chester, Pa., where he was employed as assistant advertising manager since 1937. He is now serving a second term as president of the Eastern Industrial Advertisers and is a director and chairman of the finance committee of the National Industrial Advertising Association.

☆ ☆ ☆

Appointment of **H. A. Pratt** as parts and service manager of the DAVEY COMPRESSOR CO., Kent, Ohio, was announced recently by **Paul H. Davey,** president. A veteran of over 20 years of company service, Pratt was formerly superintendent of the Kent, Ohio, plant.

☆ ☆ ☆

Walter C. Robertson has been designated as vice-president in charge of export sales for GAR WOOD INDUSTRIES, INC., Wayne, Mich., and will handle all products of the three divisions of the company. Robertson has been with the company for 21 years, and for the past 11 years has been vice-president in charge of national accounts with headquarters in New York City. His new headquarters will be located in the executive offices at Wayne.

☆ ☆ ☆

Construction of a new factory to house facilities for the manufacture of Diesel wheel-type tractors and Diesel motor graders and for the final assembly of scrapers, wagons and rippers has been initiated by CATERPILLAR TRACTOR CO., Peoria, Ill. The factory is being constructed in an area near the new Diesel engine factory and will provide 785,000 sq. ft. of manufacturing area. The outer walls will be constructed of brick topped by corrugated steel, insulated, and with steel sheeting on the inner walls.

☆ ☆ ☆

Appointment of factory managers for the construction equipment factories of CATERPILLAR TRACTOR CO., Peoria, Ill., has been announced by **James R. Munro,** general factory manager for the company. **Lloyd J. Ely** will be manager of the company's new Diesel engine factory, which is currently under construction and is slated for occupancy and partial operation before the end of this year. **John Elwood** will have charge of all Diesel track-type tractor production, moving up from a position as assistant factory manager. **Arthur W. Johnson,** assistant factory manager, becomes factory manager in charge of the manufacture of earthmoving products in the company's line. The division of managerial responsibilities accompanying the appointments is in keeping with the integration of manufacturing processes taking place along with current general plant expansion.

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, Calif.

Heavy-duty Bulldozer

Manufacturer: American Tractor Equipment Corp., Oakland, Calif.

Equipment: Bulldozer especially designed for Case industrial wheel tractors.

Features claimed: Bulldozers cut the full width of the tractor and are securely fastened to tractor at the transmission case, drawing pad and rear axle housing. Bulldozer push members are pivoted above the rear axle so part of the working load is transferred to the rear wheels to increase traction. Push members do not interfere with the steering so front wheels will turn in normal tractor radius even when blade is in dozing position and below ground level. Blade is powered both up and down by front-mounted hydraulic pump, which assures constant power without gear shifting.

Beam Compass

Manufacturer: Omicron Co., Glendale, Calif.

Equipment: New type of beam compass using retractible steel tape.

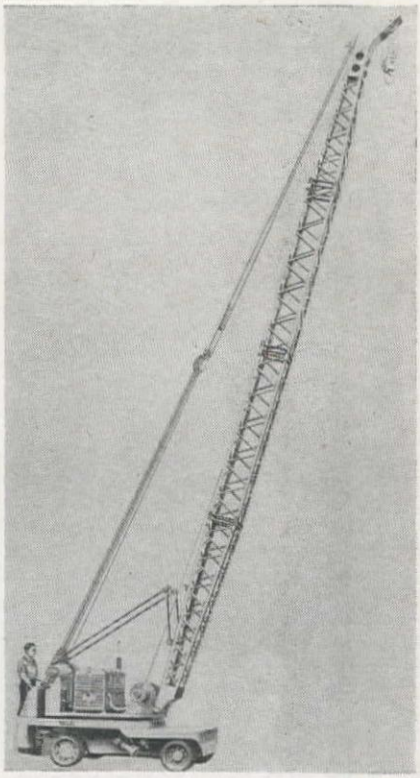
Features claimed: The flexible-rigid type steel tape retacts into a small rugged die-cast case that may easily be held in the palm of the hand. A unique brake lever firmly locks the tape in any desired adjustment. Only when the lever is depressed may the tape be moved. The accurately machined head holds a standard drafting pencil or a steel scriber. The legible scale and efficient method of reading adjustments reduces error. Rapid, efficient radius setting saves time in architectural and engineering drawing, sheet metal layout, and woodworking.

Crane Truck

Manufacturer: Yale & Towne Manufacturing Co., New York, N. Y.

Equipment: New crane truck with 40-ft. boom.

Features claimed: The boom is constructed in 10-ft. sections. The center sections can be removed to provide 20 ft. and 30 ft. booms when longer lengths are not needed. The capacities of the boom at full length are 4500 lb. at a 7-ft. outreach and 2000 lb. at 19 ft. The 10-ton crane truck has a balancing point at the 19-ft. outreach of 3125 lb. and has electric elevating and



booming limit controls. It is equipped with outriggers on both sides for hoisting capacities up to 10,000 lb. and has a 270 deg. steering range. A lazy arm boom-stop prevents loads from swinging past the pivot point of the boom.

Motorized Wheelbarrow

Manufacturer: Whiteman Manufacturing Co., Los Angeles, Calif.

Equipment: One man unit with 6 h.p. gasoline engine.

Features claimed: The Power Buggy hauls 2000 lb. or 12 cu. ft. at speeds from 2 to 15 m.p.h. forward or reverse, goes up a 25 deg. ramp with a load, turns in its own

radius, and is fitted with a hitch for light tractor use. Power is provided by a 6 h.p., 4-cycle, air-cooled engine with an automatic clutch and variable speed changer through a worm gear reducer. Its light weight of 750 lb., high maneuverability and narrow width adapt it for scaffold and upper story work. The bucket height of 34 in. enables it to load at most concrete mixers without pit or platform. One man with this unit should be able to do the work of 6 men with wheelbarrows.

Crawler Tractor

Manufacturer: International Harvester Co., Chicago, Ill.

Equipment: Tractor powered by a 170 h.p. Diesel engine.

Features claimed: The new TD-24 crawler tractor weighs more than 18 tons and is the most powerful tractor built by the company. It is designed to handle the largest construction equipment of all types.

Trucks for Cement Mixers

Manufacturer: Four Wheel Drive Auto Co., Clintonville, Wis.

Equipment: Four wheel drive trucks adapted to mounting of mixers.

Features claimed: A complete line of Four Wheel Drive trucks has been adapted for use with every standard type of transit

mixer. The drive traction, applied to the proper capacity mixer, will take the load through mud and sand without delay assuring delivery of the concrete at the proper consistency. The trucks will take a load through the loose dirt, fill and mud of a construction site that a two wheel drive truck could not negotiate without the assistance of a tractor. Models for heavier mixers are equipped with an auxiliary rear axle for weight carrying ability.

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.

STEEL FORMS—**Irvington Form & Tank Corporation,** New York, N. Y., has published an attractive 25-page booklet on the erection and maintenance of steel forms. Instructions show the procedure for a usual-type job, and the builder is taken through the process step by step, from the cleaning of footings through stripping and preparation for re-use. He is also shown how to cut his form and lower labor costs by as much as 50%, and how to save on erection and stripping. Included are 49 pictures and sketches of form erection in various stages.

TRACTOR POWER—**Allis-Chalmers Manufacturing Co.,** Tractor Division, Milwaukee, Wis., has just released a six-page folder describing the new HD-19 Torque Converter tractor. A three-page center spread heralding the HD-19 as the "World's Largest, Most Powerful Tractor" lists many of the new unit's prominent features. Another part of the brochure provides il-

lustrations of the tractor's large comfortable operator platform, its six-cylinder General Motors engine, and a cut-away view of the truck wheels which require greasing attention only once every 1000 hrs. A pictorial page of on-the-job views portrays application of the HD-19 on a variety of jobs such as stump removal, road building, logging, bulldozing, and earthmoving with scrapers. A full page of specifications relative to engine construction, steering design, speeds and drawbar pull, and general dimensions of the new tractor completes the folder.

SIMPLIFIED ARC WELDERS—**The Hobart Brothers Company** of Troy, Ohio, now has available a new 36-page, three color catalog containing illustrations, descriptions, dimensions and specifications on its complete line of "Simplified" arc welders which include electric motor driven DC welders in 5 sizes from 150 to 600 amperes; gasoline engine driven welders in 4 sizes from 200 to 600 amperes; AC transformer type welders in 3 sizes from 200 to 500 amperes; welding generators only in 4 sizes from 150 to 400 amperes; gasoline engine driven welders with auxiliary AC or DC power generators; and other models in all sizes for special arc welding applications. Various features comprising the machines are individually illustrated and described, and helpful information is given for various welding problems. Also listed is the complete line of Hobart arc welding electrodes and accessories.

TYPE 604—**Lima-Hamilton Corp.,** Lima, Ohio, has recently published a new 24-page bulletin containing a complete, detailed description of the Lima Type 604 shovel, crane and dragline. Many illustrations are contained in the bulletin showing details of construction and operating advantages including the application of "precision" air control. Liberal space is given to specifications, capacities, and working ranges. As a shovel the Type 604 has a capacity of 1½ cu. yds.; as a crane, 30 tons; and as a dragline, variable.

MIXERS ON THE MOVE—**The Four Wheel Drive Auto Company,** Clintonville, Wis., has made available new literature describing FWD trucks available for mounting ready-mixed concrete bodies. Titled "Mixers On The Move," the folder describes use of its trucks in capacities ranging from twenty thousand to thirty-eight thousand pounds gross vehicle weight for use with mixers from two to five and a half yards capacity.

THE HI-BOY—**Blaw-Knox Company,** Pittsburgh, Pa., has

prepared a bulletin No. 2223 on the Hi-Boy Trukmixer, its recent introduction into the high-discharge type of truck mixer. The pamphlet is illustrated with service and construction views and gives specification data and operating information on the new unit.

TERRA-COBRA EARTHMOVER—**Wooldridge Manufacturing Company,** Sunnyvale, Calif., has released a 12-page bulletin illustrating and describing the improved operation and construction features of the Wooldridge Terra-Cobra high-speed self-propelled earthmovers. Descriptive data is combined with on-the-job photographs to show engineers, contractors, and equipment owners, how the earthmovers are used to gain greater yardage profits in earthmoving operations. The positive two-wheel hydraulic steering action, plus the flexibility articulated oscillating king pin pivot are among the features covered in detail by the new bulletin.

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