WESTERN CONSTRUCTION NEWS

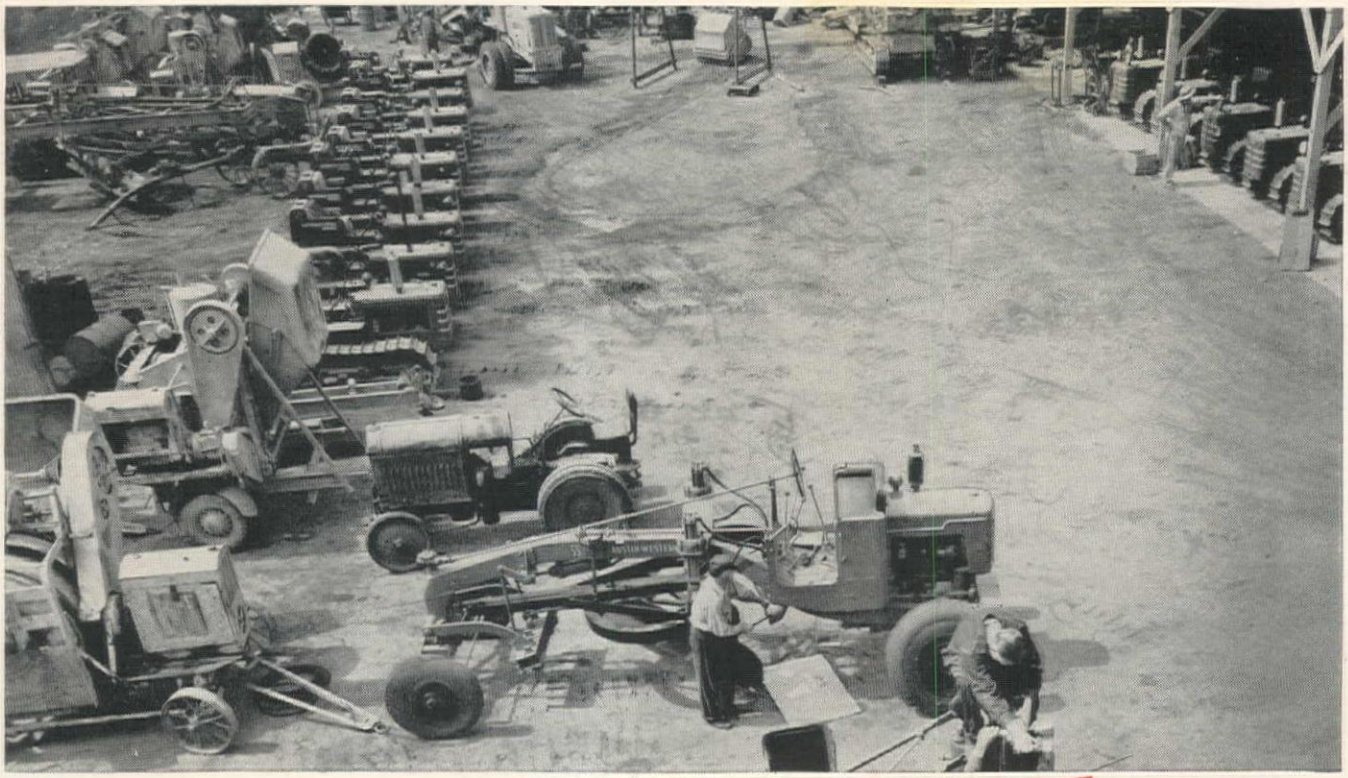
WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXI, No. 9

SEPTEMBER • 1946

35 CENTS A COPY
$4.00 PER YEAR

GLORY HOLE spillway at Owyhee Dam, Bureau of Reclamation structure in Oregon. Water drops 300 ft. straight down. Normal capacity is 30,000 sec. ft., and upper 15 ft. of the steel ring gate is adjustable, to permit regulation of water level. It was built in 1932, is spilling this year.



Prevent Rust

ON THE JOB or in the yard, contractors' equipment of all types needs protection against rust. *Texaco Rustproof Compound* assures *positive* protection. It is easy to apply, long lasting and economical.

Texaco Rustproof Compound fights rust three ways. It 1) prevents rust from forming; 2) penetrates existing rust and stops further rusting; and 3) loosens existing rust, makes it easy to remove.

Texaco Rustproof Compound forms a soft, self-healing, *waterproof* film — easy to brush on, easy to remove. A single application usually protects for a whole year. Because of its proved effectiveness, *Texaco Rustproof Compound* is widely used wherever metal is subject to rust and corrosion.

Order *Texaco Rustproof Compound* from the nearest of the more than 2300 Texaco distributing plants in the 48 States. Write for your copy of our 36-page book "Rust Prevention." The Texas Company, 135 East 42nd Street, New York 17, N. Y.

MANY USES FOR TEXACO RUSTPROOF COMPOUND

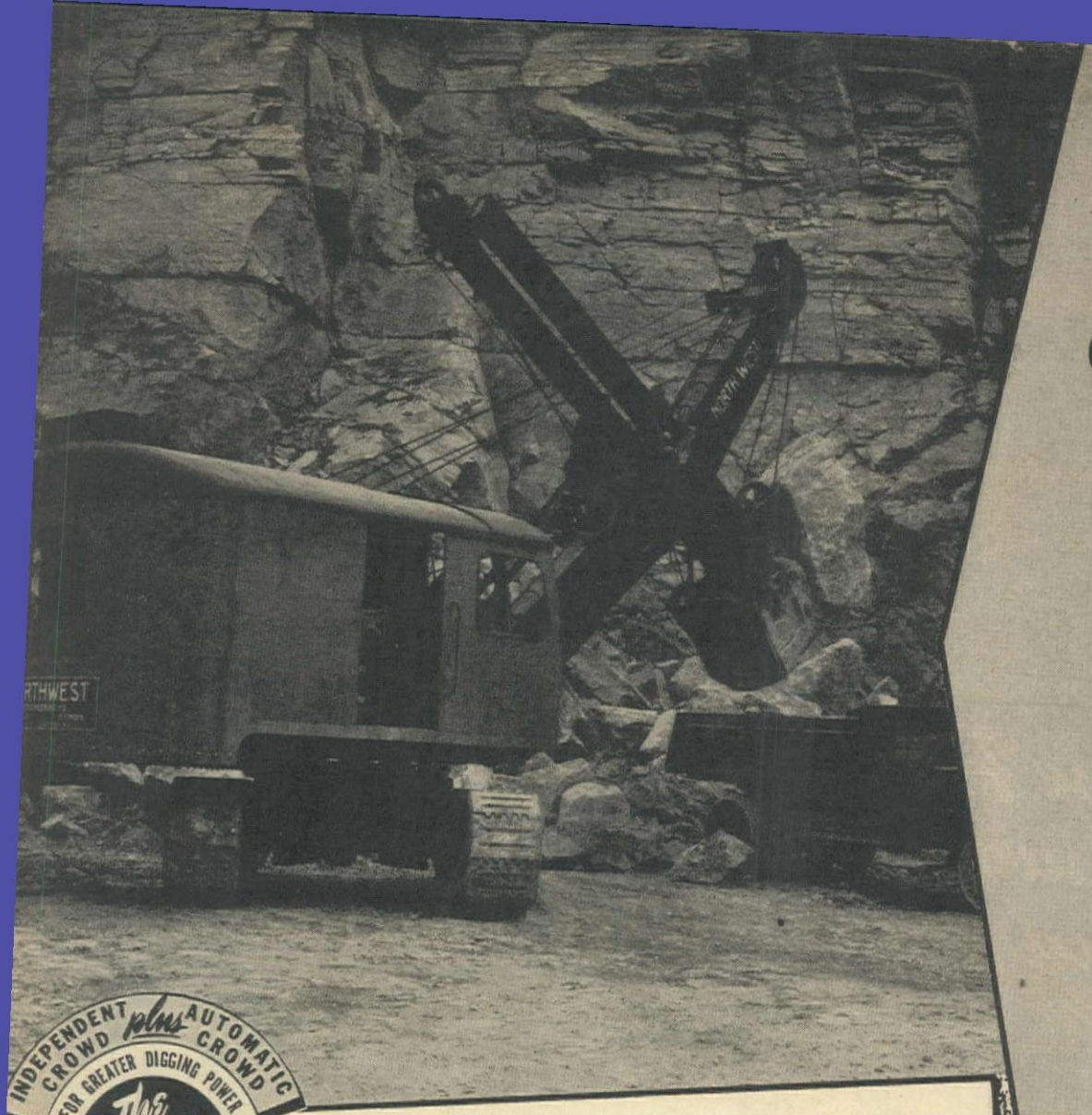
Metal construction equipment of all kinds, also gas holders, water works, sewage disposal plants, bridges — wherever metal is exposed to weather or corrosive chemicals and fumes — *Texaco Rustproof Compound* provides safe and economical protection. For example —

A Pennsylvania County Commissioner writes: "We have been using your Rustproof Compound for the last two years to protect our bridges in this County. Up to this writing we have coated some seven or eight bridges with splendid results. In the near future we intend to coat more of the bridges here."

TEXACO REG. T. M.

TEXACO Rustproof Compound

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



THAT EXTRA CROWDING FORCE OTHER SHOVELS WASTE— pays out in the TOUGH DIGGING!

INDEPENDENT CROWD *plus* AUTOMATIC CROWD
FOR GREATER DIGGING POWER

The DUAL CROWD

The Northwest Dual Independent Crowd accomplishes *everything* that any other independent crowd can accomplish, but only the Northwest Dual Independent Crowd adds the force in the end of the Hoist Cable to the Crowding action! No other crowding mechanism combines the simplicity of the Northwest Independent Crowd with the additional crowding force secured by dead-ending the hoist cable onto the end of the dipper sticks.

That extra force all other shovels waste pays added dividends to a Northwest owner.

A Northwest, because of this additional crowding force, cannot only handle harder digging, but it handles *more yards per hour.*

This design is described in detail in "Digging Power Plus," a booklet that we will be glad to send without obligation.

NORTHWEST ENGINEERING COMPANY
1736 Steger Building • 28 E. Jackson Boulevard • Chicago 4, Illinois

Sales Agents:

CHEYENNE, WYOMING
Wilson Equipment Supply Co.

DENVER, COLORADO
The Mine & Smelter Supply Co.

PORTLAND, OREGON
Baizer Machinery Co.

SALT LAKE CITY, UTAH
Arnold Machinery Co., Inc.

Branch Offices:

DENVER, COLORADO
3015 Clermont

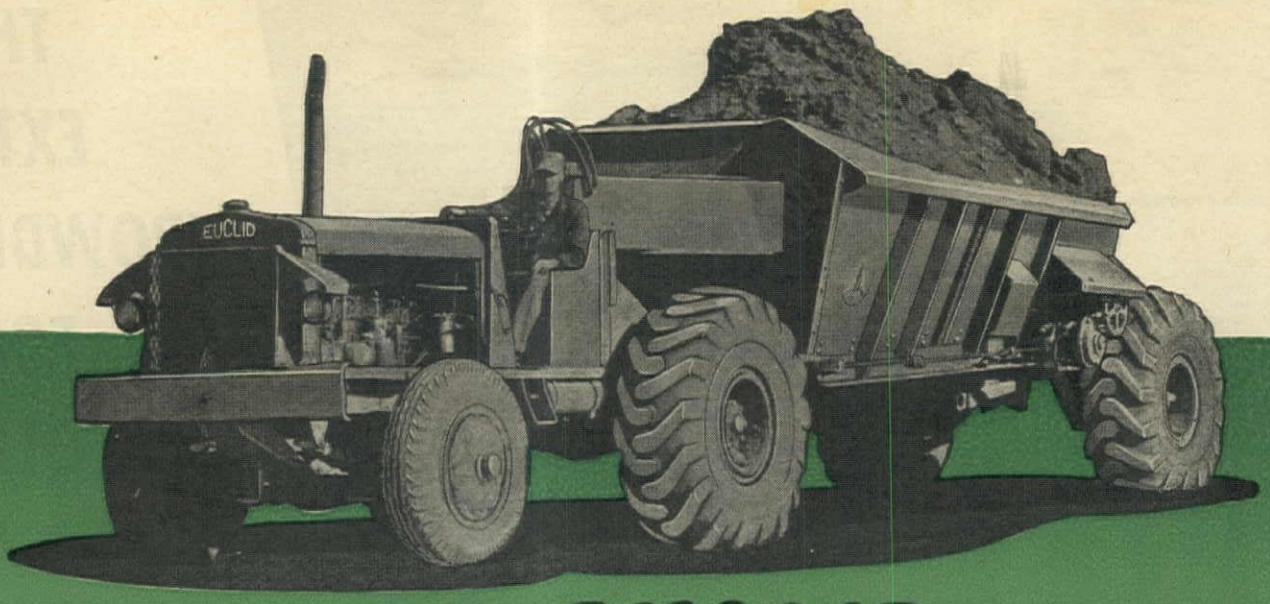
LOS ANGELES, CALIFORNIA
3707 Santa Fe Avenue

SAN FRANCISCO, CALIFORNIA
255 Tenth Street

SEATTLE, WASHINGTON
[illegible] Sixth Ave., South

NORTHWEST

. . . and when you have a real Rock Shovel you won't have to worry about output in dirt



These Proved EUCLID features Assure Dependable Performance And Lower Cost Operation

Versatility—The Bottom-Dump Euclid hauls all types of earth, ore, and free-flowing material . . . loads fast and easy with shovels, draglines, elevating graders, conveyor belts, or from transfer bins.

Speed and Capacity — Moves 20-ton payloads at speeds from 2 to 26 m.p.h.

Fast Turning — Ample clearances and sturdy universal hitch permit fast, sharp turns . . . save time and money at every turn on fill and at loading unit.

Quick Dumping — Wide, full length doors, smooth, steep hopper sides, and air controls assure quick, clean dumping. Load is dumped on the fill without stopping.

Economical Operation — Full-floating, planetary-type drive axle is unequalled for trouble-free performance . . . proper payload weight distribution and large tires for traction in tough going . . . heavy duty 150 h.p. engine and five speed transmission for ample power on steep grades and difficult, off-the-highway hauls.

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

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

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

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for September, 1946

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3 New

Adams is proud to announce three new post-war motor graders—all possessing outstanding features . . . *in design—in construction—in operating efficiency and economy.*

The new Adams Motor Graders are products of more than five years of intensive research and development effort. Among other important improvements, all three machines feature Adams' high-arch front axle, giving Adams machines greater axle clearance than any other graders. Axle bulldozing is eliminated—larger windrows of earth and oil mix are moved—*better, faster, cheaper.*

These new machines are by far the finest in Adams' long history . . . *more powerful—more rugged—more economical to operate and maintain.* Ask your local dealer about Adams—*America's No. 1 Motor Graders.*

J. D. ADAMS MANUFACTURING CO., INDIANAPOLIS 6, INDIANA

Adams Motor Graders

ALL WITH HIGH-ARCH FRONT AXLE

No. 512—DELUXE HEAVY-DUTY MACHINE

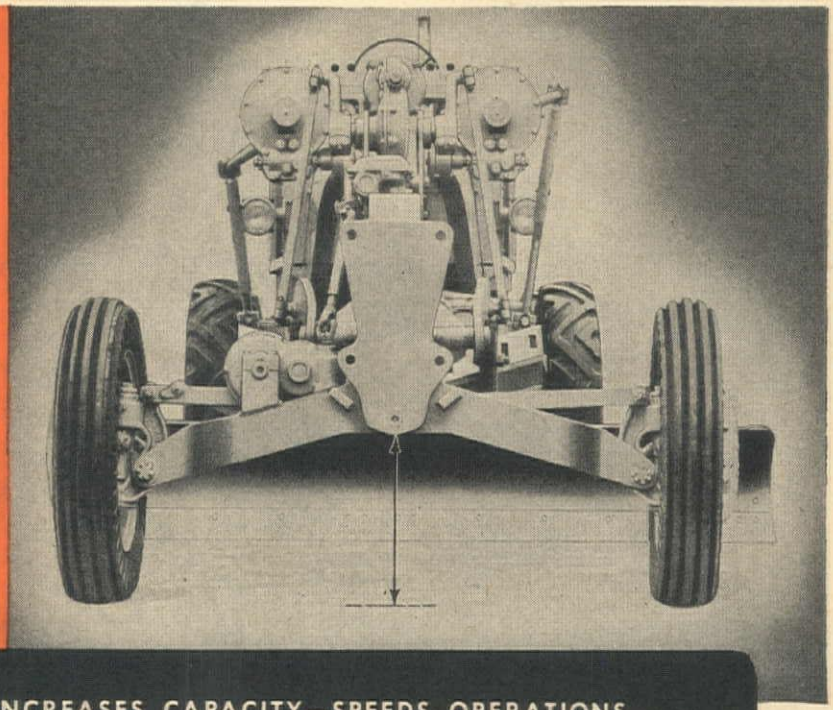
A large, rugged motor grader, possessing exceptional power and stamina. Machine is built extra strong throughout to stand up to continuous severe service under difficult operating conditions.

No. 414—HEAVY-DUTY MACHINE

This machine is equipped with same engine as the No. 512, but is not quite as heavy. Powerful and versatile, it is capable of handling all average surface, ditch and bank operations on a high production basis.

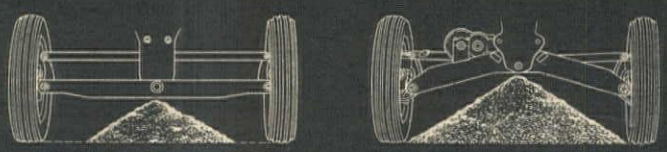
No. 312—MEDIUM-DUTY MACHINE

Economical to buy and operate, this machine has all blade positions of larger models. Widely used by cities, townships and counties for a wide variety of construction and maintenance work.



HIGH-ARCH FRONT AXLE INCREASES CAPACITY—SPEEDS OPERATIONS

The Adams high-arch front axle provides approximately twice the capacity of conventional axles for straddling large windrows of material, as illustrated by accompanying sketches. Thus, bulldozing of axle through material is eliminated—no waste of power, no loss of operating speed.



LOCAL *Adams* DEALERS

CALIFORNIA—Western Factory Branch
J. D. ADAMS MANUFACTURING CO.
230 7th Street, San Francisco 3
Adams Distributors at: San Francisco, 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—O. S. Stapley Company, Phoenix
COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equipment Co., Boise, Pocatello
MONTANA—Industrial Equip. Co., Billings, Missoula
Hi-Line Equipment Co., Great Falls
NEVADA—Brown Motors, Reno

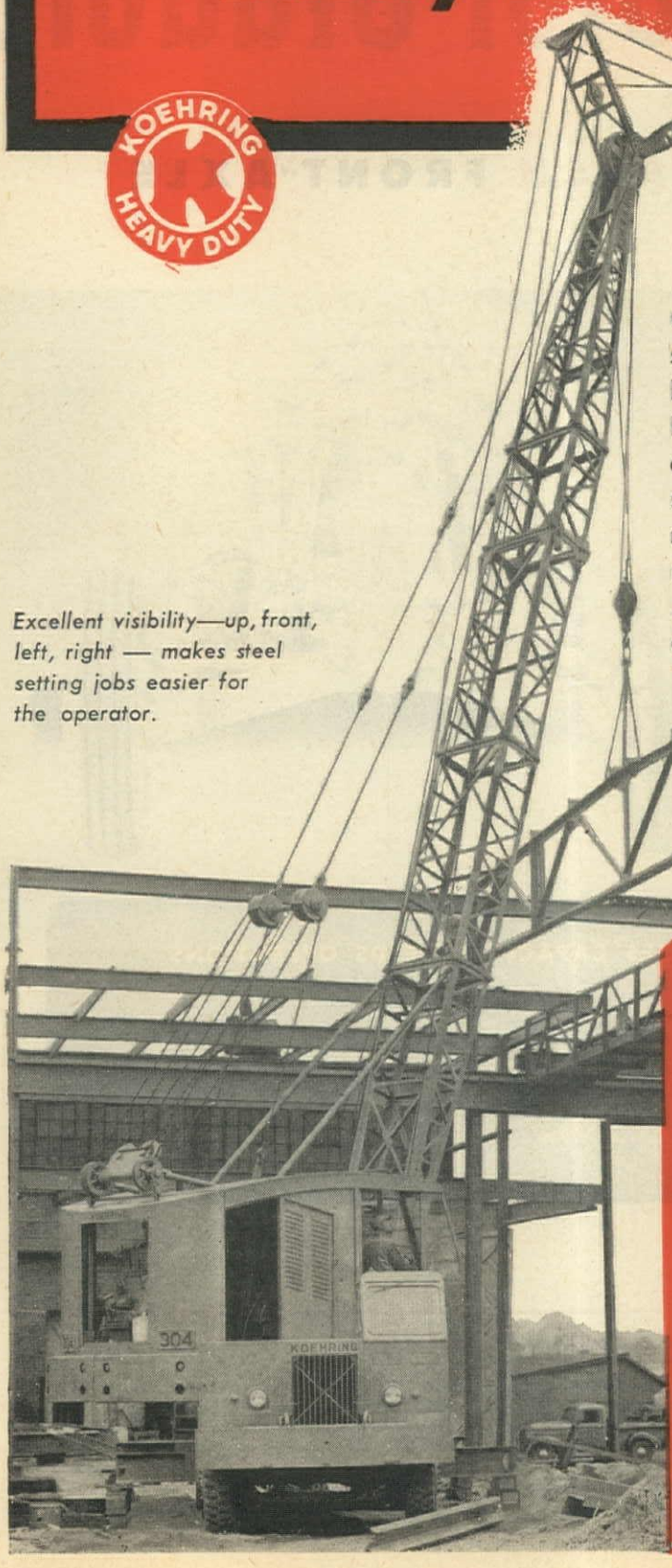
NEW MEXICO—Hardin & Coggins, Albuquerque
OREGON—Howard-Cooper Corp., Portland, Eugene
UTAH—The Lang Company, Salt Lake City
WASHINGTON—Howard-Cooper Corp., Seattle
Intermountain Equipment Co., Spokane
WYOMING—Industrial Equip. Co., Billings, Mont.
The Lang Company, Salt Lake City, Utah

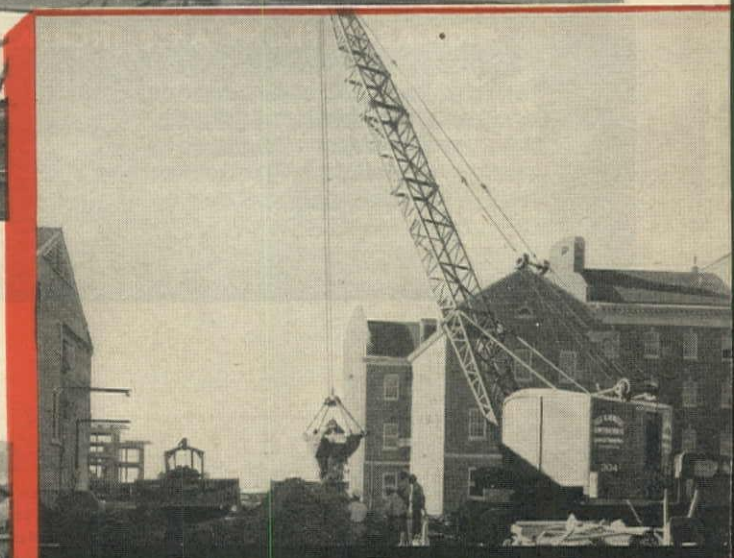
New KOEHRING
Easily Lifts 40,000 lbs.

KOEHRING HEAVY DUTY

CHECK the new Koehring 304 Truck Crane, the new Heavy-Duty unit with all the sturdy quality of the Koehring line. The same base machine that makes the Koehring 304 a Heavy-Duty leader in the crawler class is yours on the Koehring 304 Truck Crane. Its extra strength turns added stability gained by truck mounting into extra lifting capacity. With outriggers, you easily lift 40,000 lbs. (85% rating) . . . not only over the end, but over the side and all around. Without outriggers, you lift up to 15,800 lbs.

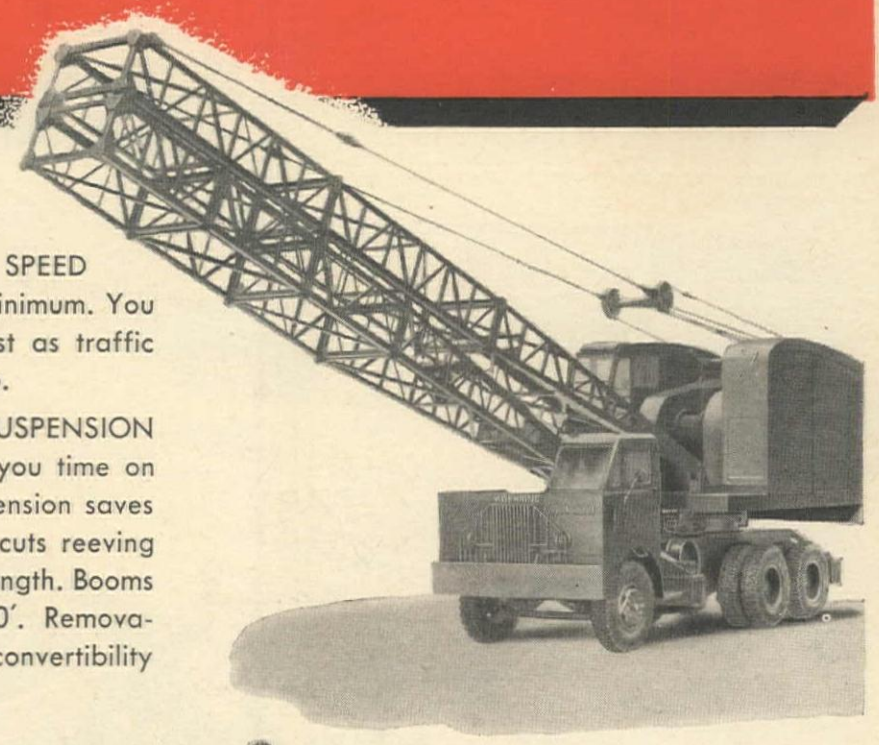
Excellent visibility—up, front, left, right — makes steel setting jobs easier for the operator.





High lifting capacity gets big pay loads, extra production, in clamshell work.

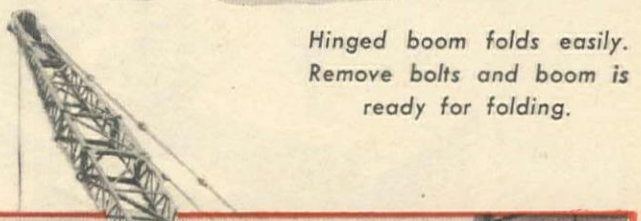
304 TRUCK CRANE
Travels at Traffic Speed



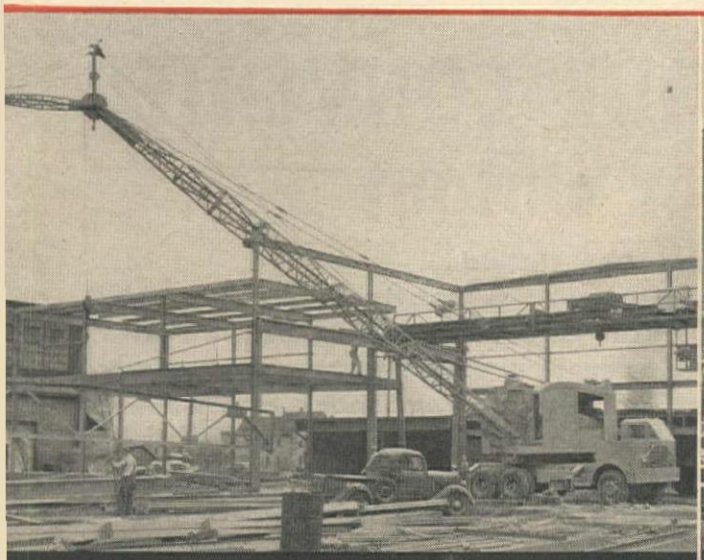
YOU ROLL ALONG AT TRAFFIC SPEED
No-pay travel time drops to the minimum. You roll along from job to job as fast as traffic flows. Where trucks go, you go.

FOLDING BOOM . . . PENDANT SUSPENSION
Hinged boom folds easily, saves you time on every move. Pendant boom suspension saves 60% of boom suspension cable, cuts reeving time whenever you change boom length. Booms up to 110′. Jib extensions 5′ to 30′. Removable outriggers are optional for full convertibility to shovel, pull shovel or dragline.

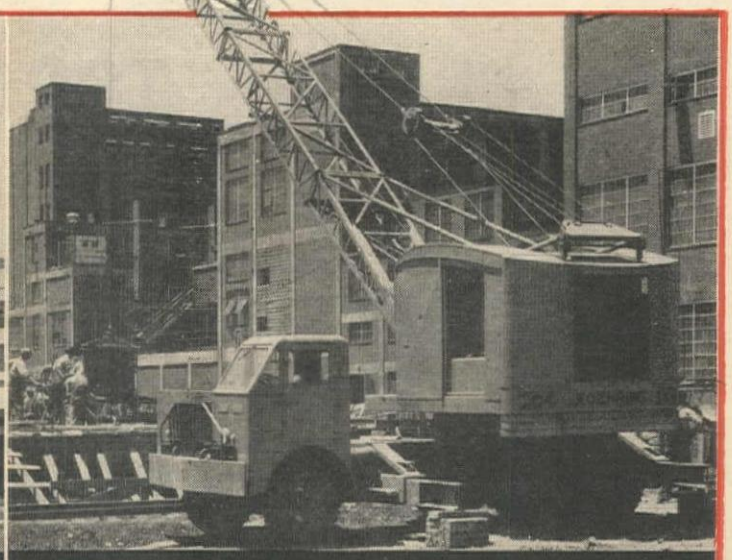
KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN
Subsidiaries: KWIK-MIX • JOHNSON • PARSONS



Hinged boom folds easily. Remove bolts and boom is ready for folding.



Smooth, accurate brakes and clutches put steel just where you want it.



Pendant boom suspension cuts cable costs, simplifies changes in boom length.

A "flying" project from the start! Four A-C torque converter tractors really make the dirt fly on this million yd. airport project. Owner F. W. Schrom also speeds maintenance and finishing with an Allis-Chalmers Model A-D Motor Grader.

• • •

Left: Torque converters plus pusher loading... this is the way to really move dirt! Owner Schrom assures himself of fastest possible loading and hauling, capacity loads every trip, with this combination.

Allis-Chalmers TORQUE CONVERTER Boosts Tractor Output

The Allis-Chalmers torque converter method of transmitting tractor engine power livens up tractor performance — gets much more work done.

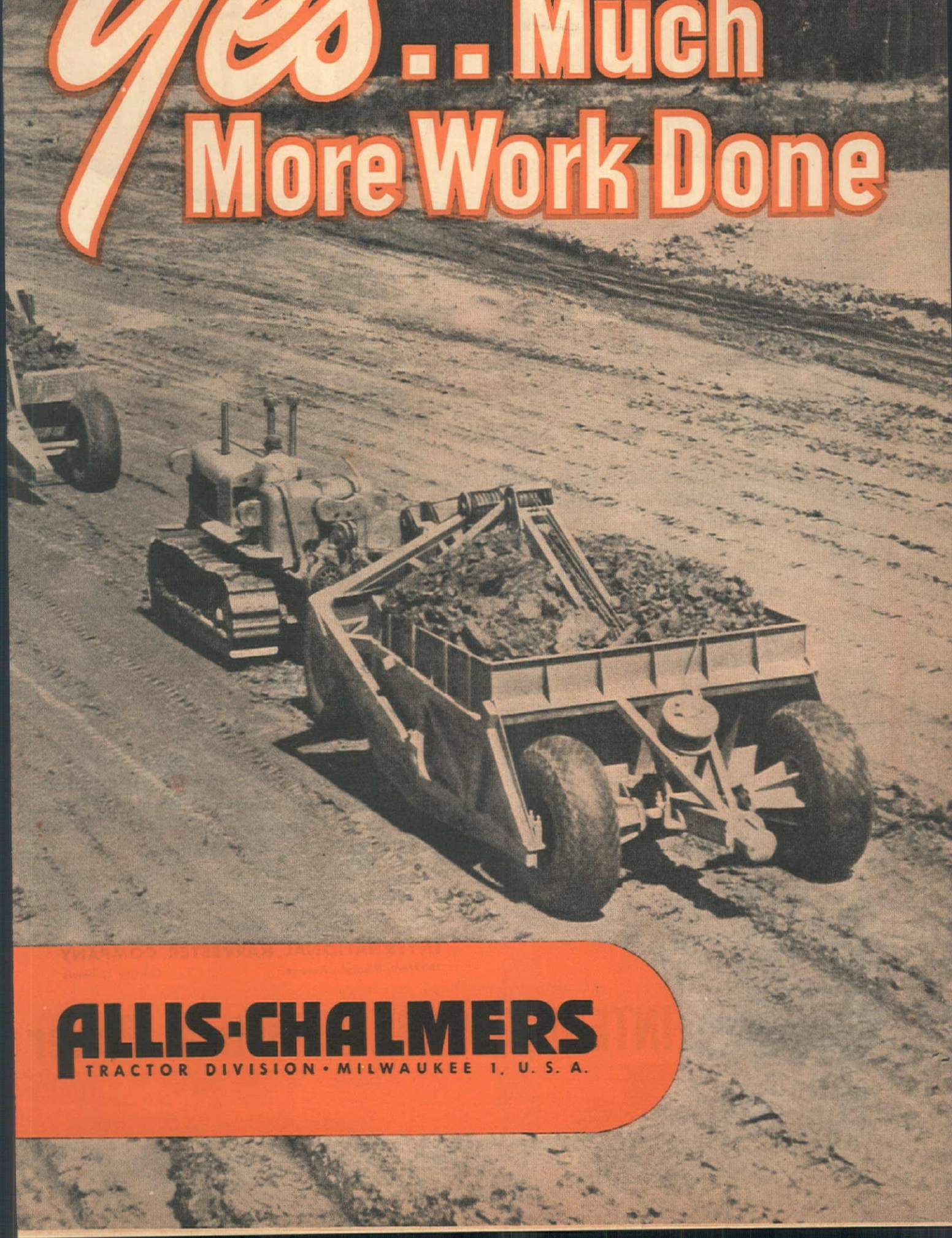
With a torque converter, highest possible speeds at which load can be moved are automatically selected in each of the three forward and reverse speed ranges. This gives you infinite working speeds in each gear — from zero to maximum. Assures peak tractor performance at all times. Keeps gear shifting to an absolute minimum.

There's no restarting, either. Engine cannot be stalled!

Operation is continuously smooth. Cushion of oil between engine and tractor train protects tractor and auxiliary equipment from shock and abuse. There's more time on the job . . . less money spent on repairs, overhaul!

Operators go for it, too! Smooth, easy operation, less gear shifting, means less fatigue — more work done!

Yes . . . moving dirt with torque converter tractors is a new construction experience . . . worth your immediate investigation.


Yes... Much
More Work Done
ALLIS-CHALMERS
TRACTOR DIVISION • MILWAUKEE 1, U. S. A.

You'll Get the Best with INTERNATIONAL

When you buy dirt-moving *power* and *equipment* from your International Industrial Power Distributor, you get this unbeatable combination:

INTERNATIONAL TRACTORS — built by *specialists* in engine and tractor design.

MATCHED EQUIPMENT — built by *specialists* in earth-moving machines and developed through close cooperation with International Harvester engineers.

International tractor and equipment combinations are balanced units that move dirt efficiently, at lowest possible cost. They are exactly suited to your locations and the requirements of your jobs.

The tractors and engines are built to standards nowhere else excelled! Investigate their features of design and performance and you'll agree that Internationals can't be beat!

The matched equipment is equally outstanding, built by *specialists* who know the dirt-moving business from A to Z, through long experience in competing successfully for the earth-moving market. This assures the production of the best possible equipment for International Tractors and Power Units.

POWER UNITS

WHEEL TRACTORS

CRAWLER TRACTORS

In addition, the service facilities of International Industrial Power Distributors are unexcelled. Wherever you go there's a thoroughly equipped, factory-trained service organization near you to keep your tractors and equipment in first-class working order.

Yes sir! Here is the *best combination:* International Tractors, Matched Equipment and the nation-wide service facilities of International Industrial Power Distributors.

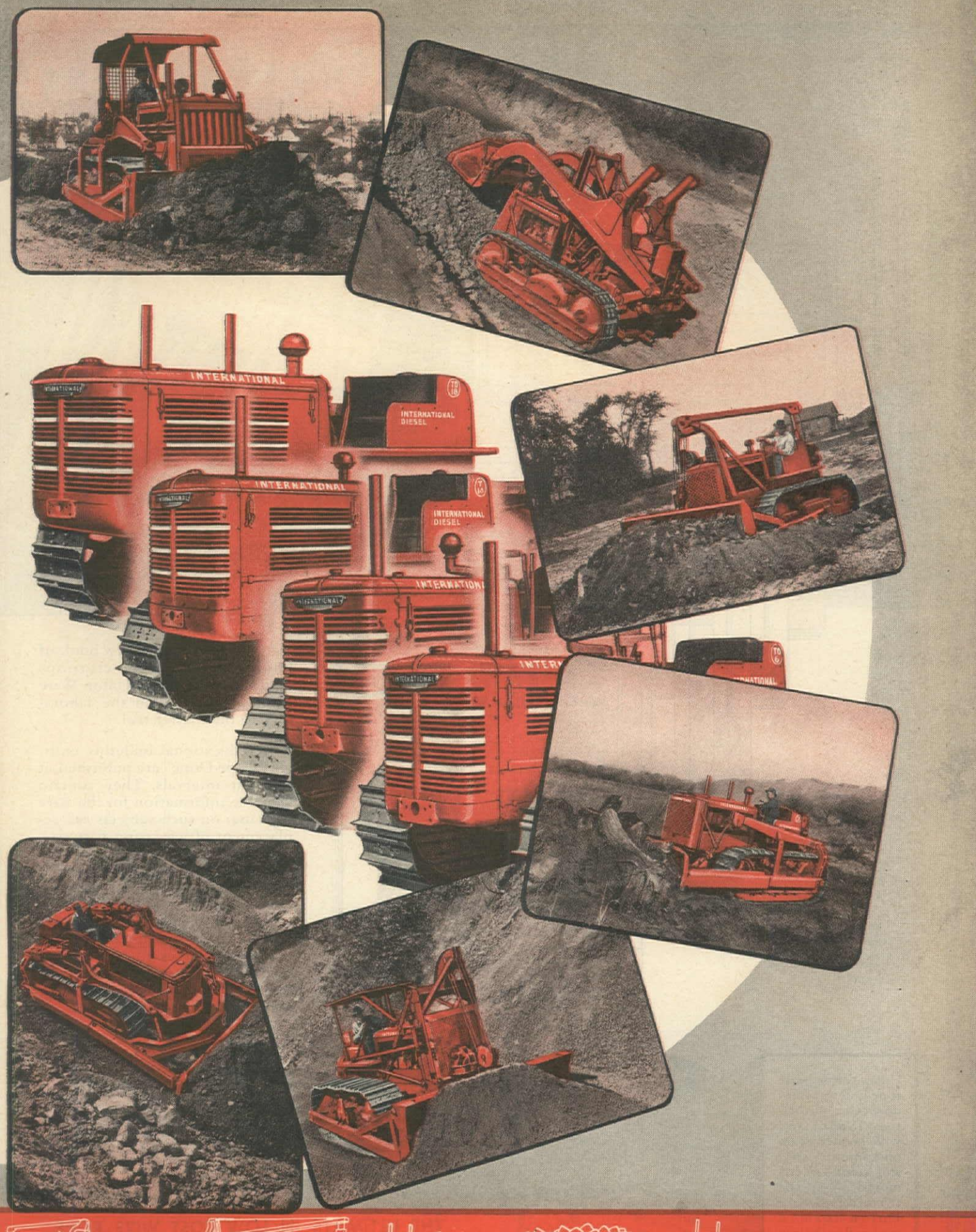
The distributor near you will give you further information about the tractors, power units and equipment now available—and about the facilities he provides for factory-level service—whenever you want it.

Industrial Power Division

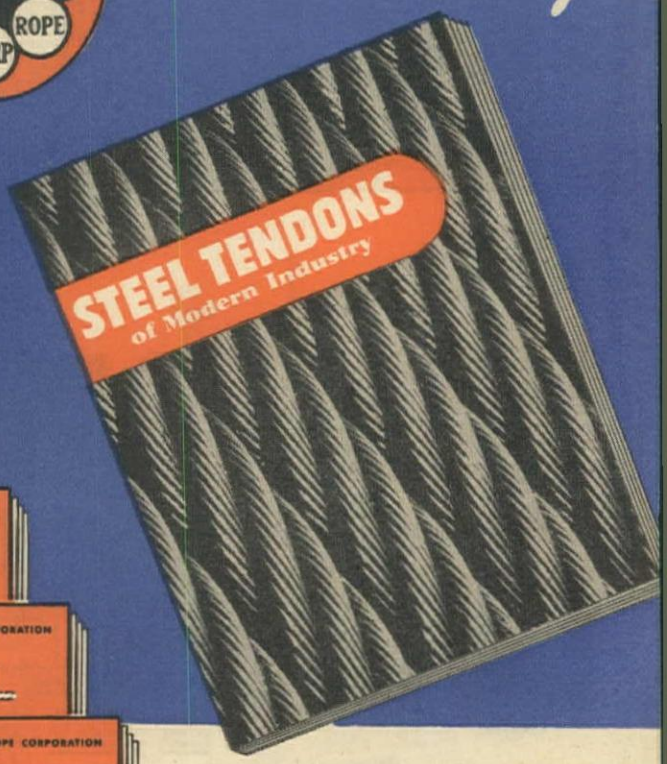
INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue — Chicago 1, Illinois

INTERNATIONAL Industrial Power


INTERNATIONAL
INTERNATIONAL DIESEL
INTERNATIONAL
INTERNATIONAL DIESEL
INTERNATIONAL
INTERNATIONAL

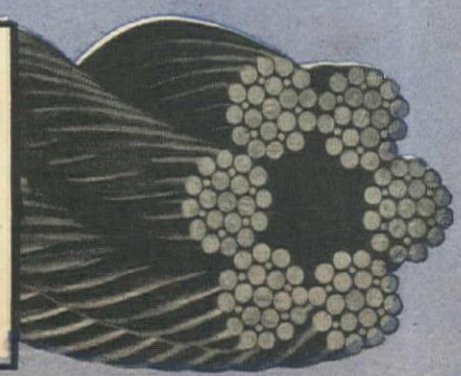
union Wire Rope



"Steel Tendons" is a new book of photographs and descriptions which show you how Union Wire Rope is made, from the laboratory to the master reel.

Nine educational bulletins entitled "Rope Dope" are published at frequent intervals. They contain valuable information for the wire rope user on such subjects as: replacement of wire rope as to size, tread, diameter, type of construction and correct grades of steel; explanation of the lays of wire rope; types of wire ropes with complete specifications; factors which determine rope life; installation and abuses to be avoided; care of wire rope; abuses and their results and figuring the working load and actual stresses.

Union-formed wire rope is designed to do specific jobs better – longer and with greater economy. Internal stress and strain are removed by special forming giving Union-formed more flexibility and stamina.



union-formed

(preformed)

THE ULTIMATE IN LOW COST WIRE ROPE

is Made by Specialists Who Share Their Knowledge to Help Users Get Maximum Service

Ours is an organization of specialists devoting their whole time to the making of wire rope and to its application.

The latter is of importance to the user because the life and efficiency of the best wire rope is foreshortened if improperly applied.

To safeguard against this, distributors of Union Wire Rope are fully equipped with a thorough working knowledge of wire rope application and are capable of making sound recommendations.

To post users of Union Wire Rope on proper application and on many other factors involved in its use, a library of useful information is published. Sent gratis on request.

UNION WIRE ROPE CORPORATION

2146 Manchester Avenue — **Kansas City 3, Missouri, U. S. A.**

Send book or bulletin as checked.

Firm Name_____

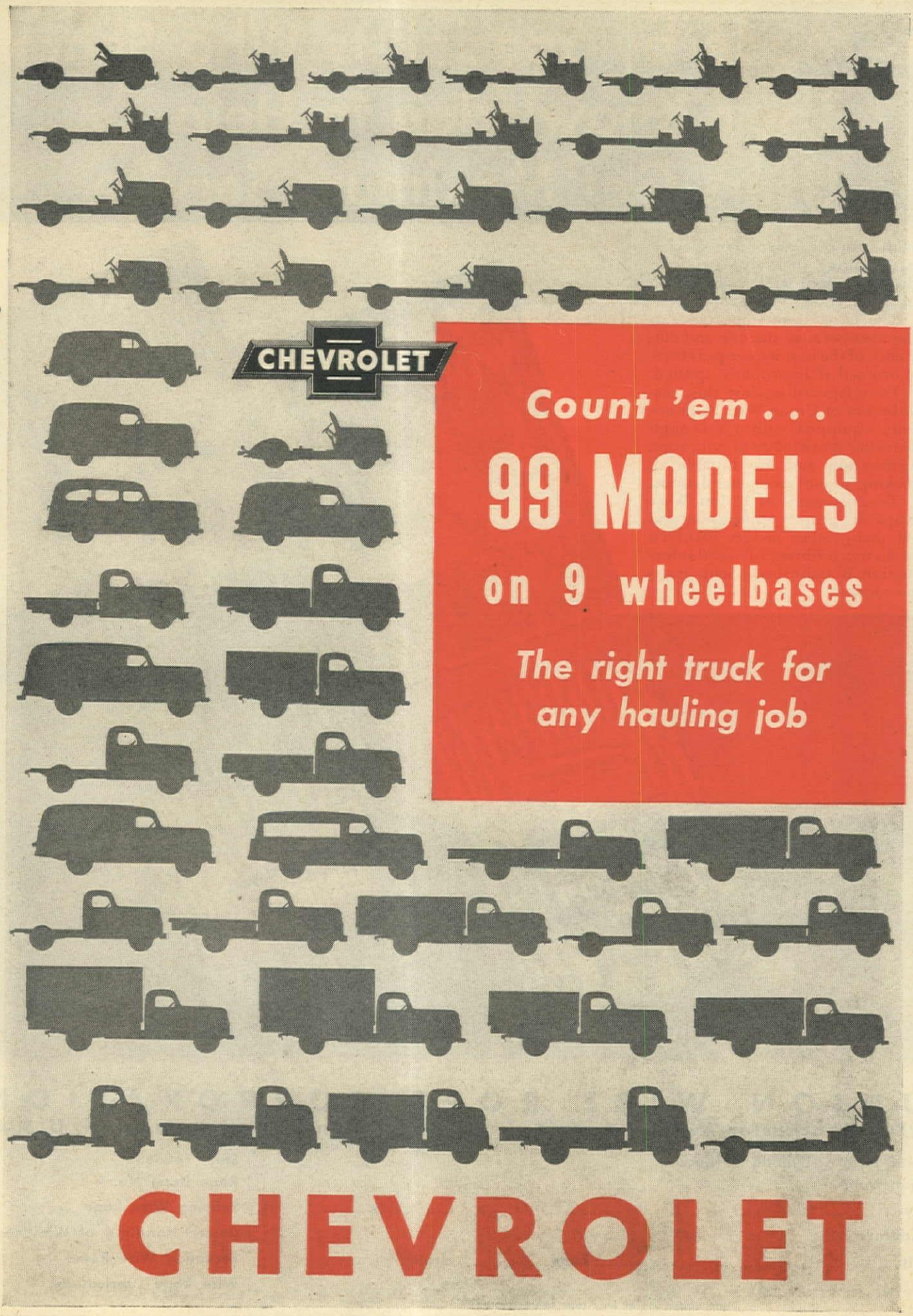
By_____ Title_____

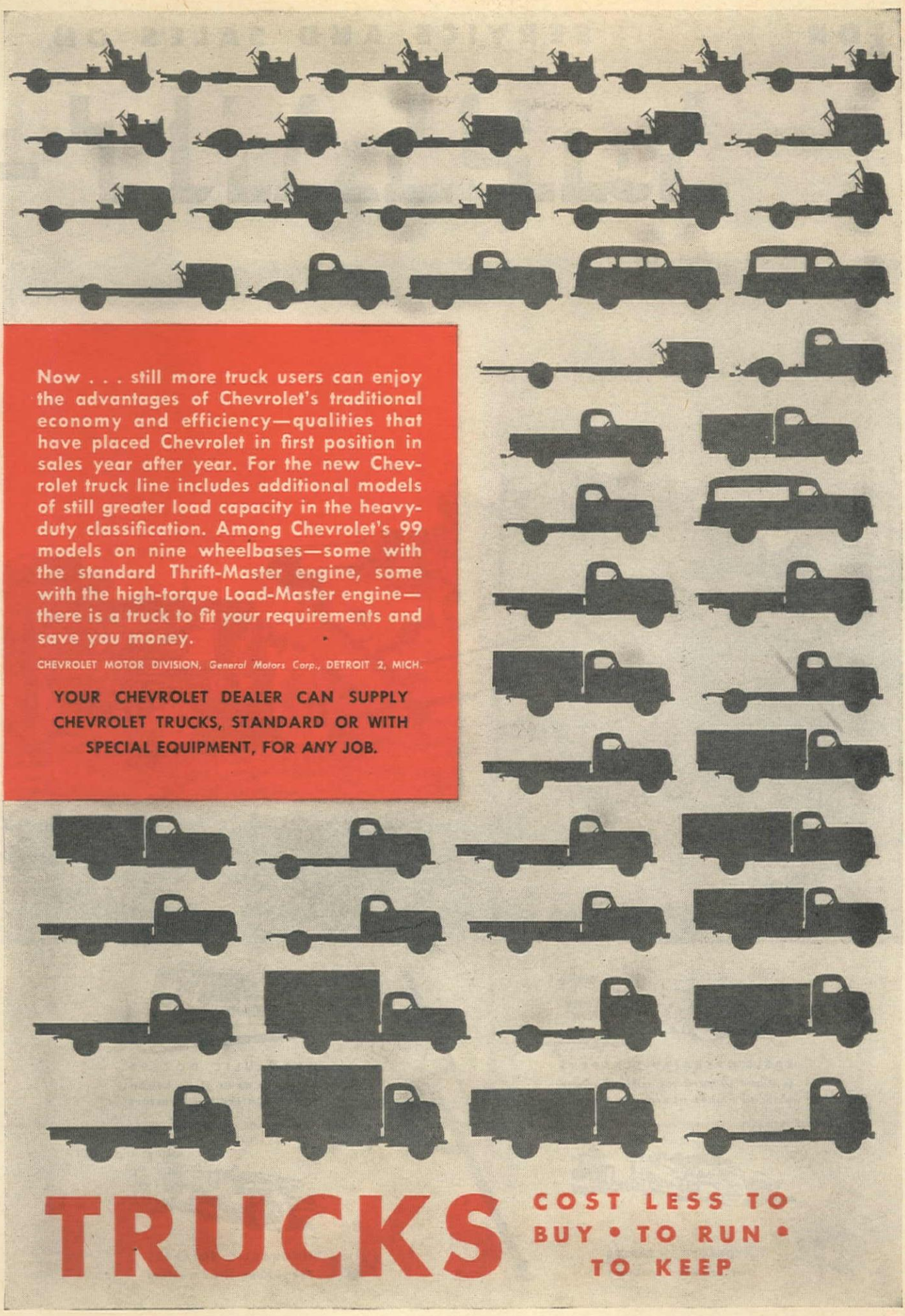
Address_____

City_____ Zone_____ State_____

- ☐ Steel Tendons
- ☐ Rope Dope No. 1
- ☐ Splicing Wire Rope
- ☐ Correct Handling of Wire Rope
- ☐ Socketing Wire Rope
- ☐ Wire Rope Lubrication

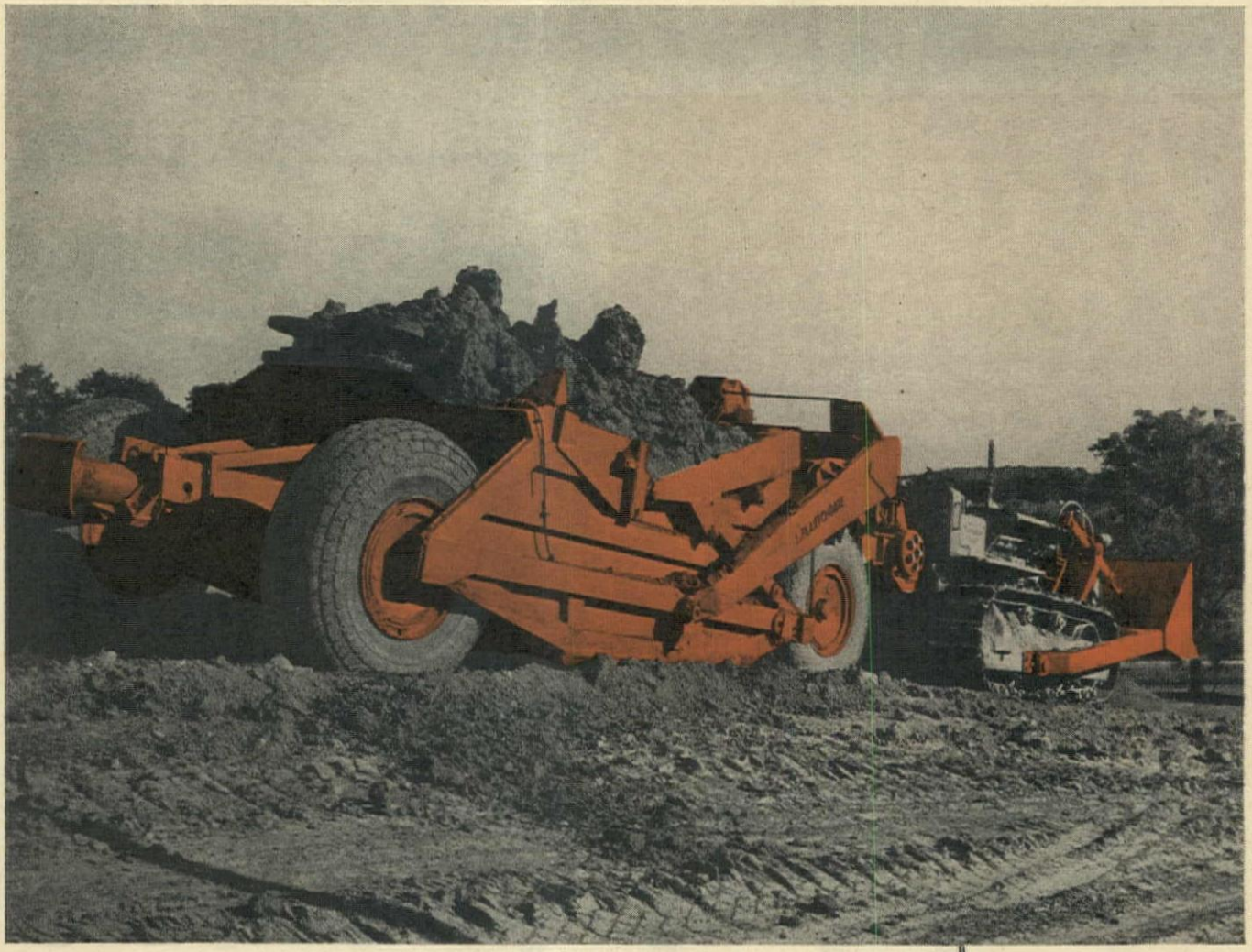
State above use of wire rope contemplated.


CHEVROLET
Count 'em . . .
99 MODELS
on 9 wheelbases
The right truck for
any hauling job
CHEVROLET

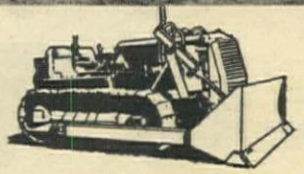

Now . . . still more truck users can enjoy the advantages of Chevrolet's traditional economy and efficiency—qualities that have placed Chevrolet in first position in sales year after year. For the new Chevrolet truck line includes additional models of still greater load capacity in the heavy-duty classification. Among Chevrolet's 99 models on nine wheelbases—some with the standard Thrift-Master engine, some with the high-torque Load-Master engine—there is a truck to fit your requirements and save you money.
CHEVROLET MOTOR DIVISION, General Motors Corp., DETROIT 2, MICH.
YOUR CHEVROLET DEALER CAN SUPPLY CHEVROLET TRUCKS, STANDARD OR WITH SPECIAL EQUIPMENT, FOR ANY JOB.
TRUCKS
COST LESS TO BUY • TO RUN • TO KEEP

FOR *Western* SERVICE AND SALES ON

LaPLANT-

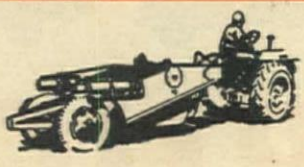


CABLE OPERATED SCRAPERS
6, 8 and 14 yard capacities for use with all makes of crawler tractors



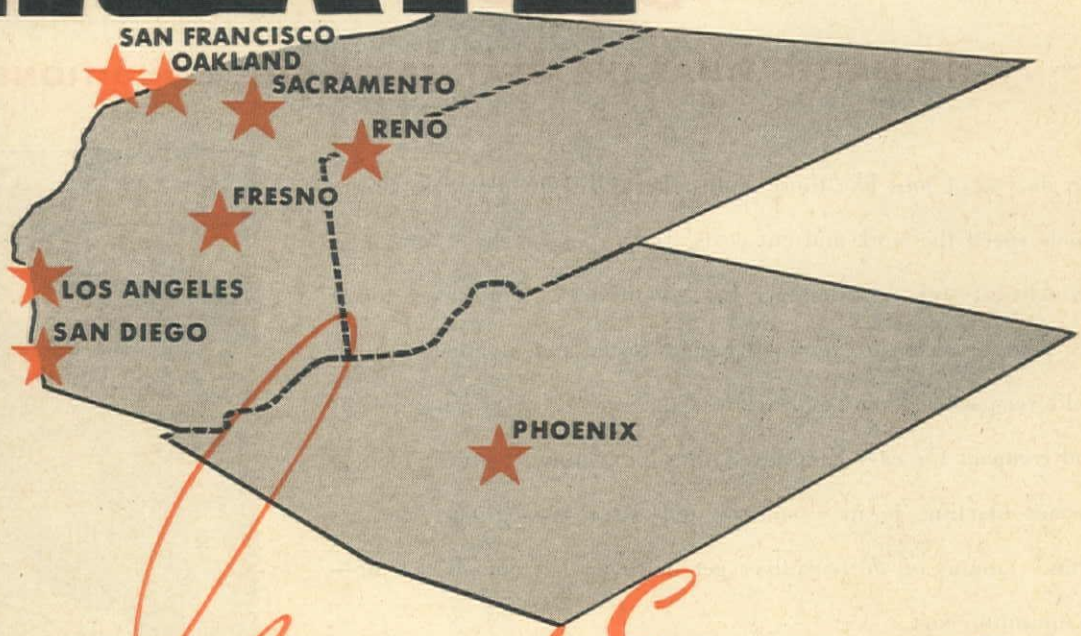
HYDRAULIC DOZERS
Straight or angling blade for all "Caterpillar" tractors

HYDRAULIC SCRAPERS
For crawler tractors



HYDRAULIC SCRAPERS
For rubber-tired tractors

CHOATE



Job-proved Equipment

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

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

INDUSTRIAL EQUIPMENT COMPANY

★ SAN FRANCISCO ★ OAKLAND ★ RENO ★ FRESNO

★ LOS ANGELES ★ SAN DIEGO ★ SACRAMENTO ★ PHOENIX

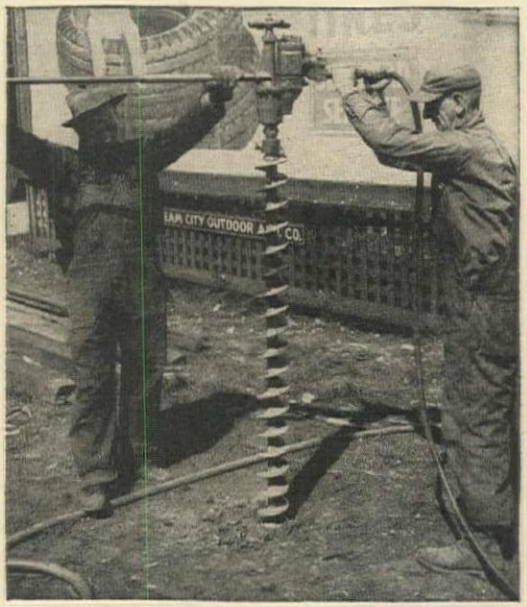
ALL THESE JOBS... *done faster*

with Thor PORTABLE POWER

...NO MATTER WHAT THE WEATHER OR SOIL CONDITIONS!

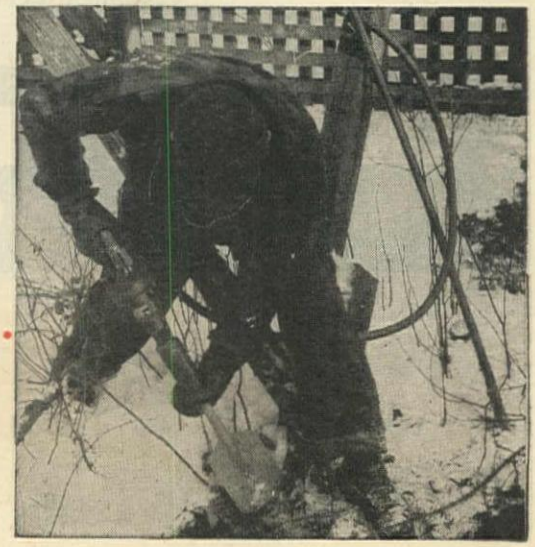
On dozens of jobs like those shown here, THOR Portable Power Tools speed the work and cut costs. Hard rock or shale, frozen or drought-hit soil . . . whatever the conditions . . . however tough the going, you'll do every job easier, faster and at greater profit.

Power-packed Thor Tools are fast and smooth in operation, light and compact for easy handling. Other outstanding features include instant starting, positive control and extra rugged construction. Thor's famous *air-thrifty* valves get more work from all the air—at minimum cost.



THOR 264RY Air Drill with auger steel: **". . . a mechanical digger that works wonders. We enjoy freedom from the arduous digging of post holes. We now have uniform depth of holes, which adds increased safety and freedom from 'blowdowns'."**

THOR SINKER ROCK DRILLS, light, medium and heavy duty models for fast, powerful work in all formations.

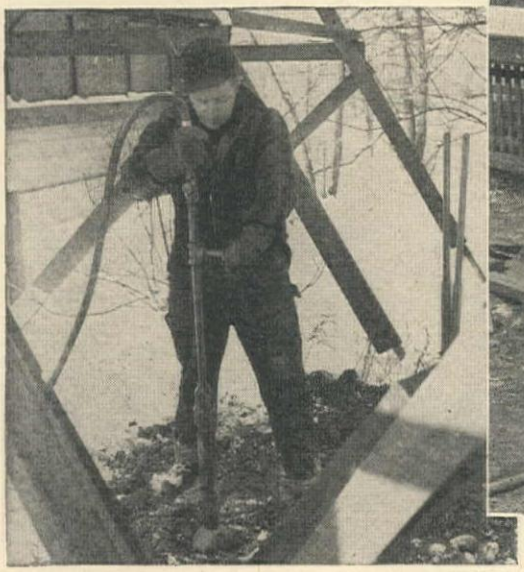


THOR 412 Clay Diggers: **". . . readily breaks through frost or dry clay, trims up the sides of the holes and cuts tree roots or sod easily, with little human effort."**

at less operating cost....

TOOLS

THOR SUMP PUMPS with their self-priming, centrifugal impeller-type construction operate with high efficiency in oil, sludge, sewage or dirty water-



THOR 60BFT Tamper: "Gives immediate, firm support to posts, such as we used to achieve only after the board had been built for years."

THOR PAVING BREAKERS do fast demolition on pavements, columns, walls, piers, foundations, etc.

THOR PS12 Pneumatic Saw: ". . . cuts all types of lumber on the job."

Put your operations on a more profitable basis. Now . . . *today*, call your nearest Thor contractors' tool distributor, or THOR branch office for an immediate demonstration of THOR Air Tools. Prove to yourself that they are tops as time-savers and profit-producers.

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

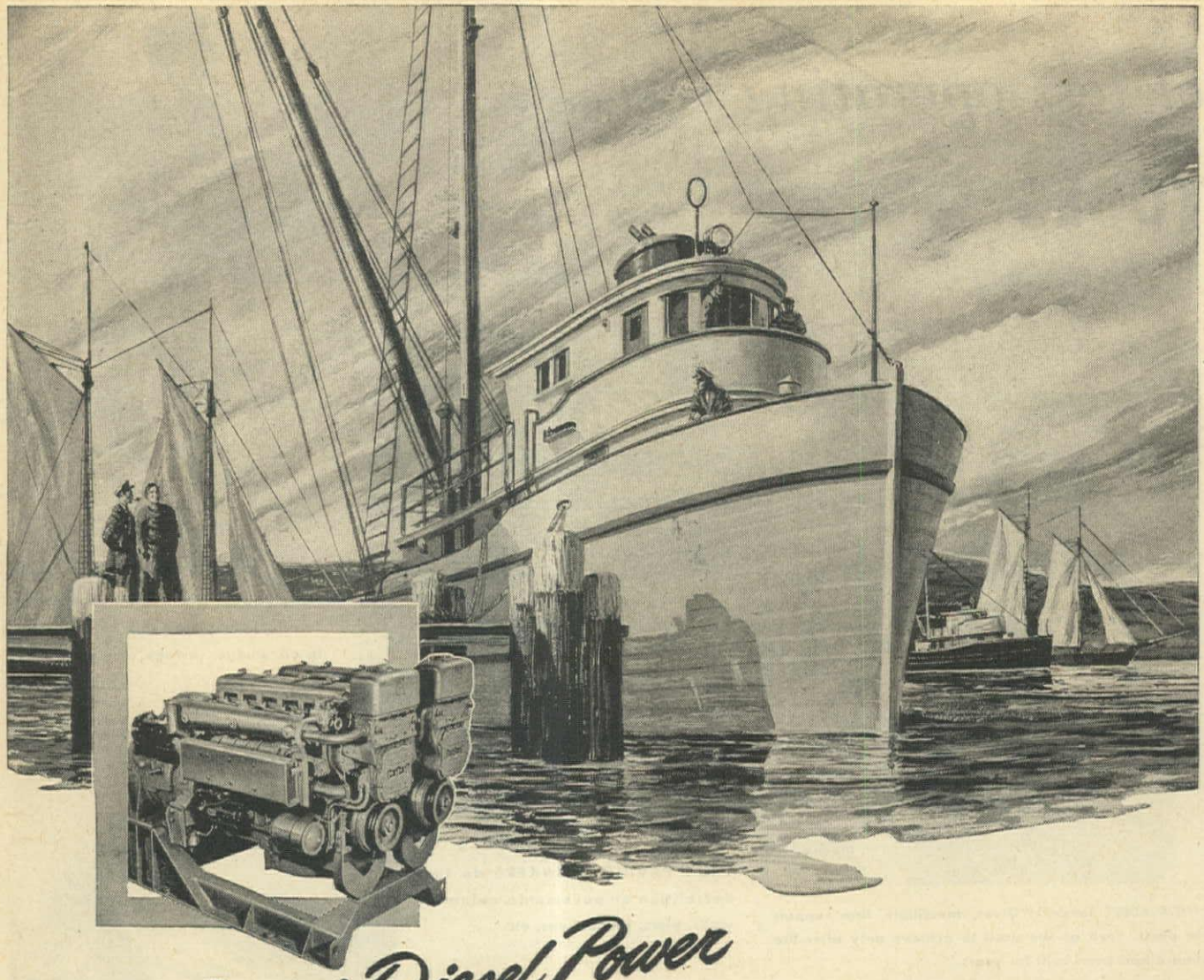
Birmingham	Boston	Buffalo	Cleveland	Detroit	Los Angeles
Milwaukee	New York	Philadelphia	Pittsburgh	St. Louis	St. Paul
Salt Lake City	San Francisco		Toronto, Canada		London, England

Thor

PORTABLE POWER

TOOLS

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



For Great Diesel Power —set your course by the fisherman

FISHERMEN make their money by getting back fast with the most fish at the least cost. There's no profit in hauling around big, heavy engines that take up a lot of room.

So every day sees more and more General Motors Diesels going into fishing boats. And for good sound reasons. These Diesels pack more power in less space—weigh less than older types. *So GM-powered boats carry more fish.*

GM Diesels get efficient combustion from low-cost fuel—keep going day after day with the least maintenance.

Add these features to the reduced fire hazard, easy starting, quick availability of parts and service, and you see that GM Diesels have features that are valuable everywhere power is needed.

So whatever needs for power you may have in road-making machinery, cranes, shovels, or any other construction equipment—look to GM Diesels.

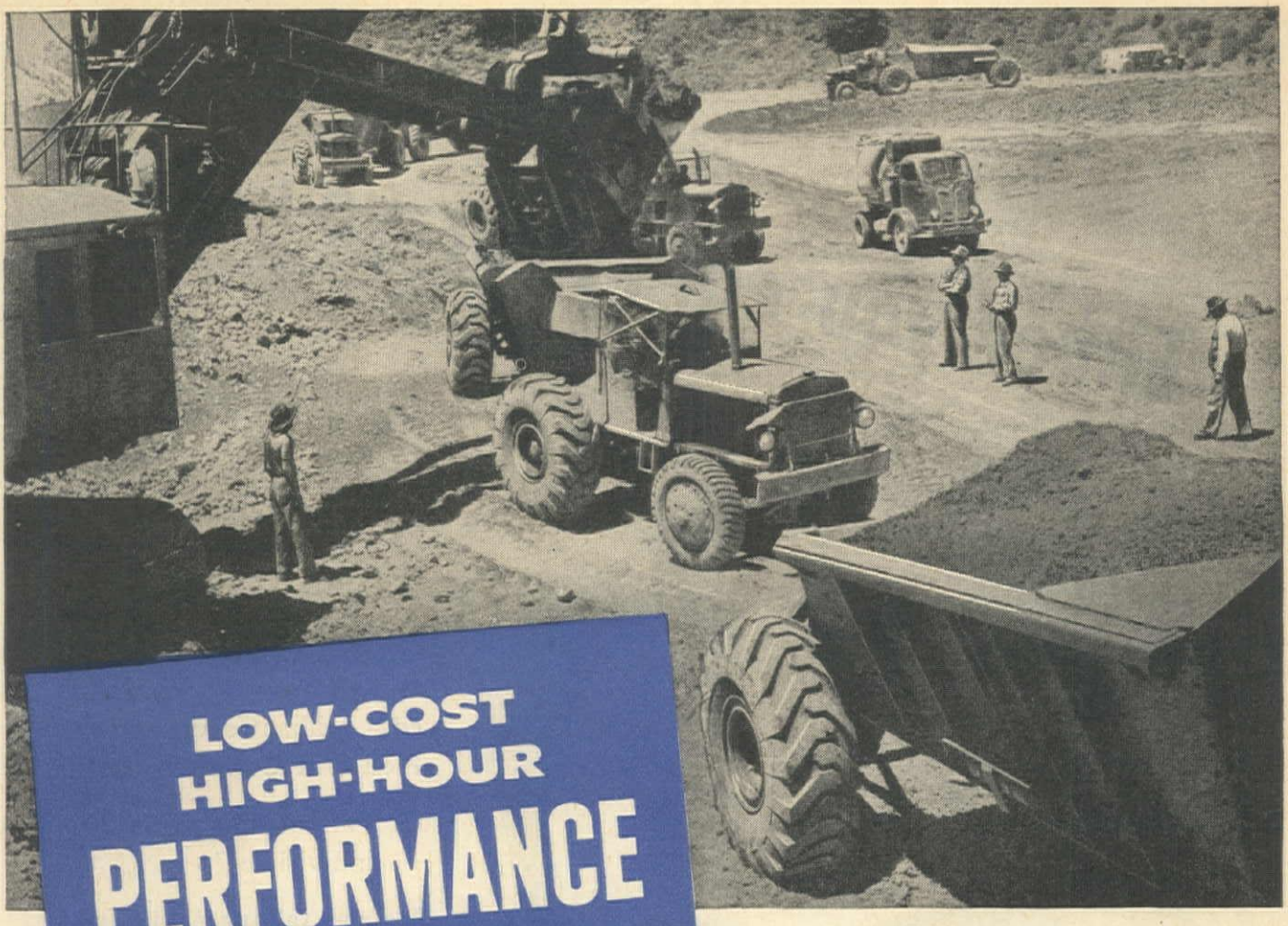
GM
GENERAL MOTORS
DIESEL POWER

Features of GM Diesels Important to Every User of Power

- ***QUICK TO START*** on their own fuel
- ***LOW COST***—run on common fuel oil
- ***EASY TO MAINTAIN***—clean design plus accessibility
- ***LESS FIRE HAZARD***—no volatile explosive fuel
- ***COMPACT***—readily adaptable to any installation
- ***SMOOTH OPERATION***—rotating and reciprocating forces completely balanced
- ***QUICK ACCELERATION***—2-cycle principle produces power with every downward piston stroke

DETROIT DIESEL ENGINE DIVISION
DETROIT 23, MICH. • SINGLE ENGINES . . Up to 200 H.P. MULTIPLE UNITS . . Up to 800 H.P.
GENERAL MOTORS

Evans Engine & Equipment Co. SEATTLE 9, WASH.
Moore Equipment Co. STOCKTON, CALIF.
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.



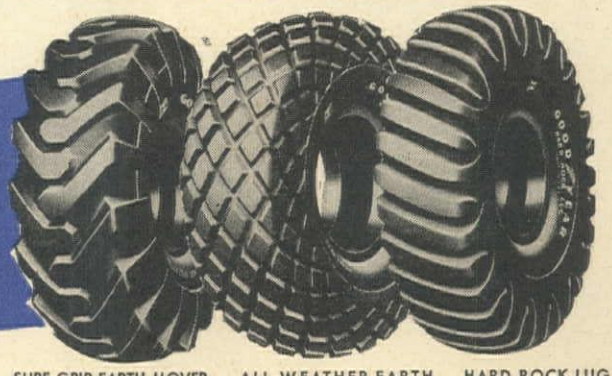
LOW-COST
HIGH-HOUR
PERFORMANCE

is the reason why year after year
MORE YARDS ARE MOVED ON

GOODYEAR

OFF-THE-ROAD TIRES
THAN ON ANY OTHER KIND!

BUY and SPECIFY
GOODYEAR
– it pays!



SURE-GRIP EARTH MOVER for maximum traction on drive wheels

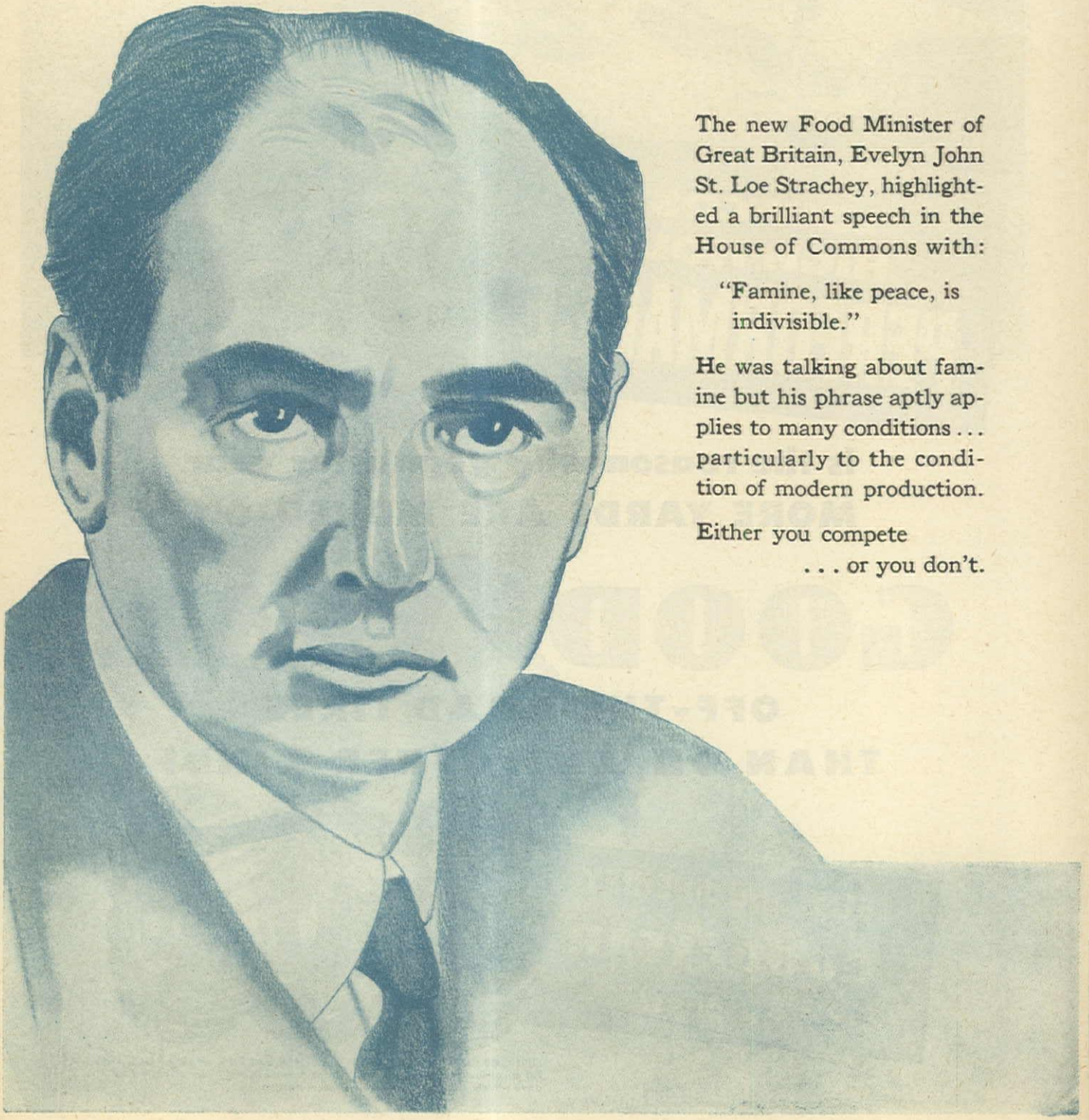
ALL-WEATHER EARTH MOVER for drawn vehicles and general traction

HARD ROCK LUG for all rock work

Sure-Grip, All-Weather—T.M.'s The Goodyear T. & R. Co.

then he said to himself:

Either you eat . . . or you don't



The new Food Minister of Great Britain, Evelyn John St. Loe Strachey, highlighted a brilliant speech in the House of Commons with:

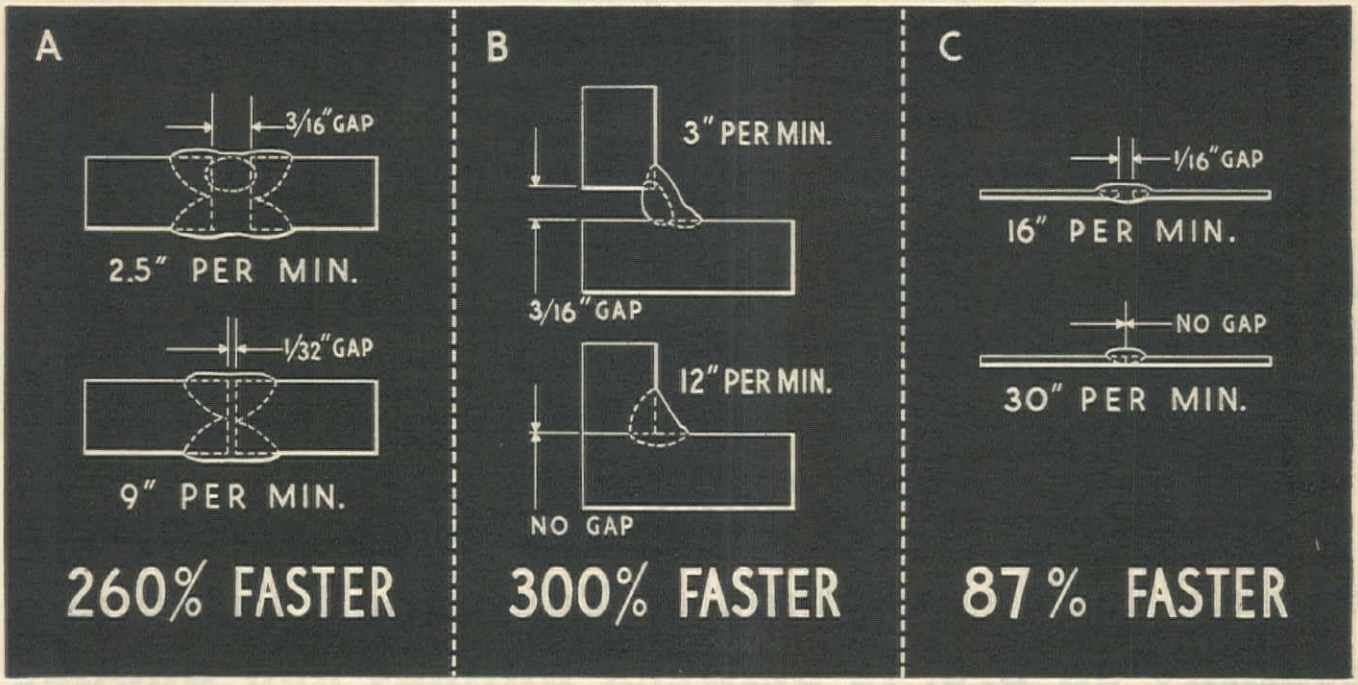
"Famine, like peace, is indivisible."

He was talking about famine but his phrase aptly applies to many conditions . . . particularly to the condition of modern production.

Either you compete
. . . or you don't.

MR. STRACHEY: **Here's food for thought to help you get the full measure of competitive advantage from arc welding:**

GET GOOD FIT-UP



Care in cutting, forming and fitting up of plates and shapes to be welded pays big dividends. By improving fit-up of joints, you increase welding speed and thereby cut costs and minimize distortion.

EXAMPLE A—This square butt joint in 3/8" plate with gap of 3/16" is made at an arc speed of 2.5" per min. With recommended gap of 1/32", speed is 9" per min.... 260% faster.

EXAMPLE B—This fillet weld in 1/2" plate, with 3/16" gap, is made at an arc speed of 3" per min. With no gap, speed is 12" per min.... 300% faster. Both welds have a 5/16" throat.

EXAMPLE C—This butt joint in 14 ga. sheet, with 1/16" gap, is made at an arc speed of 16" per min. With no gap, speed is 30" per min.... 87% faster.

The sign of abundance. When you see 3 DOTS on an electrode, you know you have genuine "Fleetweld" ... the world's leader for *low cost, speed* and *quality*. "Fleetweld" incorporates the full measure of Lincoln's pioneering research and worldwide engineering experience.

Handy pocket manual, giving, "Fleet-Welding" procedures for all types of joints in mild steel, free on request. Ask for Bul. 444.

THE LINCOLN ELECTRIC COMPANY • DEPT. 362 • CLEVELAND 1, OHIO

America's greatest natural **recourse**

ARC WELDING

3 TOURNAPULLS grade . spread sub-base .

Rigs spread 9" sub-base in two 4½" lifts. Positive cable control insures accurate spread.

. . . Stanley H. Arkwright, Inc. of Billings, Montana, took advantage of Tournapull speed and versatility on U. S. 10 between Billings and Huntley

Relocation included 386,000 cubic yards of grading in clay, sand, loam, gravel and blasted rock, all moved with LeTourneau equipment. Hauls ranged from 600 to 4000'.

11 Trips per hour on 1500' 1-way haul

On grading, each Tournapull, loading dry sandy clay, made 11 trips per hour, averaged 10½ to 11 pay yards per load, delivered better than 115 pay yards per hour. Part of haul was tough going . . . over a fresh fill on a spongy alkali bog.

Tournapulls spread 45,000 yards sub-base . . . hauls to 2.2 miles

As each section of grading was finished, Arkwright's rigs quickly stripped overburden from

Arkwright's Tournapulls stripped roadside pits . . . loaded out select sub-base gravel.

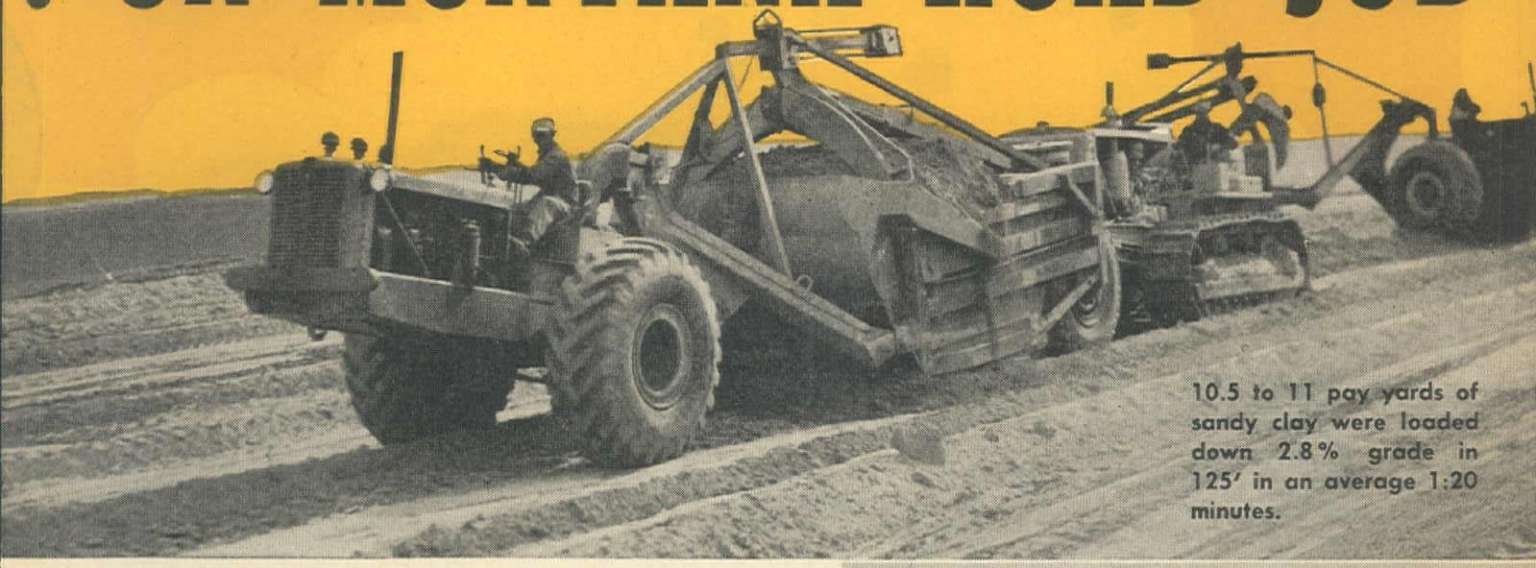
Big-load capacity, high-speed travel kept cost per yard down on hauls from pits up to 2.2 miles one way.

LETOURNEAU
PEORIA, ILLINOIS

JOB-PROVED
Over 4500 Built and Shipped

TOURNAPULLS

. . . strip gravel pits . . .
. . . ON MONTANA ROAD JOB



10.5 to 11 pay yards of sandy clay were loaded down 2.8% grade in 125′ in an average 1:20 minutes.

centrally located roadside gravel deposits, then spread 9" sub-base on the roadbed. Operators used controlled ejection with patented tailgate, plus finishing action of Scraper blade to spread in smooth accurate 4½" lifts, cut finishing time to a minimum. On hauls averaging 6100′ one way over 2% adverse grade . . . each Tournapull rig averaged 38 pay yards per hour.

You, too, will find Tournapulls' high speed on both long and short hauls, plus job versatility for grading, stripping and graveling, will deliver lowest-net-cost-per-yard for you. Ask your LeTourneau Distributor for facts and figures.

Tournapulls spread grading material in smooth even layers. Big tires help compact fill.

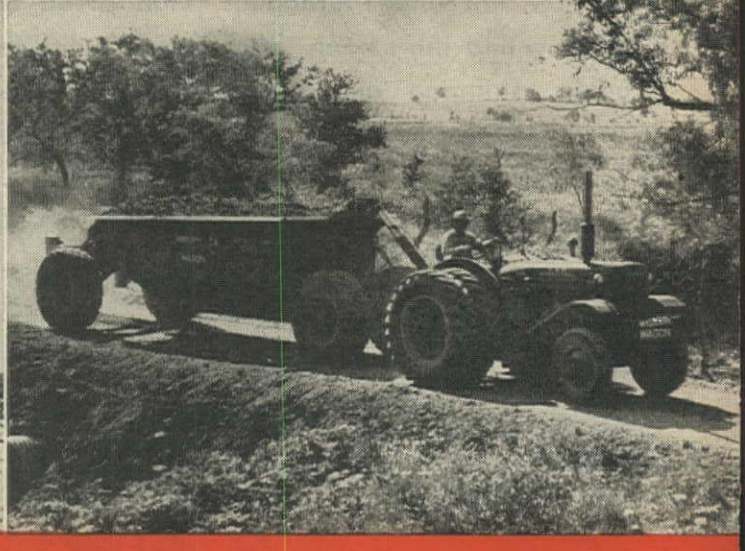
On grading operation, each Tournapull hauled 115 pay yards per hour on 3000′ round trips.

• FOR LOWEST NET COST PER YARD

Pit material used for roadbed treatment and detour road topping was quickly dumped by the Mississippi Wagons in accurate windrows.

A Mississippi Wagon takes on its 10-yard load at the gravel pit, six miles off the highway.

Rolling fast over the long lead-in road, the Wagons averaged better than 20 m. p. h. for each round trip.



★ MISSISSIPPI WAGON

MISSISSIPPI WAGONS Cut Time and Cost of Hauling on Texas Highway Job

THE H. E. WILLIAMS COMPANY, of Waco, Texas, used a fleet of ten Mississippi Wagons for the long-distance hauling of 78,000 yards of pit gravel, in the reconstruction of six miles of Texas Highway No. 6, south of Waco.

Needed for both roadbed treatment and detour road topping, the gravel had to be moved from a pit six miles off the highway, over a haul route averaging 9.5 miles to the dump and 10.5 miles return.

Carrying 10-yard payloads, the ten Mississippi Wagons moved an average of 1,000 yards a day over the rough, rolling haul road. Each Wagon averaged ten 20-mile round trips per 10-hour day, covering each round trip at an average of over 20 m. p. h.

Records of the H. E. Williams Company on this job show a total cost for hauling with Mississippi Wagons of 34.3¢ per yard, or 3.6¢ per yard-mile, including reserves for depreciation, parts and tires.

"This figure," says Mr. Williams, "is very pleasing to us, as it is considerably lower than the best records of hauling equipment previously used by us on similar work. We are also well satisfied with the general performance of our Wagons—their ease of handling, superior flotation on soft ground, and efficient operation both on and off the highway."

The ability of Mississippi Wagons to move yardage fast and cheaply is being demonstrated every day on jobs all over the country. Ask any owner what he thinks of Mississippi Wagons—then ask your nearby distributor for facts and figures on what Mississippi Wagons can do for YOU.

●

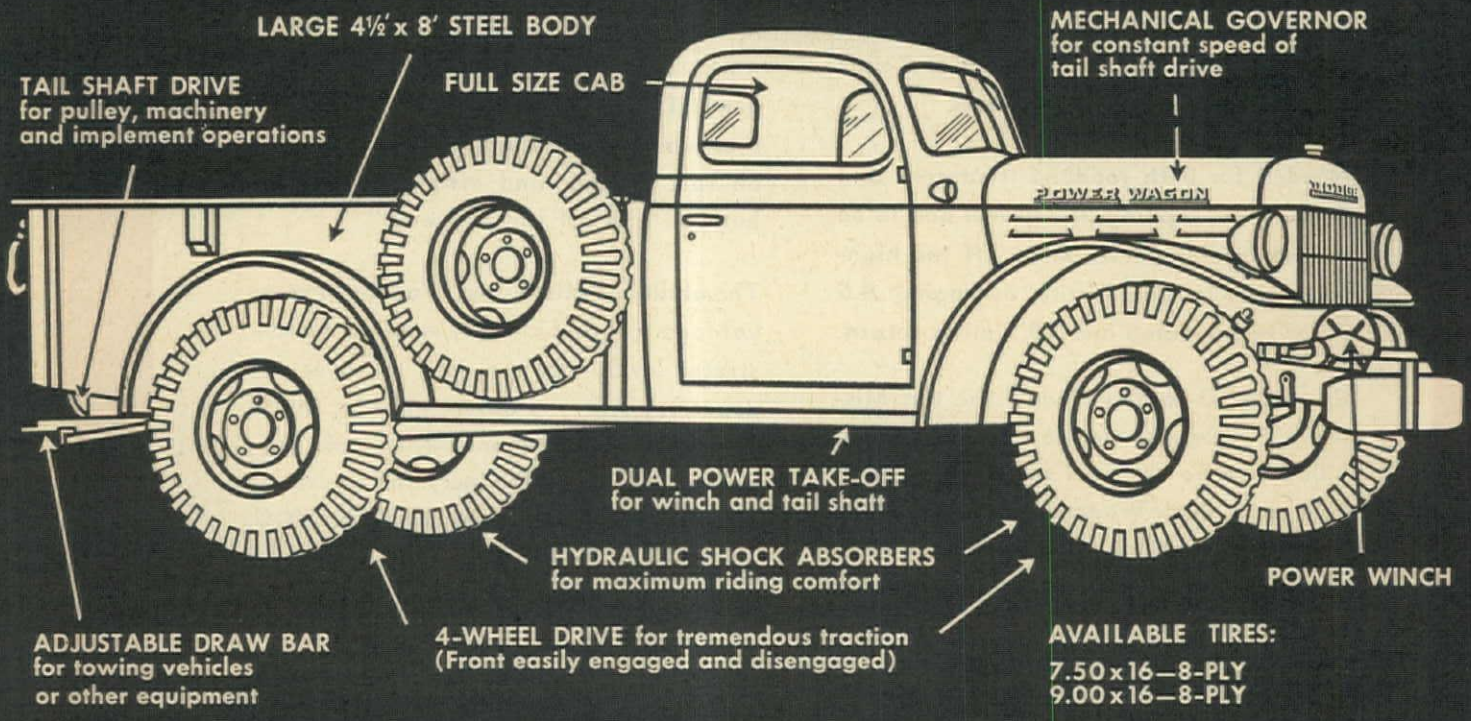
M-R-S MANUFACTURING COMPANY
Jackson, Mississippi, U. S. A.

When profits depend on low-cost hauling... You can depend on MISSISSIPPI WAGONS!

★ *The World's Most Modern Hauling Unit*

DODGE ANNOUNCES THE

POWER



Carries welding equipment, shot drills and other machinery on oil fields.

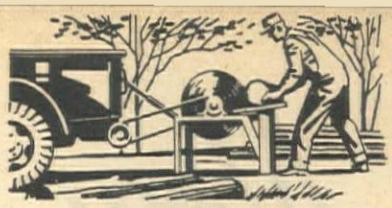
Its powerful winch elevates heavy materials in logging and other industries.

Quarries, mines and gravel pits find plenty of uses for its power and traction.

ONLY DODGE BUILDS "*Job-Rated*" TRUCKS!

Public utilities call it the most versatile vehicle in their fleets.

Its power and traction make it the ideal "wrecker's" car.



Its portable power plant (pulley or shaft drive) is always available.

WAGON

It's a "FULL SIZE" truck for jobs no other truck can do!

Here's the truck that needs no roads . . . the new and remarkable Dodge Power-Wagon. It's the kind of truck you've hoped someone would build some day.

It's a *full size* truck! It has a full size *body* for your loads. It has a full size *cab* for your comfort. It has full size *power* to go places and do things other trucks can't do.

With four-wheel drive, you can cross fields, plow through deep sand or mud, cross streams and climb tough, rugged hills.

With dual power take-off, it's a "power-house" on wheels. Heavy loads can be hoisted or pulled with a front-mounted power winch. From pulley-drive and tail shaft you can saw wood, grind grain, and operate a wide variety of machinery and equipment.

Like all Dodge trucks, the Power-Wagon is *Job-Rated* . . . engineered and precision-built to fit the job . . . to save money on the job . . . and to last longer.

Chances are that *you* have a job that the Power-Wagon can do *better* than any other vehicle. See your Dodge dealer now. See the Power-Wagon. See what it can do for you on your job.

DODGE DIVISION OF CHRYSLER CORPORATION

POWER-WAGON FEATURES

- Six-cylinder, 94-H.P. *Job-Rated* Engine.
- Four-wheel Drive (Disengagement for rear wheel drive).
- Full Floating Front and Rear Axles.
- Heavy-duty, double-acting Shock Absorbers.
- 4-speed Transmission—2-speed Transfer Case (8 Forward Speeds—2 Reverse Speeds).
- High Traction Tread Tires.

AUXILIARY EQUIPMENT: Power Take-off • Power Winch • Pulley-Drive • Tail Shaft • Draw Bar, Front Tow Hooks, and Pintle Hook

WANT MORE INFORMATION? MAIL THIS COUPON TODAY

Truck Sales Dept., Dodge Division
7926 Joseph Campau Ave., Detroit 11, Michigan

Please mail me available literature illustrating and describing The POWER-WAGON.

NAME.....

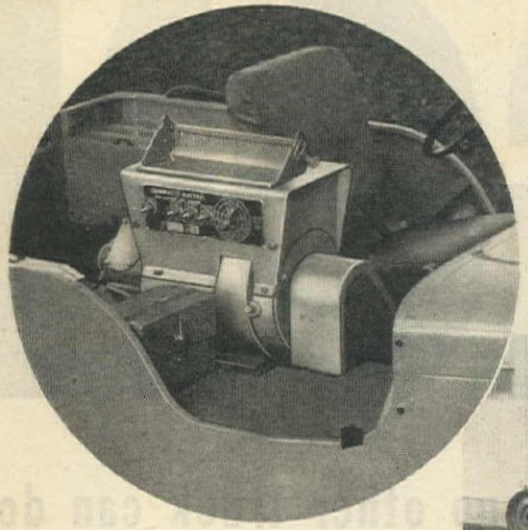
TYPE OF BUSINESS.....

ADDRESS.....

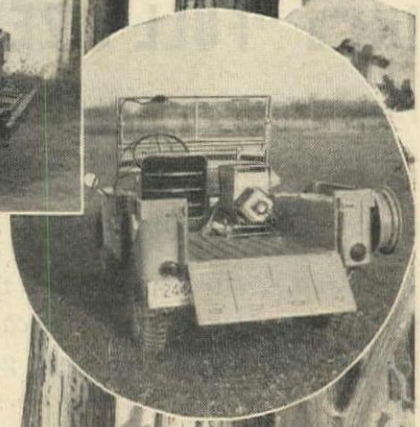
CITY AND STATE.....

Now THE VERSATILE JEEP CARRIES KILOWATTS *anywhere, anytime for:*

★WELDING
★LIGHTING
★POWERING drills, saws, hammers, and other electric tools



Welding generators (left, center) are available up to 300 amps at 32 volts. Power generators (right) come in 1-, 3-, and 15-kw ratings. Jeep can be supplied with either one or both generators.



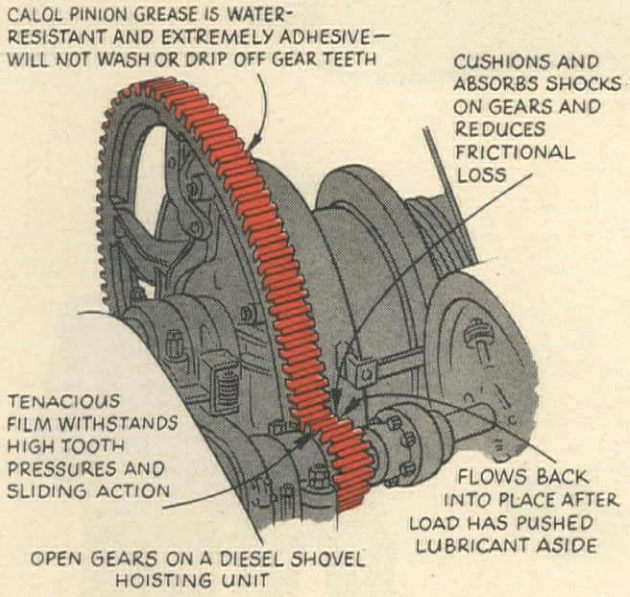
● The universal Jeep can now be equipped with G-E power-generating units for welding, for temporary lighting, or for operating electric tools on those out-of-the-way jobs, thus eliminating the necessity of bringing the job to the shop. This unique combination of Jeep and G-E power unit, greatly extends electrified construction with portable tools. Power can now be made available far from power lines, in remote spots inaccessible to vehicles lacking the Jeep's strength, stability, and four-wheel drive. The electrified Jeep is ideal for patrol, maintenance, repair, and light construction jobs which take you up hills, across streams, and over rough terrain—such jobs as pipelines, telephone and power lines, drilling, lumber camp work, mining, oil field and building construction, and numerous other heretofore difficult tasks. Why not consult your equipment supplier now, and find out how the electrified Jeep can serve your field of construction activity? *Apparatus Department, General Electric Co., Schenectady 5, N. Y.*

GE ELECTRIFIED CONSTRUCTION
BETTER PRODUCT ★ LOWER COST

GENERAL ELECTRIC

655-54-162

STANDARD ENGINEERS NOTEBOOK



Tacky grease sticks to open gears, cuts wear

The problem of keeping lubricant on exposed gears is eliminated by the use of Calol Pinion Grease.

Calol Pinion Grease is water-resistant and will not wash off gears in rain or other wet conditions. It maintains a tenacious film that will not drip off, but flows slowly back into place after pressure and sliding action of gear teeth have pushed it aside. This prevents excessive loss of lubricant and keeps a cushion on the teeth which absorbs shocks, reduces frictional loss and wear.

To meet all conditions, Calol Pinion Grease is made in four grades. In the proper grade, it is recommended for all types of open gears.

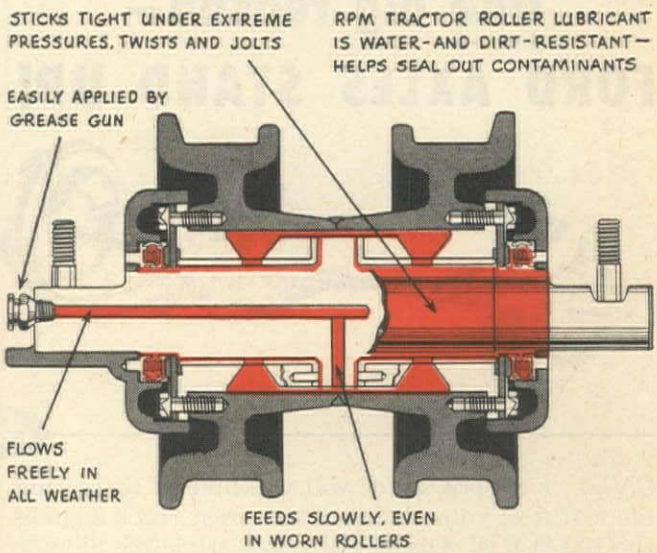
Number 0 is particularly adaptable for exposed, high-speed gears operating in cold weather and may be used on wire rope. Numbers 1 and 2, for medium-speed, exposed gears, are slightly heavier and more adhesive. Number 5, very heavy, is for severe pressure and temperature conditions.

Shock-absorbing grease stays in track bearings

Many operators have prolonged the lives of tractor track-roller bearings by using RPM Tractor Roller Lubricant.

This product, made especially for these bearings, contains an unusual stringiness compound. The compound controls the flow of lubricant, assuring complete lubrication. It also keeps a tough lubricant film on bearing surfaces in all operating conditions. Acting as a cushion, it absorbs the force of shocks and load — and won't squeeze off even when the load is unevenly distributed, as in sidehill work.

RPM Tractor Roller Lubricant is water-resistant. It has a tendency to float out grit that may enter a bearing and maintains a grease-seal at outside edges against grit and moisture. It maintains an even consistency and works easily in grease guns in all seasons.

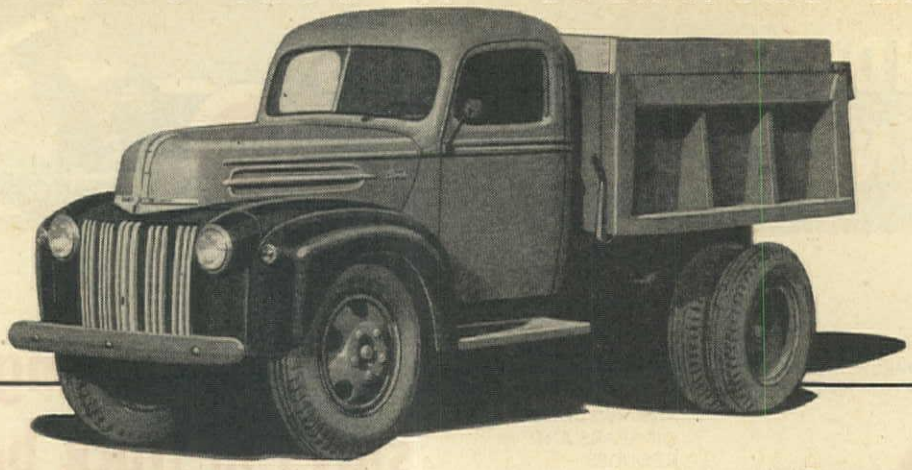


CROSS SECTION OF A CATERPILLAR TRACK ROLLER BEARING

Standard Fuel and Lubricant Engineers are always at your service. They'll gladly give you expert service—make your maintenance job easier. Call your local Standard Representative or write Standard of California, 225 Bush St., San Francisco 20, California.

FOR EVERY NEED A STANDARD OF CALIFORNIA JOB-PROVED PRODUCT

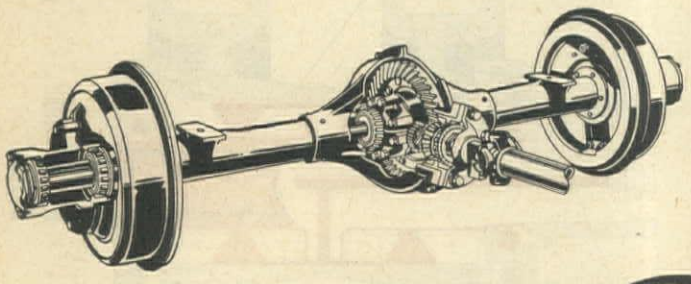
REGISTRATIONS *SHOW* IT — OPERATORS *KNOW* IT!



Dump Body by
MARION METAL PRODUCTS CO.,
Marion, O.

"FORD TRUCKS LAST LONGER!"

One big reason—
FORD AXLES STAND UP!



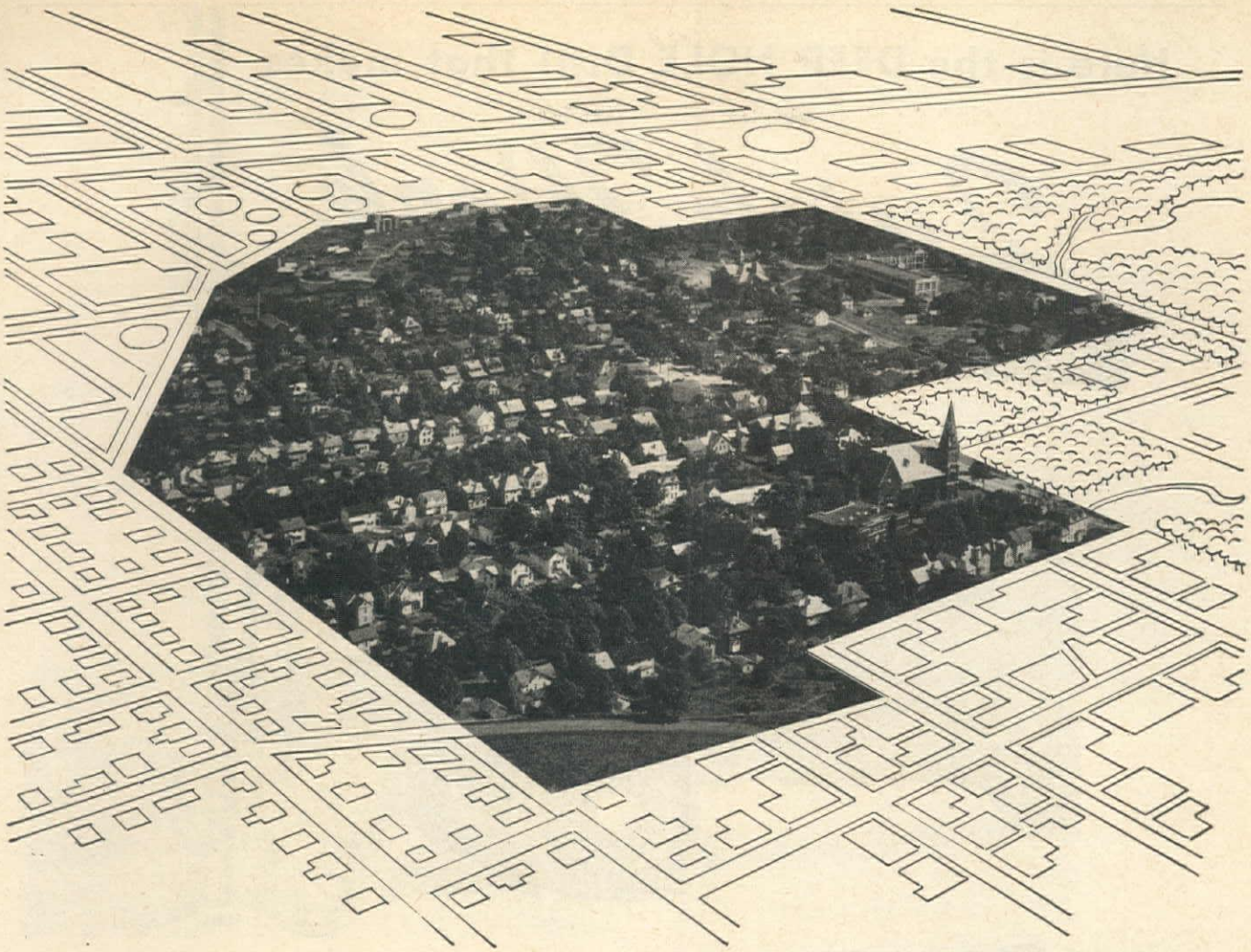
Ford Truck axle shafts carry no weight load, because *ALL* Ford Trucks have ¾-floating or full-floating axles. All weight stresses are carried on the axle housing—none on the shafts—minimizing shaft breakage. Driving pinion is straddle-mounted on 3 large roller bearings, maintaining positive mesh with ring gear—no destructive springing away under stress. Differentials have 4 sturdy pinions, even in light duty chassis, spreading the load and strain.

Ford

ONLY in a Ford Truck will you find all these long-life features: your choice of two great truck engines, the 100-H.P. V-8 or 90-H.P. Six—triple-life Silvaloy V-8 rod bearings—Flightlight aluminum alloy, 4-ring pistons—efficient air- and oil-filtering—full pressure lubrication—heavy channel section frames, *doubled* between springs in heavy duty models—semi-centrifugal clutch—big hydraulic brakes, with non-warping, score-resistant cast drum faces for maximum life. More than 50 such long-life features contribute to Ford Truck endurance . . . and that endurance is proved by the fact that 7 out of 11 of all Ford Trucks built since 1928 are still in use. See your Ford Dealer!

FORD TRUCKS

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE



Will the water pipe you install today meet *TOMORROW'S* needs?

IF YOU are planning a water system to meet the expanding needs of tomorrow, it will pay you to give careful consideration to the pipe you install today. For not only the initial cost of the system, but even more important, *its operating economy in the long run,* may be at stake!

What will happen to water pressures and volume? Will they be sufficient for the community's future growth—without resorting to larger diameter pipe than would otherwise be necessary in order to offset progressive reduction in rate of flow?

With Transite, you can select the minimum pipe size from the start—without allowance for reduced carrying capacity due to tuberculation. For Transite's initial high flow coefficient (C-140) can never be reduced by this costly form of internal corrosion.

What about pumping costs? Will your water lines develop "hardening of the arteries" in the years to come? Will tuberculation choke off delivery, increasing pumping costs and adding to taxpayers' bills? The answer is "no" if the pipe you install today is non-tuberculating Transite!

How about maintenance costs? Will you have to resort to periodic cleaning . . . lining your pipe . . . reinforcing it with additional mains . . . or even replacement to meet tomorrow's needs? In thousands of communities, tuberculation-proof Transite is helping to eliminate such maintenance costs . . . keeping water rates down . . . and providing important savings to taxpayers through the years.

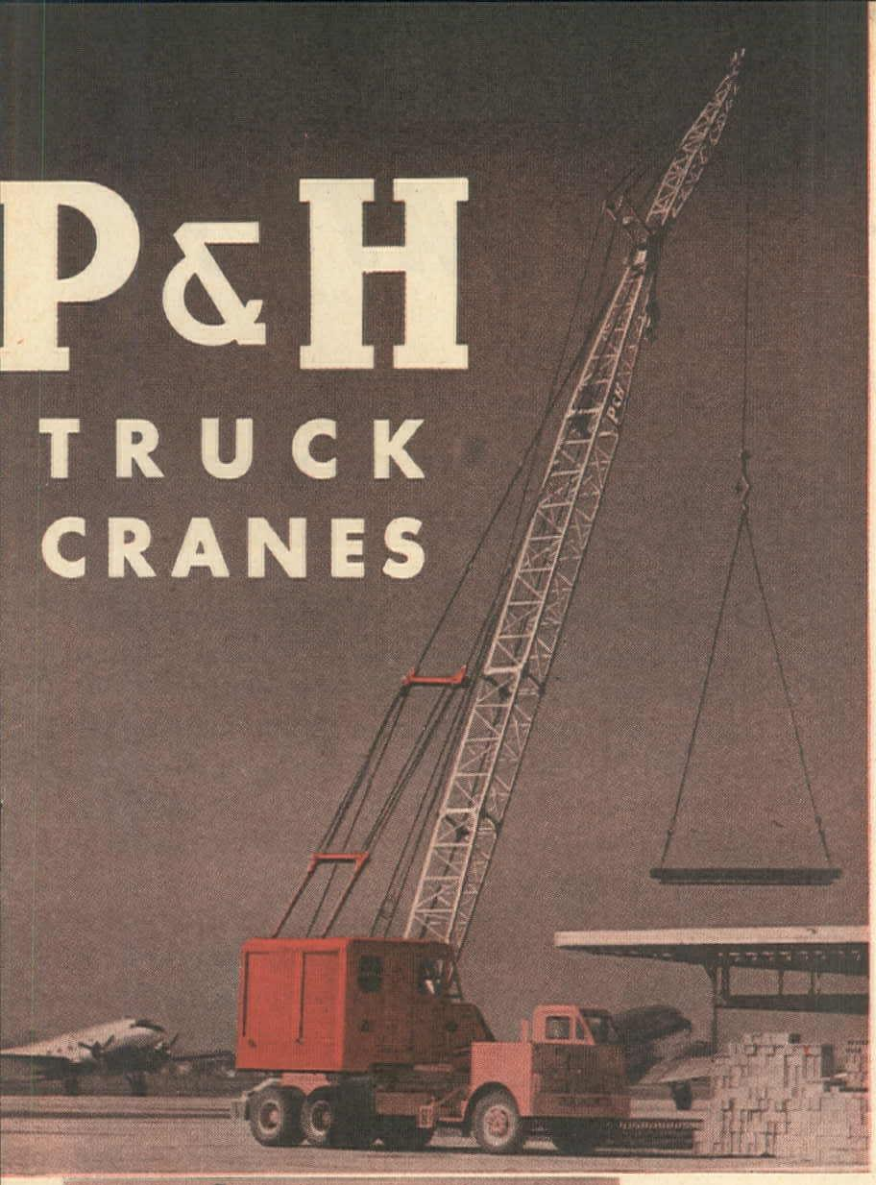
For all the facts, write for brochure TR-11A. Johns-Manville, Box 290, New York 16, N.Y.

JOHNS-MANVILLE JM PRODUCTS

Johns-Manville Transite Pressure Pipe

An Asbestos Product

P&H TRUCK CRANES



ALWAYS READY FOR A *quick take-off!*

Yes, this new P&H Truck Crane is right at home in fast company. For it's a high speed traveler — always ready for a *quick take-off* to the next assignment — across town or across the state — wherever there's heavy work to be done.

Dual power does it. One engine geared for travel . . . *another* engine for load handling. Less time *between* jobs — more performance *on* the job!

Whether it's crane, dragline, shovel, or other work, this dual power combination is a sure bet for lower handling costs. Write for full details.

Above: "Size for size, no P&H Truck Crane has ever been outlifted!" Here a heavy steel girder is gently moved from flat car to trailer . . . evidence not only of the truck crane's power, but of the "inching" made possible by Planetary load lowering.

Right: P&H Truck Cranes "take 'em as they come" — like this job, which calls for accurate placing of big batches of concrete. Tomorrow this same machine may be lifting out the forms . . . then speeding miles away to start a new excavation. (See bottom of page for the many P&H Truck Crane applications.)

P&H *Added Values*

- *Hydraulic Control* — a new peak in operating ease and safety.
- *Greater stability* — with exclusive torsion bar-mounted front axles and lower center of gravity.
- *Independent Planetary boom hoist* — raises or lowers boom smoothly, with or without load.
- *Planetary load lowering* — permits "inching" of loads, accurately.
- *All-welded construction* — greater strength. Weave-proof frame eliminates sway at boom point.

HARNISCHFEGER CORPORATION

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

General Offices: 4490 W. National Avenue, Milwaukee 14, Wis.

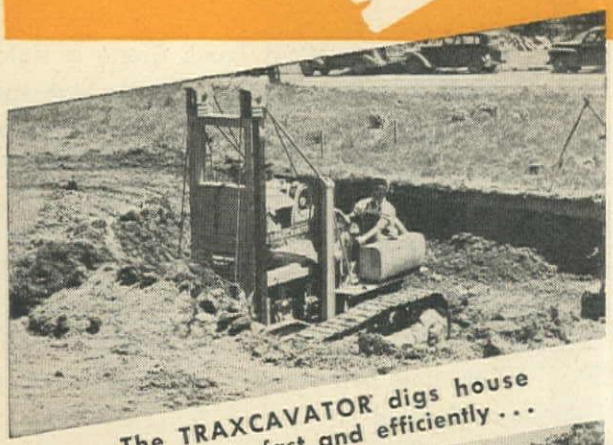
HARNISCHFEGER CORPORATION: SAN FRANCISCO, Calif., 82 Beale Street
Warehouses: SEATTLE, LOS ANGELES, SAN FRANCISCO

PORTLAND, Oregon: Loggers & Contractors Machinery Co.; WILLOWS, California: Willows Motor Sales Co.; NAPA, California: Berglund Tractor & Equipment Co.; SALT LAKE CITY, Utah: National Equipment Co.; BOISE, Idaho: Olson Manufacturing Company; EL CENTRO, California: Faure Tractor & Equipment Co.; FRESNO, California: Brown Tractor Co.; SPOKANE, Washington: F. M. Viles & Co.; SACRAMENTO, California: Capital Tractor & Equipment Co.; RENO, Nevada: Dennison Tractor & Supply Co.; SEATTLE, Washington: Glenn Carrington & Co.

DIGGING BASEMENTS? GRADING?

TRAXCAVATE!

IT'S THE PROFITABLE WAY TO MOVE THE EARTH



The TRAXCAVATOR digs house basements fast and efficiently . . .

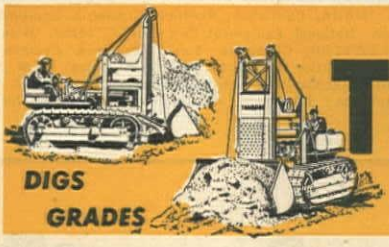
. . . carries and dumps the dirt where wanted or loads directly into trucks . . .

. . . back fills the walls after they are laid, and grades and levels the lot

TRAXCAVATORS are profitable equipment to have on your side. They pay off in more work on more jobs, at lower cost. Their versatility is practically unlimited when there's earth to be moved or material handled. Whether you're doing excavating and grading work for single houses or large housing projects, TRAXCAVATORS' performance is an honest-to-goodness time and labor-saver. Digging, loading, grading, carrying, leveling, backfilling are only a few of the tasks you can assign to these rugged, multi-purpose machines.

TRAXCAVATORS are built in various sizes for every job and purpose — with bucket capacities from ½ to 2½ cubic yards. Each is a balanced unit with the sturdy "Caterpillar" track-type tractor by which it is powered. Available interchangeable attachments increase the work-potential of these profit-building machines. See your TRACKSON-"Caterpillar" dealer today or write for informative literature to TRACKSON COMPANY, Dept. WC-96, Milwaukee 1, Wisconsin.

Big T7 TRAXCAVATOR grading and landscaping residential grounds in a Minneapolis suburb



TRAXCAVATOR

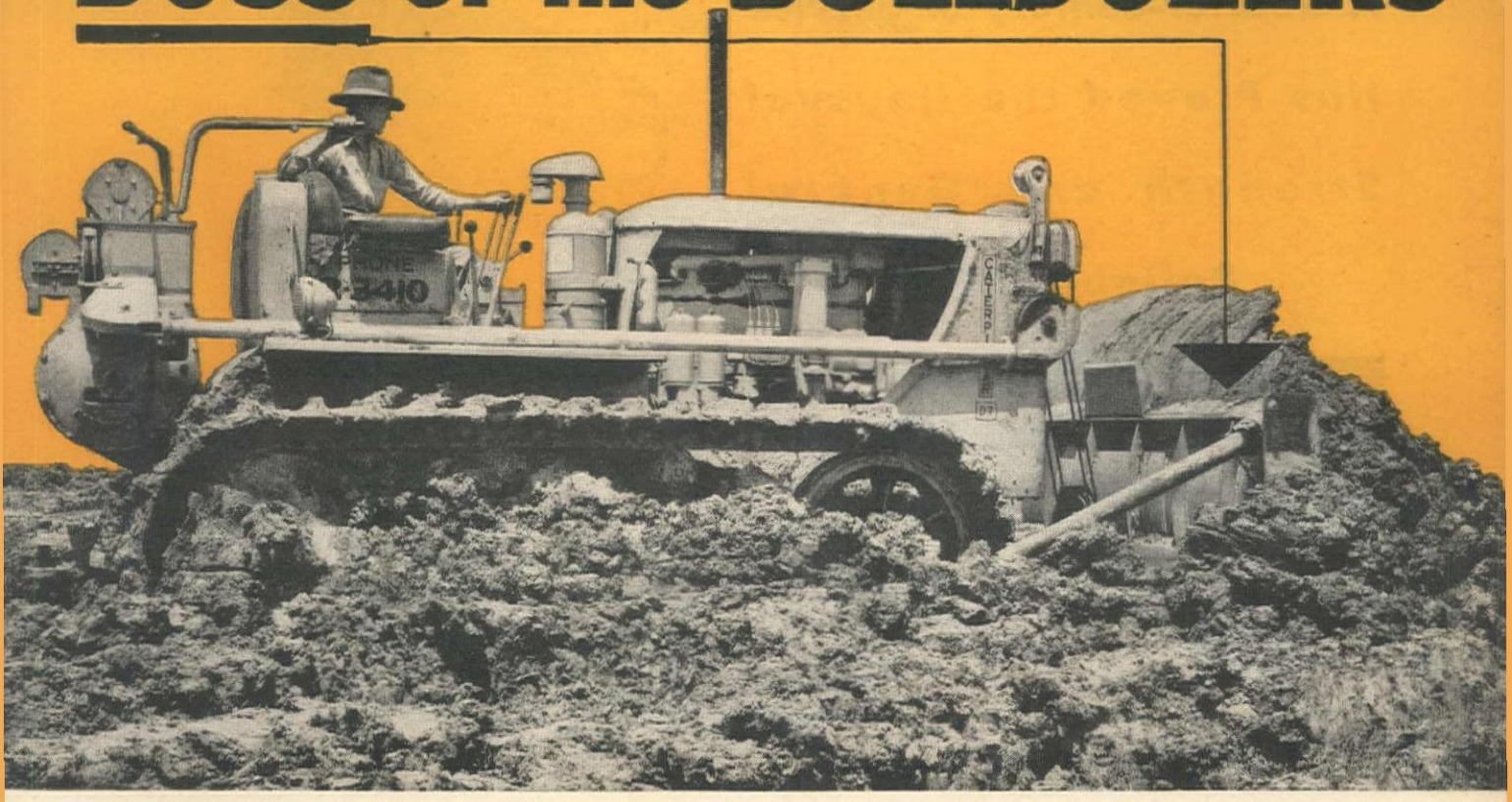
REG. U. S. PAT. OFF.

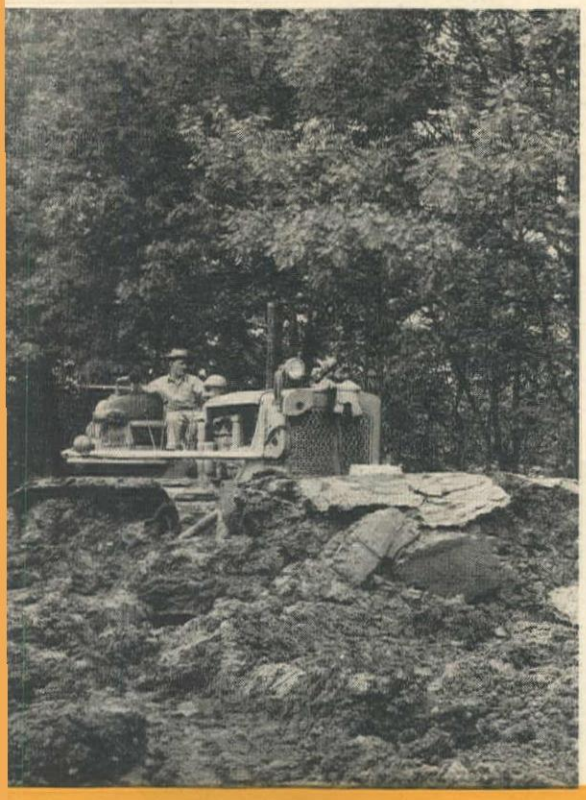
DIGS GRADES

THE ORIGINAL TRACTOR EXCAVATOR

LOADS CARRIES

BOSS of the BULLDOZERS





THERE'S a new champion among bulldozers. Designed, built and put through the stiffest of job-tests by Caterpillar Tractor Co., the new "Caterpillar" Bulldozer entered the earthmoving field a year ago. Its success has been immediate and unqualified. Old hands in the business who have used them all say without hesitation it's writing new history in fast, economical earthmoving.

Among the outstanding advantages of the "Caterpillar" Bulldozer are these:

1. The scientific curve of the blade rolls the earth ahead instead of shoving it—producing greater capacity and lower yardage costs.

2. With the famous "Caterpillar" Diesel Tractor, this 'dozer is a matched, perfectly balanced work unit. Tractor and 'dozer are both built by the same experienced manufacturer—both sold and serviced by the same well-equipped dealer.

3. It can be mounted and demounted quickly, with none of the inconvenience of an overhead frame.

4. Extra-hard steel gives the blade edge long, durable life.

5. Cable controls are fast, sure-acting, easy to operate, and cables and sheaves are protected from dirt-clogging.

"Caterpillar" Bulldozers with straight or angling blade are available for the three larger sizes of "Caterpillar" Diesel Tractors and they'll make a lot of dirt fly in the great earthmoving days that are ahead.

Caterpillar Tractor Co., San Leandro, Calif.; Peoria, Ill.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

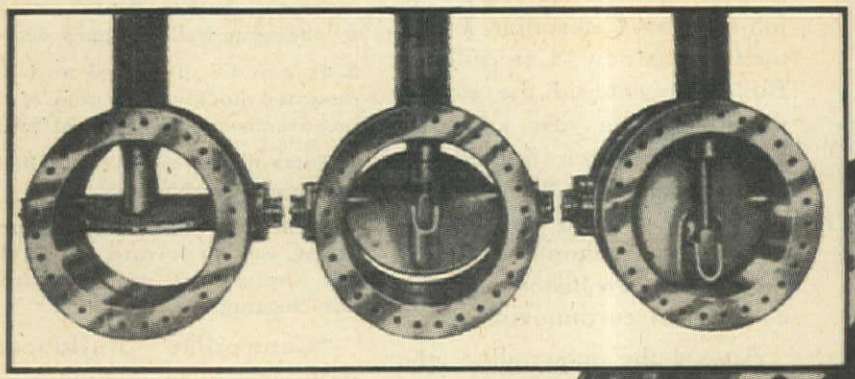
ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

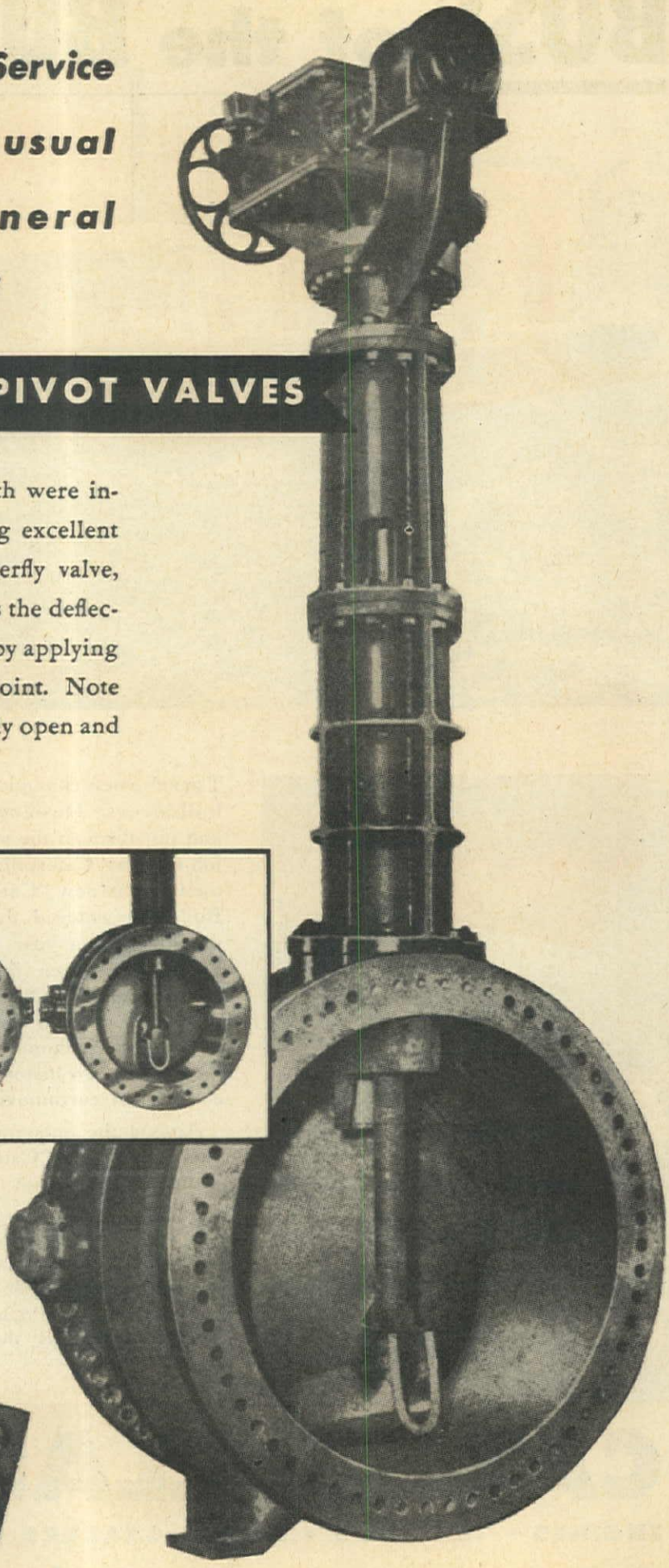
—for lowest costs on earth

A Quarter-Century of Service Has Proved the Unusual Strength and General Reliability of

DOW DISC-ARM PIVOT VALVES

The first valves of this design, which were installed 25 years ago, are still giving excellent service. An improved type of butterfly valve, the Dow Disc-Arm Pivot Valve takes the deflection out of the lower half of the disc by applying the operating force to the proper point. Note below how disc is held in open, partly open and closed positions.





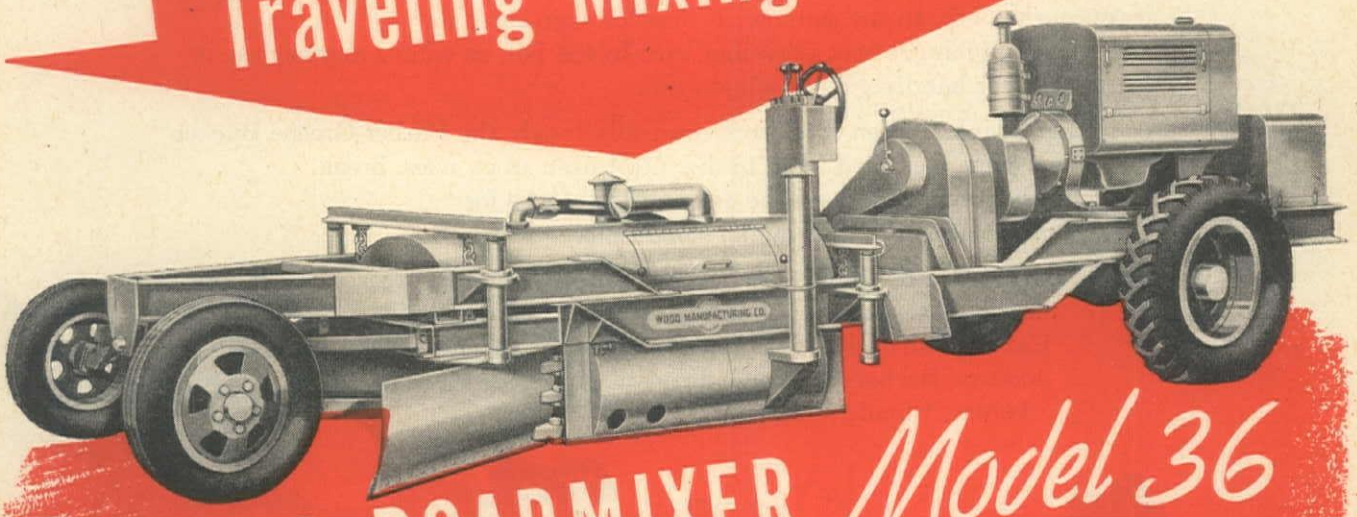
The Chapman Valve Manufacturing Company

INDIAN ORCHARD, MASS.

Complete engineering data and recommendations are contained in Bulletin No. 40. Write for a copy.

Now!

A Lower Cost, Self-Propelled Traveling Mixing Plant



WOOD ROADMIXER *Model 36*

As easy to operate and maneuver as a motor patrol. Made to order for such small jobs as shoulders, stock piles, parking areas, and detours, yet plenty of capacity for any size job. Handles road oil, cut-back, tar, emulsion, and soil-cement mixes. Uses native or imported materials and produces 100 to 150 tons per hour of ready-to-spread mix.

In fact, the Model 36 incorporates all of the proved features of the famous Wood Roadmixers, Models 48 and 54, plus maneuverability, speed, and self-propulsion.

Get all the facts on this sensational new self-propelled Roadmixer today. See your local Wood Roadmixer dealer or write direct to the Wood Manufacturing Company.

Ask for Bulletin Thirty-Six

Facts

Rubber Tire Mounted—One-Man Operated—Five forward and five reverse road speeds, 2 to 14 miles per hour, for self-transportation to and from jobs—Five mixing speeds 11.5 to 71 feet per minute—Will handle 4 cu. ft. windrows—Power controls—Super traction for soft subgrade—Ample power for all operations.

1-36

ROADBUILDING EQUIPMENT

WOOD MANUFACTURING CO.

BOX 620, 6900 TUJUNGA AVE. • NORTH HOLLYWOOD, CALIF.

Why a B-G Bucket Loader Produces Profit the Year Around

"Versatility" best describes the Barber-Greene Bucket Loader—versatility not only in materials it can handle, but in handling these materials throughout the year.

In the spring, the B-G Bucket Loader is used in conjunction with a blade grader and truck for shoulder clean-up, curve widening, contouring, etc. In the summer, it handles aggregates for asphalt patching, street graveling, etc. In the fall, as winter approaches, it is ideal for handling cinders and sand.

In the winter, when conditions are really tough, the Barber-Greene Bucket Loader can be relied upon to dig into frozen stock piles, break up the lumps, and load the distributing trucks for prompt action in meeting icy conditions.

Barber-Greene Bucket Loaders are built in a number of sizes and models. The Barber-Greene Bucket Loader Catalog No. 82 describes and illustrates the various loaders. Barber-Greene Company, Aurora, Illinois, U.S.A.

B-G Barber-Greene CONSTANT FLOW EQUIPMENT

46-24

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

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

6 Reasons Why

HENDRIX Lightweight DRAGLINE BUCKETS

ARE BETTER!

10% to 14% Manganese Steel Chains and Fittings are standard on all types and sizes.

3/8 to 30 Cubic Yds.

1. 20% to 40% lighter than other buckets, type for type.
2. All welded construction for greater strength and durability.
3. Manganese Steel chains, fittings, and reversible tooth points.
4. Full Pay Load every trip, even in wet diggings.
5. Perfect Balance; handles easier, fills faster, dumps cleaner.
6. Three Types; light, medium, and heavy duty. With or without perforations.

Write for descriptive literature or ask your dealer.

DESOTO FOUNDRY, INC. • MANSFIELD, LOUISIANA

the best advertisement for a Carrimor* is a competitive test!

COMPARE THE RESULTS OF THIS TYPICAL TEST BY AN UNBIASED ORGANIZATION*

Test Data	LPC Carrimor	Scraper "A"	Scraper "B"
Struck Capacity	8.4 yds.	8.2 yds.	9.25 yds.
Loading Time	1.0 Min.	1.0 Min.	1.0 Min.
Spreading Time	.157 Min.	.172 Min.	.366 Min.
Turning & Travelling time considered as constant for purposes of computation	3.22 Min.	3.22 Min.	3.22 Min.
Total Trip Time	4.38 Min.	4.39 Min.	4.58 Min.
Weighed yds. per trip	7.3	6.1	6.0
Trips per 54 Minute Hr.	12.32	12.30	11.7
Total Yds. per Hr.	89.9	75.0	70.2
Total Yds. per 8-hr. Day	719	600	562

*Name on request

Claims are easy and talk is cheap but if you want the real facts on which scraper *will put the most money in your pocket*, we suggest a competitive test with the new 8 yard LaPlant-Choate Carrimor.*

For example, here are the results of a typical test, conducted by an unbiased organization with no connection with any scraper manufacturer. Every condition was carefully controlled to get as nearly a perfect comparison as possible—same operator, same material, same tractor, same haul and *even the same loading time*. But look at the difference in scraper production, based on actual weighed loads at the fill! At 25 cents per yard, the LPC Carrimor* would earn $29.00 per day more than scraper "A" and $39.00 per day more than scraper "B".

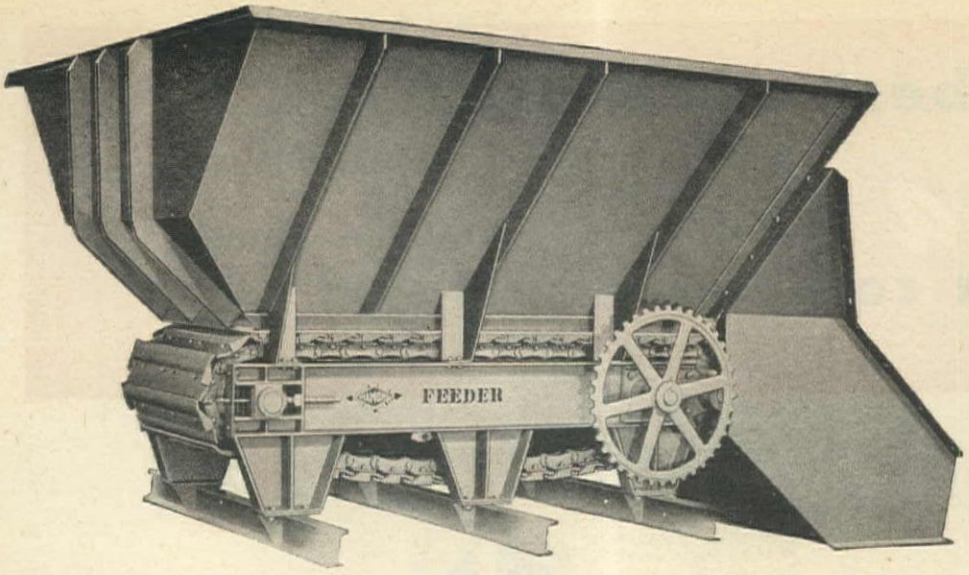
With an opportunity for extra profits like these, isn't it worth waiting a little longer to be sure of a Carrimor*—the scraper that's "best by competitive test." LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, Calif.

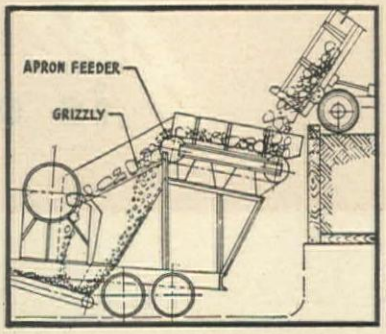
*Reg. U.S. Pat. Off.

LaPLANT-CHOATE

Job-Proved Equipment... for Lowest Possible Cost in Moving Earth

APRON FEEDER





Flow chart shows feeder operating on an upward incline with finger grizzly, scalping off large rock for primary breaker.

There's nothing tougher

THAN A DIAMOND FEEDER

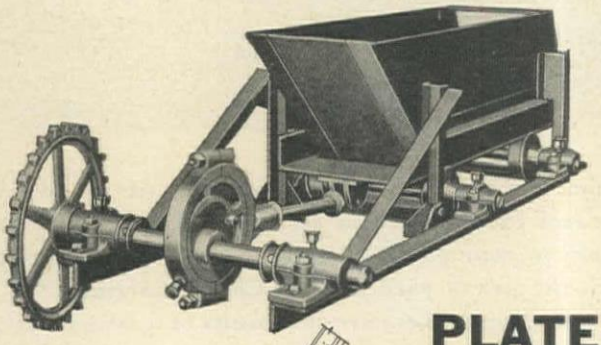
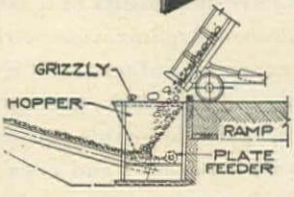


PLATE FEEDER



Illustrated is but one of many uses. Belt life is lengthened, and even flow maintained.

For feeding sand, gravel and lighter materials, the DIAMOND Plate Feeder is a versatile unit. Made in six widths with either single or double eccentric. Both types have an **adjustable throw** that provides exactly the correct flow of material for the job at hand.

There's nothing tougher than All these DIAMOND products: Jaw Crushers . . . Roll Crushers . . . "DUAL-ACTION" Crushers . . . Hammermills . . . Screens . . . Conveyors . . . Bins . . . Feeders . . . Portable and Stationary Plants. Ask for our Quarry Plant Bulletin D-45-A.

30 different sizes are available to match up with capacity of your trucks, shovels or bins. This heavy duty DIAMOND Apron Feeder handles stone, gravel, ore and similar "big chunk" materials in volume. Operating at a horizontal or inclined position, it may be used for feeding to a primary crusher or from under large bins to a belt conveyor. Please write us, stating your requirements, and we will be able to advise you as to width, length and capacity.

FREE: **Write for Bulletin D-44-K on DIAMOND Feeders.**

DIAMOND DEALERS

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

DIAMOND

DIAMOND IRON WORKS, INC.

AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINNESOTA

CHECK THESE PROFIT-POINTS *For Greater* TRACTOR-LOADER PERFORMANCE

A Hydraulic pressure actuates piston which drives cable drum — eliminates all clutches and gears.

B Long, long, (group 4F5510) track assembly on "Caterpillar" Diesel D4 Tractor assures correct balance, eliminating shock and untimely wear to track rollers and idlers.

C Single lever, convenient to operator, insures smooth, positive bucket control.

D More pay loads with new, faster-digging, cleaner-dumping bucket.

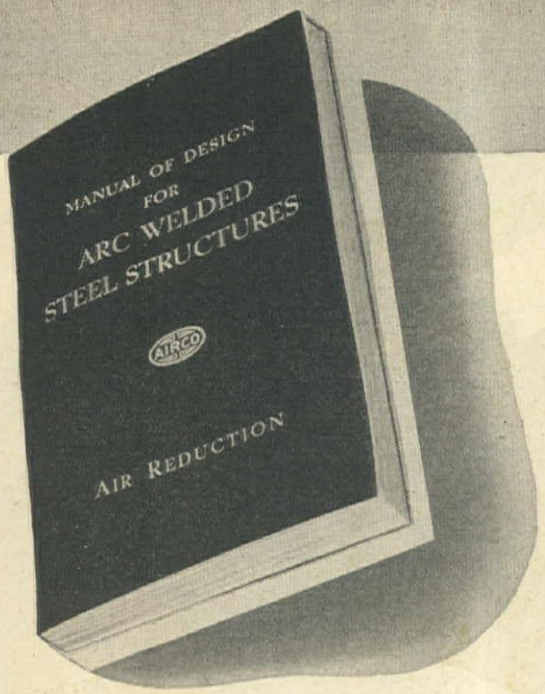
HERE'S a tractor-loader with greater digging and loading performance . . . with exclusive, simple, fast hydraulic control that enables you to hit new highs in production in most any materials. Its newly designed bucket makes it a capable digging unit — backed by the dependable power and traction of the "Caterpillar" Diesel D4 Tractor. Retaining the proved features of hundreds of Athey Mobi-Loaders in the field — adding new, exclusive features to increase production and ease of operation — the new Athey ML 4 MobiLoader is today's buy in the tractor-loader field! Ask your Athey "Caterpillar" Dealer about an early delivery of the *new* MobiLoader or write direct to

ATHEY PRODUCTS CORPORATION
Chicago 38, Illinois

Athey APCOR Products

New Athey ML 4 MobiLoader

YOU are invited to examine this book Free!



Here is the first book of its kind ever published — the "Manual of Design for Arc Welded Steel Structures." It is handy, useful, bringing you a wealth of information covering design, materials, inspection, estimating, and engineering control of welding and related operations . . . tables of standardized welded connections for all sizes of beams . . . AND a series of diagrams for the rapid design of special connections.

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- ★ Types of Welds and Joints, and Weld Sizes, Arrangement of Details
- ★ Specifications for Welded Buildings, Bridges and Similar Structures
- ★ Proportioning Welds for Allowable Stresses in Building Construction
- ★ Economical Weld Sizes and Groove Forms
- ★ Diagrams for the Rapid Determination of Allowable Eccentric Loads on Welded Connections
- ★ Standardized Welded Connections for Simple Framing and Tables of Allowable Loads on Beams and Piece Marks for Welded Connections
- ★ Estimating Electrode Requirements, Weight of Deposited Metal, and Cost Factors

But see the book for yourself . . . simply fill in and mail the coupon — look the book over for five days; then, at the end of this period, if the book meets your requirements, just send us your check for $2 in payment—otherwise mail the book back to us.

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Send us a copy of "Manual of Design for Arc Welded Steel Structures." We agree to send you our check for $2 at the end of five days, or return the book to you.

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A well-calked joint—a level trench without humps or hollows—a tamped backfill in all but sandy soils: these are simple fundamentals of good practise in laying cast iron pipe. Observe them and you give the pipe full opportunity to deliver the centuries of useful life built into it at the foundry. For, cast iron pipe, like all materials of construction, must be properly installed if it is to give maximum service with minimum maintenance cost. Our new 16 mm. sound motion picture, "Installing Cast Iron Pipe" is available, on loan, without charge, to water and sewage works officials, engineering schools and organizations. Address Dept. H. Cast Iron Pipe Research Association, T. F. Wolfe, Engineer, 122 S. Michigan Ave., Chicago 3.

CAST IRON PIPE
SERVES FOR CENTURIES

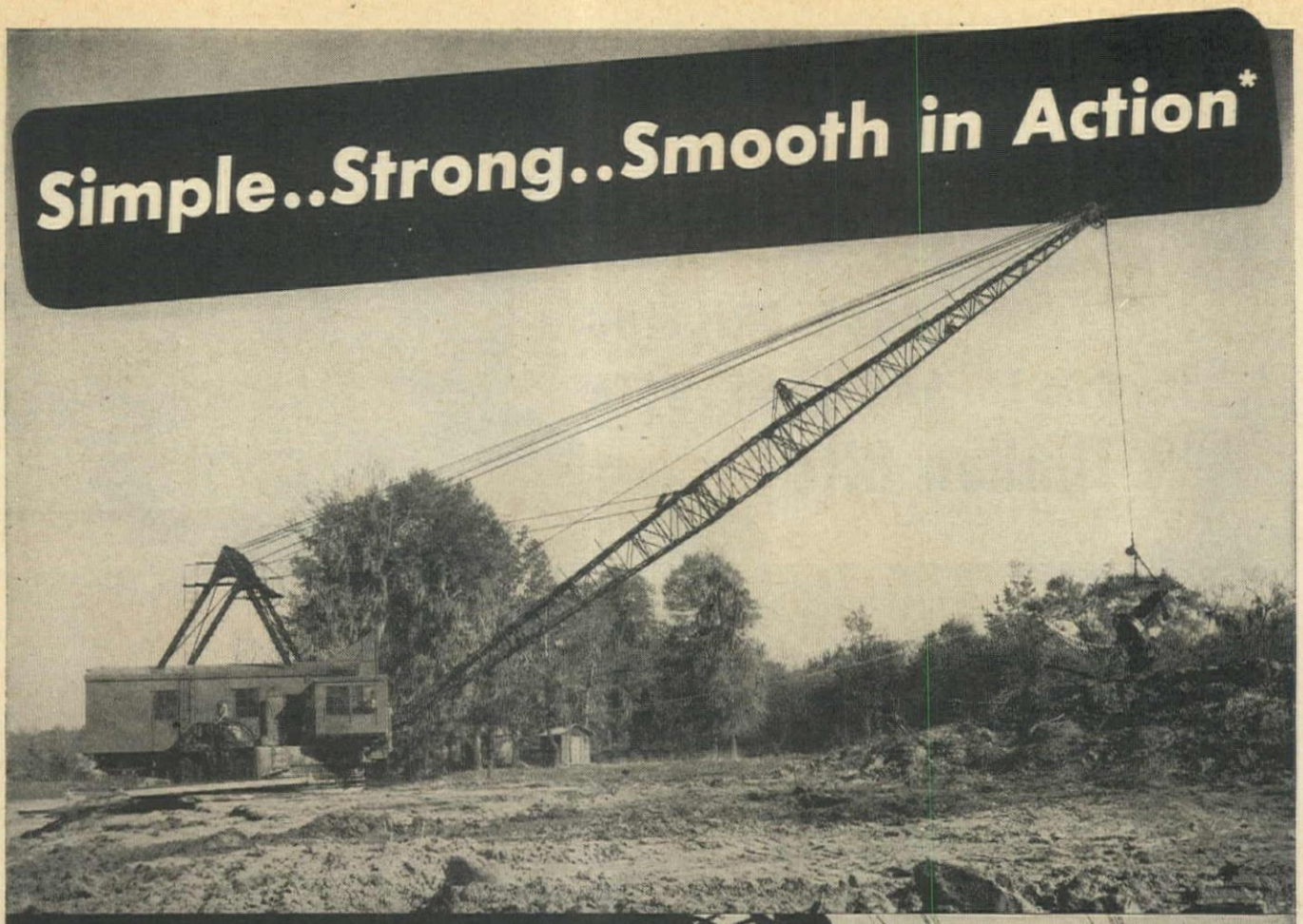
Any contractor who has had any appreciable experience with Timken Rock Bits will tell you that his rock moving costs are considerably lower than they used to be.

That's because Timken Bits drill faster; yield more footage per bit; can usually be reconditioned several times for additional service life; drastically cut steel costs; save the drillers' time.

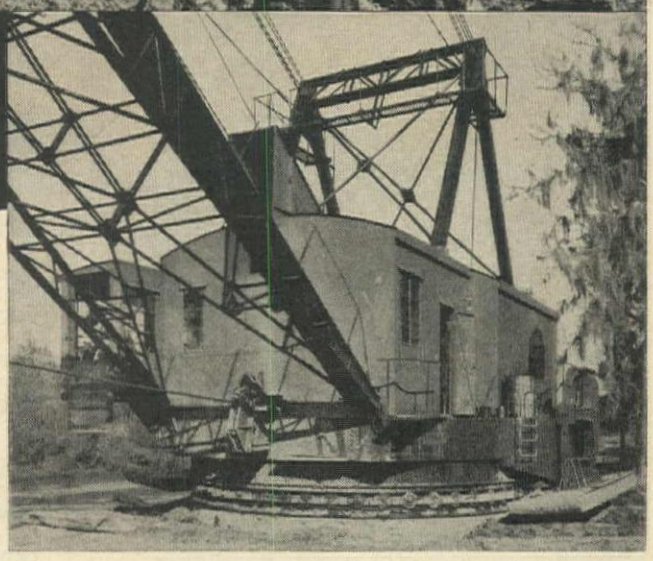
These advantages spring from a combination of design, material and manufacturing technique that cannot be duplicated. No other bit manufacturer makes his own steel. No other bit manufacturer has the benefit of such far-reaching metallurgical knowledge and experience.

If you've never used Timken Bits you don't know what you're losing. Write for name of nearest authorized distributor. The Timken Roller Bearing Company, Canton 6, Ohio.

Simple..Strong..Smooth in Action*



Three of Many Reasons Why
BUCYRUS-MONIGHANS
Are Years Ahead



BUCYRUS-MONIGHAN simplicity means smooth performance and minimum maintenance — in both digging and walking. Main machinery is not complicated by gadgets or by intricate gears and shafts that cause trouble and reduce efficiency. It is easily accessible for maintenance and well positioned for good rope leads and maximum counterweight effect.

In the walking machinery, too, there is very little to go wrong. By means of the smooth rotating and sliding action of the rolling cam, the walking cycle is executed without jerking or shock to the machinery. It's a walking action that lasts because parts are strong, few in number, smooth in action.

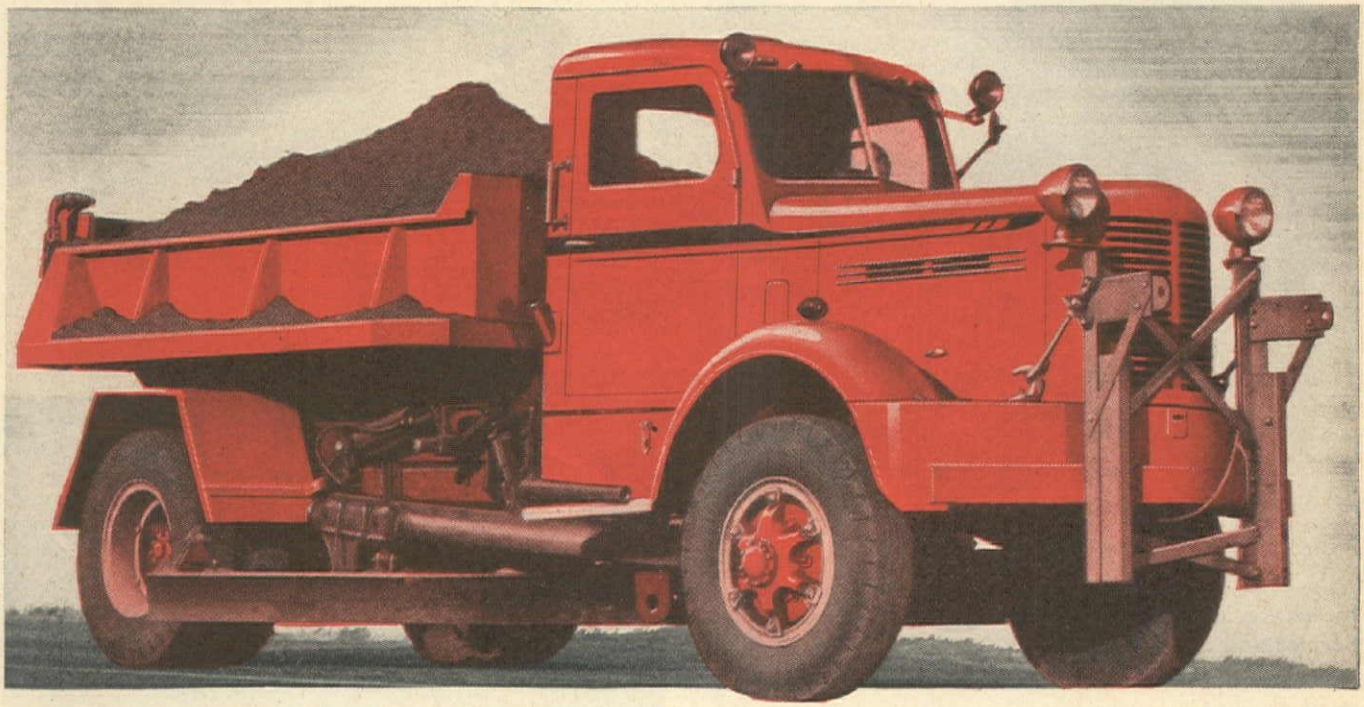
14M46

BUCYRUS MONIGHAN

SOLD BY
BUCYRUS-ERIE COMPANY
SOUTH MILWAUKEE, WISCONSIN

FWDs

"CARRY A LOT OF WEIGHT"



...in highway construction and maintenance

Well known as the ONE truck that does MANY jobs, FWD four-wheel-drive trucks "carry a lot of weight" in the highway construction and maintenance field. They are a credit to any organization engaged in this work.

Proved in performance through more than 36 years, FWD dependability has made these rugged trucks the first choice of highway construction and maintenance men throughout America, who know the advantages of these all-purpose, all-season trucks that can go in anywhere, pull out of anything, blade roads, haul heavy materials and equipment, clear snow and do many other vital road jobs economically.

See the nearest FWD Distributor about the ONE truck for MANY jobs, or write to . . .

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

FWD

America's Foremost Heavy-Duty Truck

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.

Efficient TRUCK TRANSPORT BENEFITS EVERYONE

And efficient truck transport means efficient service and maintenance—International Service and Maintenance. Here's why:

Mechanics who furnish International Service are *truck* mechanics—specialists in truck service.

They are trained in International shop methods.

They are kept constantly informed of all improvements in service and maintenance practices.

They use International-approved equipment for analysis and testing.

They install International factory-engineered parts.

Now is no time to skimp. America needs truck transport too badly. Operators need to hold costs down.

So give your trucks the best available—International Truck Service—supplied by thousands of International Dealers and the nation's largest company-owned truck-service organization—International Branches.

Make *your* date for service today.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue — Chicago 1, Illinois

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

Tune in "Harvest of Stars" every Sunday—NBC Network. See newspapers for time and station.

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This emblem identifies the nation's largest company-owned truck-service organization—International Branches—and International Truck Dealers everywhere.

INTERNATIONAL

INTERNATIONAL *Trucks*

A SAFE ROAD TO FOLLOW

Contractors: Instead of tying up valuable working capital in purchases of Construction Equipment, LET C.I.T. FURNISH THE FUNDS.

You select the equipment needed . . . take delivery . . . we pay the bill . . . let the machinery pay its own way out of earning capacity . . . repay the obligation over extended periods.

Play safe! Conserve operating funds for pay rolls, supplies, materials, tax payments. C.I.T. will finance your equipment purchases at LOW COST; terms to suit the needs of your business.

Send for free copy of new booklet on "Financing Purchases of Construction Equipment." It explains our LOW COST plan; tells how contractors arrange C. I. T. financing.

Any of these offices are at your service.

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The Mark of LEADERSHIP

C.I.T. CORPORATION

INDUSTRIAL FINANCING

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CHICAGO, ILLINOIS

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416 West 8th Street
LOS ANGELES, CALIF.

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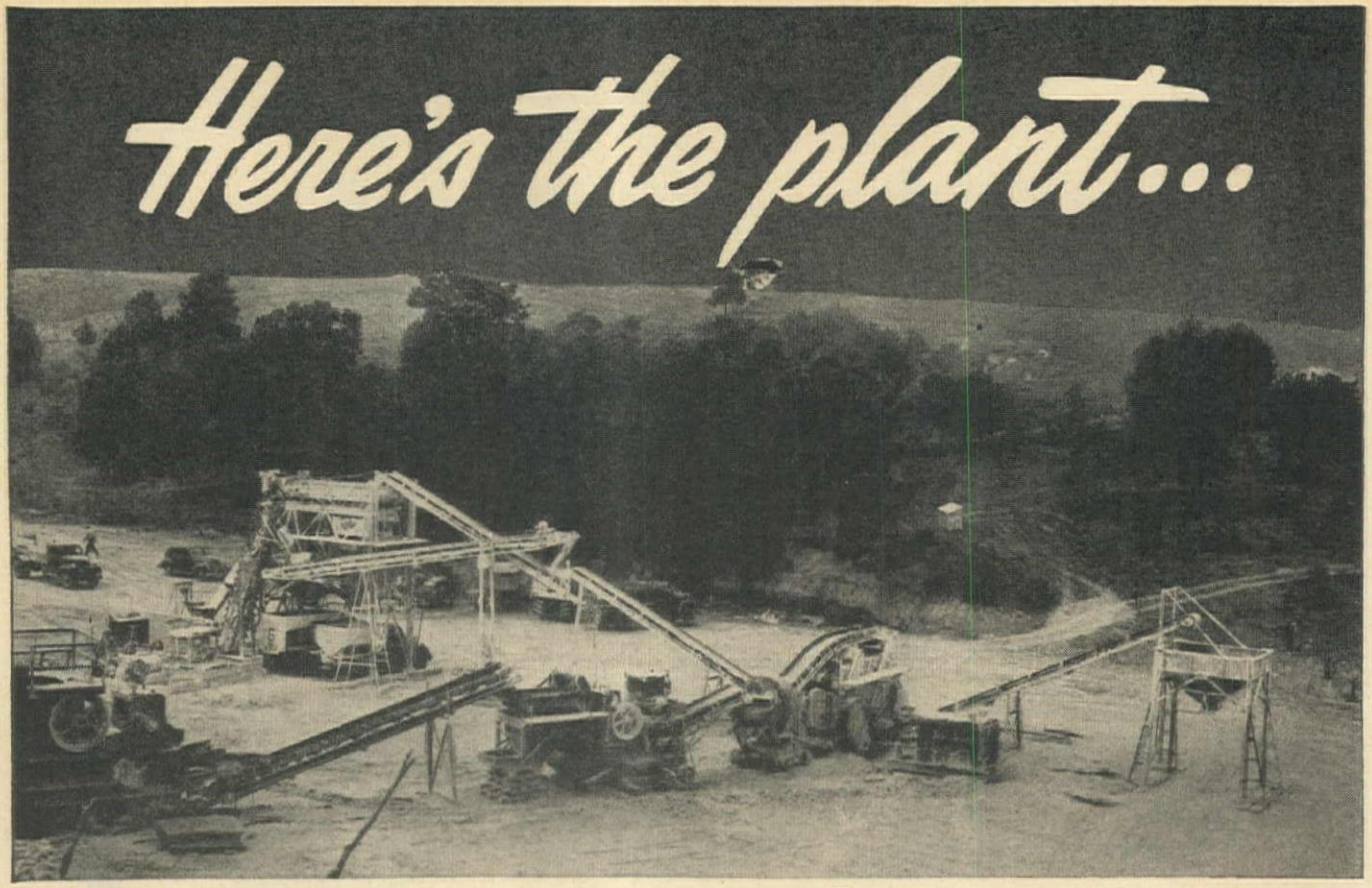
AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED



... that fits all aggregate production requirements —

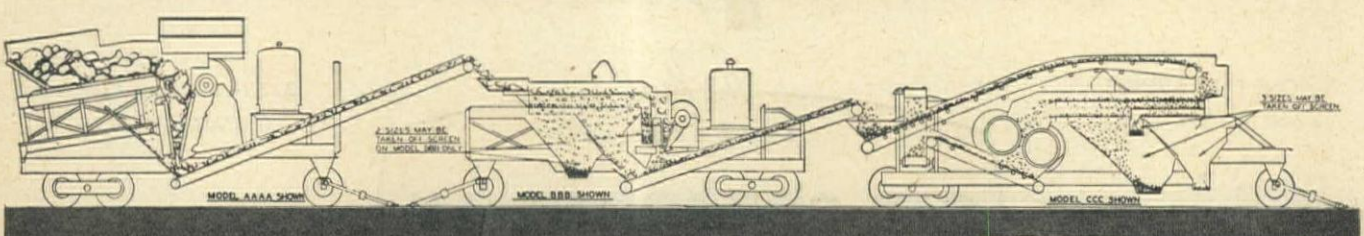
... any quantity ... any specification

IT'S A Cedarapids Unitized Plant that will crush, size and wash rock or gravel to fit any specification from riprap stone to agstone. The complete set-up consists of a primary crusher unit, a secondary crusher unit, a roll crusher unit and a washing and sizing unit. Each unit is complete in itself and can be used alone or in any one of a dozen different combinations depending upon the pit or quarry and the finished product desired. A wide range of sizes of each unit makes it possible to have a plant with almost any desired capacity. Choice of roll crusher, cone crusher, twin jaw crusher or hammermill provides still more flexibility.

You can start with the secondary jaw and roll units to produce crushed gravel and add the other units as your demands increase. Get the complete story from your nearest Cedarapids distributor and study the flow diagram below.

When buying a crushing plant — buy the best — buy Cedarapids.

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 Medford, 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, California

ARIZONA-CEDAR RAPIDS CO.
Phoenix, Arizona

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

SIERRA MACHINERY CO.
Reno, Nevada

Cedarapids

Built by IOWA

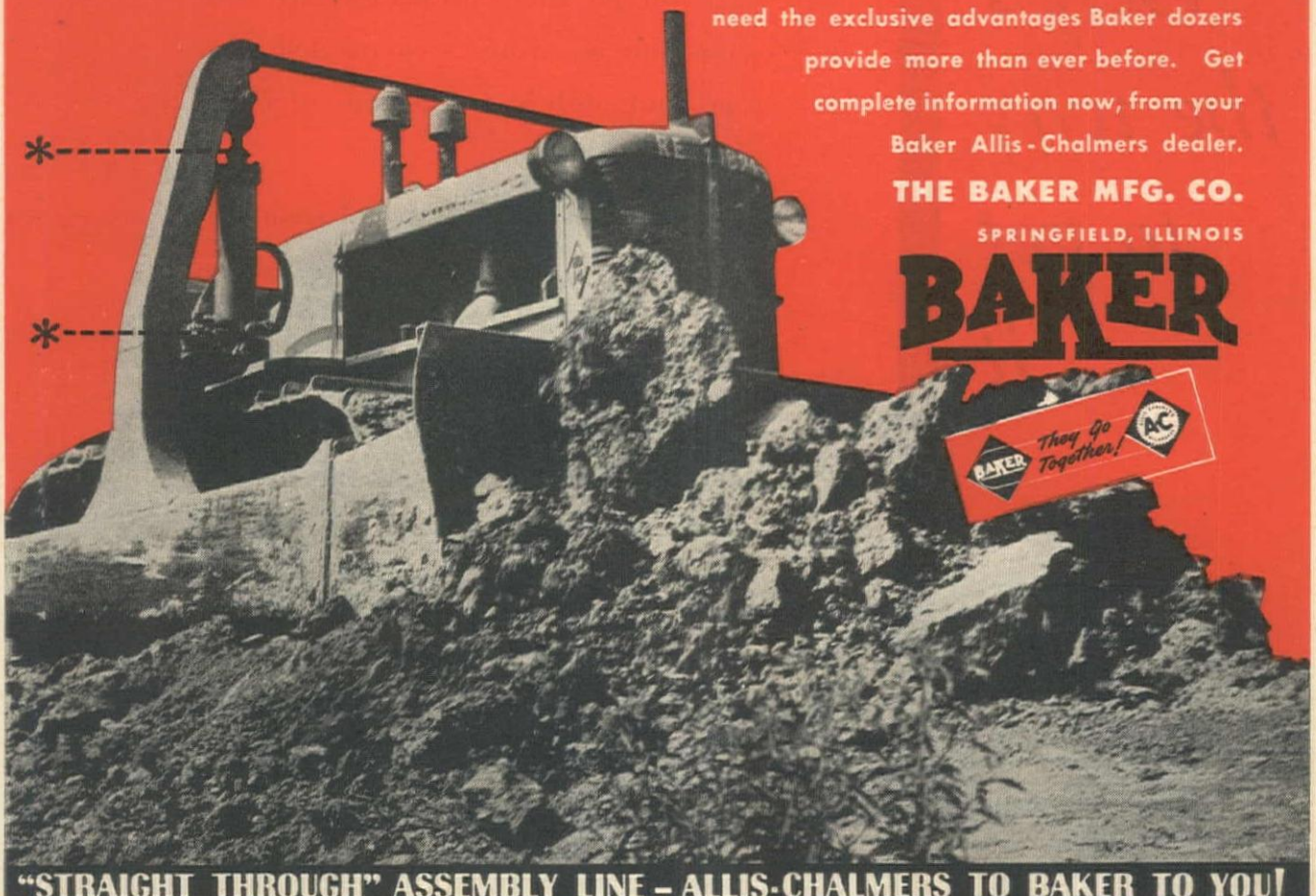
LESS LINKAGE* MORE YARDAGE

Baker simplified, direct-lift bulldozers mean extra yardage on any job. The elimination of complicated linkage assures fast, positive, accurate control of the blade, plus life-long rigidity. Fewer connections also mean fewer points of wear — less maintenance — less down time — maximum yardage per shift. Now, when time is important, when huge yardages must be moved, you need the exclusive advantages Baker dozers provide more than ever before. Get complete information now, from your Baker Allis-Chalmers dealer.

THE BAKER MFG. CO.

SPRINGFIELD, ILLINOIS

BAKER



"STRAIGHT THROUGH" ASSEMBLY LINE – ALLIS-CHALMERS TO BAKER TO YOU!

The modern Baker plant with its completely equipped fabricating, machining and blacksmithing shops adjoins the Allis-Chalmers crawler tractor plant. When you order an A-C tractor with Baker bulldozer or gradebuilder, your tractor leaves the A-C assembly line, crosses a narrow court and goes on the Baker final assembly line.

NEED STEEL?

Here's the way to get it

Scrap is needed to produce new steel. Millions of tons of steel products that have served their usefulness are idle—obsolete machines, structural shapes, pipe, old boilers and dozens of other awkward pieces.

Flame-cutting is a fast and economical way to reduce steel to pieces of the right size for charging into furnaces for the production of new steel. Line up a scrapping program *now*—we will be glad to help. Just call the nearest Linde office.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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

In Canada: Dominion Oxygen Company, Limited, Toronto

Bethlehem Pacific reinforcing steel being placed in the deck of Pier 6, U. S. Naval Shipyard, Terminal Island, Calif.

4 Acres of concrete laid over tidewater

Arrangement of concrete piling used to support Pier 6. Each pile is 83 ft. long and 20 in. square at the top

Pier 6 of the U. S. Naval Shipyard at Terminal Island is an outstanding example of heavy-duty, reinforced concrete construction handled over tidewater.

This pier consists of a reinforced concrete deck 27-in. thick, 1222-ft. long and 151-ft., 10-in. wide. The deck is supported on 2288 concrete piles. Carried on the deck are two 2-story utility buildings, tracks for crane and rail movements and complete facilities for servicing naval vessels.

Here as in other noteworthy Coastal construction projects Bethlehem Pacific supplied reinforcing steel. Approximately 5000 tons of reinforcing bars were rolled and fabricated for this pier by Bethlehem Pacific's Los Angeles mills.

With mills at Seattle, South San Francisco and Los Angeles, Bethlehem Pacific is well situated to furnish reinforcing steel cut and bent to meet all types of concrete construction requirements.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

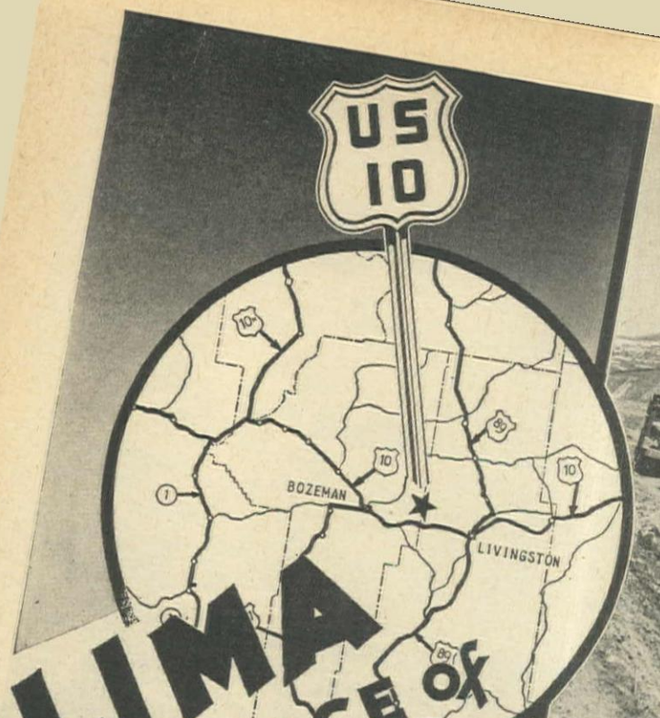
General Offices: San Francisco

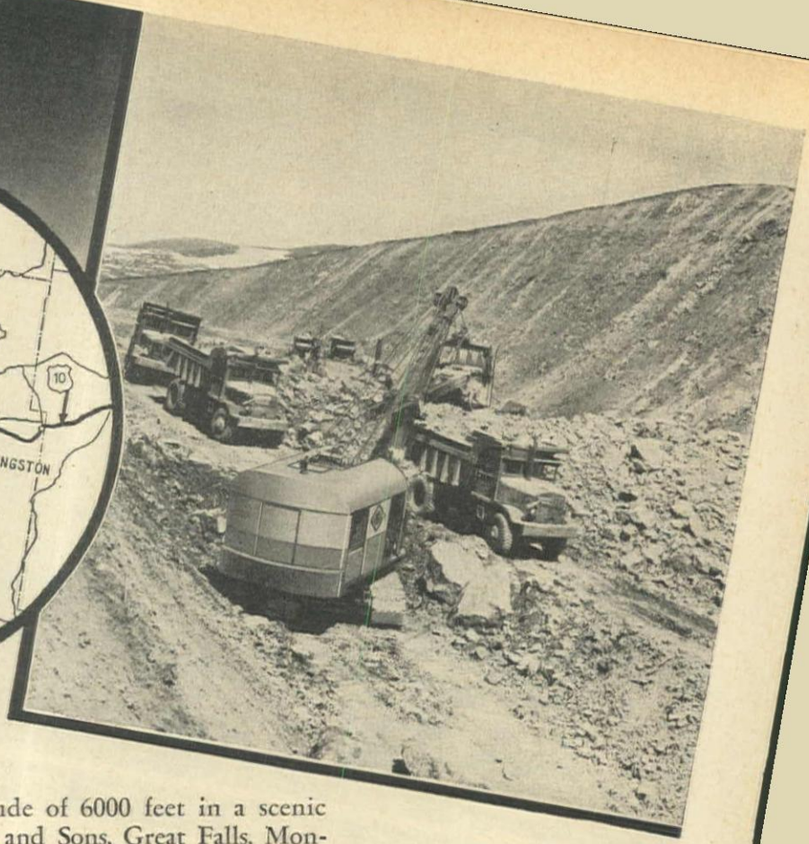
District Offices: Los Angeles, Portland, Seattle, Salt Lake City, Honolulu

Steel Plants: Los Angeles, South San Francisco, Seattle

BETHLEHEM STEEL

BETHLEHEM PACIFIC





LIMA LIFTS FACE of BOZEMAN HILL

Working at an altitude of 6000 feet in a scenic wonderland, S. Birch and Sons, Great Falls, Montana, contractor, is carving four (4) miles of straight-line highway through Bozeman Hill, halfway between Bozeman and Livingston, Montana. The job calls for the moving of 511,886 cubic yards of mountain top, most of which is solid rock. Working as many as three (3) shifts a day, the LIMA 2½ cubic yard heavy-duty shovel, shown in the illustration, averaged 2600 to 3400 yards of rock per shift. This kind of excavating calls for the highest quality equipment. For this reason LIMA got the call. S. Birch and Sons are long-time users of LIMA equipment having purchased their first shovel in 1936. The continuous use of LIMA equipment for 10 years represents a lot of satisfaction. If you have a tough digging job coming up, profit by the experience of successful contractors, make your next shovel, crane or dragline a LIMA.

SHOVELS • CRANES • DRAGLINES

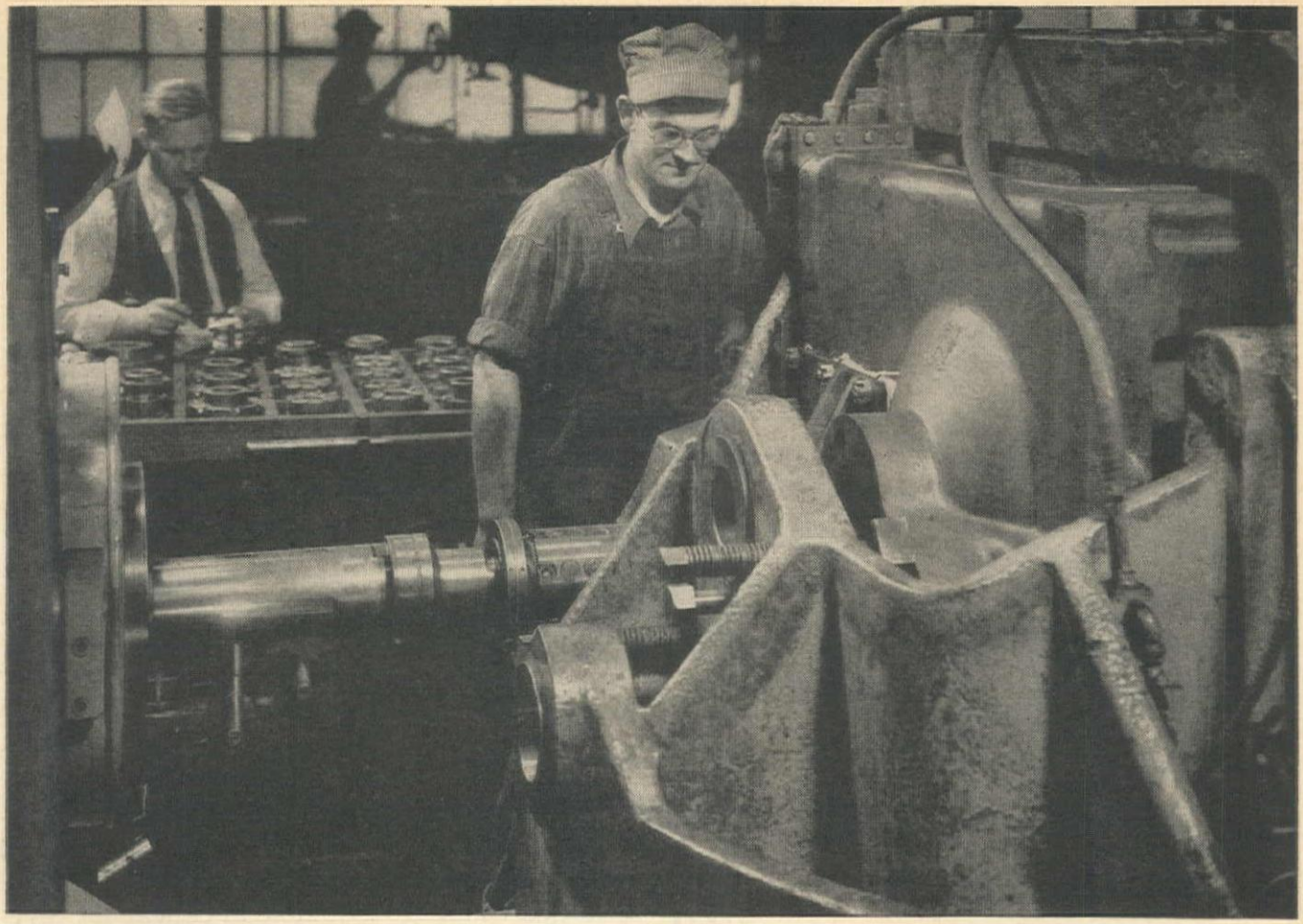
LIMA

LIMA LOCOMOTIVE WORKS, INCORPORATED
Shovel and Crane Division . . . . . Lima, Ohio, U. S. A.
OFFICES IN PRINCIPAL CITIES

A TYPE AND SIZE FOR EVERY MATERIAL HANDLING JOB

LIMA

Fouiger Equipment Co., Inc., 1361 So. 2nd West, Salt Lake City, Utah; 1932 First Avenue South, Seattle 4, Washington, W. C. Champion, District Manager; Feenaughty Machinery Company, 112 S. E. Belmont St., Portland 14, Oregon, 600 Front St., Boise, Idaho; Garfield and Company, 1232 Hearst Bldg., 5 Third Street, San Francisco 3, California; Smith Booth Usher Company, P. O. Box 3578 Terminal Annex, Los Angeles 54, California; Held-McCoy Machinery Company, 3201 Brighton Blvd., Denver 5, Colorado; Smith Booth Usher Co., 1756 Grand Ave., Phoenix, Arizona; Contractors' Equipment and Supply Co., Springer Building, P. O. Box 456, Albuquerque, New Mexico; Modern Machinery Company, Inc., N. 2417 Division St., Spokane 2, Washington; Jameson Engineering Sales, Fairbanks, Alaska.



Boring transmission case to close tolerances. All holes bored from one setting to insure concentricities and accurate alignments

Perfect setting for a "Boring" story!

To assure smooth, efficient operation, all holes in the transmission cases of Oliver "Cletrac" crawler tractors are bored to exceptionally close tolerances from one setting. In this way, we can guarantee the exact alignment of all transmission gears and shafts, assuring economical operation and freedom from excessive maintenance.

This efficient operation not only improves performance, but is another of the cost-cutting steps which make it possible for us to add *extra* quality without additional cost to you. *Extra* quality is the standard that characterizes every Oliver "Cletrac" tractor part.

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

CLETRAC

THE OLIVER CORPORATION Cletrac

a product of **The OLIVER Corporation**

State of Arizona: Choguill Tractor Co., Phoenix. *State of California:* Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Comber & Mindach, Modesto; Tractor Service Company, Inc., 820 Broadway, Chico; Tractor & Equipment Co., San Leandro; Flood Equipment Co., Sacramento; W. J. Yandle, Santa Rosa; Hamsher Tractor Co., Stockton. *State of Washington:* Inland Truck & Diesel Company, Spokane; Pacific Hoist & Derrick Co., Seattle; Melcher-Ray Machinery Co., 202 East Alder Street, Walla Walla; Coleman-Jones Equipment Co., Chehalis; Central Tractor and Equipment Co., Wenatchee. *State of Oregon:* Loggers & Contractors Machinery Co., Portland and Eugene. *State of Idaho:* Idaho Cletrac Sales Co., Lewiston; The Sawtooth Company, Boise. *Western Montana:* Western Construction Equipment Company, Billings and Missoula. *State of Nevada:* B & M Tractor & Equipment Corp., 1420 S. Virginia St., Reno. *British Columbia:* Pacific Tractor & Equipment, Ltd., 505 Railway Street, Vancouver.

GOVERNMENT-OWNED SURPLUS

STEEL... at quick sale prices!

STEEL can be bought now through War Assets Administration, for immediate shipment to you. Alloy steel billets, blooms and many items of alloy steel bars, particularly in the larger sizes, are available in Chicago, Cleveland, Detroit and other Regional Offices.

Lowscale prices make it worth your while to buy this high-grade material, even if you intend it for low-cost products.

Carbon and alloy steel mechanical tubing is also available in a wide range of sizes and specifications. Contact your nearest War Assets Administration Office below, or clip and mail the coupon.

All steel is subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

FREE INFORMATION

To War Assets Administration:*

Please send me full information, including availability and pricing of the following:

Carbon and Alloy Billets and Blooms ☐—H. R. & C. R. Alloy Sheets ☐—Strip and Plates ☐—Stainless Steel Sheet and Strip ☐—Mechanical Tubing, Carbon and Alloy ☐—Standard Type Valves and Fittings ☐

NAME.....TEL. NO.....

FIRM.....

ADDRESS.....

CITY.....STATE.....

*Send coupon to nearest Regional Office below for fast service.

EXPORTERS

Most surplus property is available to the export market. Merchandise in short supply is withheld from export, and if such items appear in this advertisement they will be so identified by an asterisk.

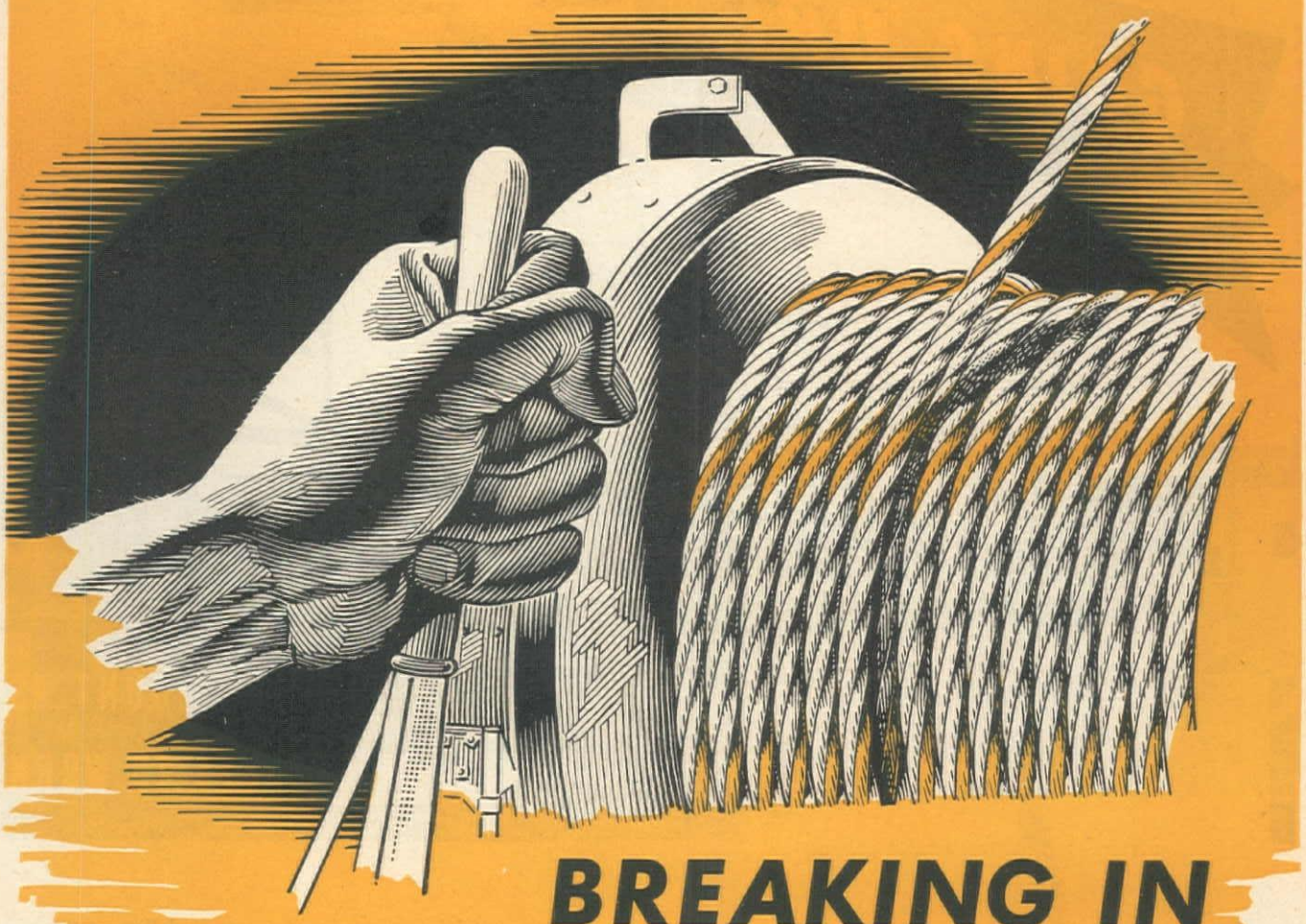
WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

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

x57-6

Take the full load sooner!



BREAKING IN

the new line is a short job with *PREFORMED* YELLOW STRAND

Let's agree that "slow and easy" is a good rule for putting most equipment to work — *Preformed* Yellow Strand included. Proper adjustment between wire rope and other operating parts extends rope life.

But a prolonged slowdown for starting a new rope is expensive. And it's *unnecessary* with *Preformed* Yellow Strand, because the factory process that preshapes wires and strands is equivalent to a *preliminary break-in.*

When flexible *Preformed* Yellow Strand reaches you it is notably relieved of internal stresses. You save much of the time that would be spent trying to relax the stiffness of a corresponding unpreformed rope. After a short, gradual stepping up—to bed the strands firmly on the core—you can take the full load.

The same rope tractability aids production in other ways. *Preformed* Yellow Strand is installed quickly. It resists kinking... stays in the sheave grooves... curbs overwinding on the drum.

Specify *Preformed* Yellow Strand by name. Get all you should in wire rope performance and economy. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* SEATTLE, Portland, New York, Chicago, Houston. *Factories:* SEATTLE, St. Louis, Peoria.

HAND BOOK FREE: "Industrial Wire Ropes" contains useful facts, tables, pictures. Write for your copy.

BRODERICK & BASCOM
Yellow Strand
***PREFORMED* WIRE ROPE**

The New WHEELER

3 to 4 Ton TANDEM ROLLER

Smooth PERFORMANCE

STURDY CONSTRUCTION

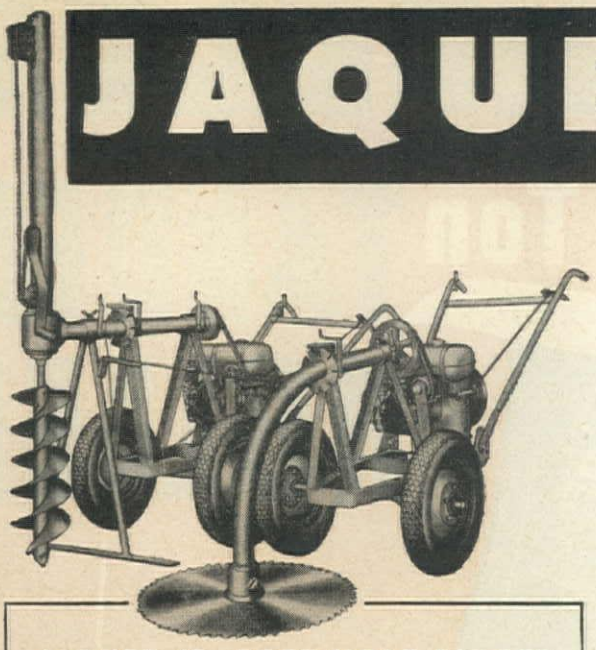
A New Name in Rollers
A New High in Value

Exclusive Distributor

Shaw Sales & Service Company

5100 Anaheim-Telegraph Road, Los Angeles 22, California
Phone ANgelus 1-7141

JAQUES LABOR SAVING MACHINES

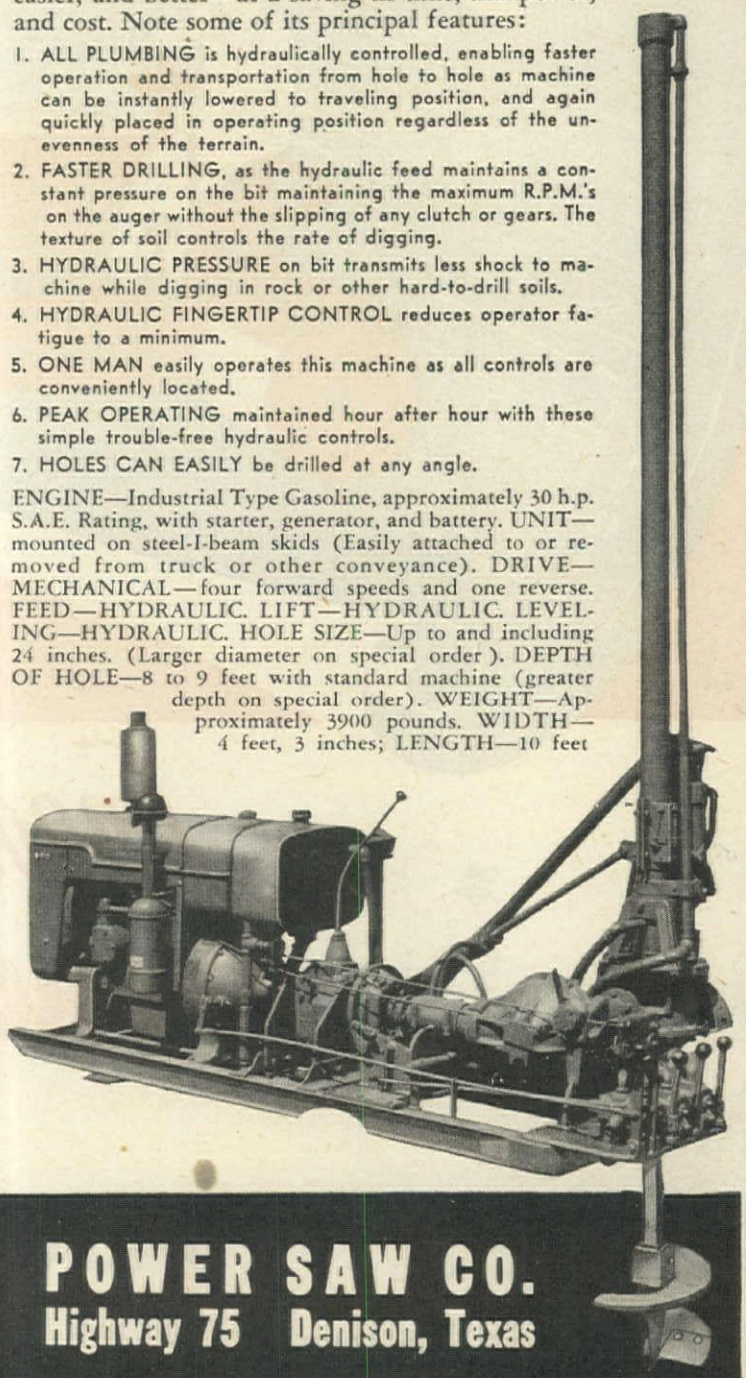


Do the Job
QUICKER • BETTER

If it's a big job like constructing a telephone, power line, or drilling foundation holes, THE JAQUES HYDRAULICALLY CONTROLLED EARTH BORING MACHINE below will do the job faster, easier, and better—at a saving in time, manpower, and cost. Note some of its principal features:

1. ALL PLUMBING is hydraulically controlled, enabling faster operation and transportation from hole to hole as machine can be instantly lowered to traveling position, and again quickly placed in operating position regardless of the unevenness of the terrain.
2. FASTER DRILLING, as the hydraulic feed maintains a constant pressure on the bit maintaining the maximum R.P.M.'s on the auger without the slipping of any clutch or gears. The texture of soil controls the rate of digging.
3. HYDRAULIC PRESSURE on bit transmits less shock to machine while digging in rock or other hard-to-drill soils.
4. HYDRAULIC FINGERTIP CONTROL reduces operator fatigue to a minimum.
5. ONE MAN easily operates this machine as all controls are conveniently located.
6. PEAK OPERATING maintained hour after hour with these simple trouble-free hydraulic controls.
7. HOLES CAN EASILY be drilled at any angle.

ENGINE—Industrial Type Gasoline, approximately 30 h.p. S.A.E. Rating, with starter, generator, and battery. UNIT—mounted on steel-I-beam skids (Easily attached to or removed from truck or other conveyance). DRIVE—MECHANICAL—four forward speeds and one reverse. FEED—HYDRAULIC. LIFT—HYDRAULIC. LEVELING—HYDRAULIC. HOLE SIZE—Up to and including 24 inches. (Larger diameter on special order). DEPTH OF HOLE—8 to 9 feet with standard machine (greater depth on special order). WEIGHT—Approximately 3900 pounds. WIDTH—4 feet, 3 inches; LENGTH—10 feet



JAQUES JR. POST-HOLE DIGGER

HOLE DIGGING is easy, fast, economical and efficient with the JAQUES JUNIOR POST-HOLE DIGGER. In ordinary ground, it bores 9" hole three feet deep in sixty seconds or less. Can be operated by one man. Throws dirt out leaving hole clean. Complete, F.O.B., Denison . . .

$398.00

JAQUES JR. PORTABLE POWER SAW

It's easy to clear land of brush and trees, with a JAQUES JUNIOR PORTABLE POWER SAW. Its 30" unbreakable saw, powered by 5 to 6 h.p. engine zips through brush and trees in seconds, cutting them off level with ground. Once tree is felled, angle of saw can be changed quickly to trim and cut tree to any desired length. Price of saw, complete, F.O.B., Denison, is only . . .

$379.50

SAVE $200 ON COMBINATION

If you prefer, you can buy the SAW complete with frame and engine for $379.50 and the Post-Hole Digger attachment, which is interchangeable with saw, for $198.00 extra. Switch from Saw to Post-Hole Digger can be made in about five minutes.

TRACTOR MOUNTED SAW

For the bigger clearing jobs inquire about the JAQUES TRACTOR MOUNTED SAWS.

JAQUES POWER SAW CO.
Highway 75 Denison, Texas

PLEASANT DREAMS

Every state or county highway engineer . . . every superintendent of streets . . . every contractor . . . every airport maintenance manager . . . can rest contented in the fact that HUBER Road Machinery is the answer to his dreams of low maintenance costs—plus a minimum outlay for equipment to do the job.

The HUBER MAINTAINER—"the one-man maintenance crew" is 8 machines in one—a broom, mower, patch-roller, one-way or V-type snowplow, bulldozer, scraper, and lift-loader.

The new 3-wheel HUBER ROAD ROLLER is a versatile machine that gets jobs done in a hurry. It is built in sizes from 5 to 14 tons.

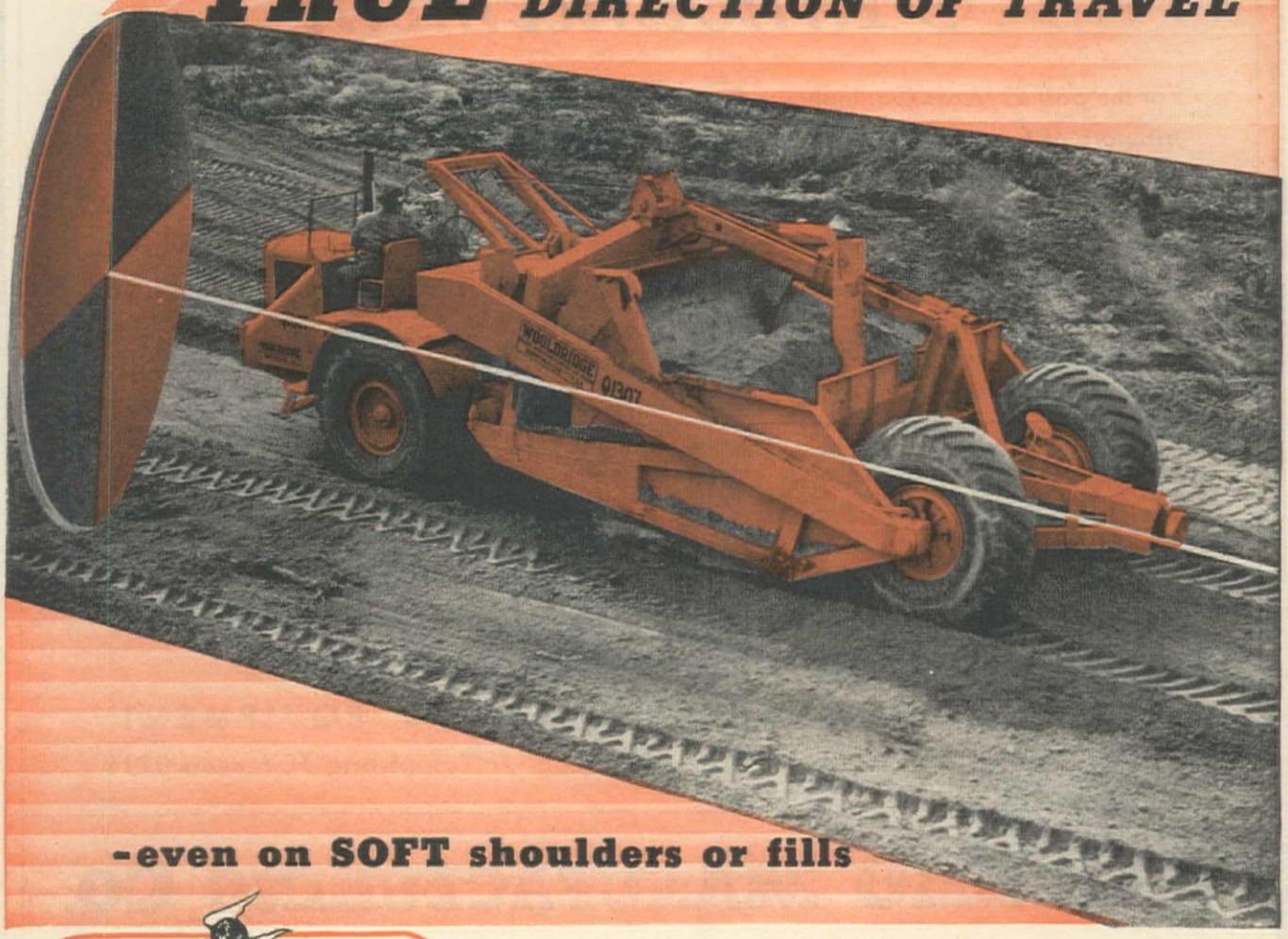
And . . . there's a new HUBER TANDEM for every type of work . . . from 3 to 12 tons.

Make your plans to standardize on HUBER Road Machinery—and make sure your dreams of lowest possible maintenance costs come true.

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

LEE & THATRO EQUIPMENT CO.	Los Angeles, California
JENKINS & McCLOUD	Reno, Nevada
THE MINE & SMELTER SUPPLY CO.	Denver 17, Colorado
CONTRACTORS' EQUIPMENT & SUPPLY CO.	Albuquerque, New Mexico
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
WESTMONT TRACTOR & EQUIPMENT CO.	Missoula, Montana
EDWARD F. HALE CO.	Hayward, California
EDWARD F. HALE CO.	San Francisco, California

TRUE DIRECTION OF TRAVEL



-even on SOFT shoulders or fills

WOOLDRIDGE
EARTHMOVING EQUIPMENT
Includes

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

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

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

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

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

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

Due to their exclusive, hydraulic steering system Wooldridge Terra-Cobras always maintain a fixed direction of travel over all types of ground including soft or slippery surfaces. Obstacles such as rocks, ruts or timbers in their path will not cause these high speed earthmovers to veer from their set course. A single steering bar permits operator to maintain positive *two-wheel* steering control from a fraction of a degree to a sharp angle turn. With no effort required, operators are able to maintain higher yardage averages throughout an entire shift. To keep yardages on the move investigate Wooldridge Terra-Cobras for your jobs—today!

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

TERRA COBRA
Hi-Speed Self-Propelled EARTHMOVERS

Announcement

For the past 23 years Garlinghouse Brothers have been established in Los Angeles as Distributors of Construction and Industrial Equipment in the Southern California Territory.

During the past ten years Garlinghouse Brothers have manufactured a complete line of concrete placing equipment, concrete carts, and wheelbarrows. Due to the growth of this activity, and also due to a recent development in manufacturing of industrial wheels for pneumatic tires, it has been decided to separate the three activities. The independent operation of the three divisions will enable us to serve more efficiently the respective trades.

GARLINGHOUSE BROTHERS

DISTRIBUTORS

Exclusive Distributors in Southern California of Nationally Known Manufacturers of

CONSTRUCTION AND INDUSTRIAL EQUIPMENT

2416 E. Sixteenth Street • LOS ANGELES • Telephone JEfferson 5291

GAR-BRO MANUFACTURING CO.

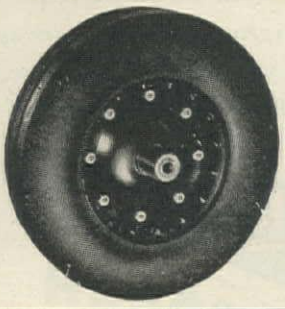
EQUIPMENT GAR-BRO ENGINEERING SERVICE

Manufacturers of

CONCRETE PLACING EQUIPMENT • WHEELBARROWS CARTS • INDUSTRIAL EQUIPMENT

2416 East 16th Street • LOS ANGELES • Phone JEfferson 5292

GAR-BRO WHEEL COMPANY



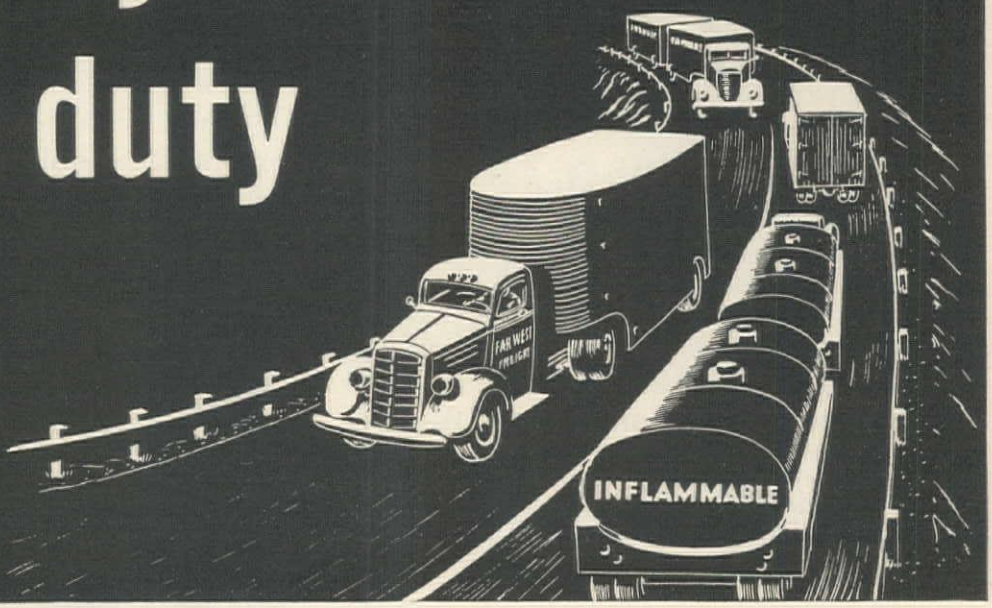
Manufacturers of

PRESSED STEEL WHEELS FOR INDUSTRIAL PNEUMATIC AND CUSHION TIRES

2416 East 16th Street • LOS ANGELES • Phone JEfferson 5293

For the present, until larger facilities are obtainable, the operation of the three companies will be located at the same address of 2416 East 16th Street, Los Angeles.

keeps those 'heavy duties' on duty



Cadel A.P. Heavy Duty Lubricant

An all-purpose engine oil for both gasoline and diesel power plants. Detergent, dispersive and inhibited for better lubrication, clean engines and oil lines, and longer bearing life. Available in grades best suited to your uses.

• • •

The worse the conditions under which your equipment must operate, the more you'll appreciate the performance of this already famous lubricant. In trucks of all weights—as in tractors, shovels or any piece of equipment with an internal combustion engine—Cadel A. P. will keep that engine clean, perfectly lubricated, its bearings uncorroded, and operating at top efficiency for longer periods between overhauls than you would have believed possible. Ask your Associated Lubrication Engineer for proof of Cadel's remarkable performance—and prices and drum sizes.

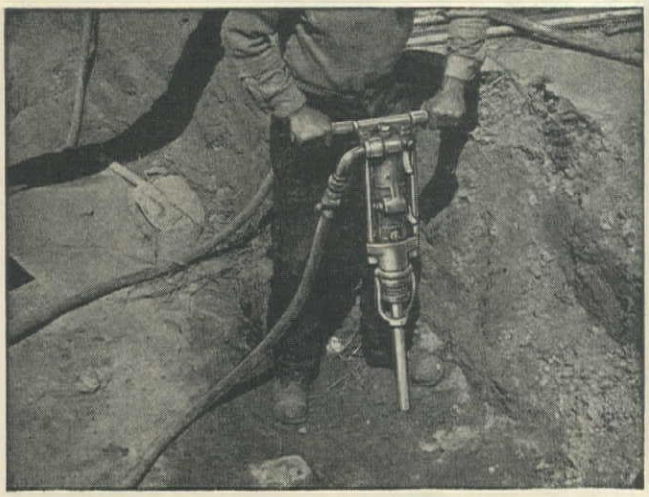
Tell Your Associated Dealer You Want a Credit Card

Free Football Schedules At Associated Dealers

TIDE WATER ASSOCIATED OIL COMPANY

Use CP EQUIPMENT

...to increase profits



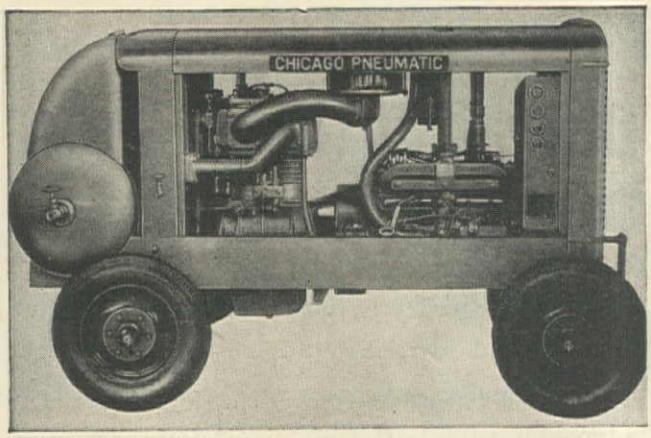
OUTSTANDING IN ITS WEIGHT CLASS — The CP-42 Sinker Drill has penetrating power, excellent hole-cleaning, strong rotation. This fast 56 pound drill is ideal for general excavation, shaft sinking, quarrying, etc. CP Sinker Drills range from the 28-pound CP-22 to the 119-pound CP-60N.

Fast-operating, dependable and low-maintenance equipment plays a major part today in determining a contractor's profits. To meet his exacting requirements, the contractor always can rely on the Chicago Pneumatic line, and a telephone call, telegram or letter will secure the immediate cooperation of your nearest CP Distributor. Write for Catalog 600, covering the complete line of Chicago Pneumatic's equipment for contractors.

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



AIR DEMAND DETERMINES ENGINE SPEED — On CP PORTABLE COMPRESSORS, the Gradual Speed Regulator adjusts engine speed exactly to air demands. You get 15% to 35% more air per gallon of fuel than if engine had to run at maximum speed for partial load requirements. Gasoline-driven and Diesel-driven Chicago Pneumatic portable models range from 60 to 500 c.f.m. actual capacity.

SMOOTH OPERATION — MINIMUM KICK-BACK — The 55-pound CP-115 general utility DEMOLITION TOOL excels in its weight class for ease of handling — speed and efficiency of operation — low air consumption. The goose-neck air-inlet swivel is positioned so the hose cannot interfere with operator's hand.

FAST AND ECONOMICAL TO OPERATE — For concretes 3″ slump and over, walls and columns under 15″ thick, light floor and roof slabs, the CP-219 PNEUMATIC VIBRATOR is ideal, because of its high frequency, low air consumption, accessibility of parts and its economical, one-man operation.

BALZER MACHINERY CO.
Portland, Oregon

HALL-PERRY MACHINERY CO.
Butte, Montana

WESTERN MACHINERY CO.
5722 Santa Fe Avenue
Los Angeles 11, California

CHICAGO PNEUMATIC TOOL COMPANY

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

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

WESTERN MACHINERY CO.
Spokane, Washington

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

UNIT'S "Big 3"

Designed for FASTER and EASIER OPERATION . . . where the Going is TOUGH!

UNIT 514
½-Yard Dragline

UNIT 1020
¾-Yard Shovel

ALL *Unit* Models are Convertible to ALL *Attachments*

UNIT 357
5-Ton Mobile Crane with Magnet Attachment.

Here are three time-tested UNIT machines that continue to "make the headlines" because of their unusual speed, efficiency and all-around dependability. Check the following exclusive UNIT features: *Compact, streamlined design . . . Straight line engine mounting . . . Drop forged alloy steel gears . . . Automatic traction brakes . . . Interchangeable disc type clutches . . . One-piece cast gear case* . . . and above all, UNIT's safety-promoting *FULL VISION CAB.* No other excavator on the market has all these features.

CONTACT FACTORY DIRECT *for Price and Delivery*

UNIT CRANE & SHOVEL CORP.

UNIT CRANE & SHOVEL CORP. UNIT MILWAUKEE WISCONSIN

6421 W. BURNHAM ST.
MILWAUKEE 14,
WISCONSIN, U.S.A.

A 4894-1PC-R

WE START THE FINISH RIGHT.... TO MAKE IT END THE WAY IT'S WANTED

"Smooth as a baby's cheek— and baked on to stay!"

That's the way the Plant Superintendent likes to see fluorescent fixtures come off the line. His sensitive fingers and critical eye tell him his production figures are "right on the dime, friend; your stuff is KO."

There are many ways to bake a finish on metal. Whether the curing schedule requires five minutes or an hour, by gas or electric oven or by infra-red tunnel (illustrated), Fuller formulates a finish to fit.

Our synthetics, we are told, give better covering, better "mileage," higher gloss, more durable wear.

Such properties, important to water heaters, fixtures, refrigerators, air conditioning units, stoves and such, indicate the Fuller laboratory technique—look beyond the production line to a useful life for every Fuller-finished product.

In the general paint application field, too, Fuller always formulates in terms of final service, because *use* is the final proof of quality.

Whatever your surface protection or beautifying problem, we believe we can solve it. We've solved some tough ones. We're still on our mettle! W. P. Fuller & Co. Factories: San Francisco, Los Angeles, Portland. Branches, warehouses in principal Western cities.

FULLER *Industrial* FINISHES

PRODUCTION FINISHES

Many leading Western wood and metal finishers specify Fuller for production profit, sales appeal, buyer satisfaction.

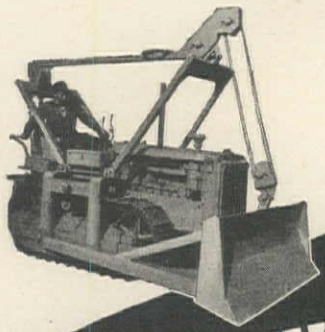
MAINTENANCE FINISHES

Protection for equipment, plant machinery, buildings, offices, plus "Color Engineering" —Fuller products fit, suit, serve and save.

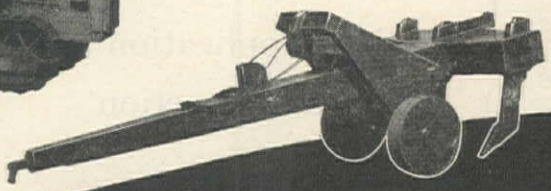
AIRCRAFT FINISHES

Millions of war flight-hours proved Fuller Aircraft Finish quality. Now available for private planes. See your Airport Refinisher.

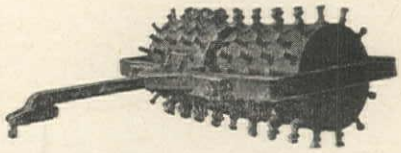
BULLDOZERS & TRAILBUILDERS



LOADERS

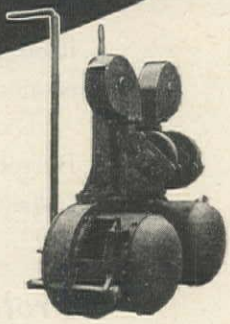


RIPPERS

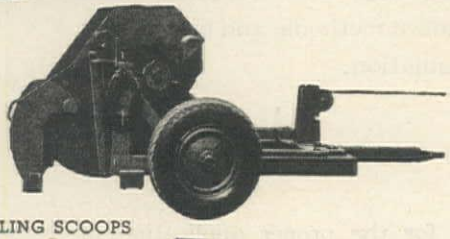


TAMPERS

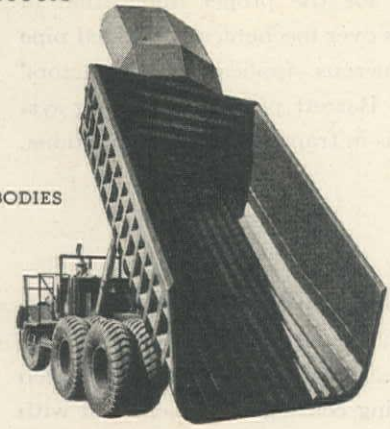
SOUTHWEST Construction Equipment *for every job!*



POWER CONTROL UNITS



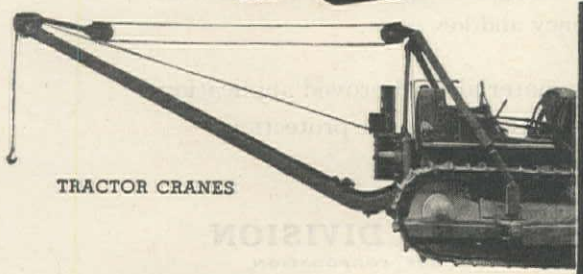
HAULING SCOOPS



DUMP BODIES

Southwest's complete, standardized line affords construction men an opportunity to fill their needs from one dependable source. From start to finish, no matter whether Allis-Chalmers, Caterpillar, International or Cletrac tractors are used, an economical Southwest unit is available to bring you increased profits.

In addition to the standard line, special Southwest Dump Wagons, Tampers, Heavy Duty Compaction Units, etc., are giving outstanding performance on out-of-the-ordinary jobs all over the country . . . Why not let Southwest help solve YOUR problems?



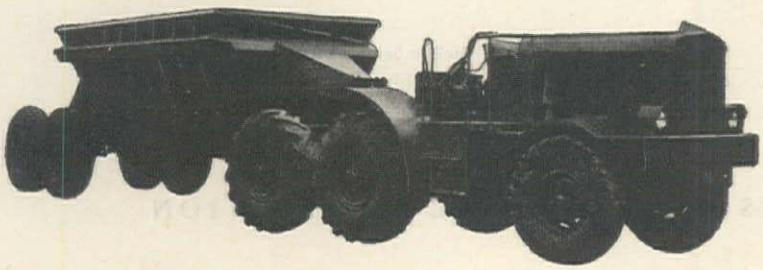
TRACTOR CRANES

CONSTRUCTION MACHINERY DIVISION

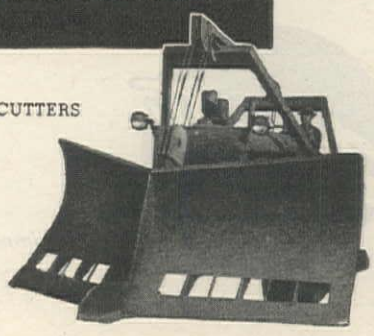
Southwest Welding & Manufacturing Company

ALHAMBRA, CALIFORNIA

BOTTOM DUMP WAGONS



BRUSHCUTTERS



THE ECONOMICS OF CORROSION-PROOF PIPELINES

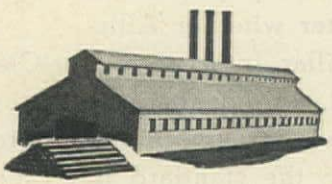
require

- Stability of protective coating
- Modern application and electrical inspection
- Cathodic protection

The electrical insulating properties of Barrett Coal-tar Enamels are not affected by varying moisture content of the soil during changes in weather, season or time itself—factors which are necessary to make cathodic protection effective and economical.

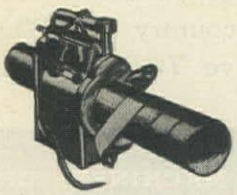
Over the years, uniformly satisfactory results have been obtained when Barrett Coal-tar Enamels have been applied by modern methods, and electrically inspected, to insure continuity of the electrical insulation.

Protection applied in transit



Modern equipment for the proper application of primers and enamels over mechanically cleaned pipe is available at numerous application contractors' plants, which apply Barrett protective coating systems while the pipe is in transit to your destinations.

Protection applied in the field



Thousands upon thousands of miles of pipelines have been protected with Barrett primers, enamels and asbestos felts, application being made over the ditch with modern traveling coating equipment and with increasing efficiency and low costs.

Either way, the combination of proved coating materials and proved application methods will assure the economy of your investment in cathodic protection.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 Rector Street, New York 6, N. Y.

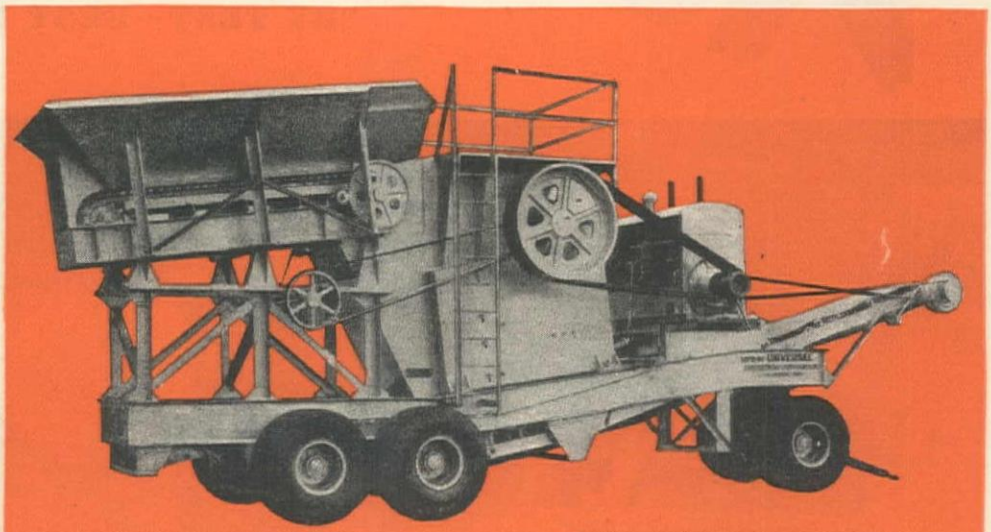
FIELD SERVICE: The Barrett Pipeline Service Department and staff of Field Service men are equipped to provide both technical and on-the-job assistance in the use of Barrett Enamel.

Barrett
COAL-TAR ENAMEL

. . . an important factor in

THE ECONOMICS OF CATHODIC PROTECTION

LIKE A WATERFALL MATERIAL FLOWS IN A STEADY STREAM FROM UNIVERSAL "STREAM-FLO" ROCK AND GRAVEL PLANTS

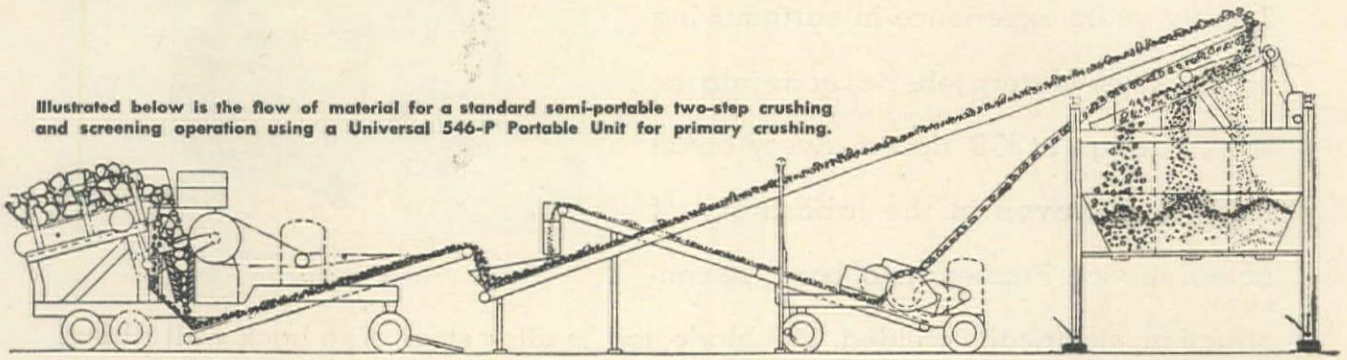


THE UNIVERSAL 546-P PORTABLE PRIMARY CRUSHING UNIT

Built to stand up under high speed production, the 546-P Primary Crushing Unit steps up the output of any secondary crushing plant. It can be used to convert your gravel plant to handle rock, or to increase the efficiency of your rock plant by eliminating sledging or pop shotting of large oversize.

The 546-P provides a steady stream of ideal sized material. When teamed up with a gyrating screen and a Universal Pulverizer, it produces unbelievable quantities of aglime with remarkable economy. Easily moved from job to job, the 546-P meets today's production needs of highest capacity at lowest cost.

Illustrated below is the flow of material for a standard semi-portable two-step crushing and screening operation using a Universal 546-P Portable Unit for primary crushing.



More and more cost-wise operators are profiting with the 546-P. For complete information see your Universal distributor or write for Bulletin No. 56.

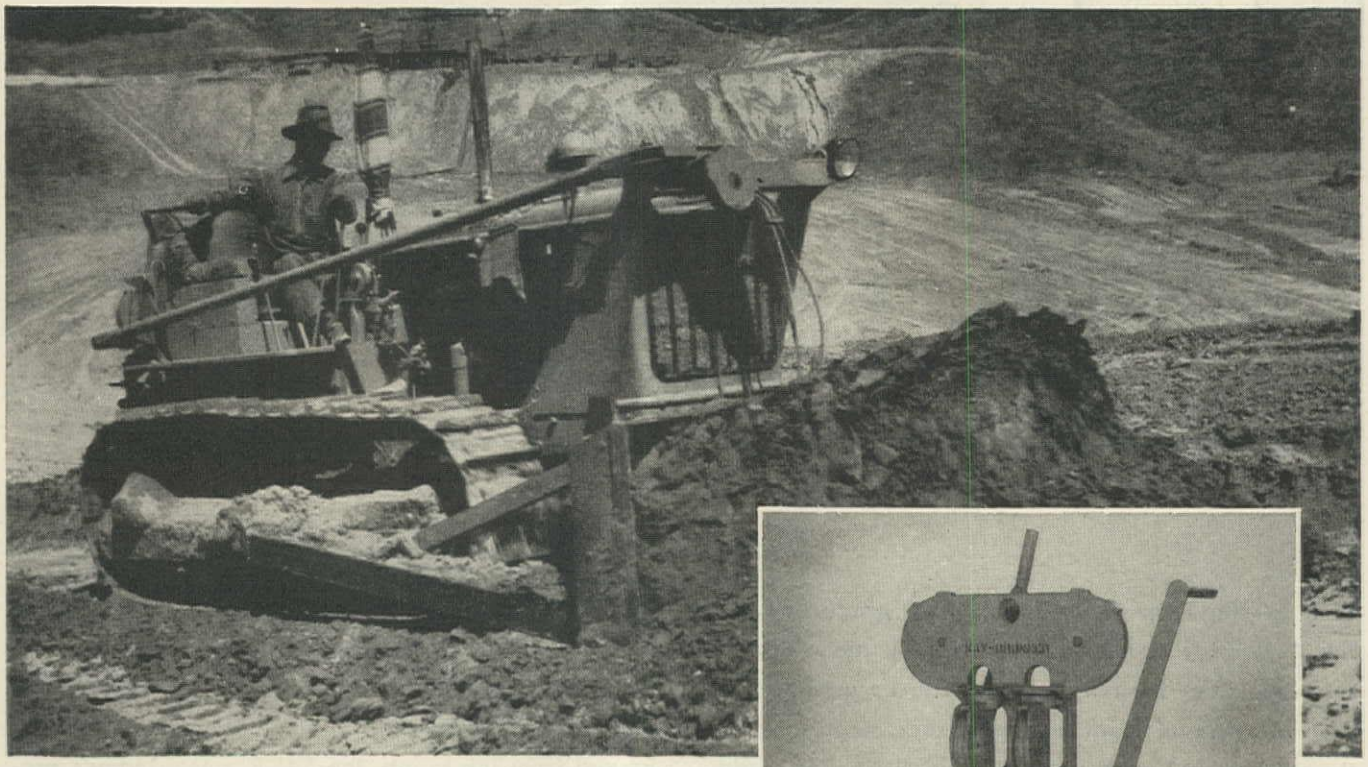
UNIVERSAL
ENGINEERING CORPORATION
323 Eighth Street N. W., Cedar Rapids, Iowa

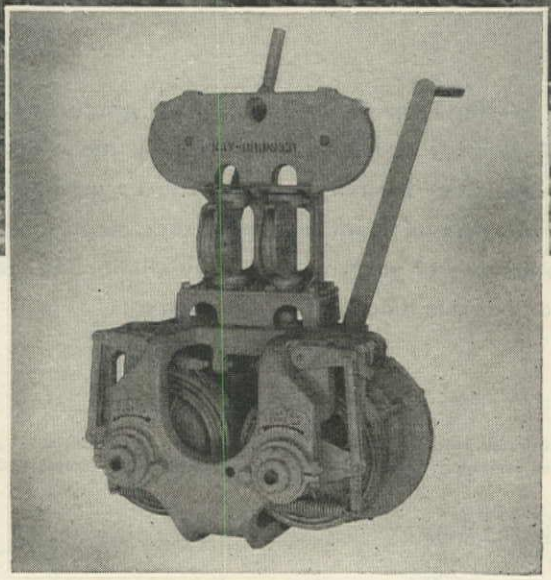
ROCK, GRAVEL AND LIME CRUSHING PLANTS • CONVEYORS
SCREENING OR WASHING PLANTS • APRON FEEDERS

RUGGED!

K-B BULLDOZERS

"BY TEST—BEST FOR THE WEST"



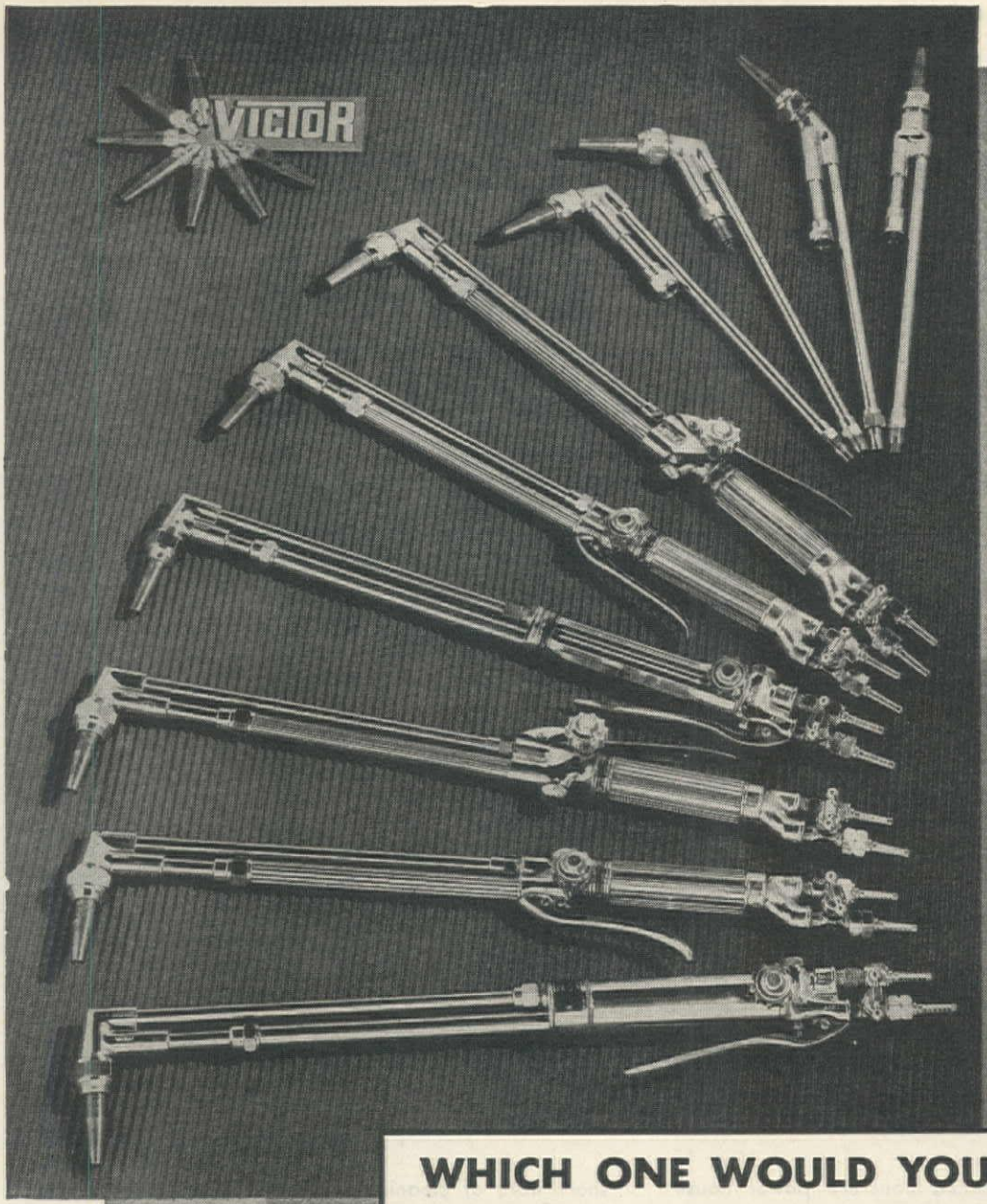


Kay-Brunner Double Drum Power Control Unit. Built in two sizes for track type tractors.

Twenty years experience in earthmoving on countless western jobs has gone into the sturdy design of K-B 'dozers. Every detail has been proven in the laboratory of actual service. Frames are of box type construction, electrically welded. The blade, too, is alloy steel, with back well ribbed for greater strength. Because the blade is mounted close to the front end of the tractor, better balance is insured, yet ample clearance is provided, with maximum lift and drop for handling any type of dirt.

KAY-BRUNNER STEEL PRODUCTS, INC. ***Equipment Division***

2721 ELM STREET ★ LOS ANGELES 41, CALIFORNIA



WHICH ONE WOULD YOU CHOOSE?

COMFORT TOO SAVES MONEY

Give your burner a cutting torch with the maximum comfort value. Some prefer the high pressure valve lever on top, some on the bottom, some in front and some in the rear of the torch. Which of these VICTOR hand cutting torches do you like the best? Of one thing you can be sure—no matter what the choice, VICTOR cutting torches are designed for maximum operating speed and minimum ownership cost.

VICTOR

ARMY E NAVY

VICTOR EQUIPMENT COMPANY

844 FOLSOM ST. • SAN FRANCISCO 7, CALIFORNIA

DEMOLITION OR CONSTRUCTION

-- it's all the Same to a

LINK-BELT SPEEDER

CONTRACTOR FINDS CONVERTIBLE LS-85 BEST MEANS OF WRECKING REINFORCED CONCRETE BUILDING

Razing the large, reinforced concrete power house for the Cherry-Burrell Corporation at Little Falls, N. Y., and doing it fast, called for more than ordinary wrecking equipment. The contractor, Pelnik Wrecking Company, Yorkville, says, "There was only one thing to do—and we did it." They purchased a Link-Belt Speeder LS-85 shovel-crane, which was first fitted with a 70 foot boom and a 2500 pound steel ball. With this rig the huge concrete roof and walls were soon battered down. Reinforcing steel was cut with torches and then the crane, fitted as a shovel, made short work of cleaning away the rubble, completing the job in record time.

This job demonstrates the superiority of the Link-Belt Speeder method over back-breaking manual methods, and is a striking example of the versatility of the many-purpose, convertible Link-Belt Speeder.

THE SAME BASIC MACHINE

can be used equally well as shovel, crane, dragline, trench-hoe, pile driver. You can keep in the bidding with your Link-Belt Speeder!

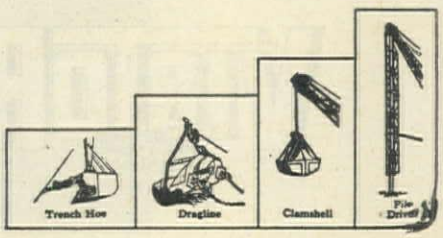
For Prompt, Efficient, Convenient Sales and Service:
There is a Link-Belt Speeder Distributor Located Near You

10,425

LINK-BELT SPEEDER

Builders of the Most Complete Line of
SHOVELS-CRANES-DRAGLINES

LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO 9, ILL.
A DIVISION OF LINK-BELT COMPANY



The INSLEY Line

To keep your excavating and material handling costs within the limits of your bid, let your Insley dealer show you the Insley Line . . . equipment built to make your job pay. Ask for full details on the Insley Excavator 3/8 and 1/2-yard sizes, crawler or rubber mounted. Gasoline or diesel powered.

The World's Largest Exclusive Manufacturer of Small Excavators

EXCAVATORS
INSLEY
CONCRETE EQUIPMENT

INSLEY MANUFACTURING CORPORATION · INDIANAPOLIS, INDIANA

FOR INSLEY SERVICE AND SALES IN YOUR TERRITORY

ANDREWS MACHINERY.....404 N. W. Broadway, Portland 9, Oregon
ANDREWS EQUIPMENT SERVICE.....126 South Walnut St., Spokane 9, Washington
CHOGUILL TRACTOR CO., INC.....1748 Grand Avenue, Phoenix, Arizona
CONSTRUCTORS EQUIPMENT CO.....3707 Downing St., Denver 4, Colorado
MOTOR EQUIPMENT CO.....507 N. 2nd Street, Albuquerque, New Mexico
H. H. NIELSEN COMPANY.....541 W. 2nd Street, Salt Lake City 1, Utah
SERVICE EQUIPMENT CO.....300 Aurora Avenue, Seattle 9, Washington
SHAW SALES AND SERV. CO...5100 Anaheim-Telegraph Rd., Los Angeles 22, Calif.

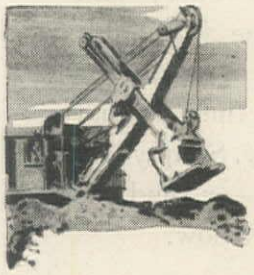
MARION DISTRIBUTORS

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

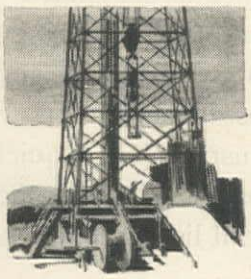
Your New Car is Coming...

How Wire Rope Contributes to it

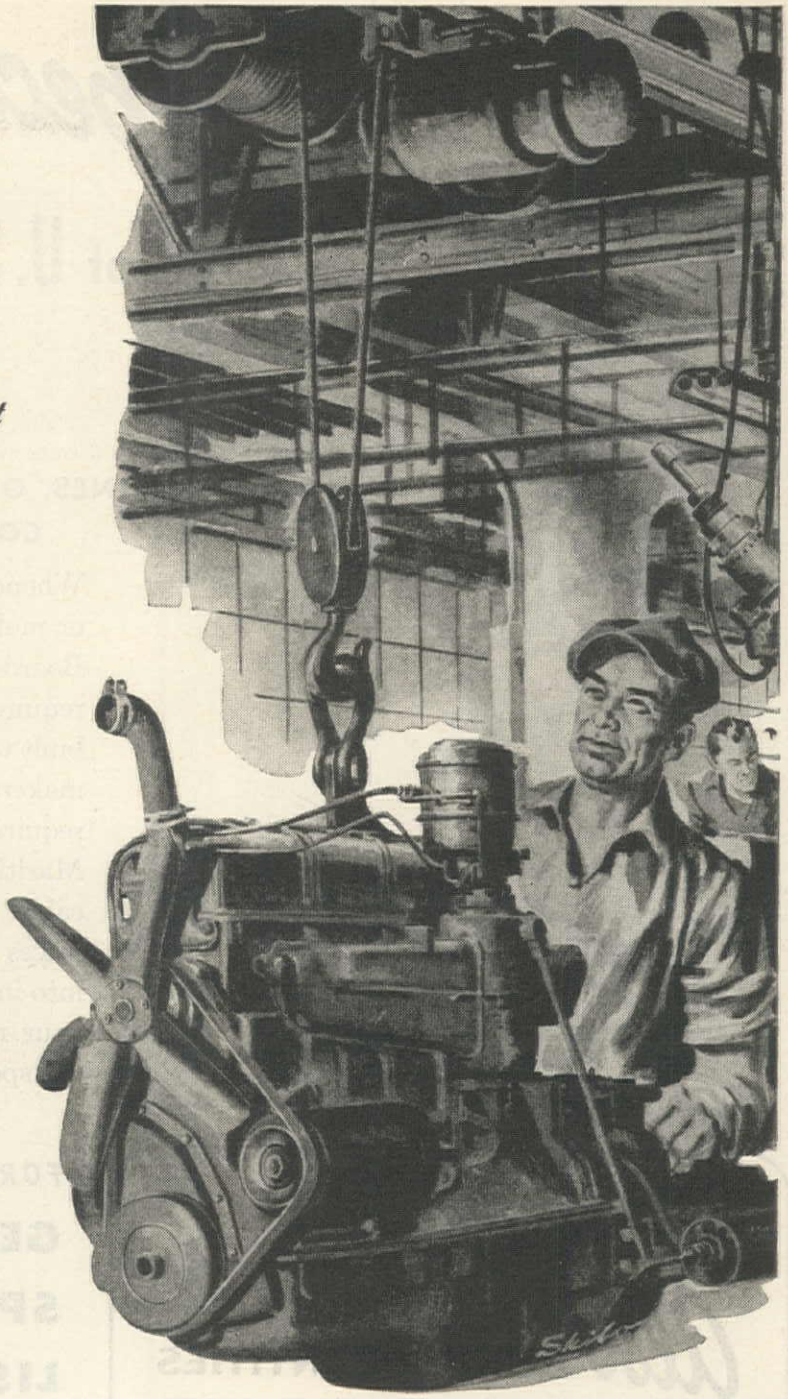
Automobile factories are working hard to get your new car to you as soon as possible. They use many cranes and hoists which depend on wire rope to transmit power to moving parts. Much of this wire rope is Preformed—because Preformed is more flexible and runs over small sheaves with minimum wear. This means it lasts longer. Preformed wire rope also resists kinking or twisting and so helps speed production.



Building of new roads over which you'll drive your new car is also speeded by using Preformed wire rope on shovels, bulldozers, scrapers, graders and concrete mixers. This modern wire rope spools evenly, reduces shutdowns for replacements.



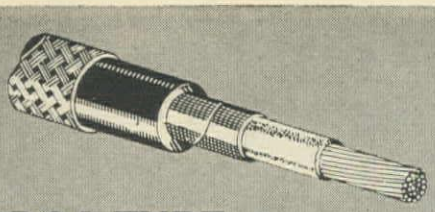
Oil that will run and lubricate your new car comes from fields where equipment rigged with Preformed wire rope is at work. Drillers like Preformed because it resists whipping, spools better on the drum. It also makes faster round trips.



Preformed wire rope contributes to speeding production of your new car . . . building roads . . . drilling oil. Men in many industries which require a wire rope that must stand up under severe service specify Preformed. In fact, companies which change to Preformed find that its exclusive built-in features pay big dividends in time, money and efficiency. Preformed is the modern wire rope for modern machines.

Send for an interesting new free booklet, "PREFORMED WIRE ROPE—WHAT IT IS—WHAT IT DOES." Write the Preformed Wire Rope Information Bureau, 520 North Michigan Avenue, Chicago 11, Illinois, or

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

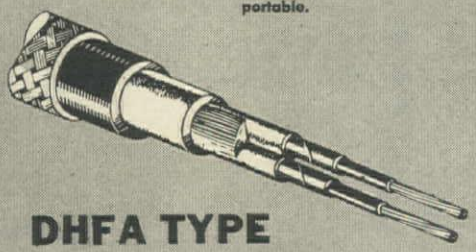


SDGA TYPE

Single conductor, degaussing, armored.

DCOP TYPE

Double conductor, oil resistant, portable.



DHFA TYPE

Double conductor, heat and flame resistant, armored.

MDGB TYPE

Multiple conductor, degaussing, binnacle.

Special Sale of U.S. SHIPBOARD CABLE *for Use in*

MINES, OIL WELLS, RAILWAYS, QUARRIES, CONSTRUCTION WORK, ETC.

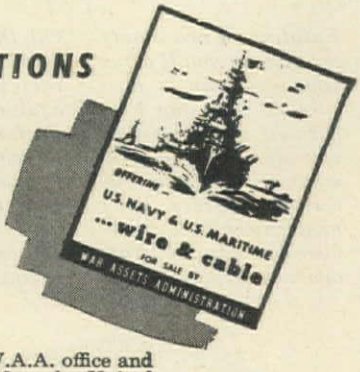
Whenever rugged electrical cable of single or multiple conductor type is needed and Board of Underwriters' Approval is not a requirement this cable is ideal. It was built to rigid specifications by well known makers to meet the special performance requirements demanded for Navy and Maritime service during the war. This cable is available in large quantity at prices established to move the material into industry's hands quickly. Simply call your nearest W.A.A. office—or send for the special listing described below.

Also **LARGE QUANTITIES of AIRCRAFT CABLE ANJC**

This cable was manufactured to rigid specifications of both the Army and Navy to meet performance needs with minimum weight and was largely used in aircraft.

FOR SPECIFICATIONS

GET THIS SPECIAL LISTING



Write, wire or phone any W.A.A. office and ask for this special offering of surplus United States Navy and Maritime Shipboard Cable.

EXPORTERS:

Most surplus property is available to the export market. Merchandise in short supply is withheld from export, and if such items appear in this advertisement they will be so identified by an asterisk.

All Shipboard Cable is subject to priority regulations. VETERANS OF WORLD WAR II are invited to be certified at the War Assets Administration Certifying Office serving their area and then to purchase the material offered herein.

WAR ASSETS ADMINISTRATION

GOVERNMENT OWNED SURPLUS

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

691-1

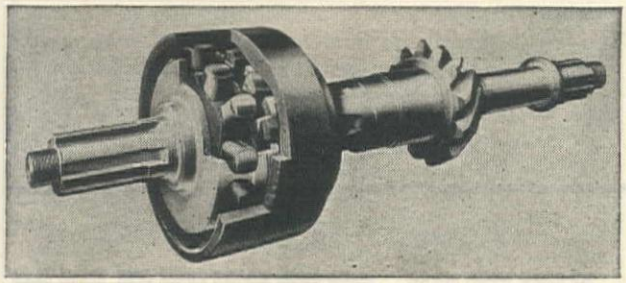
ARE HARD, TROUBLE-FREE WORKERS!

Here's a bogie that's a leader in the field today. It provides increased flexibility, efficiency and durability. It does away with bogie hopping, unequal tire wear and hard steering. Torque reaction is balanced out, eliminating weight transfer and assuring equal traction on all wheels.

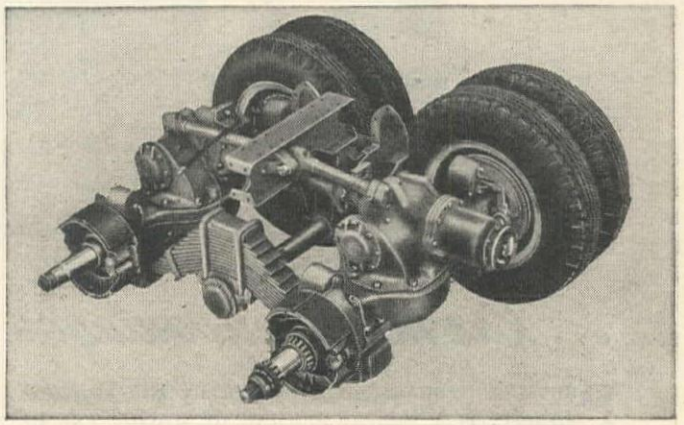
Furthermore, it's not added weight or complicated parts that give these advantages . . . it's perfected balancing. The Mack bogie is actually simplified and lightened.

Most important among its many features are two Mack exclusives: One, the Mack Power Divider, preserves traction on slippery ground without overstress on any part, and prevents wheel fight and tire wear. The other, Mack rubber Shock Insulators, makes twisting of the springs impossible even over roughest roads.

The Mack bogie is only one of the reasons Mack 6-wheelers are preferred where the hauls are tough.



THE MACK POWER DIVIDER, a third differential which transmits torque to whichever axle maintains the most traction. Prevents wheel fight, tire wear, and over-stress on parts.



THE MACK BOGIE is rugged, yet unusually simple and accessible. Perfected balancing makes bogie hopping, wheel fight and tire scuffing unknown.

Mack

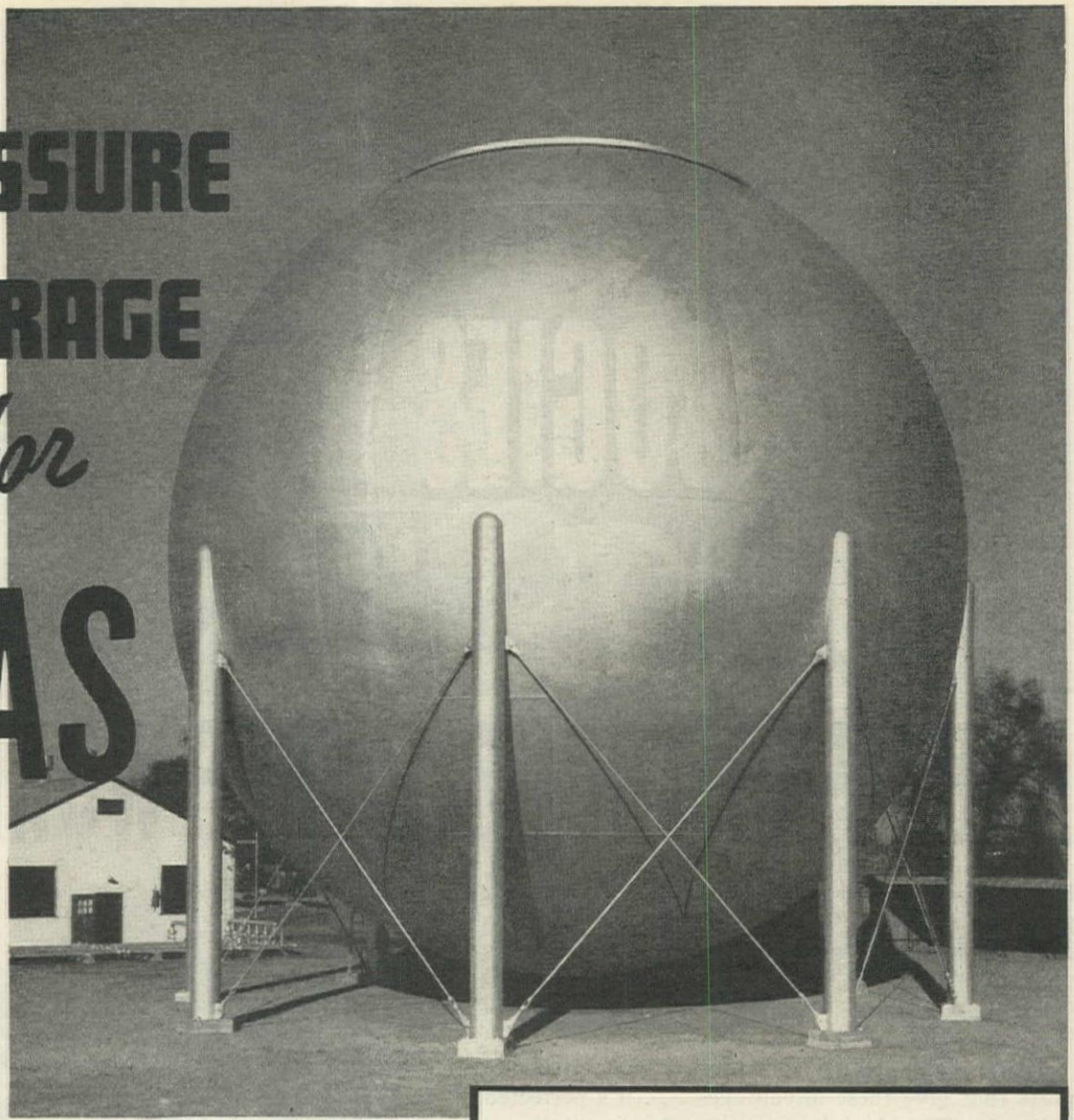
TRUCKS

FOR EVERY PURPOSE

PERFORMANCE COUNTS!

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

PRESSURE STORAGE *for* GAS

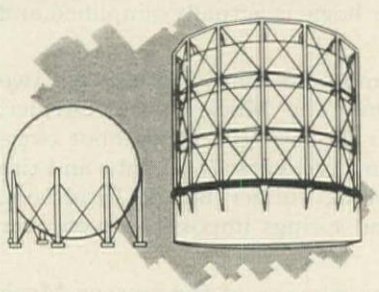


... has many advantages

PRESSURE STORAGE, as provided by the Hortonsphere, is a logical method of storing gas in distribution systems. The Hortonsphere supplies high pressure gas in the system at the pressure desired. It has no operating parts, requires little attention, and is easy to maintain. It has a minimum of surface to cover at re-painting time and is pleasing in appearance.

Hortonspheres for gas storage are built in standard sizes up to 65 ft. in diam. They can be designed to handle pressures from 40 lbs. per sq. in. up to 200 lbs. per sq. in.

The Hortonsphere shown above is located in the Southern California Gas Company's system at Visalia, California. It is 60 ft. in diam.



HORTONSPHERE VS. CONVENTIONAL STORAGE TANK

• A 60-ft. diam. Hortonsphere operating at a maximum of 75 lbs. per sq. in. will release 500,000 cu. ft. of gas at 10 lbs. pressure. A standard lift-type holder with a capacity of 500,000 cu. ft. is approximately 98 ft. in diam. by 106 ft. high. Compressors would have to be operated continuously to deliver the gas from it into distribution mains at 10 lbs. pressure.*

*Quoted as free gas for comparable quantities.

CHICAGO BRIDGE & IRON COMPANY

SAN FRANCISCO • ATLANTA • BIRMINGHAM • PHILADELPHIA • DETROIT • WASHINGTON
CHICAGO • HOUSTON • NEW YORK • CLEVELAND • TULSA • LOS ANGELES

Plants in **BIRMINGHAM, CHICAGO, and GREENVILLE, PENNSYLVANIA**

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

September, 1946 — Vol. 21, No. 9

Stopping Construction

INFLATION COMES about when there's too much money and too few products. It can be licked by production—and that's the only way it can be licked, that is by manufacturing, building, mining, growing, or otherwise producing enough things to absorb all the money.

Now it can be nurtured and made worse by many means—the printing and distribution of new "printing press" money by the government, thereby reducing proportionately the value of each unit of currency, application of governmental or other controls which hamper production, government subsidies on the ordinary needs of life. All of these things the government of the United States is now engaged in doing.

But elections are just around the corner. So we find the President, through Reconversion Director Steelman, issuing an order to curtail much-needed construction work over the country "to effect government economy and fight inflation." His action cuts the federal public works budget from $1,600,000,000 to $900,000,000, a saving of 700 million dollars. Quite a sum, to be sure, but LESS THAN TWO PER-CENT of the total estimated 1947 budget. Two percent of saving in government expenditures is truly good, if applied in proper places—for instance UNRRA donations to Russia and her slaves, the hopelessly muddled surplus property disposal program, the horde of OPA investigators, and the TVA bureaucracy, to mention but a few outstanding expenses we could well do without. Very odd it is that construction is the only federal item cut!

Perhaps a hundred million dollars will be cut from construction expenses in the Missouri Valley. Is the President willing to guarantee the people of that basin that there will not be floods next spring which will cause more than that amount of damage? Some $85,000,000 is pared from reclamation—is there suddenly too much food in the country? If so, please send some of it to San Francisco. This is a particularly silly cut, inasmuch as reclamation appropriations are reimbursable, either in cash or benefits (or at least are reimbursable to whatever extent the Bureau leftists will permit). Public Roads Administration is cut in appropriations at a time when there is more need for roads both for industrial and private purposes than ever before in our history.

Actually, of course, the whole thing is a tempest in a teapot. With the passing into history of the November elections, we prophesy a unanimous forgetting of any such order. It seems to smell very similar to the lifting from rationing of a great many items a few months prior to the 1944 election, and their hasty return to regulation immediately it was over.

Our Industry

LET US FACE THE FACT that the Construction Industry is virtually at a standstill and that there are no signs of any improvement in the immediate future. Insurmountable obstacles which have hamstrung the industry for many months must be eliminated before the long awaited building boom becomes a reality.

There are many factors causing the stagnation in the industry. The failure of governmental agencies to accelerate the production of building materials continues to be a vital drawback. More than eighteen (18) months ago a committee of the A.G.C. warned officials of the War Production Board that extreme shortages would develop unless immediate steps were taken to speed the production of building materials. This warning was ignored and the conditions then predicted confront us today.

The Veterans' Housing Program, which holds top priority in the nation's needs, has made no appreciable start and the prospect of any material improvement this year is practically nil.

The construction industry is not to blame. All types of building materials are extremely scarce. Labor, now receiving the highest wages in history, is difficult to obtain. Production has continued to decrease in spite of the substantial wage increases that have been granted. The small home program suffers from these conditions as well as the failure of government agencies to establish proper ceiling prices. Under the ceilings now allowed, it is almost certain that every house built will be an unprofitable undertaking.

There can and must be improvement.

Let all persons affiliated with the Construction Industry realize that existing conditions can be improved if Architects and Engineers make utmost economy in design their goal, if Contractors operate at top efficiency, if the workingman produces a full day's work.

—Weekly Bulletin, AGC Intermountain Chapter,
Salt Lake City, Utah

Seventy-five Years Ago

WROTE THE de Goncourt brothers in their Journal in 1870—"They are saying that Berthelot has predicted that a hundred years from now, thanks to physical and chemical science, men would know of what the atom is constituted—To all this we raised no objection, but we have the feeling that *when this time comes in science,* God with His white beard will come down to earth, swinging a bunch of keys, and will say to humanity, the way they say at 5 o'clock at the Salon, 'Closing time, gentlemen'."

A Few Straws

FEDERAL ADMINISTRATOR MOREELL, now operating the nation's coal mines, informed owners they could not have their mines back without giving "assurance of uninterrupted production." In other words, they must swallow the contract that John L. Lewis was handed by the federal government. A pattern for seizure of any industry?

* * * *

In primary elections all over the country, the politicians in power are being thrown out, the good with the bad. The people are "fed up" and are blindly upsetting all officials, in the hope that they will get a little relief from taxation and regulation.

* * * *

The Russian engineers engaged in rebuilding the Dneiper river dam complain because U. S. manufacturers are charging them double prewar prices for their products. In most things, residents of this country would be happy to settle for only double!

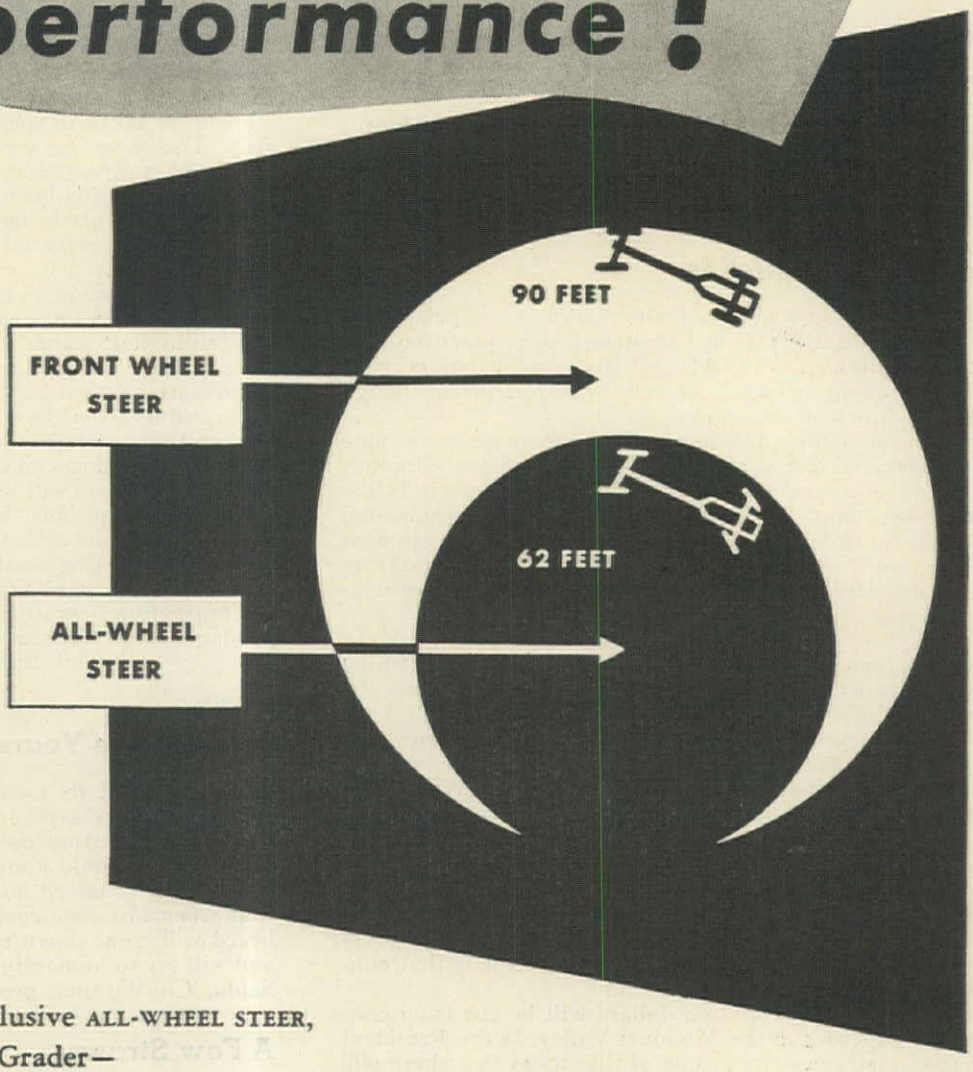
* * * *

A couple of months ago, Sen. Carville of Nevada vociferously declared his opposition to restoring the name of Hoover to the great dam in Black Canyon of the Colorado River. Sen. Carville was defeated by Nevada electors on Sept. 3.

* * * *

Voters of Los Angeles County a few weeks ago defeated public works bonds amounting to nearly $20,000,000. A few months ago, any bonds passed almost automatically.

PAYS OUT in performance!



These two circles, with their 62 foot and 90 foot diameters, graphically demonstrate the increased maneuverability that results from All-Wheel Steer.

By reason of its exclusive ALL-WHEEL STEER, the "99-M" Power Grader—

WORKS around corners where other motor graders cannot work

GOES places where other motor graders cannot go

SAVES time and money on practically every job

No Motor Grader without All-Wheel Steer can hope to equal the all-around performance of the "99-M"

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

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COLORADO—LIBERTY TRUCKS & PARTS CO. . . . . Denver 1
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MONTANA—WESTERN CONSTRUCTION EQUIPMENT COMPANY . Missoula
NEVADA—C. D. ROEDER EQUIPMENT CO. . . . . Reno
NEW MEXICO—WESTERN STATES WELDING & PRESS CO. . Albuquerque
OREGON—COLUMBIA EQUIPMENT COMPANY . . . . Portland 14
UTAH—WESTERN MACHINERY COMPANY . . . . Salt Lake City 13
WASHINGTON—COLUMBIA EQUIPMENT COMPANY . . . . Seattle
WYOMING—WILSON EQUIPMENT & SUPPLY CO. . . . . Cheyenne

Naval Testing Lab in Desert

In the barren spaces where storms blow sand instead of water, the Navy is erecting a dust-proof, sparkproof, earthquake-resistant building to house its $5,000,000 guided missiles research laboratory—Pumice deposit on grounds will be utilized in lightweight concrete

By A. E. NIEDERHOFF
Civil Engineer
Naval Ordnance Test Station
Inyokern, California

ONE HUNDRED and ten miles east of Bakersfield, California, in the middle of the Mojave Desert, the U. S. Navy is constructing a $5,000,000 research laboratory. The idea of the Navy having a station in the desert is not so far fetched when it is realized that the function of the new establishment is to develop and test rockets and other ordnance items. Construction of the laboratory first got under way during the war in 1944 and continued until June, 1945. Most of the excavation and some of the subsurface concrete work was completed during this period under two, cost-plus-fixed-fee contracts. Competitive bids for completion of the work were opened on Aug. 28, 1945.

Six bids were received but because of the end of the war and resulting changes in policy and the amount of money the Government was willing to spend for war purposes, a delay of four months ensued. When it was finally decided to go ahead with the laboratory in January of 1946 the low bidder refused to accept the job due to changes in labor rates and rising costs of materials. Award was made to Johnson, Drake & Piper, Ltd. of Minneapolis, the second lowest bidder, for a price of $5,060,000. Completion was specified at 300 calendar days.

Design of the building was by the Bureau of Yards and Docks in Washington, D. C., in conjunction with the Bureau of Ordnance. Because the laboratory is on a desert where extremely high summer temperatures prevail, where frequent sand storms blast the paint off of automobiles, where sparks of static electricity jump whenever two substances are rubbed together, and in an active earthquake zone that keeps things well shaken up, special attention had to be given to these conditions. An air conditioning system, glass insulated roofs, weather stripping, double doors forming a dust lock, bonding and grounding of metal items, sparkproof finish on concrete floors, and rigid frame construction with earthquake resistant foundation struts, all testify to the excellence of the engineering displayed in the design of this building.

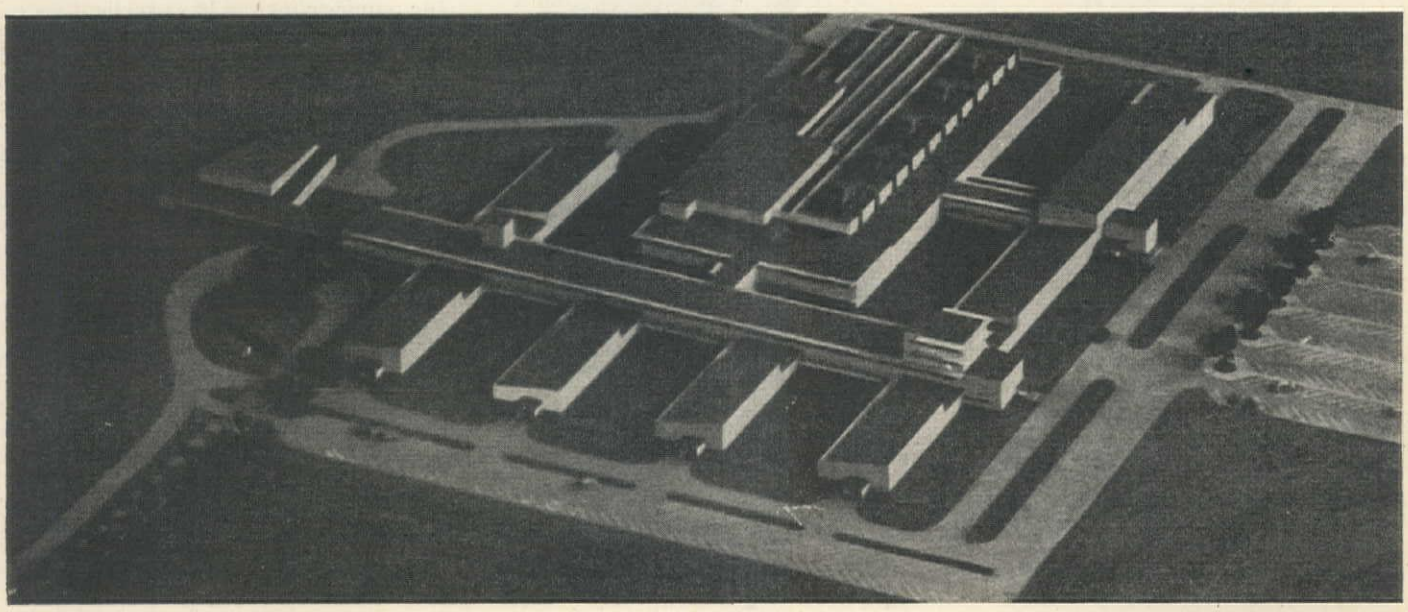
MODEL OF Naval Ordnance Testing Station reveals exterior treatment, overhanging concrete louvered canopies and preponderance of straight horizontal lines of the structure which create an illusion of the rambling spaciousness of a ranch house.

Description of laboratory

In plan, the structure consists of a long, two-story corridor from which four wings project on the east side and two wings and a large shop building project on the west side. At the north end of the corridor where the short, single-story east wing and the long, single-story west wing join the main corridor is a four-story radar tower. The shop building, which is the largest of the component units, covers about 110,000 sq. ft. in plan and consists of a partial basement, a first floor, and a partial second and third floors. A future development at the south end of the main corridor is an auditorium for lectures and mass meetings.

The architectural treatment is in harmony with the surroundings. Reinforced concrete, rigid frame construction is used. The concrete walls, concrete louvered canopies and preponderance of straight horizontal lines and shadows create an illusion of rambling spaciousness usually associated with a ranch house. Windows and exterior doors are of metal. Fixed window sash on the north side of each wing extend from 3½ ft. above the floor level to the ceiling and take in all of the wall space between columns. The south windows are not quite so large because of the 1½-in-12 pitch of the roof. These windows have a 9-ft. cantilevered, precast concrete canopy over the top to furnish shade from the ever present desert sun.

Interior partitions within the building are demountable, insulated metal while the suspended steel ceilings are generally of acoustical material. The ceilings of the wings are level for about half the



REINFORCING STEEL is placed for the rigid frame superstructure along with the steel for the floor slab of one of the wings of the laboratory. A utility tunnel extends down the center of this wing. Lightweight concrete is used throughout.

width of the wing and then break vertically around the large rectangular air ducts and finally follow the roof line to the high north wall of the structure, leaving the beams exposed. A monorail system is supported by these beams. Stairs, stair wells, elevator shafts, fire walls and certain other walls are of concrete construction.

The shop building matches the rest of the laboratory in exterior architecture. The interior faces of exterior walls are insulated with asphalt dipped fiber glass and finished with cement mortar plastering. Tiled wainscots are used in toilet rooms, shower rooms, galley, lunchroom and cafeteria. Roofs of all parts of the laboratory consist of two layers of roofing paper mopped on top of the lightweight concrete slab, then two layers of asphalt dipped fiber glass providing a 5-in. thickness of heat insulation, then two more layers of roofing paper on top of that followed by an asbestos cap sheet. The terrific wind velocities make it imperative that all roofing be mopped solid with asphalt.

In addition to the $5,060,000 contract for the building there are other contracts for elevators, machinery, bridge cranes and for outside utilities in the vicinity of the laboratory. The total cost of the project including Government furnished material and facilities is expected to exceed $6,000,000.

Pumice concrete used

On the 1,000 sq. mi. of Naval Ordnance Testing Station grounds there is an excellent supply of pumice suitable for use in lightweight concrete. The pumice deposit is worked by the Paul R. Splane Co. Specifications prescribed the use of all lightweight concrete except for places where design stresses indicated a 3,000-lb. per sq. in. concrete is necessary or in areas subject to wear. Not less than 7 sacks of cement per cu. yd. and 0.6 lb. of approved admixture per sack of cement is specified. Crushing strength of this lightweight concrete is specified as 2800 lb. per sq. in. Stock piles of pumice must be kept wet for 48 hr. minimum before use because of high absorption factor (approx. 32% by weight).

Actual tests on 7-sack cement pumice concrete with admixture yielded 28-day strengths averaging 2,888 p.s.i. for 24 cylinders. Slump averaged 4 in. The designed mix was 9.04 cu. ft. of sand, 9.79 cu. ft. of pumice aggregate, 5.15 gal. of water per sack of cement, 7 sacks of cement and 4.2 lb. of Pozzolith per cu. yd. of concrete. Sieve analysis of the sand and of the 1-in. pumice is shown below:

Aggregates—Percents Passing Tyler Standard Sieve Size.....	1"	¾"	⅜"	#4	#8	#14	#28	#48	#100
Sand....	100	100	100	95.8	87.5	71.7	49.8	25.3	7.0
Pumice	100	84	43.2	9	6.1				

Specific gravity of the sand was 2.6 and of the pumice 1.12, giving a weight of 110 lb. per cu. ft. for the concrete.

The mix above can be compared with ordinary weight concrete (150 lb. per cu. ft.) with a tested average strength of 2,647 p.s.i. for 35 cylinders at 28 days. The coarse aggregate was ¾-in. rock and the sand conformed generally to the sieve analysis given above. Mix of this standard concrete was 8.7 cu. ft. of sand, 11.6 cu. ft. of ¾" rock, 6.3 gallons of water per sack of cement and 5.2 sacks of cement per cubic yard. Cost of dry materials entering into this concrete was $8.26 per cu. yd. as against lightweight concrete costs of $8.18. Small haulage costs from local deposits of pumice accounts for the low price of lightweight concrete.

Actual experience with the pumice has shown that 8 sacks of cement are necessary to obtain the minimum strength requirements for making precast concrete vanes for louvered canopies over windows. Pozzolith is added to the mix at a rate of 4.8 lb. per cu. yd. The resultant concrete weighs about 110 lb. per cu. ft., has a maximum slump of 4 in., and an average crushing strength of 3,047 lb. per sq. in. for 15 test cylinders.

INGENUITY OF the contractor accomplished the job of cutting openings in existing concrete walls by using a diamond saw to cut the wall on the left in a precise, neat line, saving hours of labor.

Advantages of pumice

The low thermal conductivity of pumice concrete is well known and frequent use is made of it for insulating purposes. In the desert climate where the research laboratory is located it is an ideal material for walls subject to extreme summer temperatures. Insulating value is in excess of four times that of conventional concrete and in addition the pumice concrete has excellent sound reduction properties. Alternate freezing and thawing of test specimen showed no disintegration after 50 cycles. There is no quick way of testing for alternate freezing and thawing because its low thermal conductivity makes freezing a very slow process.

Pumice concrete has some other valuable properties that are of interest to structural designers. These are resiliency, ability to take and hold nails driven into it, and total absence of condensation. This last appears to merit serious consideration for basements, machinery pits and refrigeration rooms where dampness or lack of ventilation results in excessive condensation. The modulus of elasticity of pumice concrete is only 750,000 p.s.i., compared to 2,000,000 or 3,000,000 p.s.i. for ordinary concrete. This gives a value of "n" (used in reinforced concrete design as the ratio of modulus of elasticity of steel divided by the modulus of elasticity of concrete) of 40 com-

pared with 10 to 15 for conventional concrete. Reinforcing steel requirements are definitely affected by this higher value of "n" and ordinary graphs and tables for reinforced concrete design do not apply. New tables must be prepared for this lightweight concrete.

Certain new problems present themselves when using pumice for aggregate. The most prevalent one is that of the aggregate floating when troweling on the final finish. Instead of water coming to the top of floor slabs under troweling, the aggregate pops up. Excessive vibration produces much the same effect and it is only with experience gained on the job that the concrete finishers know when to stop working the concrete.

When forms are stripped from pumice concrete walls it has been noted that there are a great many air bubble holes in the concrete surface. These small air holes are of no importance structurally but they do call for a lot of extra work if a "sack finish" is required.

There is no segregation of coarse aggregate from the mix when dropping into deep column or wall forms but there is the danger of bridging. In narrow forms or where the reinforcing steel is complicated, the lightweight aggregate sticks about half-way down and holds back the remaining concrete. Vibrating overcomes this difficulty but as stated above it must be done carefully to prevent the pumice from floating to the top.

Precast louvers

Mass production of 2,300 precast concrete vanes for the canopied window louvers is one of the contractor's organizational schemes that is saving him considerable money. The vanes are in three sizes, averaging 10 ft. long by 18 in. wide and only 1 in. thick. The longitudinal stiffening rib increases the weight to about 225 lb. per vane. Forms are made of plywood and, in order to facilitate removal of the vane, are lined with oiled sheet metal.

Four parallel rows of about 15 forms each are laid out on sleepers. Lightweight concrete is poured in one row of forms and then a flanged wheel truck with a steel platform is pushed along wood rails up to the first form in the row. Two men lift the 225-lb. concrete vane and form onto the truck where it is vibrated by an electric jack hammer mounted underneath the steel plate. When the concrete is sufficiently dense from vibration the form is lifted off the steel plate and placed on sleepers behind the truck. The movable vibrating machine is then pushed forward to the next form where the operation is repeated. Upon reaching the end of one row, the truck is carried by another truck operating on rails laid at 90 deg. to the rows of forms, to the second row of forms.

Initial curing is accomplished in the forms by covering exposed concrete with wet burlap. After 12 hrs. the vanes are removed from the forms and stored in a curing yard where an overhead sprinkler system keeps them constantly wet. The manufacture of the vanes has been a fill-in job for the concrete finishers, but with 12 men working eight hours they have produced in excess of 50 vanes. Breakage of the vanes in handling, despite the 1-in. thickness of concrete, has been less than one per cent.

Prefabricated roof shoring

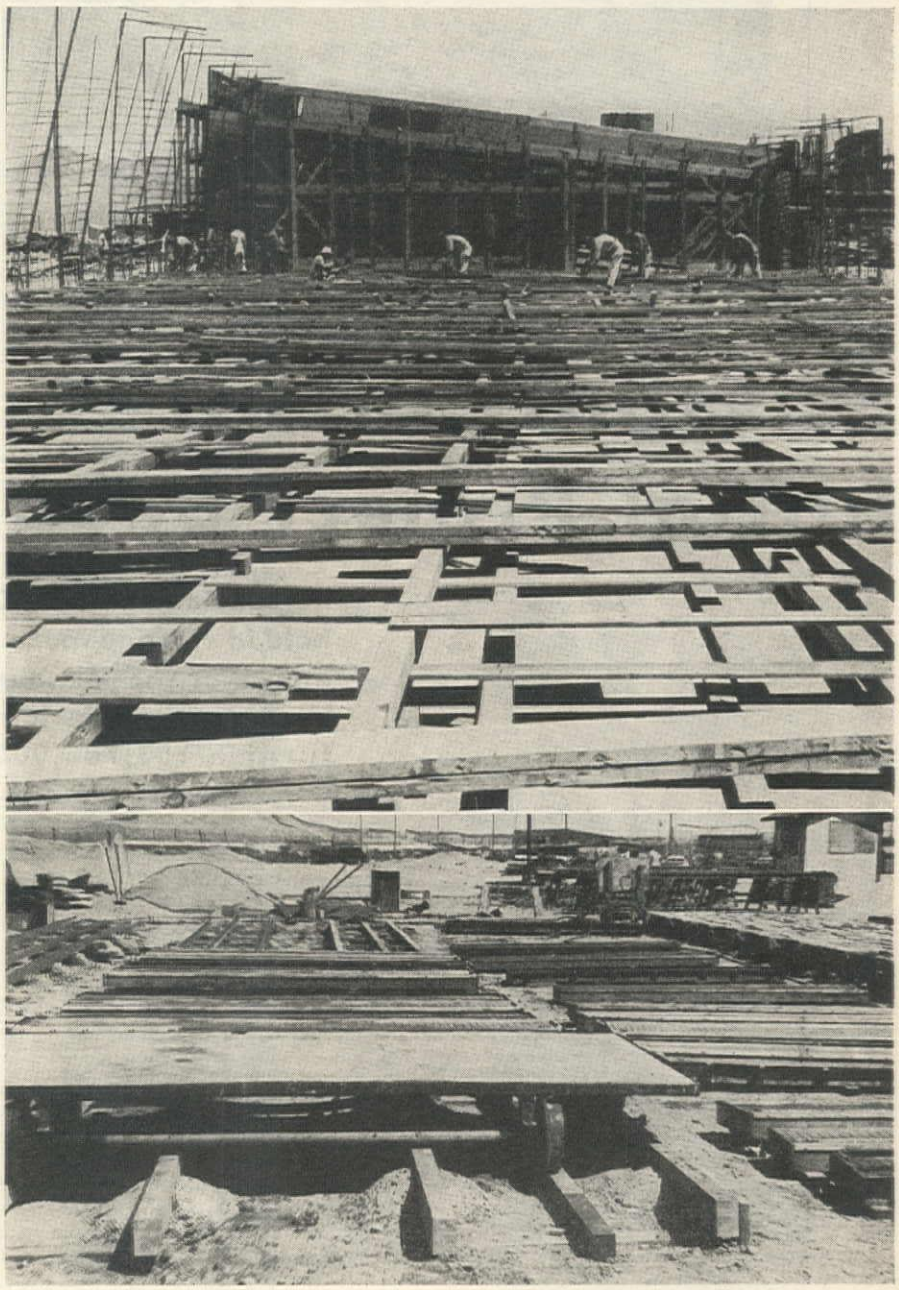
To expedite shoring of roof forms in the six wings of the laboratory the contractor adopted the practice of fabricating the shoring on the floor, in large sections, and then raising it into place with a crawler crane. The roof height and pitch is the same for all six wings, which leads to multiple use of the shoring and forms. Initial fabrication on the floors saved scaffolding material and the time consumed in using ladders.

Although the Navy furnishes all water to the contractor free of charge, it has been found more convenient and less expensive to use the Hunt process for curing concrete. In the case of the roof slab this membrane covering serves the dual purpose of curing the concrete and acting as a priming coat for the mopped-on roofing paper.

Throughout the job the contractor has displayed ingenuity and resourcefulness in accomplishing the work. Changes in plans when switching from a cost-plus-a-fixed-fee to a lump sum contract called for cutting openings in concrete walls already built. To do this work the contractor used a diamond saw, cutting the walls on a precise, neat line.

The Commanding Officer at the Station is Captain Sykes and all construction work is done under the supervision of the Public Works Officer, Captain H. L. Mathews. Local design work is done under the design superintendent, Lt. C. S. McKenzie. Photos accompanying this article, except the model view, were furnished through the courtesy of the contractor, Johnson, Drake & Piper, Ltd. W. A. Rohrer is superintendent in charge of the contractor's activities.

SHORING FOR roof forms, top, is fabricated on ground to be raised into place with a crane. Bottom, precast concrete vanes for canopies of lightweight concrete are vibrated on steel table by electric jack hammer mounted beneath.



SITE OF Kortes Dam which will harness power for Western development is in this narrow gorge, Black Canyon, cut by the North Platte River. Aggregate from deposits downstream will be hauled to the site over construction road at left.

Missouri Basin—
Initial Project Begun at Kortes

Kortes Dam, first of 100 new reservoirs which will hold in storage more water than flows out of the mouth of the Missouri in a single year, is begun by Bureau of Reclamation in Wyoming. It will furnish 153,700,000 kw. hr. annually to the Colorado - Wyoming - Nebraska power system

FORERUNNER in the construction of twenty-nine Bureau of Reclamation projects initially authorized in the one and one-half billion dollar Missouri River Basin development is the Kortes Dam and power plant now being constructed on the North Platte River about 60 mi. southwest of Casper, Wyo. The work at Kortes is the first step in the basin-wide plan to create more than 100 new reservoirs which will hold in storage more water than flows out of the mouth of the Missouri River in a single year. Power plants included in the program are expected to produce approximately ten billion kilowatt-hours of electrical energy annually.

Control of the Missouri River and its tributaries will reduce floods which in the past have cost the people on its lower reaches an estimated $18,500,000 annually. Water stored in the reservoirs will be sufficient to provide for the irrigation of approximately fifty-three thousand new farms. Power will be manufactured for the development of coal, oil, and other mineral resources and for other purposes and navigation will be improved by regulation of the river flow.

Start of construction

Construction work at Kortes was begun early in the basin-wide program to help relieve a threatened power shortage in parts of Wyoming, western Nebraska, and northeastern Colorado, which are the regions to be benefited from power production. The site of the dam is about two miles below Seminoe Dam and power plant, completed by the Bureau of Reclamation in 1938.

Operation of the Seminoe and Kortes plants will be coordinated to obtain the maximum combined output of hydroelectric energy. The Kortes power plant will be capable of furnishing 153,700,000 kw. hr. of electrical energy annually to the integrated Colorado-Wyoming-Nebraska power system.

The contract was awarded to Morrison-Knudsen Co., Inc., Boise, Ida. in April, 1946, on a bid of $4,688,000, and construction was begun on May 25, 1946. Work now under way at the site includes excavation for river channel improvements below the dam site, camp construction, road building, and stripping of aggregate deposits. A government camp is also under construction and service roads are now about 75 per cent complete.

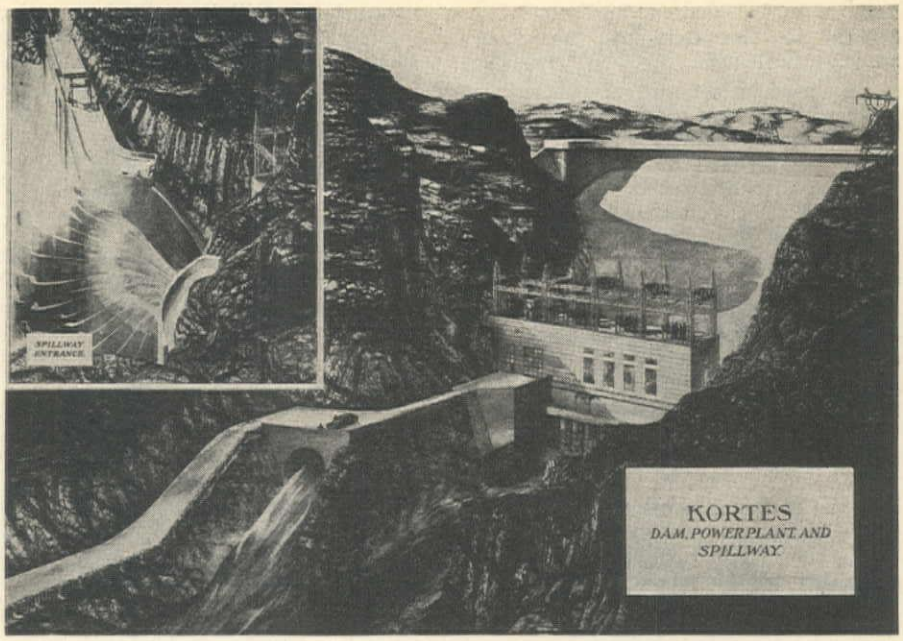
Design features

Kortes Dam, which is named for a

pioneer family of Wyoming, will be a concrete gravity type of structure having a structural height of about 240 ft. and a length of about 440 ft. at the crest. The width at the crest will be about 25 ft. The power house, containing three main generating units having a rated capacity of 12,000 kw. each, will be built on the downstream toe of the dam. In plan, the power house will be 169 by 57 ft. and will have a height of about 100 ft. Approximately 149,680 cu. yd. of concrete will be required for the dam, power plant, and appurtenant structures.

About 95,000 cu. yd. of material will be removed from the river channel below the dam to improve flow conditions in the tailrace and increase the hydraulic head for power generation. Flow conditions at the discharge end of the spillway tunnel also will be improved by the channel excavation. It is planned that the excavation will involve removal of material for a distance of about 2,000 ft. downstream from the dam. The finished channel will have a width of about 70 ft. and a 0.1 per cent slope. Other open-cut excavation required for the construction of the dam, power plant, and spillway and access roads will be the removal of about 217,400 cu. yd. of material.

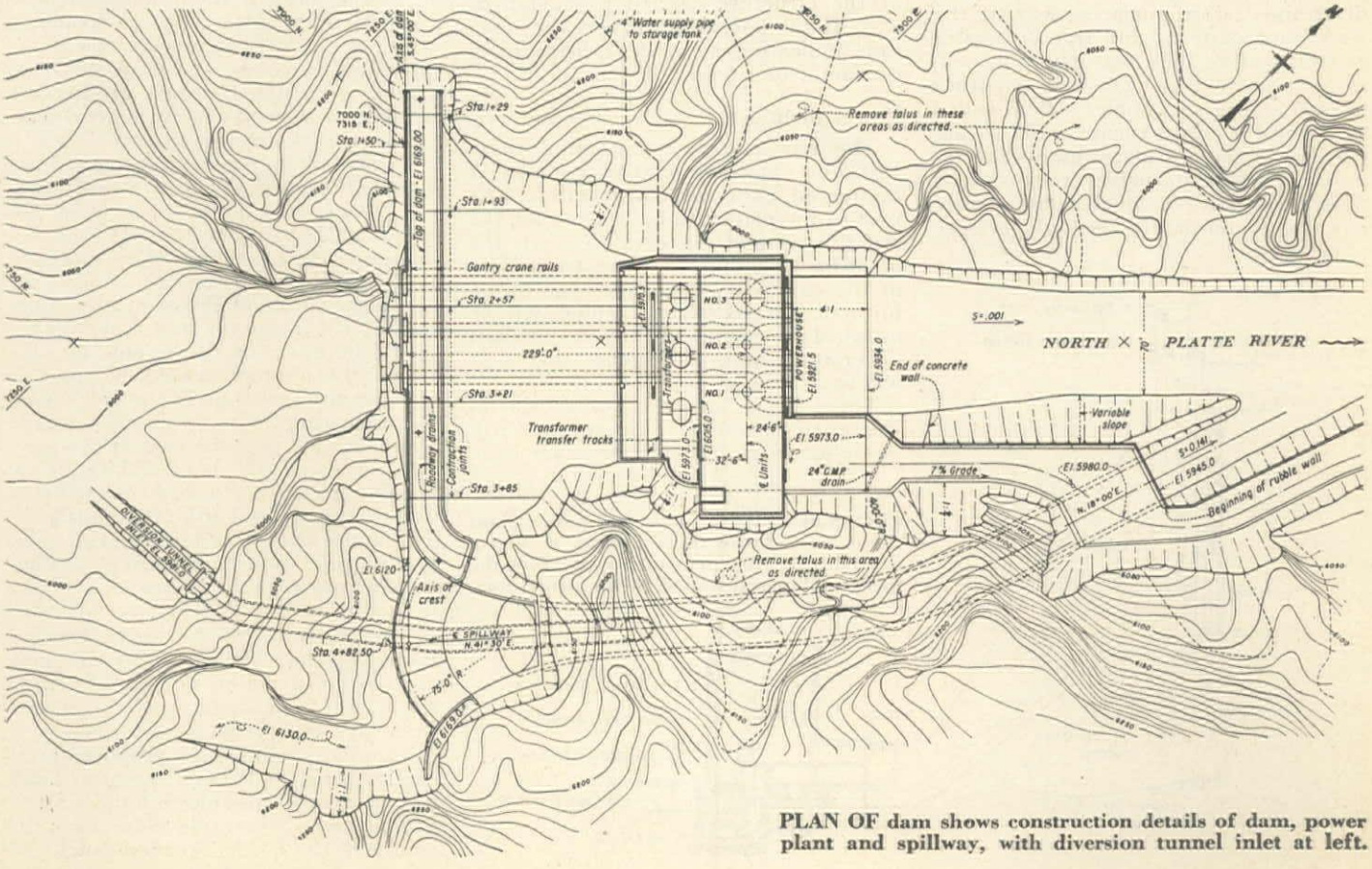
Aggregate will be obtained from a deposit about four miles downstream from the dam site along the east bank of the river. The deposit has a thickness varying from 4 to 12 ft. and is covered by about 2 ft. of overburden as determined from seven test pits dug in the area. About 35 per cent of the deposit explored contains sand, but grading tests on the remaining material indicate sufficient sizes of aggregate are available for concrete manufacture. The aggregate will be hauled to the site over a 16-ft. gravelled road now under construction on the right side of the river. This road will connect the power plant area with an existing road to Casper. The road will require about one-half mile of heavy cut and fill construction along a steep canyon wall below the dam site.



ARCHITECT'S SKETCH of dam and power plant with spillway at left. Dam will be a concrete gravity-type structure, 240 ft. high, 440 ft. long and 25 ft. thick at crest.

Site of the dam

The dam site is in a narrow gorge known as Black Canyon, which has been cut through the Seminoe Mountain range by the North Platte River. The earth movements, which in past geologic time thrust the former plains region upward to form the mountain range, created extensively faulted zones and complex joint systems in the rock formations. The vertical uplift was, however, differential in movement and there was a regional southward shift of portions of the mountain mass. The relative movement resulted in more severe faulting along the southern edge of the range than in the central part where Kortes



PLAN OF dam shows construction details of dam, power plant and spillway, with diversion tunnel inlet at left.

dam is to be located, and no serious effects to the dam are anticipated through faulting.

The foundation and abutment rock for the dam is a tough, durable granite which is usually free from areas of softened, decomposed rock, but the occurrence of so-called "sheeted" joint zones of severely broken and fractured rock layers would afford leakage passages for water from the reservoir, if they were left uncontrolled. Such loss of water could be considerable despite the fact that the greater part of the rock joints are simple and relatively tight. The jointed and fractured condition has been found to exist at depth as well as near the surface. Fifteen exploratory diamond-drill holes into the bedrock showed the continuation of these joint systems to depth. This condition of the foundation rock will require a careful and extensive grouting program as well as a large amount of excavation work to remove broken surface rock.

Foundation grouting

It is planned to grout the foundations of the dam in two stages, the first of which will require forcing a grout of cement and water into the bedrock at shallow depths using low pressures. This preliminary shallow grouting is expected to accomplish solidification of the upper layers of rock, so that deeper and more effective sealing may be obtained in the second or final grouting operation which will be performed under high pressure and at much greater depths.

The grout holes for the preliminary stage will be drilled to depths of about 30 ft., and they will be spaced in the most effective possible concentration and pattern. The spacing of the holes will be determined from surface study of the rock joint patterns and fractures after broken surface rock has been removed, as well as from water pressure and other tests. A second set of holes will be drilled to depths of approximately 100 ft. according to present plans, unless the removal of broken surface rock reveals different conditions which would require holes of greater depth. The high pressure grout holes will be drilled at approximately 5-ft. intervals on a line downstream from and parallel to the axis of the dam. To form a cutoff curtain, grout will be forced into these holes under the highest practicable pressures that may be used without causing deformation of the rock.

Concrete work

During construction the river will be diverted from its normal channel through a diversion tunnel excavated in the right bank. Later about 300 ft. of the tunnel will be concrete lined and used as part of the spillway. The upstream section of the diversion tunnel will be plugged off at the junction of the diversion tunnel with a transition spillway tunnel section leading from the crest of the spillway. The transition tunnel will have a diameter of about 30 ft. and will be inclined at an angle of 50 deg. It will curve through a radius of about 75 ft. at its lower end to form the junction with the diversion tunnel.

The concrete mass of the dam will be divided into blocks or columns by vertical transverse contraction joints. The concrete will be cooled artificially in the conventional manner by circulating water through a system of pipes laid on the surface of each succeeding lift of concrete. These pipes eventually will be filled with cement grout when the concrete mass has been cooled adequately. After cooling, the contraction joints will be grouted by means of a system of pipes embedded in the concrete.

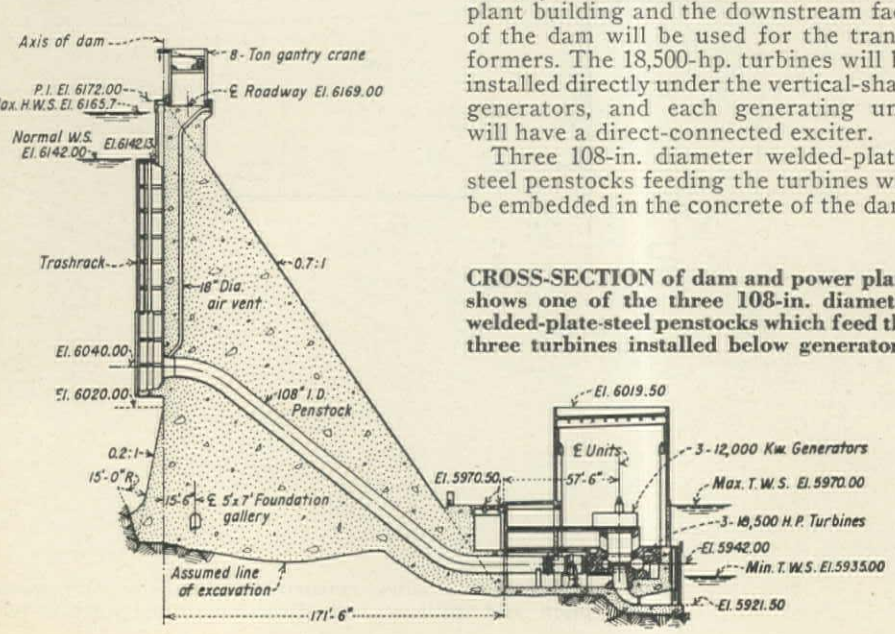
In addition to the usual gravity analysis of the design of the dam, a study was made of the effects of horizontal beam action and twisting resistance. It was found that the beam and twist resistance of the structure carried a substantial part of the forces acting on the dam, thus indicating an evident increase in the factor of safety.

Power plant

The power plant, containing three 12,000-kw. main generators, will be of reinforced concrete construction. The roof of the plant will be utilized for the switchyard, and the deck between the plant building and the downstream face of the dam will be used for the transformers. The 18,500-hp. turbines will be installed directly under the vertical-shaft generators, and each generating unit will have a direct-connected exciter.

Three 108-in. diameter welded-plate-steel penstocks feeding the turbines will be embedded in the concrete of the dam. The entrances of the penstocks will be protected by individual trashracks, the top of which will be slightly above normal water surface, so the top of the trashracks will be accessible. The penstock bulkhead gates to be installed on the upstream face of the dam will be handled by an 8-ton gantry crane operating along the top of the dam. A butterfly valve will be installed in the downstream or turbine end of each penstock to provide emergency shut-off of water flow to the turbines.

Activities at the dam are under the supervision of C. S. Rippon, Construction Engineer and I. J. Matthews, District Engineer, for the Bureau of Reclamation. The activities of the Bureau of Reclamation are directed by Michael W. Straus, Commissioner, and the engineering design and construction are under the supervision of Walker R. Young, Chief Engineer. For Morrison-Knudsen Co., Inc., contractors, B. Williams is project manager and John R. Barry is engineer.



CROSS-SECTION of dam and power plant shows one of the three 108-in. diameter welded-plate-steel penstocks which feed the three turbines installed below generators.

Would Lower Lake Tahoe To Relieve Flood Damage

STEPS TO SOLVE the annual damage caused by the Truckee basin's high water between Reno, Nev., and the shores of Lake Tahoe were proposed recently to Reno's Regional Planning Commission by E. W. Vaughan, U. S. engineer from the Sacramento district.

Following a study by the Sacramento engineers based on records for the past 50 years, Vaughan outlined a plan to build a reservoir on Prosser Creek to reduce Lake Tahoe's maximum level 1.1 ft., and to increase the Truckee channel capacity in the lower Truckee meadows.

Before the War Department's chief of engineers passes on any proposals, they are being discussed by local groups concerned, in order to get the general reaction and work out agreements.

To prevent high water damage at Lake Tahoe, the proposed plan would lower the lake's maximum level from the present 6229.1 ft. to 6228 ft. The storage capacity taken from the lake would be held in a 134,000 ac.-ft. dam about 1 mi. above the mouth of Prosser Creek. Control of the reservoir and Lake Tahoe would be integrated by a pipe line between them which would be used to transfer storage from Tahoe to Prosser.

Anticipating 50 years into the future, Vaughan said that the cost of the project, estimated at about $13,000,000 at present prices, would be amortized over that period at about $638,000 annually.

Channel work would be necessary also to eliminate flood damage in the valley. This would include elimination of the two dams in Wingfield Park, lowering of the river bed in the lower Truckee meadows about four feet by dredging and the construction of a gated dam to replace the river block above the Second St. bridge and the reefs near Vista.

Vaughan said that the proposed project, by using the Prosser reservoir head, would make it possible to build a 5,000-kw. capacity generating plant near the mouth of the Little Truckee River.

East Bay Sewage Proposals

Six San Francisco Bay cities join for construction of sewage treatment plant, three main interceptors, and outfall to correct serious menace to health and cultural development caused by discharge of 42 existing sewers onto tidal flats along east shore of the bay

By R. C. KENNEDY
Assistant Chief Engineer and
Assistant General Manager
East Bay Municipal Utility District
Oakland, California

FOR MANY YEARS the disposal of sewage from the cities along the east shore of San Francisco Bay has been recognized as a problem serious to the health and respect of the communities and important to the complete use and enjoyment of the naturally advantageous waterfront. The fact, however, that until 1936 no public thorofare had extended along the Bay shore, kept most of the citizens unaware of the extent to which the discharge of untreated sewage onto the shallow tidelands has polluted these waters. When the San Francisco-Oakland Bay Bridge and the Bayshore Highway were completed, a great flood of automobile traffic immediately began to use these facilities, and what was previously the back yard of a factory area became the front entrance to a great metropolitan district.

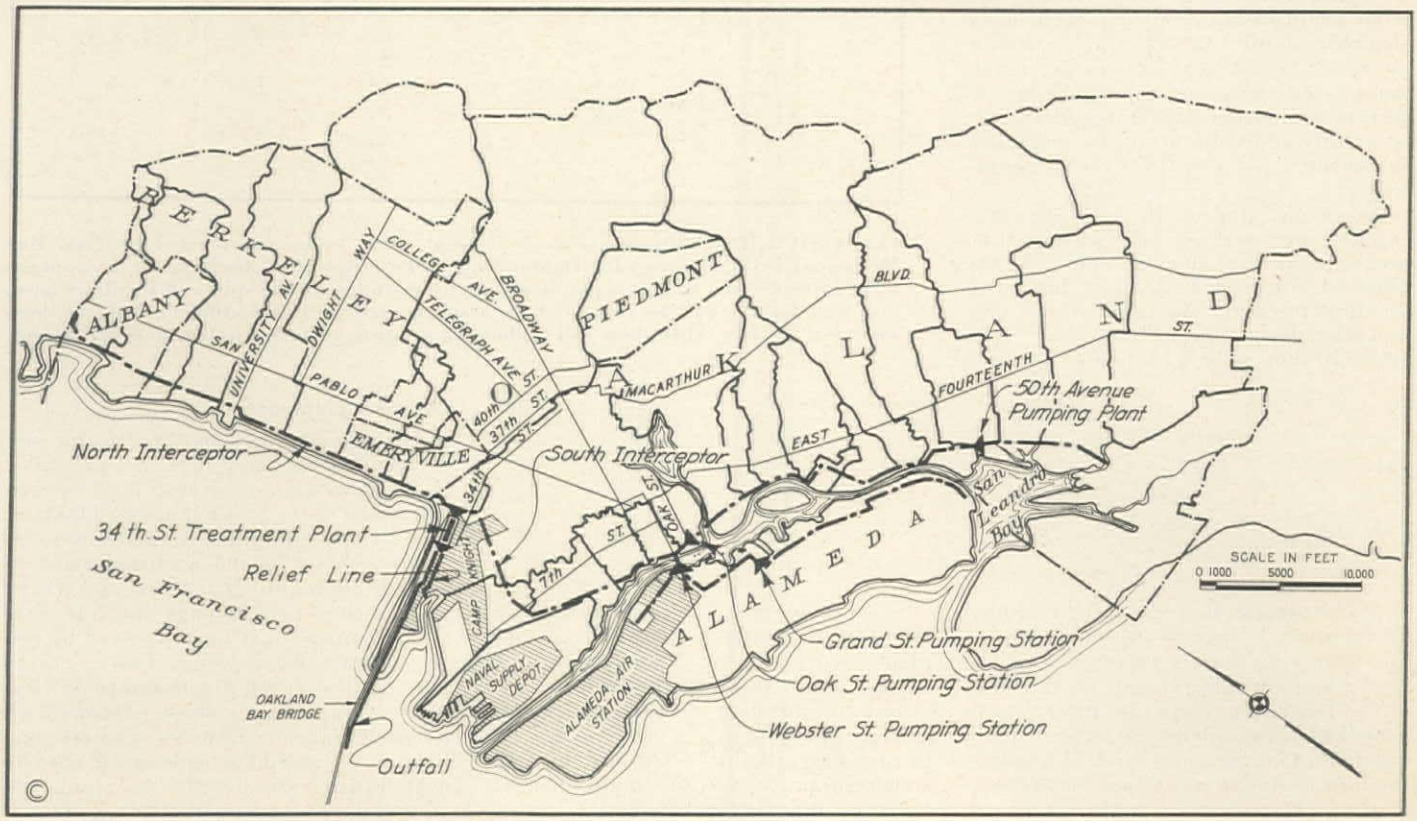
The pollution from raw sewage is not limited to the San Francisco Bay proper, but is also a problem in San Leandro Bay, and in the Estuary connecting these two bays and lying between the cities of Oakland and Alameda. So serious has been the condition in these waters that major damage has periodically been caused by sulphurous gases to the paint of houses and other buildings near the waterfront.

Historical review

The earliest recorded sewers in the area were constructed in 1869. Several engineering reports on the subject of sewage disposal have been prepared since that time, culminating in an outstanding analysis submitted on June 30, 1941 by a Board of Consulting Engineers consisting of C. G. Hyde, H. F. Gray and A. M. Rawn. Their report was sponsored by the cities of Alameda, Albany, Berkeley, Emeryville, Oakland, Piedmont and Richmond. In it is contained a recommendation that " . . . all factors being taken into consideration, the East Bay Municipal Utility District is the most effective agency available to construct and operate sewage disposal works for the East Bay cities."

The East Bay Municipal Utility District is a political subdivision of the State, comprising nine cities and a large unincorporated surrounding territory. Since 1929 the District has been responsible for providing the water supply for this area, and its engineering and administrative staff is capable, with minor changes and additions, of assuming the somewhat related problem of sewage disposal. At an election held Nov. 7, 1944, the voters of six of the East Bay cities organized the "Special District No. 1 of the East Bay Municipal Utility District," for the purpose of studying the sewage disposal problem, preparing preliminary designs and cost estimates, and submitting its findings to the electorate for decision as to a bond issue for financing the recommended construction. The boundaries of the Special District are coincidental with the outer boundaries of the cities of Albany, Berkeley, Oakland, Alameda and Emeryville. The City of Piedmont, completely surrounded by Oakland is also included.

The studies of the District's engineering staff were guided by Samuel A. Greeley of Chicago. Upon completion of the studies, two additional consultants, N. T. Veatch of Kansas City and Clyde C. Kennedy of San Francisco were employed, these three engineers forming a Board of Review. The Board thoroughly checked the reports of the District staff, and rendered a separate report, dated



AREA INCLUDED in East Bay sewage district, showing location of interceptors, pumping stations, treatment plant and outfall. Interceptors vary from 33 to 96 in. in diameter, will convey 327 mgd.

July 1, 1946. Their report in general substantiates the previous findings, and adds valuable data to be used as the basis of the final designs.

Sewerage district

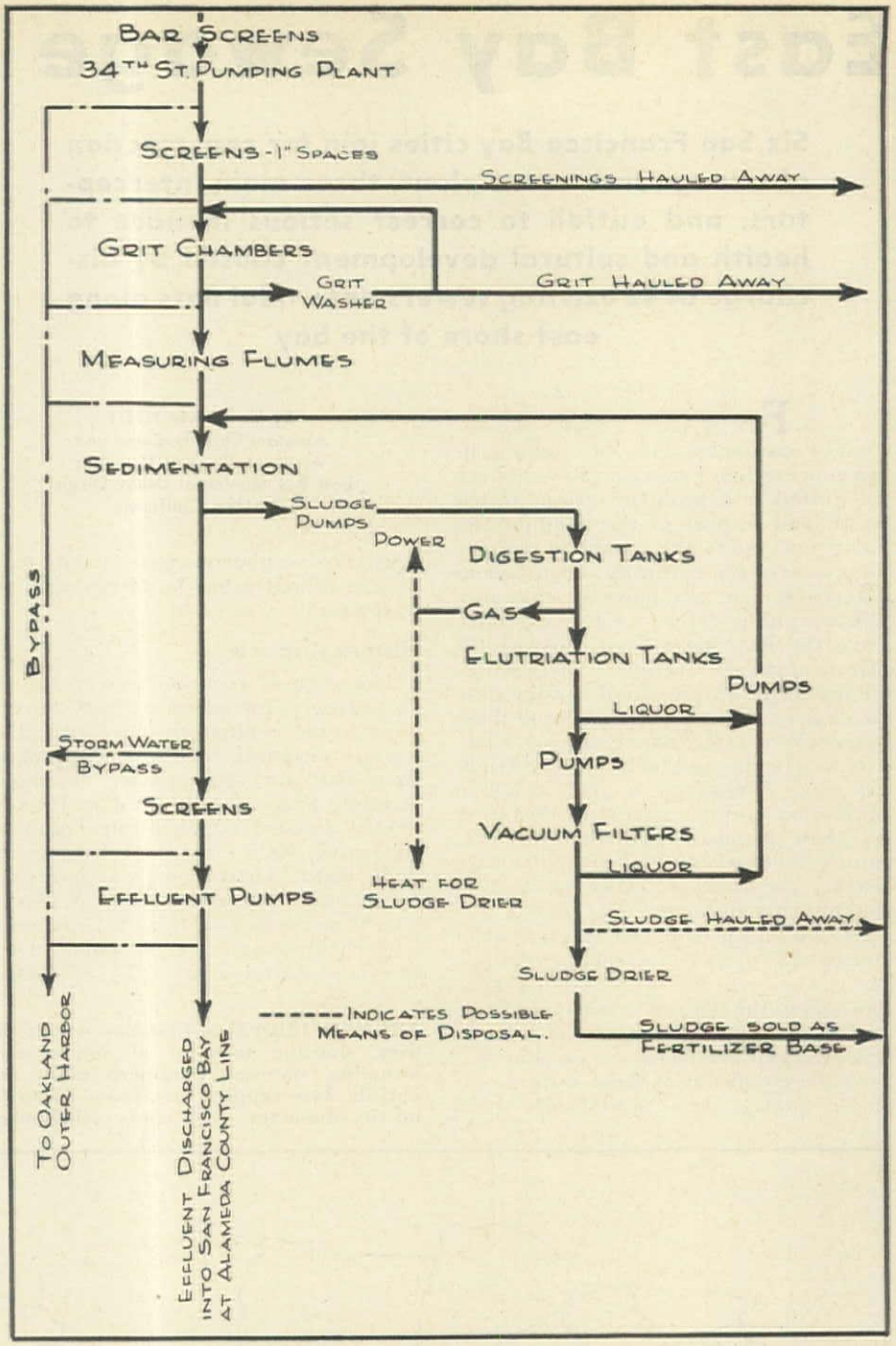
The law under which the Special District was formed prohibits such a political subdivision from lying in more than a single county, and hence, there appears to be no possibility of extension northward. The eastern boundary is at the top of the coast range, and the lands immediately beyond are mostly watershed reserve properties of the East Bay Municipal Utility District, or properties of the East Bay Regional Park District wherein no sewage-producing developments are permitted. The only possible further extension is, therefore, to the southeast to include the City of San Leandro and beyond. Since, however, the latter city has its own sewage treatment plant, now under study for enlargement, extension in this direction is also highly unlikely.

The area comprising the Special District is an alluvial plain backed by the hills of the coastal range, which rise steeply to an average elevation of about 1200 ft. with Baldy Peak (Elev. 1930), the highest point. The coastal plain slopes gently westward from the foot of the hills for a maximum distance of three miles. The width of the District varies from three to eight miles and the length is about 13 mi. The runoff from the hills is fast and concentrates quickly because of the steep slopes and the shallow depth of rock. Much of the lower area is covered with roofs and pavements with the total result that runoff from the whole District accumulates very rapidly.

Sewage quantities

The designs and estimates are based on all intercepting sewers, outfalls and other facilities not easily enlarged, being originally built for peak rates of flow estimated for the year 2000. Pump installations, sedimentation basins, sludge digesters and other structures that may be readily added to, are to be originally constructed for year 1970 requirements only.

Extensive studies by the District's engineering staff of the present and probable future development of the cities within the District have furnished the fundamental data upon which preliminary design quantities were based and are taken to be as follows:



FLOW DIAGRAM through sewage disposal plant to be constructed by East Bay Municipal Utility District for Oakland and other cities now discharging raw sewage into San Francisco Bay. It is planned that dried sludge will be sold as a fertilizer base, and that liquids will be conveyed by a submerged outfall 15,000 ft. long to deep waters of the bay. This plant will replace 42 existing outfalls with primary treatment.

Year	Population	Land Area Sewered (Acres)	Domestic Sewage m.g.d.	Industrial Sewage m.g.d.	Total Sewage m.g.d.	Total Sewage g.c.d.
1944	573,709	35,569	27.4	19.6	47.0	82
1970	716,900	42,855	37.3	33.7	71.0	99
2000	884,900	46,221	46.1	47.4	93.5	106

At the present time, the cities included in the Special District discharge sewage into receiving waters through 42 separate major outfalls. It will be the duty of the District to construct interceptors for all of these sewers, together with a number of minor ones, and to conduct the flow to one or more suitable disposal plants.

Several possible solutions of the problem were studied in detail. Either a single plant, two plants or three plants could be adopted. With multiple plants, a saving in the cost of the interceptors and pumping plants would result, but in each case, the increased cost for construction and operation of the disposal facilities more than offset this saving.

Disposal plant site

There exists only one practicable site for the disposal plant. This is a presently unoccupied area of swamp land located just south of the San Francisco-Oakland Bay Bridge approach, and just west of the Southern Pacific Railroad right of way. Foundation difficulties are severe at this site—test borings indicate that all structures must be supported by piling at least 100 ft. long. Test concrete piles of this length are found to be capable of supporting at least 120 tons with no measurable settlement, and 60 tons has been adopted as the design load. The outfall will extend 8,607 ft. along the now unused Key System Mole, and 6,200

ft. as a submarine line to the deep water.

Many float studies have been made to determine the currents of the bay waters. No point of discharge for partially treated sewage was found to be satisfactory except that chosen. At the proposed location of the outlet, the water is 40 to 50 ft. deep. The tidal currents reach a velocity up to 200 ft. per min. in each direction, and there is no pulsating movement that repeatedly returns the same water. The wide dispersion thus indicated, and the fact that the water shows practically complete oxygen saturation at all times, indicate that this is a highly favorable point of discharge.

Interceptors

The preliminary designs involve three major intercepting sewers, into which the flow from the existing outfalls will be diverted. At sanitary sewers, the diversion will be complete, but with provision for by-passing the interceptor in case of necessity. Automatic float-operated gates will be provided at combined sewer inlets so that only a predetermined maximum diversion into the interceptors is permitted, the remaining flow continuing out through existing outfalls. This protective measure is necessary due to the very high rate of discharge during heavy storms.

In all cases the interceptors have been designed to carry the year 2000 estimated sanitary flow peak quantities, plus infiltration, plus a runoff of 0.02-in. depth per hour from the areas drained by combined sewers. The surface runoff is a very important item in the design of the interceptors, totaling 114 MGD, as compared with 213 MGD capacity allowed for sanitary and infiltration flows. The latter item is taken at 2000 G.A.D. from the older developed sections, which are generally in the lower areas, and 500 G.A.D. from the newer areas. In the City of Alameda, where the ground water is generally high, the rate is taken as 1000 G.A.D.

The North Interceptor, serving Albany, Berkeley, Emeryville and a part of Oakland will operate entirely by gravity. Its length will be 29,872 ft. and its diameter will vary from 33 in. at the extreme north end to 96 in. at the south end. The South Interceptor will be 42 in. at its upper end and 99 in. at its terminus. Two "booster" pumping plants will be required on this line due to its great length (55,655 ft.) and its lack of natural fall. At about the lower third point, this sewer will be joined by the Alameda Interceptor, which totals 26,611 ft. of 24 to 51 in. sewer plus a 30 in. submarine crossing of the Estuary. The Alameda system also involves two pumping plants, making a total of four such plants on the interceptors.

At the junction of the North and South Interceptors, a main pumping station will be constructed. This will lift the sewage from Elev. —22.0 minimum to +10.5. From the latter elevation the flow will be by gravity through the treatment plant and through the 96 in. diameter outfall into the Bay. During the daily peak flows, pumping of the effluent will be required. During highest flows due to rain water intake, an 81 in. by-pass of the main outfall will carry the excess into the Oakland Outer Harbor.

Disposal plant

The sewage disposal plant will include primary treatment only, since the Bay waters are capable of disposing of the finely divided solids and dissolved materials remaining after such treatment. The raw sewage will first pass through mechanically raked bar screens spaced one inch apart. Since a large amount of rain water will be carried into the plant, provision will be made for removal of considerable quantities of sand and other heavy materials in grit chambers. In the initial installation flocculation is not planned, but space will be allowed so that this can be added if it is found desirable. Provision will be made for both pre- and post-chlorination as required.

The sedimentation basins will be of 756,000 cu. ft. capacity, which will provide one-hour detention for the wet season flow predicted for the year 1970. Space will be reserved for construction of additional capacity to allow equal detention for the flow in the year 2000. Effluent screens with ⅜-in. openings will be provided following the sedimentation basins.

Sludge is to be digested in the usual manner in concrete digestion tanks. The digested sludge will be elutriated and then dewatered on vacuum type filters. If a suitable market can be found, the sludge will be dried to 10% moisture content and sold as a fertilizer base. In the initial period about 8,000 tons of such fertilizer base will be produced per year.

Gas from the digestion process will be used for heating the sludge in the digestion tanks, and also for either power generation or drying the sludge, the latter only if it is decided to produce a dried fertilizer base. The volume of gas produced in the year 1970 is estimated to be 425,000 cu. ft. per day, and its heat value is assumed to be 600 BTU per cu. ft.

Before deciding upon the sludge disposal as described, various alternate methods were considered. The location of the East Bay cities on a harbor close to the open waters of the Pacific would make possible the barging to sea of either raw or digested sludge. Favorable currents running northerly and parallel to the coast would appear to preclude the washing ashore of any materials if the dumping area were 10 mi. off the Golden Gate. Other methods considered were incineration of either raw or digested sludge after partially dewatering on mechanical filters, disposal as fill after digestion and filtration, and drying on open or enclosed beds.

In case the election results are favorable, it is planned to proceed immediately with the detailed designs of all facilities required for the project. The disposal plant should be in complete operation by the year 1950.

The District staff responsible for studies and estimates discussed herein are L. S. Hall, Hydrographic Engineer; B. I. Burnson, Sanitary Engineer; H. A. Knudsen, Mechanical and Electrical Engineer; and the author. All operations are under the general supervision of J. S. Longwell, Chief Engineer and General Manager.

Estimated cost

The upset economic conditions at the present time have made the estimate of cost for this project extremely difficult. This estimate must be made as accurately as possible, however, since the project is to be financed through a bond issue. The estimate of construction costs, together with the annual cost for the year 1960 for the project as recommended is as follows:

Item	Construction Cost	Annual Cost—Year 1960 Operation	Debt Service*	Total
Intercepting sewers	$10,280,000	$ 20,000	$343,400	$ 363,400
Booster pumping stations	792,000	57,600	26,500	84,100
Sewage treatment plants	6,789,000	324,000	226,800	550,800
Flocculation plant	396,000	26,900	13,200	40,100
Outfalls	3,301,000	5,900	110,300	116,200
Sludge drying plant	700,000	69,300	23,400	92,700
Other costs	189,000	.....	6,600	6,600
Totals	$22,456,000	$503,700	$750,200	$1,253,900

*Debt service computed on uniform annual payment basis.

Remaining Work at Fort Peck to Cost 12 Million

WORK REMAINING to be done before the Fort Peck project in northeastern Montana will be completed will cost about $12,000,000, according to Lt. Col. H. H. Robert, district engineer.

Expenditures in the current fiscal year will total around $5,000,000, including $4,000,000 for the power plant and the second of three generators. Major project to be undertaken this year, besides the power plant, will be raising the level of the dam. Now, six years after completion, the top level of the dam is about 3½ ft. below the original height because of the great weight of earth placed on the site. Another 3½ ft. of settling is expected before it is fully stabilized. The level will be raised in the next year to care for both the actual and prospective drop.

When the dam is raised, a highway will be built across the crest. Sites for 11 recreational areas about the lake have been studied and reports are nearly ready, and plans also have been completed for a permanent town.

Western Power Line Erection

Transmission lines in Idaho and Los Angeles illustrate different techniques suitable to Western projects — Sectional erection of steel towers for Los Angeles loop line saves a great deal of time and labor— Morrison-Knudsen uses tractor and trailer crane to erect two, three, and four-pole units on Idaho Power Co. project

TWO POWER LINE projects in different sections of the West illustrate different techniques for this type of construction.

The projects are: (1) a loop transmission line encircling the central portion of the City of Los Angeles, being constructed by the Los Angeles Department of Water and Power, and (2) a 120-mi., 138,000-volt transmission line for the Idaho Power Co. from generating units on the Salmon River near Hagerman, Ida., to Boise and Emmett.

Los Angeles line

The Los Angeles loop line carries 132,000-volt power and was constructed so that any interruption of service in one area can quickly be overcome by delivering power from another portion of the loop. The line is almost entirely in built-up sections of the city.

It is supported on steel towers at an average spacing of 700 ft. Six different types of towers are used in the tower line, with bases varying from 25 to 30 ft. in width. Five of the tower designs are "strain" type, and the sixth is a standard suspension type. Variations in height are taken up in the lower legs.

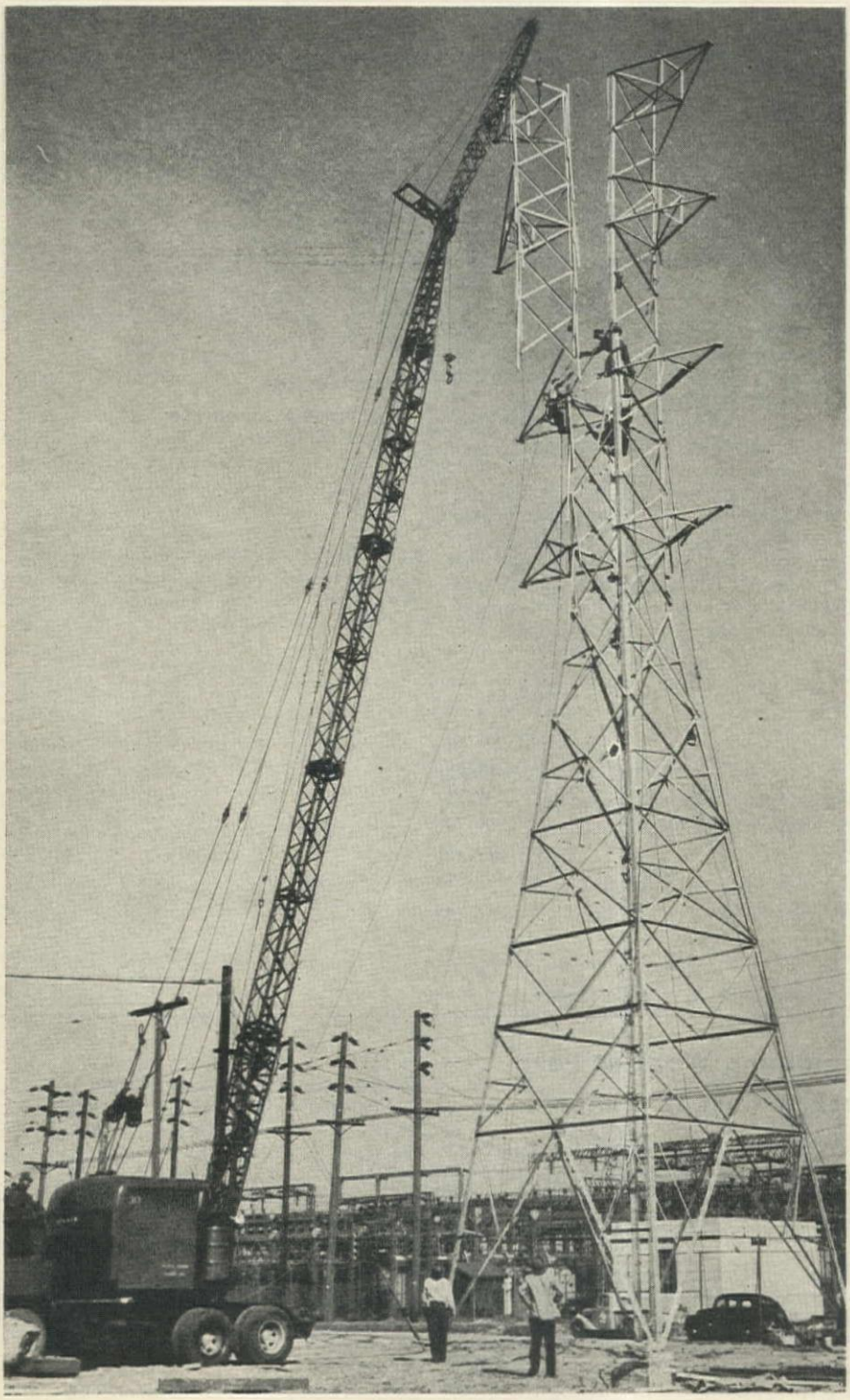
In the accompanying illustration, the tower is a straight line strain type, 65 ft. from base to tower arms, 15 ft. between cross arms, 16 ft. 2 in. from top cross arm to top overhead ground wire arm, making a total of 111 ft. 2 in. in height. The tower shown weighs approximately nine tons. It is located on the Century-Fairfax section of the loop line.

Of particular interest in this construction is the sectional erection of the towers. Each of 11 sections is laid out and bolted up on the ground and is erected by long-boom mobile crane. Once properly spotted, the crane erects the entire tower without changing truck position. The heaviest lift of any of the section is about 2,000 lb. In the illustration the crane is placing the final section of the tower.

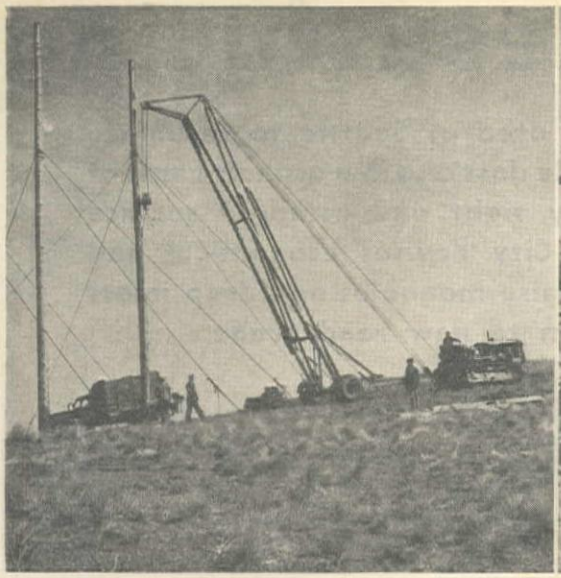
Each lift (except in the case of the lower panels) consists of one side panel completely bolted up and the members of one panel at right angles loosely attached to the leg members. In the illustration, the panel at right angles to the axis of the cross arm is rigidly bolted, while the members of the panel which is parallel to the cross arm hang loosely from the legs; and as soon as the section is put in position by the crane the workmen will "lace up" the two loose panels, thereby completing the structure.

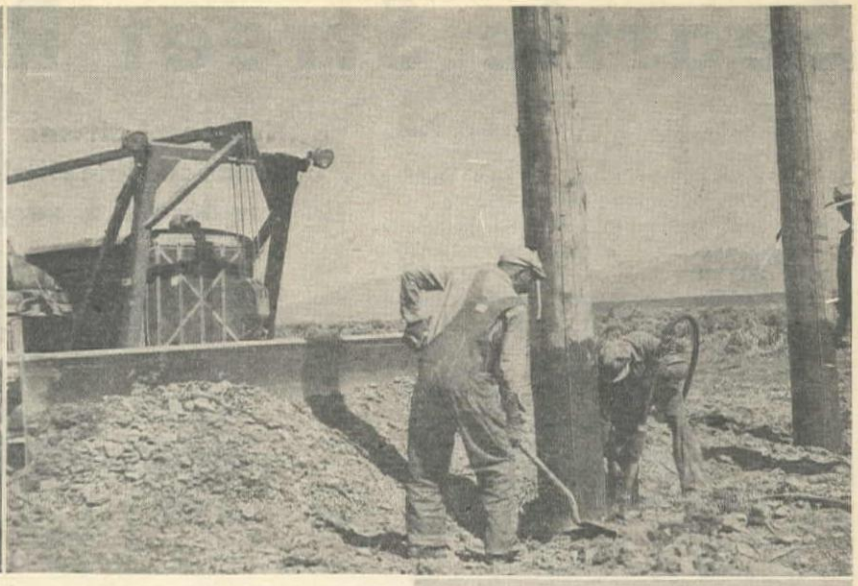
In the case of the lower panel, all four are bolted rigidly on the ground and each is raised as a separate lift.

The 11 lifts in the complete structure are as follows: (1) and (2) are bottom panels including legs and sway bracing up to the second horizontal diaphragm; (3) and (4) are the sway bracing only for the other two sides of the lower section; these four lifts complete the tower to the second diaphragm; (5) and (6) are each one rigid side and one loose side from the top of the preceding section to the top of the sloped legs; (7) and (8) are the two sections from the beginning of the vertical legs to the second cross arms; (9) and (10) are the



MOBILE CRANE lifts last panel of steel strain type tower for Los Angeles Department of Water and Power. Each of 11 sections is bolted together on the ground, fastened into place by assembly crew.





two top portions shown in the illustration, and (11) is the second horizontal diaphragm.

Work on the loop tower line was performed by force account under supervision of the construction section of the Department's Power System. The mobile crane used in the operation was rented from Pacific Crane & Rigging Co., which firm had built up the boom to a length of 120 ft. for the job.

Idaho Power job

Construction of the new generating units for Idaho Power Co. near Hagerman, Ida., was described in *Western Construction News* for May, 1946, the operation being carried out by Morrison-Knudsen Co., Inc., Boise. Erection of the transmission lines from these generators to the point of consumption, Boise and the Boise Valley, is also being performed by Morrison-Knudsen. The line from Hagerman to Boise is completed and was energized July 23. The section from Boise to Emmett is now nearing completion.

This is a wood pole transmission line with structures rising from 55 to 75 ft. above the ground. On all tangents the structures are composed of two pine poles with creosoted butts and the wires suspended from porcelain insulators hung on timber cross arms. At points of curvature or strain, however, three or four-pole structures are erected, with wires supported on insulator strings and the current bypassed on jumpers. All poles in the three- and four-pole structures are ground-guyed and also cross-guyed to each other.

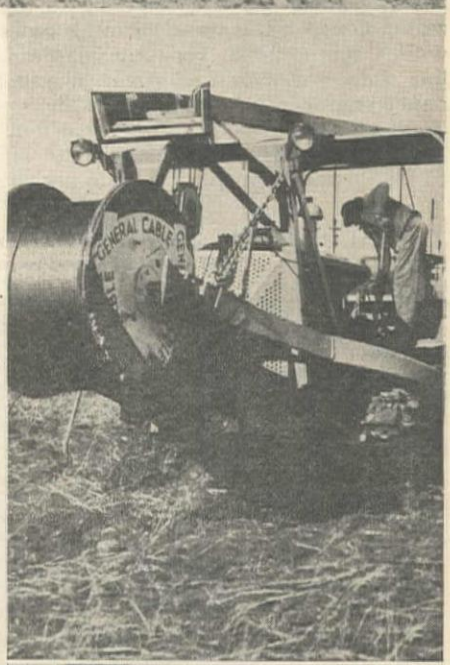
At varying intervals along the line, dead-end structures are specified, these generally being three-pole structures, to serve as an anchor point. Line tension is thus limited to the distance between dead ends, which are placed and guyed so that one broken wire will not cause any serious overstrain or deflection.

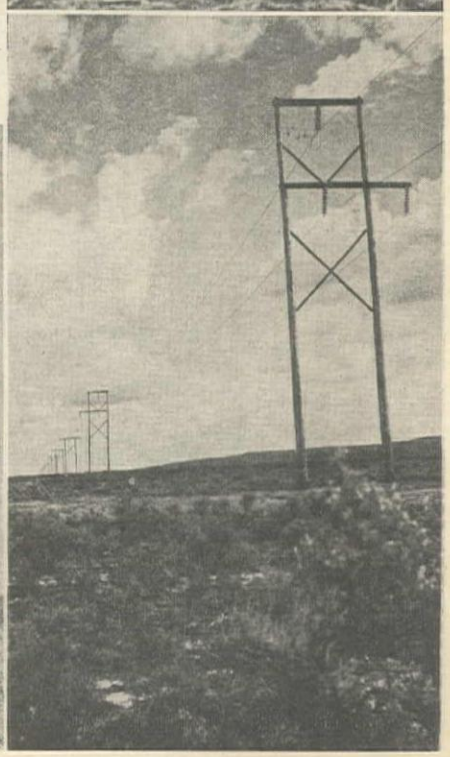
Near Mountain Home, a tap line connects the new line to the existing 138,000-volt line between Upper Salmon and Caldwell. This cross-connection will permit operators to cut out sections of either line in the event of any failure.

The poles are erected by a trailer crane with power furnished by a take-off on a tractor. Air tampers are used to compact the backfill around the butts.

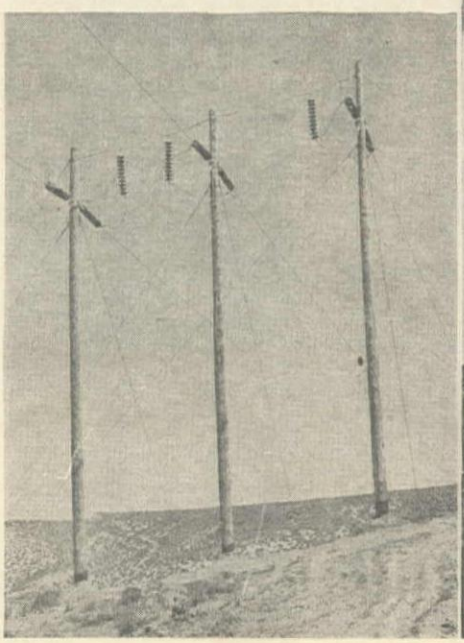
The stranded copper cable, having a cross-sectional area of 250,000 cir. mils, is unrolled from reels supported on arms in front of a D-8 tractor, this being especially suited for some of the rough country traversed.

Supervising the transmission line project for Idaho Power Co. is C. O. Crane, and B. I. Valentine is inspecting engineer. For the contractor, Morrison-Knudsen Co., Inc., Thomas O'Mara is superintendent and Larry Peck is field engineer.





POLE-SETTING on the Boise-Emmett line of Idaho Power Co., by Morrison-Knudsen Co., Inc. Top left, raising poles by tractor-powered mobile crane; top right, bulldozer and air tamper used for tamping butts; center, cable is spun out from reel mounted on arms attached to tractor frame; bottom right, completed tangent line of two-pole structures; bottom left, guyed three-pole structure, used at angle points in the line.



Seattle Street Resurfacing

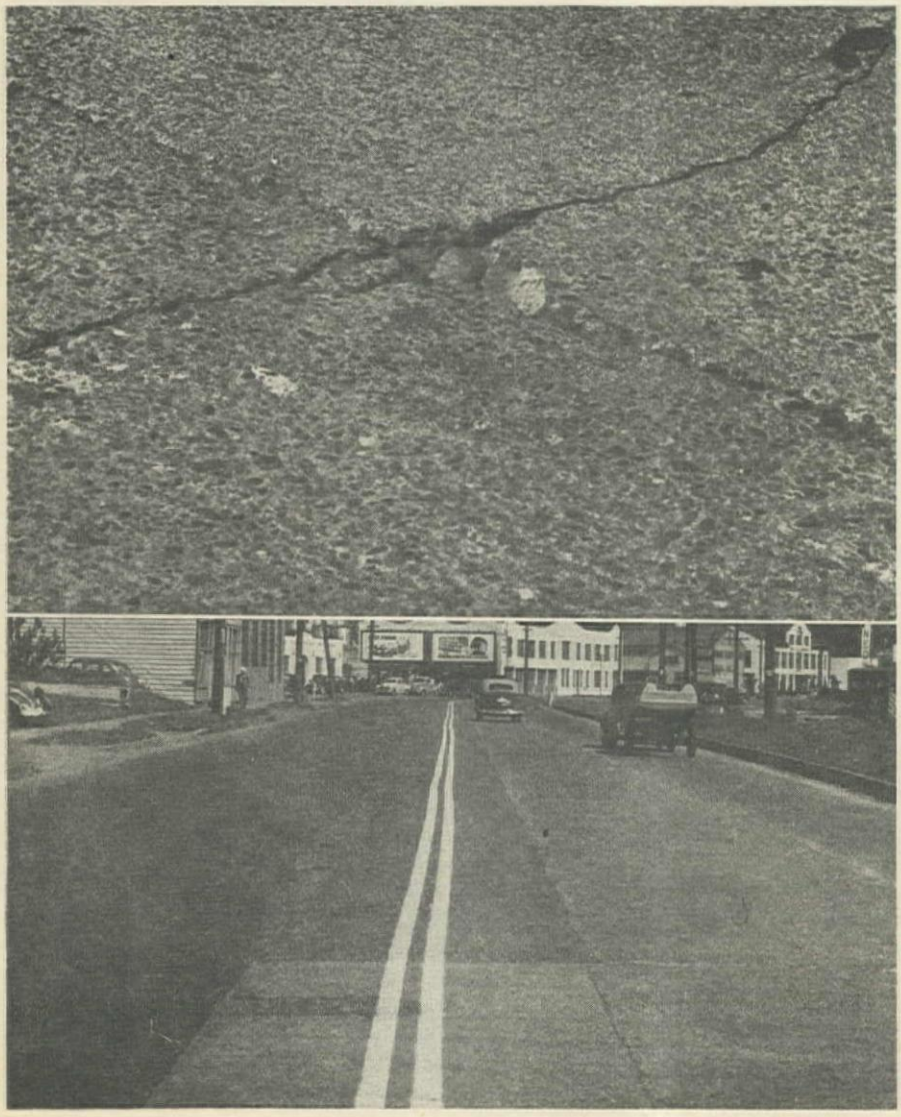
New asphalt mix used at Seattle to resurface roads contains little dust and low asphalt content but forms a very tight and compact surface within a year — City devises economical and effective way to raise manholes and drop inlets to conform to new road grade

FOR ABOUT TEN YEARS the street maintenance department of the Seattle city engineer's office has been developing and expanding the use of an asphalt mix containing little if any dust and a relatively low asphalt content for resurfacing city streets. This year the city is installing a new asphalt plant to increase the yearly output of resurfacing material, and after some considerable experimentation is placing in full use for the first time manhole, monument, and drop inlet frame extensions to raise those structures located on resurfacing projects.

In discussing the use of the Seattle asphalt street surfacing The Asphalt Forum in a recent issue used the term "open-graded" asphalt, referring to the common use of this term, meaning a mix with a minimum of very fine material, but James Robertson, street maintenance engineer, prefers to call it "dense-graded" asphalt, pointing out that density tests of the material usually run 137 to 139 lb. per cu. ft. and have run higher, depending upon the aggregates in use. While it is true that the freshly laid surfacing has an unusually open appearance, a year's exposure to traffic combined with the effect of the hot summer sun results in a very tight and compact surface, as illustrated in two of the accompanying photographs.

An example of this densifying effect under traffic and weather was seen following the resurfacing of the Lawton Way viaduct in 1929. During the first winter following the resurfacing of this structure with the then quite new dense-graded material it was observed that water leaked directly through the pavement in rainy weather. This was a matter of considerable concern to engineers of the street department at the time, but by the succeeding winter the pavement had become sufficiently dense to withstand the water, and it has continued tight since that time.

TYPICAL EXISTING concrete paving and cracks through which water seeps to sub-base. Street at bottom has been scraped and planed to receive new surface.



Mix characteristics

Aggregate used is a crusher run product and over a period of years has come from a number of different quarries in the Puget Sound area. Specifications do not require the addition of dust to the crusher run material with the result that material which would pass a 100 screen is usually about 1 per cent. More than 3 per cent is not allowable. The screen analysis for the mix is as follows:

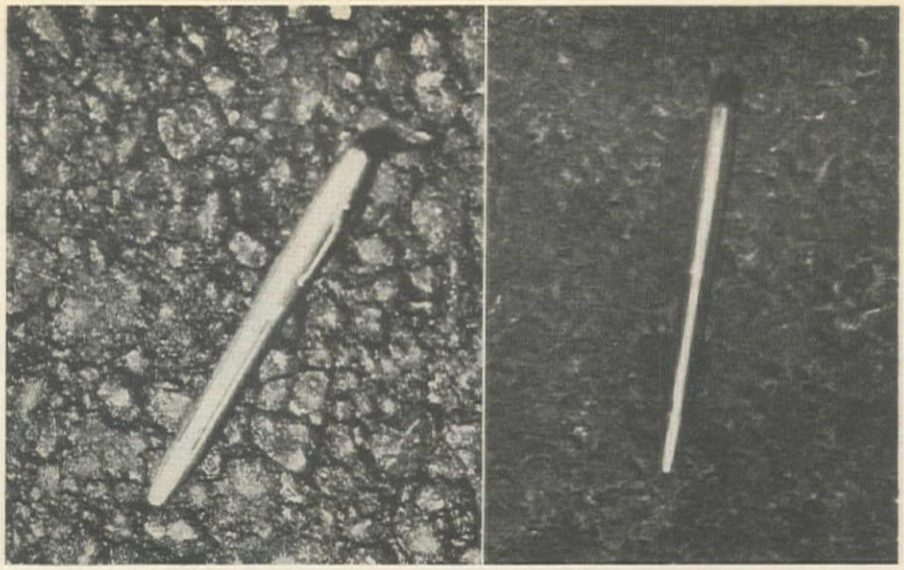
Screen	Per cent Passing
7/8-in.	100
5/8-in.	91
5/16-in.	59
No. 10	25

Maximum aggregate size is 7/8 in. At present the city is using an 84-100 penetration asphalt with this mix, the content running between 5¾ and 6 per cent.

All material for street resurfacing projects is prepared at the city's plant located on the south tip of Lake Union. Aggregates are shipped in by barge, and either fed directly to the plant or stockpiled nearby. The handling of aggregates is currently being revised, but nonavailability of equipment is delaying this part of the plant modernization program as well as other sections of the program now in progress.

Aggregate unloaded directly from the barge is fed to the oil-fired drier through a hopper by a stiff-leg derrick. No screening is done until the aggregate reaches the mixing plant. Because the plant is located in a highly developed industrial section with residential sections of the city not too far away, it is necessary to maintain close control over the dust freed by the drying process. Dust from the drier is pulled through a cyclone and into the bottom of a 42-ft. high by 13-ft. diameter washing tower. As the air current flows upward to the outlet at the top of the washing tower it passes through a series of water sprays which remove practically all of the dust, an unusual condition around most asphalt mixing plants.

Dried aggregate is elevated to the screen above the mixing plant where the four sizes of aggregate are separated. A



WHILE FRESHLY laid asphalt used at Seattle has an unusually open appearance as at immediate right, within a year exposure to traffic and weather conditions results in the compact surface at far right.

single shaker screen 42 in. by 12 ft. is used with four sections of screen as indicated in the previously mentioned screen analysis. The mixer is a 3,000-lb. Standard plant which the city bought secondhand this year from the War Assets Administration. New motors for the drives have been received and are now installed in the plant for its operation. The drier, cyclone, screen, bins, and mixer are all enclosed in a wood frame structure with corrugated sheet metal siding.

Outside structures at the plant site consist of the washing tower and aggregate storage and handling facilities, and a 6-car capacity asphalt storage tank. Bituminous material is brought in by tank car and spotted on a siding adjacent to the storage tank. Steam heating coils in the storage tank can also be connected to the car heating coils so that proper temperature of the asphalt can be maintained.

Street construction

Surfacing work done by the street department forces is confined to maintenance work and consists largely of resurfacing old pavements. During recent years there has been a considerable amount of repaving where street car tracks were removed, and there is the usual amount of resurfacing small street cuts made for various reasons. No new paving is done by the street department, the construction of bases and original paving being done entirely by contract.

Resurfacing of old pavements constitutes the major part of the work, and in general there are three types of the older surfaces being recovered. Oldest of these are the brick or cut stone pavements where, in addition to leveling the surface, an increase of traction is of primary importance. The dense-graded mix has been proven to develop easily adequate traction for present day traffic. Very little preliminary work is required before laying a 2-in. surface course over this type of pavement. Occasionally it may be necessary to fill low spots with an extra load of bituminous mix, or to remove an overly high spot, but in general the new surface is laid directly on the old one with a minimum thickness of 2 in. Lesser thicknesses, although used earlier, have been found to be generally less satisfactory. The uneven character of the original paving is sufficient to hold the new pavement firmly in place.

Old concrete pavements which have spalled, cracked, or broken are resurfaced primarily to restore a smooth surface. Here again little if any preliminary work is required, and the asphaltic concrete is laid directly on the old pavement.

Old bituminous surfaces of various types require a slightly different treatment. In these cases the preliminary work may be quite extensive. Where the old surface is badly pitted and quite uneven, particularly in the case of penetration surfaces, a leveling course of varying thickness may be laid before the surface course is placed. Most bituminous surfaces are planed prior to resurfacing in order to remove excess oil which has worked to the street surface and to remove minor irregularities.

THE MEN who mix and lay the asphalt are top, ED DUNLAP, paving plant superintendent, and PHIL GALLAHER, street foreman. On their shoulders rests the responsibility for better Seattle streets.

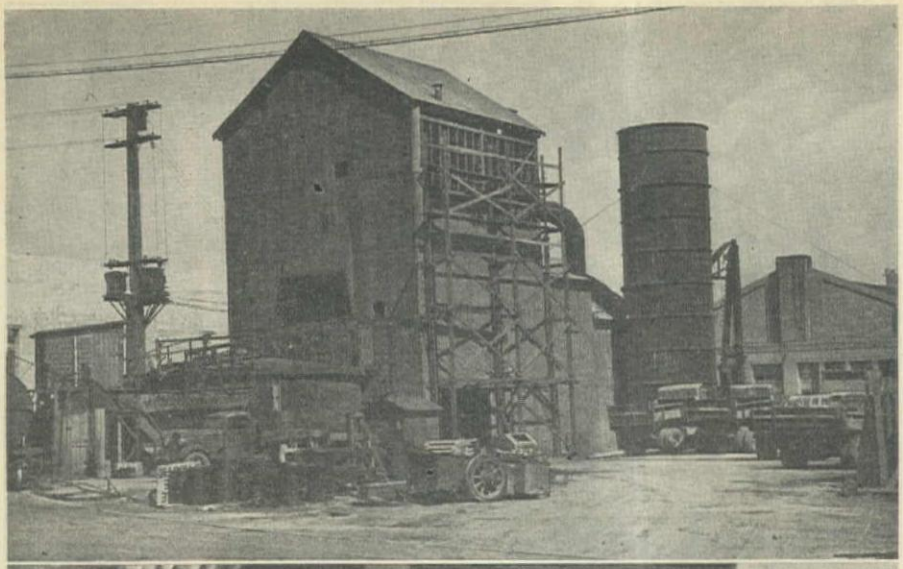
The planing machine used by Seattle is one developed by J. C. Compton of McMinnville, Ore., several years ago and now used extensively by municipalities in the Pacific Northwest. It consists essentially of an oil-fired burner pan mounted under the front axle of a motor grader. The burners destroy a large part of the surplus asphalt so that the blade may scrape off the residue, leaving an even surface. Depending upon the condition of the surface, one to three passes may be made before all surplus material has been removed. Occasionally a street may be simply planed and not resurfaced, but left to traffic as the planer finishes it. Apparently the burning action does not penetrate below the material left by the blade since little or no raveling has occurred where planed surfaces have not immediately been resurfaced.

Raising structures

One problem in resurfacing has been the raising of street structures such as manholes and drop inlets to conform to the new grade. Extension of the main structure in cases of this sort is a very expensive procedure, and for some years the Seattle engineering department has been experimenting with various types of simpler methods. This year for the first time the city has placed in general use a series of collar-type extensions which have proven in practice to be satisfactory.

Because the standard compacted thickness of 2 in. has been adopted for resurfacing most structure extensions are of 2-in. height. Manholes and monument cases are among the most common structures which must be raised to provide a uniform street surface, and for these three sizes of extensions are provided. All are 2 in. high with diameters of 12, 19, and 21 in. The extension is simply a cast iron collar designed to fit snugly onto the shoulder of the existing manhole top with another shoulder on the extension to take the original cover.

Drop inlet extensions are made up in only the single rectangular size and the 2-in. height. There are two types of monument casing ring extensions, one



IN THE PLANT at top, asphalt is mixed to a density of 137 to 139 lb. per square inch for spreading on Seattle streets. In center are the manhole and drop intake extension collars devised to fit around the necks of existing structures. At bottom, a 3-ton, 2-batch truck loads asphalt into the Barber-Greene bituminous spreader and finisher. No seal coat is needed.

circular and somewhat resembling a small manhole extension, and the other being a square type. Water and gas gate chamber extensions are of a standard diameter, but are made up in three heights, 1½, 2 and 2½ in. Before placing the extensions the old collar is brushed clean and painted with hot asphalt, following which the extension is dropped in place. The surface material is tamped in around the structure, and the job is finished. No fastening is used between the old collar and the extension other than the application of hot asphalt.

Finishing

Mixed material for the resurfacing projects is hauled to the working locality from the plant in 3-ton, 2-batch trucks, and placed by one of two Barber-Greene bituminous finishers owned by the city. To increase the service life of the finishers a ½-in. sheet of manganese steel plate has been welded to the finishing side of the screed of each machine. With the addition of this hard steel the life of the screed plate has been increased from an average of 25,000 tons to about 100,000 tons. In a locality where working time is limited by extended rainy periods the ability to work completely through the dry season without a shutdown to replace screeds is an important one and this improvement has paid in Seattle.

Compaction is secured by the use of two rollers. A 3-wheeled roller for primary compaction, and a 2-wheeled roller for final compaction complete the laying of the surface. No seal coat or other finishing treatment is made. It could be said that the surface finishing is performed by traffic, sun, and time.

Over the past five years the city plant has produced an annual average of 60,000 tons of surfacing material. With the new plant in operation it is hoped to raise this figure to about 75,000 tons per year. The plant now, without the new aggregate handling facilities installed, is producing 550 to 600 tons per 8-hr. day with the plant operating about 7½ hr.

Organization

Charles L. Wartelle is city engineer for Seattle. James Robertson, Jr., is street maintenance engineer and supervises all street resurfacing work. Ed Dunlap is superintendent of the city asphalt plant, in general charge of resurfacing, and Phil Gallaher is street foreman directly supervising resurfacing projects.

Storm Sewer Construction Projected for Great Falls

AN ESTIMATED $1,026,184 worth of storm sewer construction was recommended for Great Falls, Mont., by Black & Veatch, consulting engineers of Kansas City, Mo., after a recent extensive survey.

The first step in such a project should be the installation of three trunk sewers, the engineers said in advising that they be scheduled for early construction and the submains be added as needed. They declared that this program could be financed in conformity with existing statutes and without serious effect on the credit of the city.

The proposed three trunk sewers are on Seventh St. from Central Ave. to the Missouri River, a second which would intercept the existing storm sewer on Valeria Way at First Ave. N. to 15th St. and north on 15th St. to the river, and a third on Second Ave. NW. from Seventh St. W. to Third St. and northeast to the river.

Larger Rope Doubles Shovel Service

Until the wire rope industry presents a new preformed wire rope table of sheave and drum diameters, regrooving sheaves and increasing rope size can double shovel efficiency

"IT IS MY BELIEF that many manufacturers of heavy equipment of all types are not making sheave and drum grooves large enough. Certainly our experience is proving this." So states E. Styris, purchasing agent for the Isbell Construction Company, Reno, Nevada.

He clinched his belief by citing an example of two power shovels, both 2½-cu. yd. capacity, both working side by side, doing the same type of work, handling the same type of material, both operated by skilled shovel runners. The only difference between the two outfits was that Shovel A was equipped with 1-in. diameter rope, while the sheave grooves on Shovel B had been regrooved and equipped with 1⅛-in. rope. The two ropes were identical in construction: 6x19, Preformed Regular Lay, Improved Plow Steel.

The service records of one run showed that the 1⅛-in. rope which had been installed on Shovel B moved a total of 257,967 tons of material, while the 1-in. rope on Shovel A turned in a volume of only 112,184 tons. The job conditions were identical.

As a result of the record, the management of the Isbell Company is currently re-grooving the sheaves and drums on all their equipment (as it becomes necessary) to accommodate a slightly larger wire rope, expecting thereby to double the service of their ropes at a very slight increase in cost.

Whether or not such a policy could be applied to all cable-operated equipment seems to be debatable. However, it is probable that machine designers are building sheaves and drums to diameters suitable to ordinary non-preformed wire rope. It has been found, according to Styris, that preformed wire rope has the ability to much better withstand bending fatigue—thus making it possible to use, with this rope, a smaller diameter drum or sheave.

The current table for calculating minimum sheave and drum diameters is as follows:

Table for Calculating Minimum Sheave and Drum Diameters

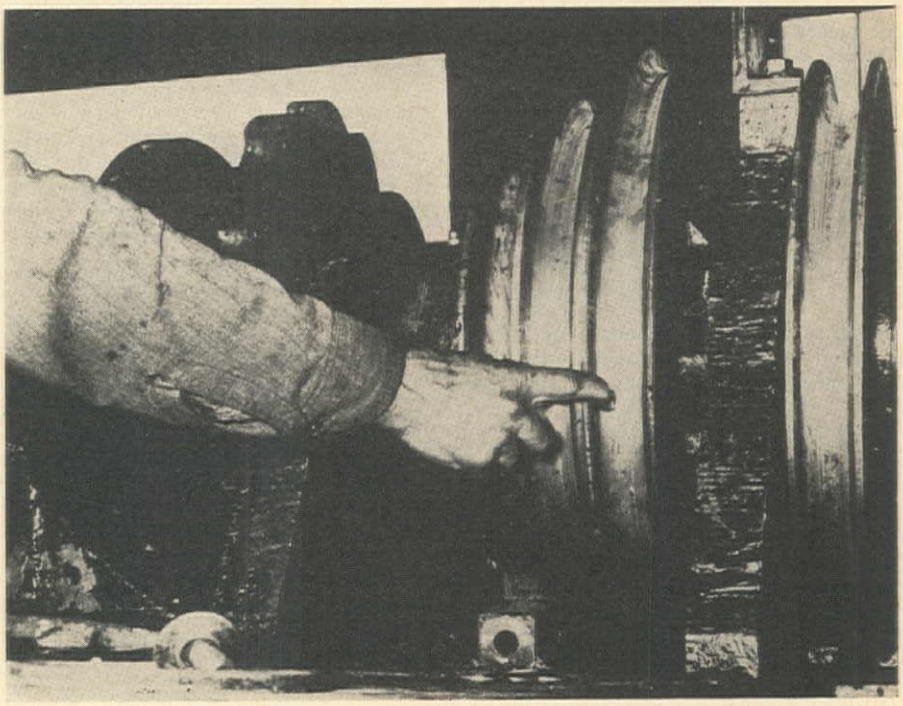
For 6x7 Construction	42*
For 6x19 Seale Construction	34
For 6x16 Filler Wire Construction	30
For 6x19 Warrington Construction	30
For Flattened Strand	30
For 8x19 Seale Construction	26
For 6x19 Filler Wire	26
For 6x22 Filler Wire	23
For 8x19 Warrington	21
For 8x19 Filler Wire	21
For 6x37 Seale	18
For 6x41	18

* Times diameter of rope.

This table, originally scaled for non-preformed wire rope, has been used for many years. Actually it is obsolete so far as preformed is concerned, as proved by Styris' recent parallelism. In his case the two ropes were, respectively, 1-in. and 1⅛-in. in diameter. Since the rope construction was 6x19 that meant, if the machine designer were to follow the table literally, the sheave diameter for the 1-in. rope should be 30 in., while that for the 1⅛-in rope should be 34 in. in diameter. Yet here, because the preformed rope had been easier to bend, was a 1⅛-in. rope giving twice the service of a 1-in. rope on a sheave designed for the latter.

It is reasonable to believe that when endowed with flexibility a larger diameter and stronger rope will far outlast a smaller rope. It appears obvious, therefore, that what really needs to be done is for the wire rope industry to formulate a new table for sheave and drum diameters based on this greater flexibility. In the meantime, many operators might effect considerable savings by regrooving their present equipment to accommodate a larger and stronger rope.

SHEAVES FOR hoisting line on a 2½-cu. yd. shovel. These were regrooved to accommodate 1⅛-in. diam. preformed wire rope instead of the 1-inch originally used.



Apportionments Announced for 1947 Federal Airport Building Program

APPORTIONMENTS to the states of $30,822,750 of the appropriation by Congress for airport construction and development under the Federal Airport Act for the fiscal year 1947 have been announced by Charles B. Donaldson, Assistant Administrator for Airports.

The state apportionments, which must be matched by sponsors of projects, were determined by the ratio which the population and area of the state bear to the total population and area of the United States.

Out of the $45,000,000 appropriated, $1,740,000 is for projects in Alaska, Hawaii and Puerto Rico, leaving a total of $43,260,000 for projects in the United States. Of that sum five per cent is for administration and 25 per cent of the remainder is set aside as a discretionary fund to be available for construction as determined by the Administrator of Civil Aeronautics. Total money available for allocation among the states, therefore, is $30,822,750.

Apportionments for projects in the respective Western states under the area-population formula are:

Arizona, $625,320; California, $1,598,582; Colorado, $650,276; Idaho, $477,266; Kansas, $620,260; Montana, $797,733; Nebraska, $538,393; New Mexico, $667,735; Nevada, $563,019; North Dakota, $426,809; Oklahoma, $621,432; Oregon, $610,420; South Dakota, $458,690; Texas, $2,081,311 (the largest to any single state); Utah, $487,007; Washington, $554,509; Wyoming, $516,629.

Chart Tells Maximum Bridge Load

Western engineers can now measure actual maximum moment and maximum reaction values set up in moving heavy equipment across various bridges, trestles and piers, by interpolation on the accompanying chart. Values are for one full lane width, simple spans, no impact

DURING THE INTENSE wartime activity in the Hawaiian Islands, there was constant movement of heavy traffic over the highways of the Islands, and bridges, trestles, piers, and other structures were continually required to support tanks, artillery, loaded trucks, and heavy construction equipment.

There were, therefore, continual requests to the U. S. Engineer Office in Honolulu for analysis of various structures, to ascertain if they would be able to carry some particular piece of equipment. Naturally, these requests for examination and report on bridges were rush orders, as usually the equipment was standing by ready to pass over the structure.

To be able to speed the reports for these investigations, George W. Forsberg, a structural engineer in the Fortifications Section of the Honolulu District Engineer Office, prepared a table which would by quick reference supply a comparison of the weights and applied loadings of miscellaneous heavy equipment and also a comparison of the stresses in bridge members caused by loads heavier than the customary design loads, H-15 and H-20, as against the stresses anticipated by these design loads.

With the thought in mind that similar problems are often faced by municipal and state highway engineers when heavy equipment is to be moved, either for nearby construction work, or in the normal functioning of a highway, Mr. Forsberg's chart is presented herewith for the use of readers of *Western Construction News*.

Actual maximum moment values (M) and maximum reaction values (R) can be obtained directly from the chart for spans of various lengths, and values for spans intermediate of those tabulated may be interpolated with sufficient accuracy for all practical purposes. The M and R values shown are for one full lane width, on simple spans, with no impact. Lanes are of variable width, according to the overall width of the piece of equipment under consideration, plus clearances as shown. The minimum lane width considered is 10 ft., and the maximum is 13 ft., 3 in.

Chart interpretations

In using the chart the following explanations are necessary:

M values are given in foot-kips, and R values in kips. Maximum shear (V) is slightly less than R.

All ratios of M and R for various loadings are to corresponding values for loadings A and C. H/A under M for loading H actually indicates $\frac{Hm}{Am}$. Similarly, under R, the symbol H/C indicates $\frac{Hr}{Cr}$.

Truck loadings A and D include trains of trucks as shown, or equivalent uniform loading per foot of lane plus concentrated loads. For all other equipment indicated in the chart, it is assumed that no other load is on the span at the same time.

Moments and reactions are to be distributed over stringers by the proper distribution factor S/C where S is the average spacing of stringers in feet and C is a constant depending on the type of flooring. (See A.A.S.H.O. bridge specifications.) The constant C may be slightly increased where the additional width of load justifies such change.

For concrete and steel bridges, impact should be added.

Dump truck loadings are estimated at 3,000 lb. per cu. yd.

Specific loadings

Lumber carriers (maximum total load, 21 tons; average load, 11 tons) correspond approximately to an H-15 loading for near maximum loads. Lane width is 10 ft.

Caterpillar D-8 tractors (weight about 17 tons) also correspond approximately to H-15 loading. A maximum excess of about 20 per cent occurs on 20 to 50-ft. spans. Lane width is 10 ft.

Concrete mixers and agitators (maximum capacity of 7 cu. yd.) mounted on Euclid or similar 4-wheel truck (total weight 26.8 tons) correspond approximately to H-20 loading. Excess of 24 to 30 per cent on spans from 4 to 50 ft., decreasing to 0 for a 100-ft. span. These values are for maximum capacity; empty pieces of equipment will not exceed H-15 loading. Lane width is 11 ft. 6 in.

Heaviest gasoline tank trucks (maximum capacity, 4,500 gal.; approximate weight, 21.4 tons) are covered by the H-15 loading. Lane width is 10 ft.

Warehouse vans are ordinarily covered by H-15 loading, and when loaded to full capacity with heavy material, the H-20 loading will virtually always be ample. Lane width is 10 ft.

Road rollers (maximum weight 14 tons) are covered by the H-15 loading. Lane width is 10 ft.

Military combat tanks required some special consideration. It was found that 2-lane bridges designed for H-15 or H-20 could carry two lines of 13.5 ton tanks without exceeding allowable stresses. Tanks of the 20 to 25-ton class may cross in single file along the centerline if spaced 40 ft. apart. Fifty-five ton tanks are required to maintain a 50-ft. spacing and not exceed 4 m.p.h., if allowable stresses are not exceeded.

Examples

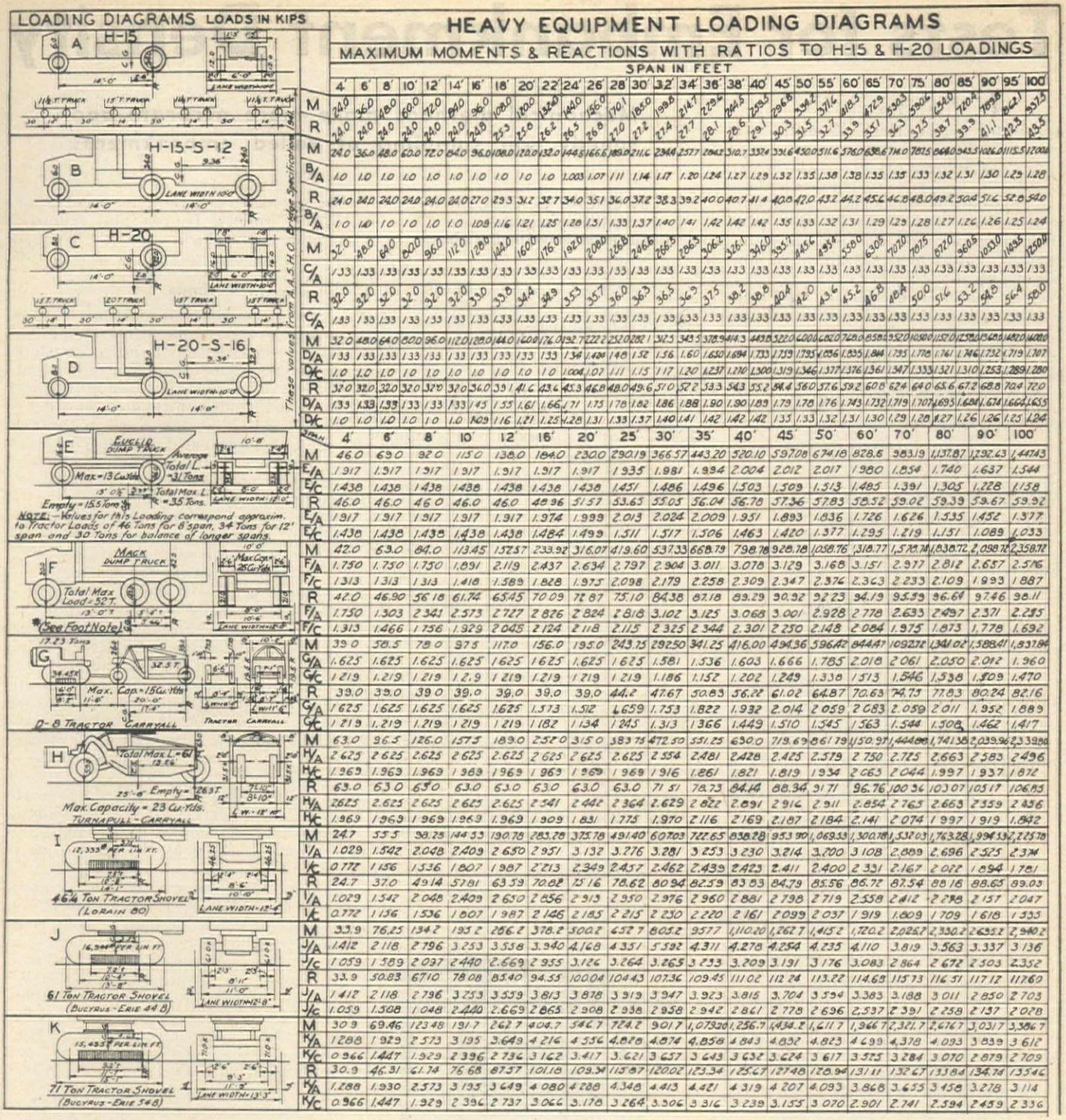
(1) Assume a 2-lane timber bridge with 21-ft. spans. The design load is H-20, with stringer spacing 14 in. C-to-C, 3 x 12-in. plank flooring with asphalt wearing surface. Required is the maximum moment in stringers for K loading shown in the chart. Direct interpolation for M between spans 20 and 25 ft. long for K load gives 582.2 ft. kips. A somewhat closer result is obtained by interpolating the ratio of $\frac{Mk}{Mc}$ which gives 3.458. M for a 21-ft. span on the H-20 loading is 168 ft. kips, multiplied by 3.458, gives 580.94 ft. kips.

The distributing factor (S/C) for 1-lane plank floor (A.A.S.H.O. spec.) is $\frac{1.17}{4}$. Increasing this by 25 per cent for wider lane of K loading and wide load distribution on tractor track, this factor becomes $\frac{1.17}{5}$ or 0.234. M per stringer then becomes 580.94 divided by 2 (for each rear wheel) x 0.234 or 67.97 ft. kips.

(2) Required in (1) the magnitude of moment per foot width of lane under loading K compared to loading C. M for K loading (580.94) divided by lane width (13.25) gives 43.84 ft. kips for foot of lane. M for C loading (168) divided by 10 gives 16.80, and the ratio of the two is 2.61. If, however, moments had not already been secured in example (1), the problem could be solved by interpolating the moment ratio for K/C or 3.458, and multiplying by the ratio of the lane widths ($\frac{10}{13.25} = 0.755$).

(3) A 1-lane truss bridge is designed for H-15 loading. Width of roadway is 12 ft. and the truss panel length is 19 ft. Required the maximum truss panel live load for E loading, and a magnitude comparison with H-15 loading.

By interpolation, the total lane reaction (R) for E load on 19-ft. span is 50.92 kips, divided by 2 gives 25.46 kips to each side. The wheels being close to the curbing on each side, this figure will be the live panel load for each truss, without impact. Also by interpolation, $\frac{Re}{Ra}$ gives 1.993 as the magnitude of the reaction to the E load compared to the A or H-15 load.



Terteling Firm Low Bidder on Long Lake Dam in Columbia Basin Project

J. A. TERTELING & SONS, Inc., Boise, Ida., were low bidders at $1,770,592 when offers were opened by the Bureau of Reclamation for building the 1,900-ft. earth-and-rock Long Lake Dam for the Columbia Basin Project.

Six bids were opened by Supervising Engineer Frank A. Banks. Other bidders, and their estimates, were:

Utah Construction Co. and Winston Bros., San Francisco, $1,775,657; Morrison-Knudsen Co., Boise, $1,867,155; McLaughlin Inc., Great Falls, Mont., $1,904,045; N. Fiorito Co., Seattle, $1,971,110; W. E. Kier Construction Co., Los Angeles; Bressi-Bevanda Constructors, Inc., Los Angeles, and Guy F. Atkinson Co., San Francisco, $2,074,740.

Intended to save several miles of costly main canal construction, Long Lake Dam will be about 2 mi. northeast of Stratford, and will block a natural channel now occupied by Long Lake, Coffee Pot Lake, and Pot Lake.

The Main Canal will be 20 mi. long, but use of Long Lake Dam will eliminate approximately 5½ mi. of "particularly difficult" construction. The southernmost 6½-mi. portion of the Main Canal, between Long Lake Dam and the division works, east of Soap Lake, is being excavated by Morrison-Knudsen Co. under a $619,000 contract. With a capacity of 13,200 cu. ft. per sec., the Main Canal will carry sufficient water to irrigate more than 1,000,000 ac. of land in the Basin.

The dam will have a maximum height of 110 ft. and will require approximately 1,500,000 cu. yds. of earth and rock fill. The successful bidder will have 800 calendar days to complete the dam after receiving orders to proceed.

Tests for Embankment Density

Mechanical methods make more accurate and speedy soil sampling of rolled embankments

By OSCAR G. GOLDMAN
Assistant Superintendent
San Francisco Water Department

IN THE CONSTRUCTION of any rolled embankment the purpose of the embankment determines to a great extent the amount of soil analysis which should be undertaken. However there are soil requirements which are common in all rolled embankments irrespective of their purpose. Probably the most important requirement for all rolled embankments is the proper densification of the soil material. Proper soil densification will produce an embankment which will not settle, thus permitting the immediate construction of the required structures against or on top of it.

The proper densification of the soil to be used for the rolled embankment is first determined in the laboratory. It is well known that for each given soil material there is an optimum moisture content which will produce a maximum density. The actual density of that soil material will depend upon the amount of uniform compaction of the soil.

Laboratory compaction

In the laboratory uniform compaction of a sample of the soil material is secured by confining the soil sample within a cylinder of known diameter and then dropping a tamping rod of known weight through a definite distance a given number of times upon the confined sample. The actual soil density, as indicated by the weight per cubic foot of the compacted soil sample, can be determined by two methods. Know the weight of the soil sample in the compaction cylinder and then determine its volume after compaction; or know the volume of the compacted soil sample and then determine its weight.

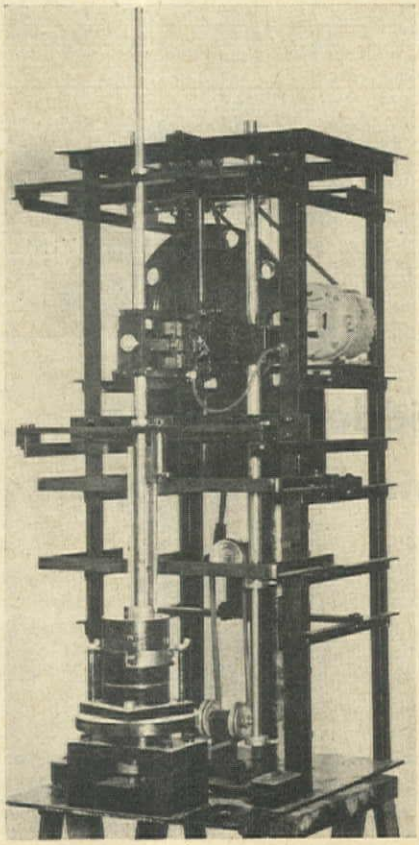
In order to determine the optimum moisture content for a specific soil material many samples of the soil are compacted with varying percentages of moisture content. The per cent of moisture content in the soil sample is the per cent of water, by weight, contained in the soil sample compared to the dry weight of the soil after compaction. This information is then plotted. The per cent of moisture content by weight contained in the soil material corresponding to the maximum dry weight of the soil is the optimum moisture content for that particular soil material. For each and every different type of soil an optimum moisture content curve must be made, and in the construction of any rolled embankment many different types of soils are encountered.

Field compaction

In the construction of a rolled embankment it is endeavored to duplicate the laboratory results in the soil materials comprising the embankment. This is accomplished by the addition of water to the soil material when a deficiency of moisture content is indicated; or when an excess of moisture is present, the material is exposed to the sun and wind in order to dry it out. The desired densification of the soil material is obtained by compacting the soil material with sheepsfoot rollers, and is controlled by the number of passes as well as the weight of the rollers. The uniformity and also the amount of the densification will also depend upon the depth of spreading of the soil material before compacting. In general the greater the thickness of the layers, the less uniform the soil densification will be and the greater will be the number of passes of the rollers required for the desired densification; and, conversely, the thinner the layers of the soil material, the more uniform the densification will be and the fewer the number of passes of the rollers required.

As soon as any portion of the rolled embankment has reached a depth of one foot a sample should be taken in order to determine its moisture content as well as its density, and necessary corrections made so as to bring it into agreement with the requirements determined in the laboratory. The corrections required may consist either of varying the moisture content in the material or increasing or decreasing the number of passes by the rollers. It may also require a change in the thickness of the layers of the spread material before compaction.

FOOLPROOF mechanical soil compactor assures exact sample densification.



Laboratory methods

From the above discussion it is obvious that a great many soil samples will have to be compacted and recompacted in order first to obtain the desired laboratory information, and second to check the actual field performance. In order to be of real value, the work in the field should be performed with speed as well as accuracy. From a practical point of view the soil sampling of the rolled embankment is of no value unless the results of the analysis can be obtained in time to apply the information while the same conditions still prevail.

As far as the writer can determine, the compacting of soil samples has always been accomplished by manual labor, that is, by hand, the tamping bar being first placed upon a portion of the soil sample contained within the compaction cylinder, raised by hand a definite height and then released, thus permitting it to fall upon the soil sample. This raising and releasing of the tamping bar is repeated until the required number of blows is struck upon each portion of the soil sample. This procedure is repeated upon each portion of the soil sample until the whole has been compacted. A typical specification for the above procedure is as follows: "A metal rammer or tamping shaft . . . weighing ten (10) pounds." . . . "After each sample has been prepared it shall be compacted in the mold in ten (10) equal layers, each layer receiving twenty (20) blows from the tamper or rammer dropping from a height of eighteen inches (18") above the final elevation of each compacted layer. After compacting the tenth layer the piston shall be placed in the cylinder and seated with five (5) eighteen-inch (18") drops of the tamper . . ."

The objectional features of the above procedure for the densification of one soil sample are: It requires the manual lifting of the ten pound tamping rod 205 times; it requires that the manual lifting of the ten pound tamping rod be eighteen inches each time, with no exact way of accomplishing that objective; it requires the person performing the test to keep an accurate count of the drops; obviously it is slow and tiresome and is subject to error.

Mechanical method

In order to overcome these objections the writer has developed and is now using in the soil laboratory at the Sutro Reservoir project in San Francisco a machine which does all of the required work in all its details. This machine consists of a ¼-hp. electric motor connected

to a flywheel by means of reduction gears, the flywheel in turn being connected to a slotted crosshead by means of a pin. To the crosshead is fastened an electric solenoid in the horizontal position.

At the end of the solenoid plunger a hole is drilled slightly larger than the diameter of the tamper shaft. Above and below the solenoid plunger and fastened to the crosshead are metal plates each drilled with a hole of the same diameter and in line with the one in the solenoid plunger. By means of a switch operated by fingers fastened to the crosshead guides, the electric power to the solenoid is controlled independent of the motor. A revolution counter is also fastened to the frame of the machine and is operated by the movement of the crosshead. The machine is put in operation by means of a manually operated switch which controls the flow of power to the electric motor as well as to the solenoid, the motor and the solenoid being connected in parallel.

When the crosshead is in its lowest vertical position the power is turned on in the solenoid which, by means of the plunger, grabs the tamping bar shaft. Power is maintained in the solenoid until the crosshead, now lifting the tamping bar, has reached the proper height, when it is cut off by means of the electric switch. The hold on the tamping bar shaft is then released, and the bar falls freely upon the soil sample contained in the compaction cylinder directly below. In addition to the lifting and subsequent releasing of the tamping bar the cylinder containing the soil sample is rotated a definite amount during each raising of the tamping bar and held stationary while the bar is falling as well as when resting upon the soil sample.

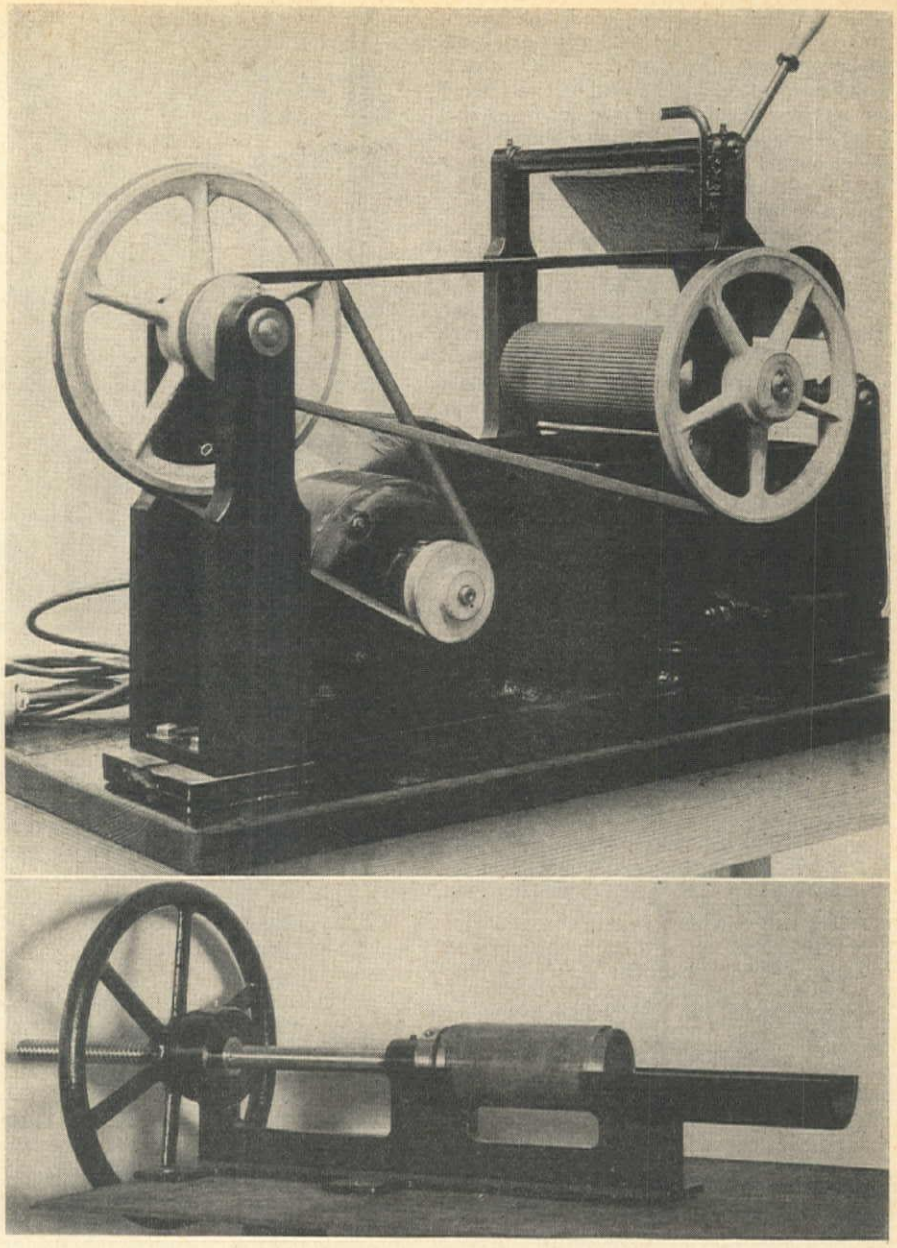
For this particular machine the weight of the tamping bar can be adjusted from 5½ to 10 lb. The maximum lift of the tamping bar is 13 in., and the number of drops of the tamping bar is 35 per minute. As actually used in the soil laboratory at the Sutro Reservoir project the machine is adjusted as follows: The weight of the tamping bar is 10 lb., the lift is exactly 12 in., and the number of drops per layer of soil sample is 30.

By the use of this machine the physical labor in the laboratory is eliminated, the accuracy of the work maintained, and the performance of the necessary soil testing assured.

Field sampling

The results of the laboratory tests are of no value unless they can be duplicated in the field. This means that the density of the soil in the rolled embankment must be determined from time to time. It also means that the determination of the soil density in the embankment during its entire period of construction must be performed as quickly as possible in order that the proper corrections, if required, can be made before additional fill material is placed. Once a mistake is covered it cannot be corrected unless the entire defective section is removed and the work started all over again—a very impractical procedure.

In the past the method of securing a sample of the rolled embankment material was by means of an orchard type hand auger operated by two men. The material loosened by the auger was carefully collected on a piece of canvas and then weighed. The volume of the auger hole was determined by either filling the hole with a known volume of dry sand or water, or by attempting to measure the varying diameters of the hole at various depths. The soil sample was then recompacted in order to determine its compacted weight per cubic foot. A small portion of the sample was oven dried in order to determine its moisture content. However since the determination of the moisture content is a slow process requiring many hours, it is usually the practice to add a known per cent of water by weight to the soil sample and then to compact the same. This procedure was repeated until the optimum moisture content was determined as indicated by the maximum dry weight per cubic foot obtainable. This procedure required the compacting of at least three soil samples in order to determine the optimum moisture content for the maximum density under the required compaction conditions.



GRATED ROLLER rotating at 200 rpm. pulverizes soil removed by core extractor, bottom, which mechanically withdraws soil from the sampler in its natural condition.

It must be obvious that the process of securing the soil sample is laborious and tiresome, that the volumetric determination of the auger hole is subject to considerable error, and that the time required for securing the soil sample, as well as the determination of the required information, is unreasonably long. As a result of these facts it is usually impossible to correct the errors in the existing rolled embankment.

To overcome the objections of the auger method for securing the soil sample the writer has developed a core sampler similar to the usual type used by any well drilling outfit but with a few minor changes.

The core sampler consists of four parts, namely, shoe, barrel, coupling and head. Each end of the barrel is threaded and finished to such dimensions as to contain exactly 1/20 of a cubic foot. The

shoe is tapered on one end, the other end being threaded to fit onto one end of the barrel. The coupling is threaded and fits onto the other end of the barrel while the opposite end screws onto the head. Inside the head is a small ball check with the required bleeder holes for permitting the air to escape when the barrel is filling with the soil material. On the opposite end of the head from the core barrel is a heavy steel rod of sufficient length to permit the driving of the core sampler into the soil by a sledge hammer. The sampler is withdrawn by means of an auto bumper jack.

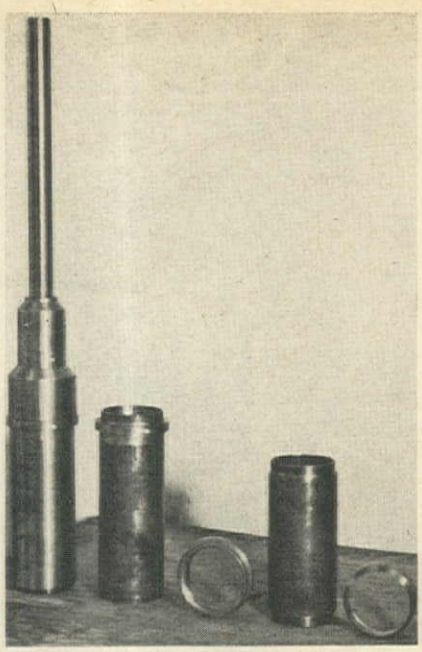
By means of the core sampler the following should be observed: an accurate sample is obtained in its actual condition; its volume is accurately determined; all work involved in its determination eliminated; no loss of moisture content due to evaporation; it is possible to secure the sample in a minimum of time; a minimum of computation required for determining the density.

Having secured the soil sample the next step is to remove the soil core from the barrel. One of the conditions in the removal of the soil core is to secure it in as near its natural condition as possible in order to observe its stratification or uniformity of compaction. For this purpose a core remover was developed, consisting of a rising stem, yoke and plunger, together with the required rests for holding the core barrel and a receiving shelf for the ejected core.

After the core has been removed and carefully inspected it must be pulverized in order to recompact the material. This requirement is necessary in order to compare the field results with those of the laboratory. As developed by the writer the pulverizing machine consists essentially of a grated roller rotating at about 200 rpm. by means of ¼-hp. electric motor and reduction pulleys.

Optimum moisture

As was stated before it is necessary to develop the optimum moisture curves



CORE SAMPLER shown above has four parts: shoe, barrel, coupling and head, the barrel containing 1/20 cu. ft.

for each type of soil encountered. This curve is the relationship between the dry weight in pounds per cubic foot and its moisture content in per cent by weight. Superimposed on the curve is now added a second set of curves showing the wet weight per cubic foot for each dry weight per cubic foot. With the use of these combined curves it is unnecessary to dry out the soil sample or to run additional compaction tests.

Perhaps the best way to illustrate the use of these curves is by a few examples.

Example (1). A soil sample in the rolled embankment was taken and found to weigh 145 lb. per cu. ft. On recompacting the sample it was found to weigh 139 lb. What correction, if any, should be made in the moisture content of the soil material in the rolled embankment? Is the embankment over or under compacted?

Answer (a). Locate the recompacted wet weight, namely, 139 lb. per cu. ft., on the optimum curve ABC, as at A. It will now be noted that the actual moisture content of the recompacted sample, which is also the moisture content of the original sample, is 8.1%. The optimum moisture content as indicated by the curve is 10.05%. Hence in order to have optimum moisture in the embankment material 1.95% by weight of water must be added to the embankment.

(b). Since the moisture content of the original embankment sample is the same as the recompacted sample, the point of intersection of the actual moisture content with the wet weight curve of the original sample determines the actual condition of the original embankment sample. In this case the said point of intersection is at D. Since point D is to the outside of the optimum curve ABC, the soil material in the embankment is over compacted, and therefore fewer passes of the rollers are required.

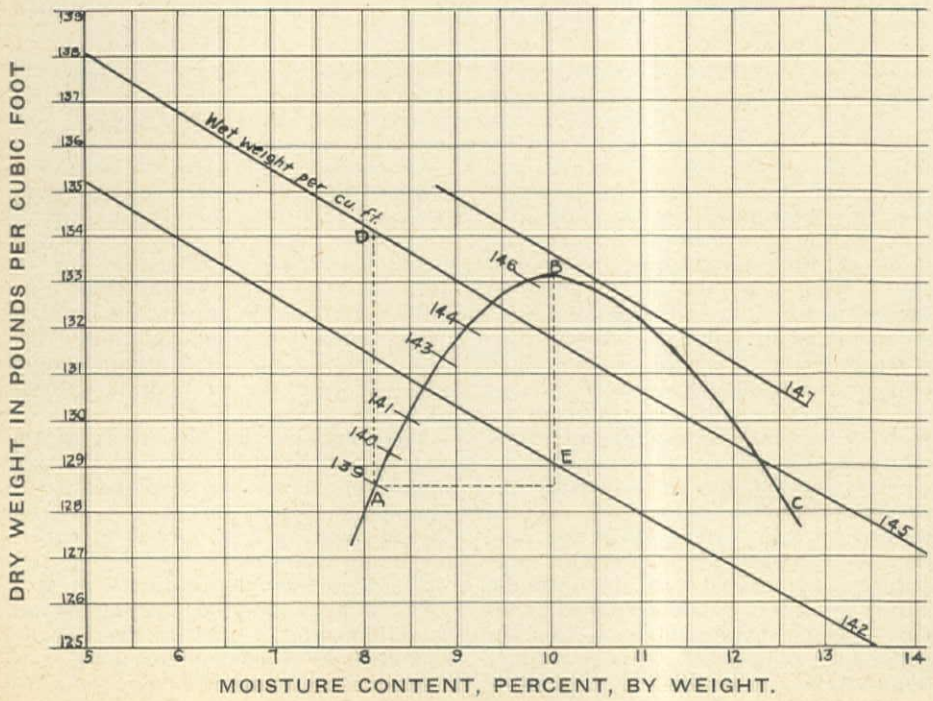
Example (2). The original soil sample from the rolled embankment was found to weigh 142 lb. per cu. ft., wet weight. On being recompacted the wet weight increased to 146½ lb. per cu. ft. What correction, if any, should be made in order to obtain the proper moisture content as well as the proper compaction?

Answer (a). Again locating the recompacted wet weight on the optimum curve ABC it is found to fall at point B. This said point coincides with the point of optimum moisture content. Hence no correction in moisture content is required.

(b). The point of intersection of the moisture content line with the actual wet weight curve, indicating the actual condition of soil in the rolled embankment, in this case, is at E. Since the point is on the inside of the optimum curve ABC, the soil in the rolled embankment is under compacted and more passes of the tamping rollers are required.

It is self evident that by the aid of these curves together with the new equipment developed by the writer the analysis of a soil sample is greatly simplified and that the time required for the analysis has been reduced to a minimum. Where formerly several hours, and in some cases even a day, were required in order to determine the correction factors necessary to secure the proper rolled embankment, they can now be determined in a few minutes. Actual experience in the field laboratory has demonstrated by the use of the above-mentioned equipment in conjunction with the proper curves that a complete soil analysis can be made in about twenty minutes.

The writer desires to give due credit to Mr. A. Hanratty, Civil Engineer in charge of the soil laboratory at the Sutro Reservoir project, for the development of the combination curves referred to in this article.



DATA ARE superimposed on the optimum moisture curve to quickly determine the correction factors necessary to obtain the proper rolled embankment.

Major Surgery for High Sierra Road

Another section of an old-time trail gives way to a modern highway through mountain and forest —A spectacular job requiring removal of 38 ac. of trees and excavation of 424,000 cu. yd. of mountain despite heavy summer traffic which could not be detoured elsewhere

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

FOREST HIGHWAY 32-K is undergoing major surgery.

Anyone traveling up the west slope of the Sierra Nevada from Placerville, Calif. to Echo Pass over U.S. 50 may not know he is traveling on Forest Highway 32-K, but he does know that something is going on. Whenever a modern highway cuts through mountain and forest, the building of it is spectacular, and this stretch through Eldorado National Forest is no exception.

The old road between Pollock Pines, and on up grade to a point called Fresh Pond (near the Placer Lumber Company) has been especially replete with blind curves. By moving 38 ac. of trees and excavating 424,000 cu. yd. of mountain, the distance can be reduced to 3.14 mi. And that, at the moment, is what H. Earl Parker, contractor from Marysville, Calif., is doing.

The job invites three-way interest between the U. S. Forest Service, the Publjc Roads Administration, and the State of California, Division of Highways. To the first, it has great value in fire suppression work and as a timber hauling road; to the second, it is part of a national responsibility; and to the third, it is a harmonious extension of the highway improvement program now in full dust-raising progress all over the State. And to the perspiring citizen of California's Central Valley, it's a faster spin to Lake Tahoe.

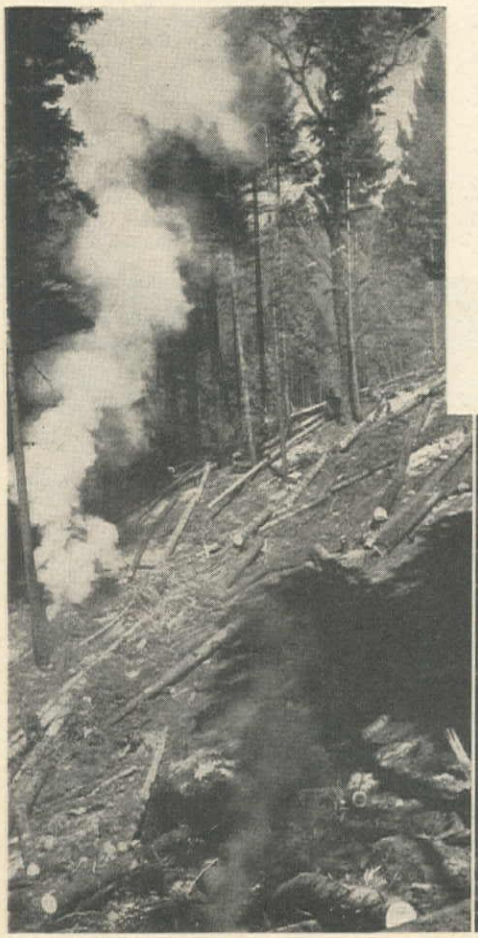
The public roads people consulted the interests of all concerned, did the engineering, and let a contract in the amount of $470,032.50. The job started March 26, and they hope to finish it by December 6. Midpoint finds trees and dirt being shoved around in a manner that becomes any mountain construction. Considering further that heavy summer traffic that cannot be detoured is flowing smoothly through this confined working area, there is ample evidence of nice advance planning.

Construction details

In order to get rid of the 38 ac. of forest, mostly Ponderosa Pine, logs were bucked and cold decked, and then headed for market. Slash burning and clearing followed, according to Forest Service recommendations.

One special problem is that of water for compaction purposes. All 13,900,000 gal. of it has to be hauled or pumped. In addition, over 30,000 tons of dry ingredients have to be hauled up the side of the Sierras before they can be mixed and rolled out in the shape of Forest Highway 32-K. When completed, a typical cross-section will begin with 6 to 12 in. of selected subgrade material, a base course of crushed gravel or stone of approximately 6 in., a bituminous prime coat, and a 3-in. surface of dense graded asphaltic plantmix, topped off with a seal coat. The new roadway will have a running surface 32 ft. in width, plus the added safety of wide shoulders that will bring the useable surface, in a pinch, to 46 ft. Thus another section of an old time trail gives way to a fast four-lane highway.

There is a little more to this three-mile stretch besides a balance of cut and fill. One is a short reinforced concrete



TREES MOVE OVER at left to make room for the new road. Logs, mostly of Ponderosa pine, are bucked, cold decked and headed for market. Slash burning and clearing follow Forest Service recommendations. Stumped path of the new route is at bottom. Old road at far right. At top new roadway hops power and irrigation ditch.

NEW GENTLE curves replace sharp turns of old road, far side at top left. Bottom, Forest Highway 32-K begins to look like a beautiful piece of road, matched only by the scenery, with cuts and fills nicely balanced, despite considerable overhaul yardage.

single-span bridge over a power and irrigation ditch carrying water from an upper tributary of the American River. Another is a 90-in. corrugated metal pipe to replace a concrete structure in the old road. The largest drainage installation on the job, it provides a new route for a sidehill stream.

New Sierra crossing

The job is admittedly a small one, especially in comparison with some of the things we watched while the country fought a war, but the work is important because it seems to be a typical example of mountain roads of the future.

To this day, U.S. 40 is the only reasonably easy way over the California hump to the West Coast for hundreds of miles in either direction. The State underscored its importance by using what thin forces it had to keep it open, and keep it maintained.

Already there are more than signs that U.S. 50 will be easy going someday, for besides the above work, a little over 2½ mi. on the east side of Echo summit is being straightened out. Eventually, the present tough climb will be eased to a six per cent grade. This section that extends east of the summit and on into Nevada is known as Forest Highway 32-J. While it has high recreational value, it does not top 32-K which will be immediately useful in getting out timber to a hungry lumber market, and therefore complete improvements to both approaches to Echo summit must wait.

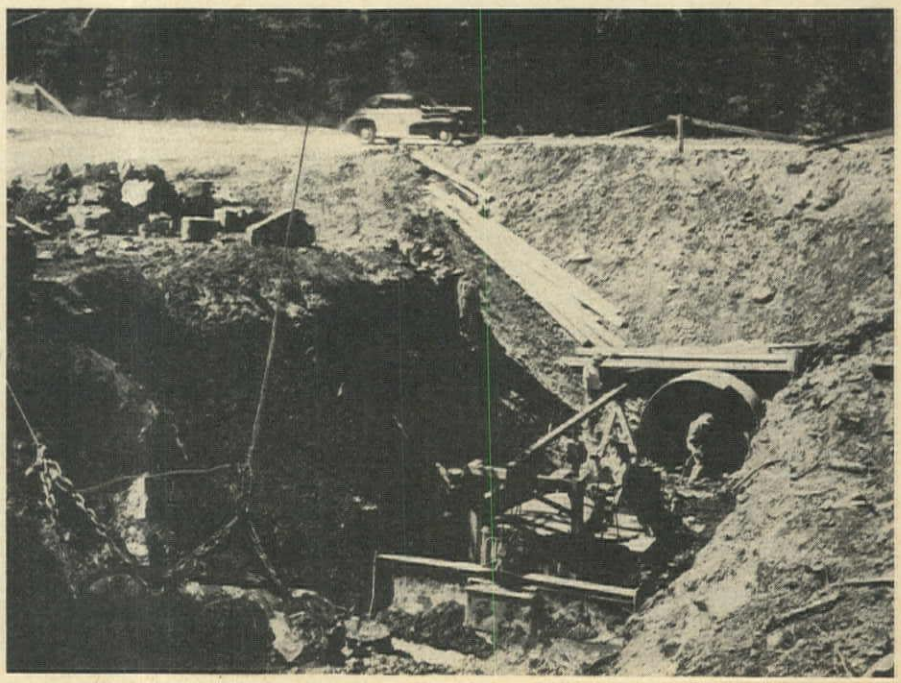
H. T. Gunderson is resident engineer for Public Roads, and maintains jobsite quarters and office at Pacific, Calif. With him is H. E. Bovee, his assistant, and Harold Claussen who keeps a federal eye on work east of the summit. Between the three of them, the first chinks of a new route over the Sierras are falling into place.

Nevada Follows California From Colorado Basin Group

NEVADA FOLLOWED California by withdrawing from the Colorado River Basin States Committee—the reorganized Committee of Fourteen—last Aug. 15 soon after the Salt Lake City meeting.

California was the first state to resign and did so just before the Salt Lake City meeting. Formerly the board consisted of two gubernatorially appointed representatives from each of the seven states.

Nevada's reason for withdrawal—much the same as California's—was because "the committee of fourteen had defeated the desires and objectives of the majority of Colorado River water users by vigorous work to secure enactment of the treaty with Mexico for the delivery of Colorado River water to Mexico under unfavorable terms and in excessive quantity."



WORKMEN place a 90-in. corrugated metal pipe culvert as tractor and dragline team up to establish new route for sidehill stream. This is the largest drainage installation made on the new highway which may some day become easy going.

Funds Advanced by FWA for Public Works in the West

ANNOUNCEMENT has been made during the last month of numerous additional advances by the Bureau of Community Facilities of the Federal Works Administration to assist in the preparation of plans and specifications for needed public works. These funds are advanced from the planning money made available by Congress and are to be repaid without interest, when construction is undertaken. Advances and the purposes for which they are designed follow:

Arizona

The University of Arizona, Tucson, received an allotment of $10,631 for planning a new women's dormitory, estimated to cost $318,026.

California

Fullerton School District received $3,358 to plan elementary school buildings which will cost $76,513; Larkspur was granted $3,000 to assist in designing an outfall sewer and pumping plant, to cost $110,750; Mill Valley School District, $10,900 for planning an elementary school at Alto, estimated at $194,110; Oroville High School District, $5,000 for designing a gymnasium, which will probably cost $110,000; Redondo Beach, $732 for a fire substation, costing $25,674, and $781 for a public library to cost $28,042; and Saugus School District, $2,400 for laying out an elementary school, estimated to cost $70,000.

San Jacinto was advanced $4,550 for sanitary sewer extensions to cost $126,279. Alhambra received three advances: $10,000 for $231,000 city maintenance yard buildings, $18,000 for a $413,800 Memorial Community Hall, and $2,500 for a $57,000 Public Library addition; Vista Sanitary District, $3,087 for sanitary sewer extensions and treatment plant improvements to cost $70,920; Fillmore, $5,500 for a $257,000 sanitary sewer system and treatment plant; Indio Sanitary District, $7,118 for $177,723 sanitary sewer extensions, treatment plant and pumping plant; Paso Robles War Memorial District, $8,758 for a $157,650, 30-bed hospital; Banning Union High School District, $2,700 for a $65,420 cafeteria addition; Watsonville Joint Union High School District, $15,600 for a shop and agriculture building estimated to cost $317,800.

Colorado

Boulder County School District received an advance of $20,175 to plan two new schools and renovation of four others, to cost in all $500,400; Granby was allotted $3,753 for planning water system extensions which will cost $74,883. Other Colorado advances were: Gunnison, $6,000 for sanitary sewer system, $150,000; Holyoke, $2,000 for sewage treatment plant, $51,000; Lafayette, $5,000 for replacing water system, $111,000; Larimer County School District, $9,000 for school additions at Estes Park, $224,000; Las Animas County School District, $5,120 for two schools at Trinidad, $165,600; Mesa County School District, $17,090 for high school expansion at Grand Junction, $459,868; Nederland, $3,326 for waterworks additions, $47,400; and Routt County School District, $5,715 for high school addition at Steamboat Springs, $186,165.

Kansas

Carbondale was granted an advance of $1,760 to plan a complete waterworks system, estimated to cost $30,000; Hamilton County received two advances, $13,400 to plan a school addition at Syracuse, costing $356,100, and $1,280 for an athletic field and accessories at Syracuse, to cost $34,500; Oberlin was advanced $770 for designing sanitary sewer additions which will cost $21,500; Quinter was loaned $2,500 to plan a complete sewage system, which may cost $71,300; and Victoria received $5,500 for a sewage system estimated at $116,500.

Nevada

Lovelock was granted two advances: $3,500 for planning improvements to the water supply, costing an estimated $75,400, and $1,500 to design a sanitary sewer system and treatment plant which will cost $35,410.

New Mexico

Albuquerque Board of Education was advanced $26,550 to plan a high school and three school additions, to cost in all $1,100,000; Roswell was granted $14,850 to design sewer system extensions, including a disposal plant, which will cost $438,886; and Tularosa received $2,700 to plan similar facilities, which will cost about $78,200.

Socorro was advanced $7,700 for street grading and paving, including curbs, gutters and sidewalks, estimated cost $184,500.

North Dakota

Bismarck has been granted 11 advances. They are: $3,270, feeder water mains, $120,000; $3,300, water system extensions, $121,000; $3,192, elevated water tank, $117,000; $9,000, storm sewers east of Capitol, $330,000; $6,000, storm sewers west of Capitol, $220,000; $3,180, storm sewers, Veterans' Addition, $117,000; $2,475, water and sewers, Veterans' Addition, $91,000; $705, water main extensions, $26,000; $2,829, water and sewers, Casey's Addition, $104,000; $3,180, reservoir and feeder main, Fisher's Addition, $106,000; and $3,930, water and sewers, Fisher's Addition, $144,000.

Oklahoma

Binger was loaned $1,528 to plan a water well and supply line, estimated to cost $32,438, and Carter County received three advances: $1,640 for school buildings at Berwyn, to cost $43,460; $2,720 for school buildings at Tatums, estimated at $72,080; and $2,840, for another school building, to cost $75,260.

Oregon

Gaston High School District was advanced $1,345 to prepare plans and specifications for a vocational building, estimated to cost $40,000; and Grants Pass was granted $2,500 for engineering concerning grading and surfacing streets, the job estimated to cost $203,150.

Texas

Amarillo received three advances of $720 each for planning fire stations to cost $36,350 each, and also $26,250 for designing a new city hall, estimated to cost $970,000; Borger School District was given $3,226 to plan an athletic stadium, estimated at $97,252; Cleburne received $2,260 to assist in planning sanitary sewer extensions, to cost $53,000; Dripping Springs High School District was alloted $5,250 for a new school building to cost $170,200; Cockran County received four allotments of $5,400 each for planning 15 mi. of roadwork in each of four county districts, to cost in each $123,775; Jourdanton was awarded $4,236 to lay out a new sanitary sewer system, which will cost $96,839; Menard County received $9,652 to plan improvements at an airport, believed to cost $227,300; and Tarrant County was granted $5,633 to design a sewage treatment plant and outfall sewer, to cost $125,233.

Utah

Advances in Utah with the project and estimated cost are as follows: American Fork, $9,800, sanitary sewer system, $313,000; Castle Dale, $2,500, replacement of water mains, $71,400; Davis County School District, $13,300, high school addition at Kaysville, $371,000; Hyrum, $8,900, sanitary sewer system, $251,100; Moab, $1,400, water supply improvements, $42,700; Monticello, $2,400, sanitary sewer system, $66,300; Morgan City, $4,370, sanitary sewer system, $123,400; Park City, $2,470, recreation facilities, $69,600; Richfield, $2,132, reservoir and pump house, $59,786; Riverdale, $6,230, water system and sanitary sewer system, $180,000; Salt Lake County, $15,526, water supply main system in southern portion of county, $835,929; Sigurd, $205, reservoir, $5,545; South Salt Lake, $3,800, sidewalk extensions, $120,300; Tooele, $5,100, memorial recreation building, $143,100; and Tremonton, $1,330, storm sewer system, $37,200.

Washington

Port Angeles was advanced $8,000 to finance planning of a municipal building, estimated to cost $216,100, and Sumner was granted $8,500 to assist in designing a sewer system and treatment plant, to cost $150,000.

Wyoming

Lusk received a federal advance of $5,500 to design a sanitary sewer system extension, estimated at $113,100, and Riverton was alloted $3,200 for similar facilities which are estimated to cost $115,000.

CONSTRUCTION DESIGN CHART

LXXV . . . . . Flow of Water in Clean Cast Iron Pipe

By JAMES R. GRIFFITH
James W. Carey & Associates
Seattle, Wash.

THE SELECTION of the proper formula by which to determine the flow characteristics in a pipe line is a difficult and uncertain problem. The availability of tables or curves, applicable to some particular formula, is frequently the determining factor in making the selection, at least for the average occasional user. Thus the Williams & Hazen Tables[1] have long been popular, not from the standpoint of flow accuracy but largely due to their convenient form of presentation.

The uncertainties and existing confusion when making a comparison between the many published flow formulas was no doubt an influencing factor when Edward Wegmann and Albert N. Aeryns undertook their investigations. Instead of attempting an original research project, theirs was a correlation project of all available records concerning the flow of water in clean cast iron pipe. Experimental and observed values of 260 gagings were plotted. These data covered pipe sizes varying from 3 in. to 61.125 in. in diameter. After values were carefully weighted, they then tried to develop an exponential formula which would more closely agree with available data. The formula thus developed, known as the Wegmann-Aeryns formula, was in the form of

$$V = 182.5\ R^{0.723}\ S^{0.539}$$

V=Velocity in ft. per sec.

R=Hydraulic radius in ft.

S=Slope of the hydraulic gradient, or loss of head in ft. per ft. of pipe length.

This formula was published in 1925 and is given, with corresponding flow tables, by the Cast Iron Pipe Research Association in their handbook.[2]

Wegmann and Aeryns reported that a comparison between results by developed formulas and experimental values showed the following average variations through all ranges of pipe sizes:

Wegmann-Aeryns formula	=—0.5%
Ganguillet & Kutter (n=0.011)	=+1.1%
Williams & Hazen (c=130)	=+5.6%
Flamant	=+5.9%

The accompanying chart has been prepared for the solution of the Wegmann-Aeryns formula by the use of a single straight line intersecting all scales. A solution line has been drawn on the chart for the following assumed conditions:

Pipe diameter (inside)=12 in.

Friction head=11.0 ft. per 1,000 ft. of pipe.

The following values were obtained from the intersection on the other scales:

Discharge=4.6 cu. ft. per sec.=2100 gal. per min.,

Velocity head=0.56 ft.,

Velocity =6.0 ft. per sec.,

Pressure loss=4.7 lb. per sq. in. per 1,000 ft. of pipe.

Using the same assumptions of pipe size and head loss, the following values were taken from the published tables[2]:

Discharge=2083 gal. per min.,

Velocity =5.91 ft. per sec.

Then by computation we have

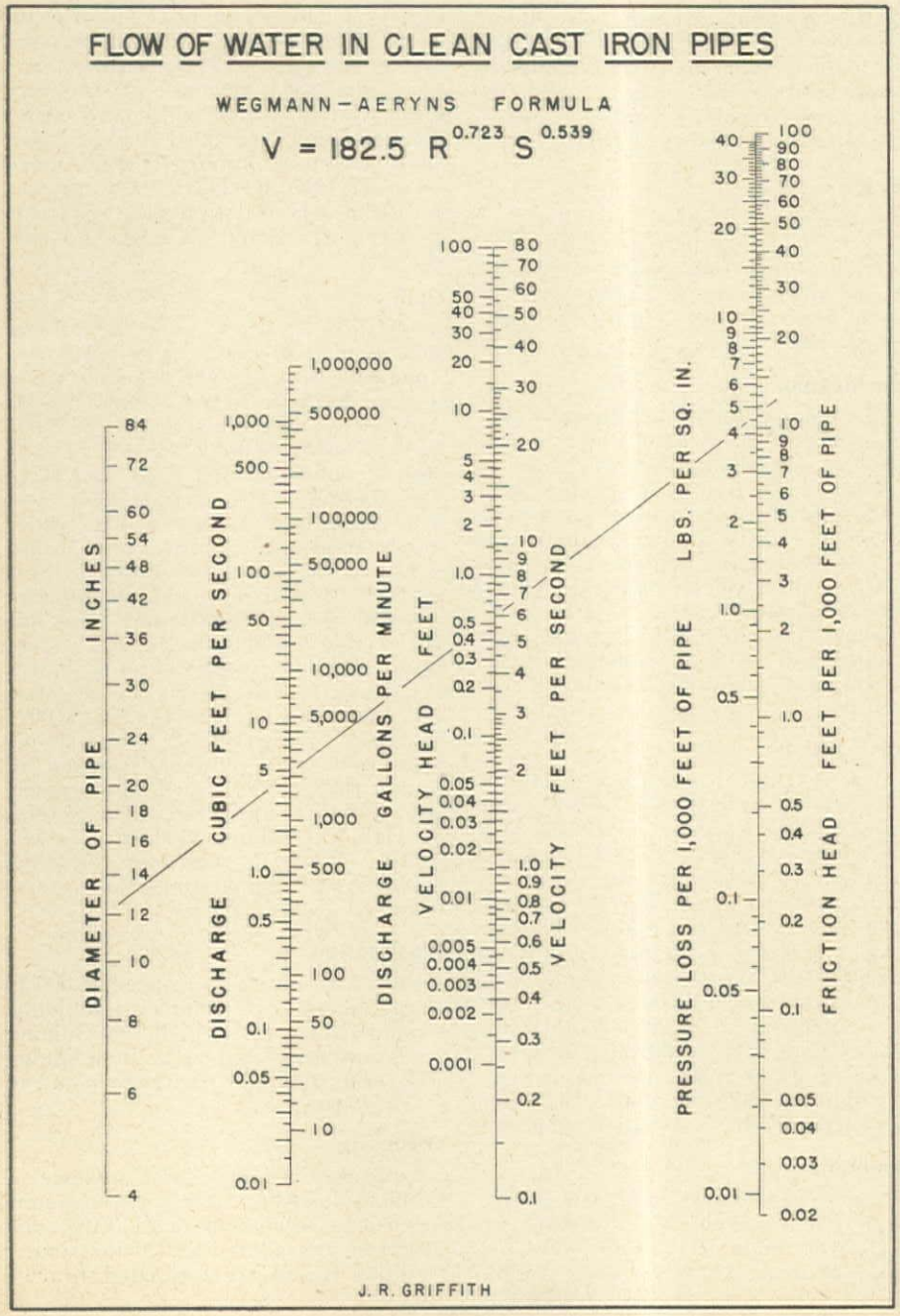
$$\text{Discharge} = \frac{2083}{448.8} = 4.64 \text{ cu. ft. per sec.}$$

$$\text{Velocity head} = \frac{5.91^2}{2g} = 0.543 \text{ ft.}$$

$$\text{Pressure loss} = \frac{11 \times 62.5}{144} = 4.76 \text{ lb. per sq. in.}$$

In contrast to the above, the Williams and Hazen Tables[1], for a value of c=130, and a discharge of 4.642 cu. ft. per sec., gives a head loss of 9.9 ft. per 1,000 feet of pipe. Thus for the almost identical discharge, the loss of head is about 10% less.

[1] John Wiley & Sons, Inc.
[2] Handbook of Cast Iron Pipe.



HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD

Montana Contractor Moves Heavy Loads Long Distances

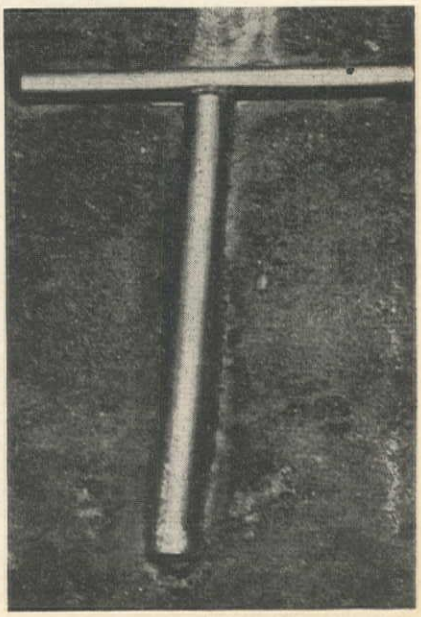
A SUCCESSFUL reputation is being built by Charles Harris, contractor of Scobey, Mont., for moving heavy objects across the long distances of that state. Pictured above are three of his recent jobs. The steel truss bridge, 112 ft. long and weighing 55 tons, was moved 30 mi., with the temperature at 28 deg. below zero. It is shown at its new location, the far end blocked up to slide onto its pier. Center picture is a 10-room house, which was moved a distance of 30 mi., and the bottom photo shows two trucks, each braced against anchor pins, moving a 12-room house. The anchor and winch technique is used by Mr. Harris, when pulling these heavy loads upgrade or over difficult road.

THE LONG AND THE SHORT

DURING CONSTRUCTION of Keswick Dam, of the Central Valley Project, by Atkinson-Kier Co., a WCN photographer snapped this view of cleaning large vibrator with a small chipping chisel.

STEEL PARKING MARKER

TO DESIGNATE individual curbside parking spaces in its streets, San Luis Obispo, Calif., places strips of 2-in. half-round steel strap welded as a tee, 22 in. across the top, with a 26-in stem.



New Rail Pulling Equipment First Used in San Francisco

REMOVAL OF old street car rails has been accomplished at rates of 100 ft. per hr. with the use of plant-made equipment, a heavy tractor, and a front end tractor shovel by Eaton and Smith, contractors of San Francisco. Intended for use where street surfacing is to be disturbed no more than is necessary and rail is not to be reused, this system of rail removal pulls the rail from the street, more or less as a dentist pulls a tooth, with a minimum of preliminary preparation and following clean up.

The pulling instrument is the tractor shovel, in this case a Traxcavator mounted on a Caterpillar D-7, to the bucket of which is attached a heavy chain and a specially made set of tongs which grip the rail. However, a special working base for the tractor provides essential clearance required underneath the machine and distributes the stress generated in the rail pulling over a larger pavement area. The base is simply a 35-ft. sled made up largely of old rail sections and a little steel plate.

The sled, or skid, consists of two sets of tracks joined together at one end by a high arched section of rail, and at the other by a small strip of steel plate. Each of the two tracks consists of a series of 4-ft. sections of rail spaced about 18-in. on center, placed laterally and supported on two skids made up from 3/8-in. steel plate. Each skid is about a foot wide and a couple of inches high, and runs the full length of the sled. On top of the 4-ft. rail grill are four rail sections running the length of the sled and forming a guide for the tractor as it moves along the sled. The two outside rails are mounted normally, base down, but just inside each of these is a section laid sideways with the base of the rail section turned in. All connections are electrically welded.

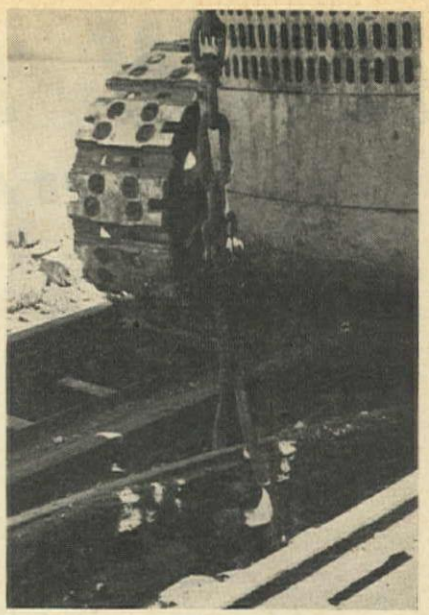
The tongs, which are of heavy steel construction, have fairly long levers above the fulcrum and are individually connected by clevises to two-link chains which are in turn connected to a common clevis on the shovel bucket chain. This arrangement forces the tongs to grip the rail more firmly as increased pull is exerted by the shovel.

The only preparatory work required is digging two 6x6-in. holes on opposite sides of the rail at intervals of about 12 ft. This is done by ordinary pavement breakers and the holes made deep enough that the tongs can get a firm grip around the head of the rail. The sled is placed on the street straddling the rail, and the tractor moves up to the holes nearest the head of the machine. With the bucket lowered, the tongs are placed around the rail and held in position until some strain has been placed on the connecting chain. Then the bucket is raised and the rail comes up out of the pavement with little apparent effort.

When the rail has been raised as far as clearance will permit, the tractor moves back to the next set of holes and repeats. As the rail is cleared the length of the sled, the tractor backs off, pulls the sled down the street one length and goes back to pull again. With the rail now above the street surface it can be cut into convenient lengths by an acetylene torch. Broken street surfacing material next to the rail is removed by hand, or with the aid of pavement breakers, into piles which can be picked up.

The net result is a pair of relatively narrow trenches left where the rails formerly lay. These trenches can be filled with concrete delivered in transit-mix trucks with very little delay.

This method was first employed by Eaton & Smith on a two-block, double-track removal job on Bush Street in San Francisco. R. F. Smith was job superintendent, and was instrumental in development of this method of rail removal.



TONGS ARE placed around rail and held in position until strain is applied. When the bucket is raised the rail is pulled loose with little apparent effort and a minimum breaking of pavement.

RAIL-PULLING equipment in action. Left, the rail in the process of being raised from the pavement. Right, tractor and skid being moved into position to prepare for lifting the next section of rail.

NEWS OF WESTERN CONSTRUCTION

SEPTEMBER, 1946

California Water Works Men To Convene in San Francisco

SAN FRANCISCO will be host to the 27th annual convention of the California Section, American Water Works Association, on October 23, 24 and 25. Meetings and social events will revolve around the Civic Auditorium and Hotel Whitcomb.

The convention will open at 8 a. m. Wednesday the 23rd with a golf tournament under the direction of Claude T. Faw. The entire morning will also be spent in registration at the Civic Auditorium. At 2:30 that afternoon Carl M. Hoskinson, Chairman of the California section, will preside over the opening of the technical sessions. Following a speech by San Francisco Mayor Roger Lapham, there will be three papers. "Water Development Plans in California" by Edward Hyatt, state engineer; "State Highway Expansion and its Effect on Public Utilities" by Fred J. Grumm, assistant state highway engineer of California, and "The Effect of Owens Lake Litigation on Water Appropriation in California" by C. T. Waldo, deputy city attorney of Los Angeles, for the Department of Water and Power.

Wednesday evening there will be a Purification Division Dinner in the Crystal Ballroom of the Hotel Whitcomb, with a talk by Harry Jordan, secretary of the national association.

On Thursday the 24th, there will be parallel sessions of the Purification Division and Plant Management and Operation Division starting at 10 a. m. in the Civic Auditorium. The Purification program, with H. C. Medbery, chief water purification engineer for the San Francisco Water Department, presiding, will cover papers on problems encountered in using high fluoride water, geochemical changes in ground water supplies and treatment of water for industrial applications of atomic energy.

H. F. Jerrauld, assistant engineer of Pasadena Water Department, will be presiding officer of Plant Management and Operation session covering practical cleaning and rehabilitation of wells, chlorination of mains after breaks and the history of water meters.

The White and Gold Room of the Hotel Whitcomb will be the setting for the Executive Committee luncheon at 12:15 p. m. Thursday. A meeting of all divisions will follow under the chairmanship of Hoskinson with scheduled talks by Blair Burnson, sanitary engineer of the East Bay Utility District; N. J. Kendall, operations engineer of California Water Service Co., San Jose; E. W. Barbee, water purification engineer with the San Francisco Water Department, and Robert Ebaugh, assistant engineer of Southern California Water Co.

The men's business dinner will be held at 6:30 p. m., Oct. 24, in the Whitcomb's Crystal Ballroom with addresses by Wendell Ladue, national president of the association, Chief Engineer and Superintendent of the Bureau of Water and Sewerage at Akron, O.

Speakers planned for Friday morning, Oct. 25, at an all division session are: A. H. Knudsen, mechanical and electrical engineer of the East Bay Utility District; I. E. Flaa and W. C. Renshaw, San Francisco Water Department; O. G. Goldman, San Francisco Water Department, and C. G. Ekstrom, Arizona Edison Co. Thursday's afternoon session will hear Dean Van Norman of the Los Angeles Department of Water and Power; W. J. Ritzell, superintendent of Pasadena Water Department, and G. L. Williams, California Water Service Co. of San Jose. This will be followed by a round table discussion of current problems with Lauren W. Grayson, superintendent of the Riverside Water Department, presiding.

The convention will close Friday evening, Oct. 25, with the Manufacturers' Dinner and Dance sponsored by the Water and Sewage Works Manufacturers Association, which will also conduct a display during the whole convention. An entertainment schedule is also being planned for wives of the delegates during the three-day meet.

NEW "THIS IS THE PLACE" MONUMENT FOR UTAH CANYON

GROUND IS BROKEN for the site of the new Mormon monument, THIS IS THE PLACE, which commemorates the point in Utah where Mormon pioneers entered Salt Lake Valley. According to legend, in Emigration Canyon Brigham Young proclaimed, "This is the place." Fred Berquists of Salt Lake City owns the Allis-Chalmers Diesel which cleared the ground for the monument to be completed in 1947.

Two-Thirds of All Central Valley Project Income Earned in 1946

RICHARD L. BOKE, Regional Director of the Bureau of Reclamation at Sacramento, reports that total earnings of the Central Valley Project for the fiscal year ending June 30 approximate $4,089,800.

Sale of power from Shasta Dam is the biggest single item, followed by water sales, rental of buildings, rent of the Shasta-Oroville power line, and leases of grazing lands in the foothills above Shasta and Friant dams. Income for 1945-6 breaks down as follows:

Power sales	$3,677,784
Line rental	75,000
Lease of grazing lands	3,421
Miscellaneous	100,750
Water sales	232,807
	$4,089,762

Almost all the power distributed was sold wholesale, under a temporary wartime contract, to the Pacific Gas and Electric Co. at Shasta Substation near Redding and at Oroville. Small additional amounts were used by the construction company at the dam itself, pumping stations on the Contra Costa Canal, and an experimental steel plant at Shasta Dam where the Bureau of Mines is developing standard steel and new alloys from California and Oregon iron, manganese and chromium.

Largest single purchaser of water has been the Contra Costa County Water District which paid the Bureau $40,000 last year. The Contra Costa Canal now waters farm lands near Martinez, Antioch and Pittsburgh, and supplies industrial water to the big Columbia Steel and Shell Oil plants. It also furnishes municipal water to Pittsburg and other towns nearby.

The Madera Canal, flowing northerly from Friant Dam, and water releases down the San Joaquin River from Friant, accounted for $180,000 last year. Last month alone, it was found that crops on 250,000 ac. in the grasslands had been saved by release of excess water impounded behind Friant Dam. Without the dam, all this water would have been lost because of a very early run-off.

The 1946 income was nearly two-thirds of all income—$6,285,000—that has been realized on the project in the five years since its first feature, the Contra Costa Canal, went into operation. The war slowed or stopped construction on many parts of the project, and it was only in July, 1944, that Shasta Dam, its biggest single unit, began to deliver power from its generators.

Construction Wages to Revert to June Levels

ONLY LEGAL wage rates in effect on June 30, 1946, in the building construction industry can be paid now that price ceilings have been restored and the Stabilization Act extended.

However, no proceedings for violation will be instituted for wages paid in the period July 25 to August 10 where applications for approval of higher rates were filed with the Wage Stabilization Board during that period.

Chairman of the board, Arthur D. Hill, Jr., said, "Management and labor must revert to approved wage rates in effect on June 30 if wage increases or decreases have been put into effect since that date. Wage rates other than those in effect on June 30 must be approved by the board before they may be put into effect. Upon request by the parties, the board will grant retroactivity to July 25 of any approved adjustment."

According to Stabilization Board attorneys, any infraction of the above rules will subject employers to penalty in the form of income tax disallowance for payment of violation of wages.

SOUTH DAKOTA DAM CONTRACTED

THE CONTRACT for construction of Angostura Dam, first South Dakota unit in the huge Missouri Basin program of the Bureau of Reclamation, has been awarded to Utah Construction Co., Ogden, for $4,237,476. The dam is located on the Cheyenne River about nine miles south of Hot Springs. This is artist's conception of dam.

Underwater Pipe Line To Be Laid in One Piece

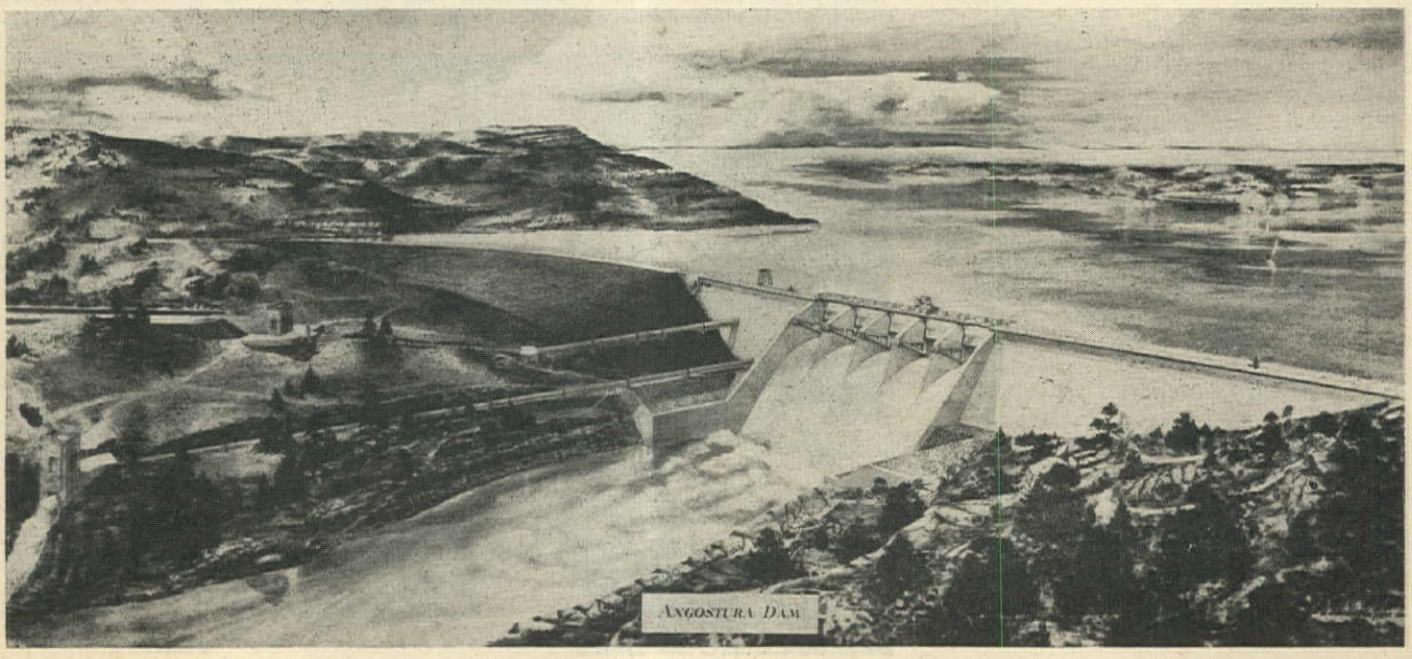
HILLSIDE IRON Works Ltd. of New Westminster, B. C., has just received an unusual under-water steel pipe installation contract, at Port Alberni, B. C.

The contract involves the laying of more than 600 ft. of welded 24-inch water line across the Somass River to the new site of a pulp plant to be erected by Bloedel, Stewart and Welch Ltd. The pipe has to conform to the irregular contour of the river bottom, 30 ft. deep at a part of the dredged channel.

Engineers originally planned to have the sections joined by a special coupling device by divers working under water. This involved more than 25 of these expensive and complicated couplings.

Wilf Hill surveyed the job and undertook to lay the whole pipe, welded in one 600-ft. section. The pipe will be welded along the river shore on skids. When ready, high tide will float it into the water. It will be towed into position and water will be admitted by means of valves, allowing it to sink and conform to the river bottom.

To prove the feasibility of the feat, Hillside Iron Works constructed a scale model and tested it successfully in a tank. A section of regular steel pipe was also sealed and thrown into the Fraser River to prove its buoyancy.



WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

SAN FRANCISCO, CALIF. This letter is written in San Francisco, after a trip from the banks of the Potomac which has roughly covered 6,000 mi., including side forays. The rest of the journey, back to the District of Columbia, will approximately cover a like mileage. The following lines are chiefly the record of impressions after an absence from the West of 16 years.

One of the most striking impressions was the sense of flourishing opulence in western Louisiana, where, obviously, the dreaming Cajun easy-come-easy-go spirit has given place to trim farming, well-kept homes and neat towns. Texas is doing exceedingly well in its industrial east and south, and looks the part, giving one the impression that it anticipates a tremendous development on the Gulf Coast. It might be wisdom for the Pacific West to cultivate a closer acquaintance with this expanding empire. All the way from New Orleans to Houston you feel that they anticipate a relatively great trade with the Caribbean and with South America, as well as with other parts of the world. One of the most impressive sights around New Orleans is the miles and miles of new docks and warehouses.

Southern California

The first dominant impression of Southern California—meaning the area from San Bernardino to Los Angeles—was what we found they now call "smog." This wedding of "high fog" and industrial smoke gives one an unhappy sense of smothering density, as well as heat, which we did not have 16 years ago. You wonder why with all their frenzied driving, the Angelenos don't do something about it. Almost any engineer could tell them about several abating systems which would go a long way to cleaning up the atmosphere. It is doubtful, however, if they could do anything about the heat. The heat this reporter found when he landed at Los Angeles' impressive Union Station was a simmering, stewing, oppressive atmospheric consistency that made memories of Washington, D. C., seem heavenly. The main difference was that it moderated in the evening.

Los Angeles is undoubtedly the miracle city of the West, probably of the Western world; but you would not recognize the fact from the casual conversation of its people. It is almost literally true that from taxi-driver to banker this reporter heard remarks that would lead the uninitiated visitor to think that very few Angelenos love their city. They agreed with the reporter that the downtown hotel where he was temporarily obliged to take quarters, despite its historic reputation, is the prize "clip joint" of the nation. We think we know the ultimate of hotel discourtesy and toughness in the Nation's Capital, but this institution in Los Angeles makes our Washington hotels appear like models of good manners patterned by Emily Post.

There is something about Los Angeles with its two million plus area population which makes you think about Chicago. It has all the spanking drive of Chicago but on the surface, at least, it does not reflect the enthusiastic teamplay which causes the woman from Chicago to rave about Marshall Field's wherever she goes. It was startling to find that the smart, trim, dashing women of 16 years ago have given way, on the streets at least, to careless, unattractively frocked and unfrocked persons who seem to have little care for their appearance. This was true even of Hollywood Boulevard. You carried away an impression of freakishness rather than good taste.

Industry in Los Angeles

On the other hand, after you get rid of the taxi driver who tells you the reason it is so difficult to obtain a taxicab is because the business is controlled by a monopoly, you learn from brisk, keen business men that industries making metal products, as well as apparel, dominate certain lines of commerce within all the United States. The products of Los Angeles' 7,000 smaller business plants, including electrical therapy equipment, furniture, and other items, have been found by this reporter in the places of most important supply throughout the populous East.

The business man—and woman—of Los Angeles, like those of almost all other parts of the country, complain bitterly about scarcity of materials, facilities, equipment, freight cars, labor, almost everything used in production and commerce. The most surprising experience is to find by actual recorded observation that over 95 per cent of the representative business people every place this reporter has visited want the Federal Government to maintain some form of control over the flow of materials, prices, transportation, over everything that enters commerce. In other words, business people feel they need an umpire.

It is this sense of the lack of direction which apparently has caused the textile industry to persuade a member of Congress to prepare a bill, to be introduced in the next session, which will enable the whole textile industry, through all its various aspects, to organize an autonomous self-governing industry bureau which can set up price levels for the industry, organize a system of priorities to channel scarce materials and facilities, in short do everything now done by the Federal Government in controlling industry. There will be representatives of the Federal Trade Commission, Civilian Production Administration, Department of Justice, and other Federal agencies on the boards. This obviously will enable the boards to regulate the industry with Federal approval and blessing.

Hopeless feeling

It also was interesting to observe the farther West one went the less hopeful business people are about the prospect of making much essential change in the machinery of Government. In the East, in the South, and in the Southwest, they are angry and they are anxious to fight. At one interesting meeting, attended by bankers, industrialists, retailers, professional men and women, they not only insisted "the rascals must be put out," but they were organizing themselves into voluntary flying wedges to appear before all kinds of groups to appeal that the next election be stripped of party labels and that men or women be chosen for office because they are sincere, honest, realistic, and competent. The appeal was made on the basis of the fact that the voter's Americanism should come before his party loyalty; and that he should not vote out an incumbent merely because he is an incumbent.

In common with business men everywhere the business folk of California feel some of the troubles in Washington should be cured by some root and branch destruction of the present group of bureaucrats. But the Westerners are notably hopeless that anything can be done. The inertia is clearly not the effect of a lack of desire to do something, but is rather a sense of helplessness, possibly often due to the distance from the Capital. It continues to be palpably true that it is psychologically much farther from California to the District of Columbia than it is from the District of Columbia to California.

Colorado river

Apparently the most serious basic problem of Southern California is the revision necessary in the terms of the Colorado River compact. It seems the original contract was honestly based on a misconception of the long-range supply of water available from the Colorado River. The present drought has made clear there is not as much water as estimated, and this has caused an open breach between the upper basin States and those most directly concerned with the affairs of California. Nevada and California have withdrawn from the combination heretofore existing, and the basin states have formed a Colorado River Basin unity.

This palpably means that the Colorado River Basin States will fight for water for the development of the projects which have lately been proposed by the Bureau of Reclamation and other agencies, on the theory that the water of the Colorado River belongs primarily to the States within the watershed. On the other hand, Southern California has a valid contract upon which it has founded one of the most important and most interesting regional developments in the United States; and California, supported by Nevada, frankly will make its fight before Congress to enforce the contract, and, probably, to obtain more water to support the amazing expansion below the Tehachapis.

There has been a suggestion that Arizona might serve its own cause more effectively by using its water rights in terms of power, to become a paramount industrial State rather than a land-reclamation area. Arizona does not take to the idea; and, in the words of a Southern California leader: "it neither will litigate nor negotiate." One of the most bitter water fights in the history of the nation apparently looms up. The conflict unquestionably will go to the Nation's Capital, and will largely be determined by the presentation which is made to the people of the nation. It will eventually be fundamentally decided by the side which makes the best public relations approach. Southern California is confronted by the need of organizing its public relations set-up with far more intelligence than was displayed in the tragic and disastrous fight against the Mexican Water Treaty.

San Francisco

San Francisco was a revelation to this correspondent. The enormous expansion which took place during the war years was still sharply evident on a tour of the city and its environs. To the casual observer who has not been here for many years the installations and the changes overwhelmingly gave a sense of solidity and permanence which far exceeded the fact that the population is not as large as that in the South. The great bridges, and their use, which reveal the pressing need for further causeways, were particularly impressive. Also it was pleasant to feel the cool and bracing atmosphere, and to get the sense of being in a place that could only be likened to pre-war Paris in its social atmosphere. Moreover, one was struck by the fact that San Francisco has the smartly dressed and sparkling-eyed women who are among the truest barometers of the spirit and character of a great city. There is no remote doubt that San Francisco, and its Bay area, remains that intangible thing which we mean when we speak of the tingling quality of the Golden West.

Sacramento

The Sacramento Valley is another revelation. It has always been the essence of the lush and bountiful wealth of the tributary area to San Francisco; but after almost a quarter century of absence it seems to this correspondent that it is approaching a pre-maturity—not an adolescence—which should mean great substance and future for the City of the Golden Gate. There is something more than mere impressiveness when you ride for miles upon miles in the pure golden sunshine through the wide and vivid Valley, with all its fruit and verdure. The highways are almost ideal to the visitor who has become accustomed to the roads of the East.

Sacramento itself appeared to this correspondent one of the most attractive Capitals he has ever seen. In its present form, with its present buildings, it appears to be an appropriate reflection of the area and the State as well as the beauties of the West. The Sutter Club is one of the few centers of the kind which give one the sense that it represents the place and the people where it is located. The same may be said of the building in which State Engineer Hyatt has his office, and where one finds the pleasant official quarters which domicile the Director of Public Works, C. H. Purcell. There seem to be few public officials who so nearly fit the picture as these two. Forthright, genial, clear-thinking Hyatt, with his incisive mind, personalizes the West as well as California. He obviously does not kid himself about any of the multifarious national problems that have an impact on the land and water and people of California.

On the Federal side of the fence it is clear the Army Engineers seek to do a job with the least friction and with a supple smoothness. The Army Engineers have always approximately tried to do what they think Congress wants them to do, which is a combination of what they have told Congress they think should be done, and what the people who pay the bills want done. Col. Lester F. Rhodes and the rest of the group in charge of the District Office at Sacramento apparently have been chosen for their skill in maintaining the best public relations as well as to do a good job of engineering.

The Regional Office of the Bureau of Reclamation was in charge of the well known engineer Deputy, R. S. Calland, the day this correspondent made his visit. There also was present one of the Bureau's power men, who listened intently but contributed little to the discussion. It is worth noting that one often encounters this dual audition in transacting business with Reclamation men in the field as well as in the Capital. It is clear that at the field engineering level, cordial cooperation exists between Army and Bureau engineers.

Hoover dam?

They have an interesting library in the Bureau's Regional Office. A volume of some size has a conspicuous back on which appears the title "Hoover Dam." It is a detailed presentation of Specification No. 519, concerning dam, power plant, and appurtenant works. It was issued on Dec. 17, 1930. The presence of the volume was particularly interesting to this correspondent because officials in the Capital in the past have been at some pains to convince him that the dam has never been called Hoover Dam.

The pleasant discussion in this Office also revealed the surprising fact that the people here had no official, and little other, information about the President's veto of H. R. 5124, a bill slipped through Congress during the closing sessions "To provide basic authority for the performance of certain functions and activities of the Bureau of Reclamation." This correspondent tried repeatedly to secure a copy of this Bill before it was enacted but found the supply in some manner had been exhausted. The President, on Aug. 14, notified the Bureau and the Department of the Interior that he had withheld his approval because certain features of the bill "are objectionable."

He refused to permit the Bill to become law because he does not agree that a general policy should be established for the education, including transportation, of **the children of Federal employees** at or near all Bureau of Reclamation projects. Said the President: "If such a policy were established . . . its application to all agencies of the Government could not be successfully resisted." He also found objectionable the authority which would have been provided to enable the Bureau of Reclamation to speed the development of raw lands on the Gila Project and the Coachella Project, not merely as a war measure, but as a permanent power of the Bureau to spend money for the purpose on the two projects. He points out that the authority Mike Straus sought would apply not only to the Gila and Coachella Valley, but would have permitted the Bureau hereafter to make such expenditures in connection with "any and all irrigation projects authorized by Federal law." "It seems to me," wrote the President, "**such broad general authority is unwise and unwarranted.** Moreover, such authority is likely to result in a duplication of certain functions which the Department of Agriculture and its constituent units are authorized and able to perform. Duplication of this character can be avoided by the development of cooperative agreements between the two Departments, and I understand that steps are now being taken to perfect such agreements."

Construction slash

No one yet seems to know, either in the field or back in Washington, exactly what will be the effect of the cut in Reclamation projects from $170,000,000 to $85,000,000, by Presidential ukase. By and large it is expected, entirely off the record, that the order to cut will largely be forgotten after the November elections, both by the President and by the agencies involved. If it is rigidly enforced it will not only make a deep slash in Reclamation works, but will hold back Public Roads, Army Engineers, and similar public works agencies.

The Senate Irrigation and Reclamation Committee went on record as willing to sponsor Senator Downey's Central Valley investigation and enquiry; but it did not provide funds, because the single vote of former Senator Robert LaFollette, Jr., twice stopped consideration of the bill authorizing the undertaking and providing the funds.

Rio Grande Dam Given Funds

THE STATE Department's International Boundary and Water Commission has received $9,350,000 to start construction on the Rio Grande, Colorado and Tijuana Rivers in accordance with the Mexican water treaty.

H. R. 6056, appropriating the funds, has received the signature of President Truman. The treaty, which was signed Feb. 3, 1944, went into effect last November.

A storage dam on the Rio Grande between Laredo and Roma, Tex., will receive $8,000,000 of the total amount, and $100,000 is provided for emergency flood-control work on the Rio Grande.

Northwest Power Shortage Looms

THE BONNEVILLE Power Administration has called on all Northwest utility systems to place their generating plants in readiness to help meet a critical power situation in the Pacific Northwest this winter.

In a letter to utility company presidents, D. L. Marlett, Assistant Bonneville administrator, said that the Bonneville-Grand Coulee system now is loaded almost to capacity and probably would be unable to supply all of the power demands of the utility companies during the winter peak load season.

Commenting on his letter, in which he urged the power companies to have their steam plants ready for operation this fall, Marlett said that demands on the Bonneville Power Administration reached a new postwar peak of 1,067,000 kw. on Aug. 13, practically absorbing the entire capacity now available from the Bonneville and Grand Coulee plants.

Marlett said that one generator at Bonneville and one at Grand Coulee are now out of service for repair and maintenance work, but pointed out that their combined capacity of 170,000 kw. would be more than offset by addition of 300,000 kw. of aluminum load this fall and the large seasonal increases in other loads during the winter. "With Northwest aluminum plants scheduled to resume almost full wartime production this fall, and with other industrial, commercial and domestic power requirements increasing steadily, the Pacific Northwest faces the prospect of as tight a power situation this winter as it experienced during the war years," Marlett stated.

S. E. Schultz, chief engineer for Bonneville, reported that the power administration now is supplying up to 155,000 kw. to the Portland General Electric Co., 137,000 kw. to Puget Sound Power & Light, and 120,000 kw. to the Ebasco companies—Washington Water Power, Pacific Power & Light and Northwestern Electric. Deliveries to Bonneville's 48 publicly owned utilities is running close to 150,000 kw.

New Generating Unit For Idaho Falls Still Too Small

THE NEW $110,000 generating unit being installed for Idaho Falls, Idaho, at the city's lower power plant on the Snake River was ready to be put into service on Sept. 1, M. P. Goudy, city electrical superintendent, has reported.

The new generator will supply the community with an additional 1,500 kw. of electric energy, upping the total capacity of Idaho Falls' power units from 7,000 to 8,500 kw.

Goudy said that the new unit would partially alleviate the current power shortage but would not be sufficient to meet demands of the city in the future. At present Idaho Falls is purchasing up to 1,000 kw. of power from the Utah Power and Light Co.

HEAVY EARTHWORK REQUIRED ON SAN DIEGO CANYON ROAD

ON A 3-MILE section of 4-lane State Highway winding up a canyon in San Diego city limits, Mittry Bros., Los Angeles contractors, used four Tournapulls, hauling from 600 to 2,000 ft. one way. Several crossings of existing highway were necessary.

Torch and Shears to Break Backs Of Old Ships in Scrapping Program

THE RECENTLY announced government program to increase the supply of scrap for the nation's steel mills will revive shipbreaking, an industry that flourished in the 1920's, according to the American Iron and Steel Institute. Since that time, ships have been built, rather than scrapped, and any large scale program of scrapping merchant vessels will face serious problems.

There are many reasons for scrapping vessels. Some become obsolete, others cannot be absorbed into regular peacetime shipping programs. Certain other vessels are too costly to maintain. The Normandie, which has already cost over $11,000,000 in salvage and maintenance since she burned and sank, is an example.

The methods of breaking up ships vary with the size. Large vessels require special equipment. Docks must be built, railway sidings put in to carry off the scrap, cranes installed to lift out heavy machinery and large sections of plate, and hydraulic shears put in place to cut the steel into shipping sizes.

Woodwork and fittings are usually taken out first. In some cases the nails are drawn from the woodwork to be used as scrap. Miles of pipe and wiring are removed. Next the superstructure is cut off and holes cut in the deck to remove machinery.

Small ships can be moved into docks and cut apart. Others are pulled up sloping tidewater shores on marine railways. The successive courses of plates are cut off and the ship is pulled farther and farther up the shore with each high tide. Sometimes the forepart of a large ship is cut off in a dock and the hull then pulled farther in. Scrap content generally runs about 70 per cent of the displacement tonnage.

It is not now known exactly how many ships will eventually find their way under the torch and shears. However, the tonnage will be large and once the program gets under way the nation's steel mills will have a supply of high grade steel scrap to augment stockpiles that are today at rock bottom.

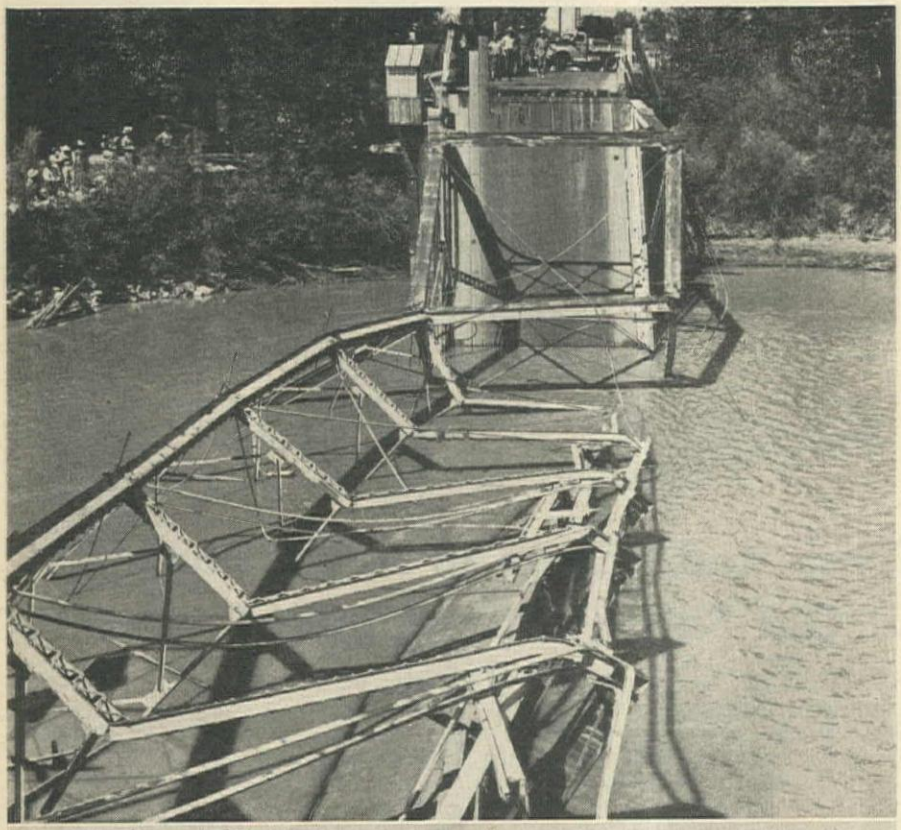
Arizona Water Supply Found in Verde Valley

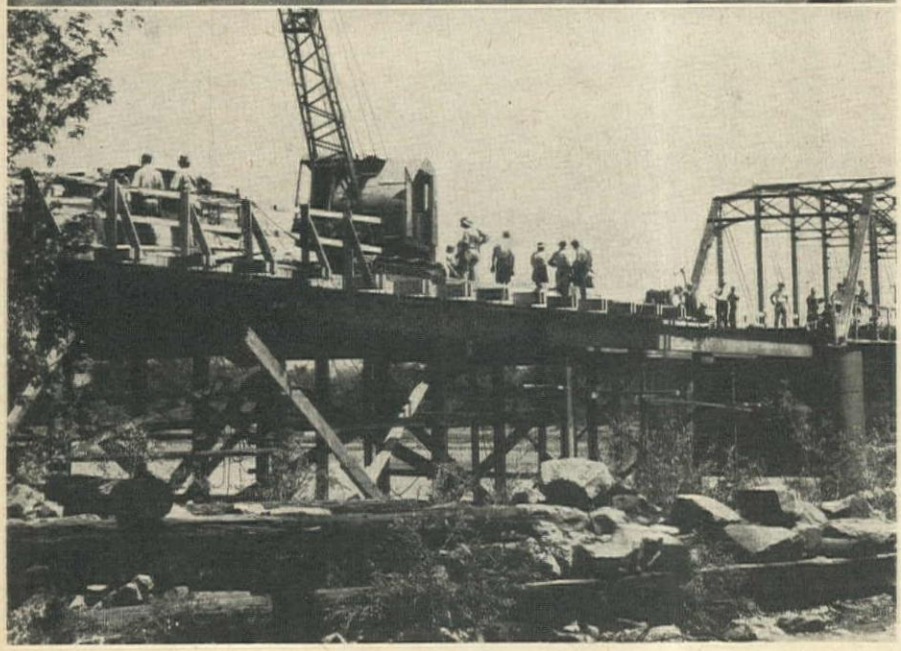
NEW AREAS suitable for the drilling and developing of wells that would furnish a relatively large supply of water have been found in the lower Verde River Valley, according to a report by W. E. Wrather, Director of the Geological Survey. The new areas are east and north of the present well fields of the city of Phoenix. Test wells showed that saturated water-bearing deposits in two of these areas are deeper and thicker than those heretofore found in any wells drilled by the city.

The principal sources of water for wells that may be drilled in these areas would be the water stored in these ground-water reservoirs and the water percolating into them from the Verde River, but small amounts would be received from the older valley fill bordering the valley.

The report summarizes the information obtained in the Verde Valley since the release, in Nov., 1945, of the first report entitled "Geology and groundwater resources of the Verde River Valley near Fort McDowell, Arizona." The reports have not yet been published, but typewritten copies are available.

Overload of Ten Tons Causes Collapse of Old Utah Bridge





COLORADO-UTAH traffic on U. S. Highway 50 was halted suddenly and the State of Utah entered the bridge-buying market in a hurry on July 30 when the state's bridge across the Green River collapsed under the weight of a heavy trailer-truck loaded with a blade-equipped tractor.

The bridge was posted with a sign limiting loaded weight to 12 tons, with a 15-mile-an-hour speed limit. State officials estimated that the truck and tractor, operated by the Ashworth Transfer Company of Salt Lake City, had an overall weight of approximately 22 tons.

As soon as the broken bridge span was cleared away by Utah State Road Commission crews, piling was driven and a temporary span was installed until a new bridge can be built. During the week that the bridge was out of commission, traffic was routed northward over U. S. Highway 40. Work of reconstructing the temporary span was directed by Maurice Housecroft, bridge engineer.

Ray H. Leavitt, chairman of the Utah State Road Commission, announced that a 24-hour patrol would be maintained at the bridge to make certain that the 12-ton 15-mile-an-hour limit is not exceeded until the new bridge is constructed three-quarters of a mile north of the present structure.

The bridge which collapsed was of light steel construction, with wooden flooring. It was originally installed in 1910 when three sections were built by Emery County. Subsequent widening of the river necessitated building of two approach spans by the State Road Commission in 1922.

Meanwhile, Leavitt announced that bids for a new bridge will be called shortly, under revised specifications prepared by the State Road Commission. The new bridge will be of heavy steel construction, 600 ft. long, and 26 ft. wide. Bids for a new structure to replace the antiquated bridge were first called for last April 10 but were rejected when the lowest bid was $223,285, as compared with an engineer's estimate of $188,598.

Roy W. McLeese, chief engineer of the State Road Commission, explained that the high bid was due to uncertainty of labor conditions and availability of materials. He said similar trouble was not expected on the new bids inasmuch as recent bids for other bridges and highways have closely paralleled engineer's estimates.

Sea Level Rise Marked During Last 20 Years

RECORDS OF the U. S. Coast and Geodetic Survey indicate that ocean levels are increasing very slowly. During the past two decades the upward trend has been at a rate of approximately 1½ ft. in a century.

Tide-gage records show about the same rising trend on both the Atlantic and Pacific shores. Experts explain that the phenomenon is associated with the gradual receding of the world's great

glaciers which has been going on for a long period. The melting ice increases the volume of water in the oceans.

The records also show that at the turn of the century the day-to-day change in sea levels was so small as to be insignificant and remained so for many years. Then a distinct upward trend occurred and has become more marked since the late 1920's.

Water heights are recorded automatically by the tide gages. At least once a year the measuring staff is checked with three survey bench marks located on the land above high water. If a change occurs in the height of the measuring staff it is carefully noted and allowed for in future computations. For example, the pier to which a measuring staff is firmly attached may subside slightly from one cause or another.

The trend may change at any time, of course, and the sea levels begin to subside. However, if the rise should continue indefinitely it might well affect tidewater land titles and have an influence on other matters of economic and social importance.

The upward trend in sea levels is too clearly defined to be a result of temporary change in ocean tides. They are governed by known movements of celestial bodies. But the rise of sea levels is something entirely different. From an engineering and geophysical point of view this is a very important movement.

Equipment Distributors to Meet In California for Conference

THE FIRST regional conference of members of Associated Equipment Distributors, Region 11, will be held from October 9 through 11 at Sonoma Mission Inn, Boyes Springs, California.

The conference has been planned by Regional Director A. F. Garlinghouse of Garlinghouse Brothers, Los Angeles, and his planning and program committee, composed of R. A. Hughes, San Francisco, president of Northern California local group, with Standard Machinery Co., Inc.; Jack H. How, San Francisco, past president of the Northern California group, with Edward R. Bacon Company; George W. Thatro, Los Angeles, president of the Southern California local group, of Lee & Thatro Equipment Company; and Roland Taylor, Los Angeles, past president of the Southern California group, with Industrial Equipment Company, Los Angeles.

National officers, who will attend the Fall Executive Committee meeting immediately preceding the conference, will take part in the program. Frank B. McBath, Portland, Ore., national president; Carol F. Winchester, Washington, D. C., executive secretary; William A. Danner, executive vice-president; C. F. Halladay, Sioux Falls, S. D.; W. W. Bucher, New York, N. Y., treasurer; and Mr. Garlinghouse, national vice-president, will speak on National A.E.D. activities.

The first day of the convention will be mainly recreational, while the other two days will be taken up with talks by the national officers and general discussion, including surplus property disposal, OPA, credits and taxes, and other allied topics of regional interest.

Some 61 firms in Arizona, California, Nevada and the Territory of Hawaii, belong to Region 11.

NEW BOOKS...

BUILDERS FOR BATTLE—by David O. Woodbury, illustrated by Lili Rethi and Louis Ruyl. Published by E. P. Dutton & Co., Inc., 300 Fourth Ave., New York 10, N. Y. 415 pages, 7x10, $7.50.

The story of the construction of the Pacific Naval air bases immediately before and during the war in the Pacific is told by an author who is both an engineer and an accomplished writer and who had the opportunity of seeing a part of the work in progress and talking to many of the construction men who were instrumental in completing an unparalleled job. Thousands of construction men who took part in the project will be interested in reading this excellent report of the entire project, and thousands more who had some inkling of what was going on in the Pacific between 1939 and 1945 will be as interested in getting the story of what did actually happen.

The author is successful in building up a sense of suspense that makes the book read like dramatic fiction, yet the book is factual and adequately covers the engineering phases with only a little of the oversimplification that usually annoys the engineering reader. For the interest of the western construction man the book is filled with familiar names, both individual and corporate, that will bring back many memories. Of particular interest will be the descriptions of the problems faced by the job superintendents including, in addition to all of the usual construction problems, that of morale.

Unquestionably designed as a tribute to the Navy's Civil Engineer Corps, Pacific Naval Air Bases contractors, and their huge staffs of engineers and construction workers, the book is fittingly designed to the magnitude of the project itself. Unfortunately, the book in its use of superlatives to match its subject is likely to leave the reader wondering whether there is not some underlying motive behind its publication.

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BUILDING CODE MODERNIZATION—a series of eight reference bulletins by Committee on Building Codes. Published by American Iron and Steel Institute, New York, N. Y. 70 pages, 6x9.

The bulletins are based on a long-term study of building practices throughout the United States, and are being sent to code authorities in many cities. They include facts related to the purpose and legal limitations of building codes, contents and arrangement, building classification, fire hazards, fire protection and exit regulations, and structural standards for steel construction.

The booklet containing the bulletins says that the main reason for modernization is "the need for placing regulatory requirements on a more scientific basis and making proper provision for the new building materials, methods and techniques developed in recent years."

* * *

AIRPORT PLANNING—By Charles Froesch and Walther Prokosch. Published by John Wiley & Sons, Inc., New York, N. Y. 250 pages, 8 x 11. Price $7.00.

Representing the seasoned judgment of an aeronautical engineer and an architect, this book is for both professional men and laymen interested in basic information on airport planning and design. It analyses airport problems from a fundamental and functional viewpoint, including the proper relationship of landing facilities to communities, the integration of air facilities and the overall transportation problem, an analysis of aircraft characteristics which affect planning and design of landing facilities, a co-ordinated treatment of the principal elements of landing facilities, and a discussion of the proper balance between the airfield and buildings of an airport. The book is finely made and has a great number of photographs and drawings.

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HISTORY OF LEGISLATION AND POLICY FORMATION OF THE CENTRAL VALLEY PROJECT—By Mary Montgomery and Marion Clawson. Published by U. S. Department of Agriculture, Bureau of Agricultural Economics. 276 pages, 7½ x 10.

This report by Miss Montgomery and Mr. Clawson, agricultural analysts of the Berkeley, Calif., office, presents a detailed and well-documented account of the history of the Central Valley Project which can serve as a useful reference for all concerned with a clear delineation of the factual record. The material in it has been drawn from reports publicly available. Neither of the authors participated in any of the events described until 1942, and then only incidentally. The record is traced to the latter part of 1945, and particularly from the viewpoint of the development of policies respecting the use to which the water and power are to be put.

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SURFACE CONSTRUCTION WITHOUT ACCIDENTS—Written and published by Engineering Department of American Mutual Liability Insurance Co., Boston, Mass. 84 pages, 5 x 7½.

"Surface Construction" includes

streets, roads, runways, parking areas and similar projects where earthmoving, paving and related operations are principally involved. The main thesis is "How can accidents be prevented?" The authors' answer is that accident prevention is founded on the basic consideration that the result of specific acts can be predicted. Thus to prevent an undesirable effect (an accident) the potential cause must be removed or put under complete control. A chart shows graphically which of certain types of accidents are most likely to occur on each operation or job item. The rest of the book deals with protection of the general public, safe practices for demolition, earth and rock excavation, drainage, base preparation, placing of pavements, first aid needs, payroll and cost records.

OBITUARIES . . .

Harry Lincoln Neel, 57, city engineer of Santa Maria, Calif., from 1916 to 1932 and county engineer for the 5th supervisorial district of Santa Barbara Co. since that time, died Aug. 22 in Santa Maria. Neel was also formerly connected with the city engineering department of Glendale, Calif.

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Jose Antonio Mayolo, Jr., 31, San Francisco mining engineer, died in a Reno, Nev., hospital Aug. 22, five weeks after he was injured at a Wyoming mine. Mayolo, who was born in Colombia, S. A., spent the recent years as a mining engineer throughout the West with headquarters in San Francisco.

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Frank Doran, 81, prominent Salt Lake City, Utah, and San Diego, Calif., contractor and builder for many years, died last month in San Diego. Doran constructed many of Salt Lake City's buildings years ago and then moved to San Diego in 1911, where he built a number of bridges, sewers and piers.

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Frank H. Depp, division engineer for the Nevada State Highway Department for 18 years, died suddenly Aug. 6 in his Elko, Nev., home. Before going to Elko, Depp held the same position in Ely, Nev. He had been with the highway department since 1922 as an engineer.

Springs to Add Water To Elko City Supply

WATER WILL FLOW into the city of Elko, Nev., at the rate of 250 gal. per min., 24 hours a day, from the Kittridge Canyon springs as soon as the laying of 3,800 ft. of pipe between the springs and the city reservoirs is completed.

The springs are in tunnels at the head of the canyon. When this supply was used in the past it averaged about 90 gal. per min. Several years ago it was cut off entirely because of the damage done to the wooden pipe through which the water flowed.

About 20 years ago Elko had one well producing 300 gal. per min., but more water became increasingly necessary. Another well of similar capacity was drilled on the China ranch, but the use of water has increased steadily till now the city is using 1,500,000 gal. of water daily.

Declaring that new sources of water may have to be sought, Allen Carter, city manager, said a survey of the underground water on the China ranch will be made this fall by the U. S. Geological Department in cooperation with the State of Nevada. Other possible supplies of water besides underground sources include the North Fork, with a dam at Devil's Gate, or water from Lamoille canyon.

Welded Design Contest Offers $200,000 in Prizes

AWARDS totaling $200,000 are being offered by the Lincoln Arc Welding Foundation for papers or reports covering the field of welding in its Design-for-Progress Award Program.

Cash prizes will range from $100 to $13,200 for individual papers, and a total of 452 awards will be made in 15 classifications. The classifications cover the design or redesign of machines or structures, operating a job weldery, maintenance service, research and education, and many different fields of welding.

Awards of $700, $500, $250 and $150 will be made for the best papers in each of 43 divisions. Four additional awards, consisting of $2,500, $1,500, $1,000 and $800 will be made for the best reports in the 15 classifications. The three papers judged best of all submitted will also receive the Main Program Awards of $10,000, $7,500 and $5,000. The very best paper selected will bring its writer $13,200, composed of $700 First Divisional Award, $2,500 First Classificational Award and $10,000 for First Main Award. There are also 217 Honorable Mention Awards of $100 each.

More information may be obtained from the James F. Lincoln Arc Welding Foundation, Cleveland 1, O.

PERSONALLY SPEAKING

Capt. L. G. Lloyd, contract superintendent for the Public Works office at the Terminal Island Naval Operating Base, Calif., for the past two and one-half years, has retired from active duty and is now on terminal leave. At Terminal Island he supervised construction of engineering and building projects totaling more than $50,000,000, including a breakwater and vertical lift bridge. Lloyd has been in the Navy Civil Engineering Corps for five years, and previously he practiced civil engineering in New York.

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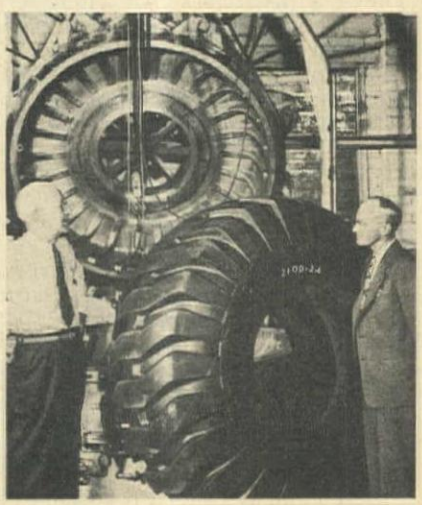
A. W. Green and **H. T. Harstad** have formed a consulting engineering firm in Seattle and Tacoma, Wash., to specialize in water supply, sewerage systems and industrial waste problems. Green, formerly senior state sanitary engineer in Seattle, also used to work for the Hooker Electrochemical Co. Harstad, a Coast Guard veteran, has served as Pierce County sanitary engineer and was engaged in soils studies for the Seattle Army Engineers.

* * *

J. S. Rogers and **L. C. Rogers,** owners of the Rogers' Tire Service of Yakima, Wash., are recapping 21.00x24 tires at their plant. Theirs was the first service in the world to have facilities for recapping tires of this size. Also included in equipment added recently is a mold which recaps 18.00 x24, 16.00x24 and 16.00x20 tires. Both of these molds have been used to recap tires from earthmoving, highway and dam construction equipment.



J. S. ROGERS, left, and L. C. ROGERS, owners of Rogers' Tire Service, demonstrate heavy tire retreading mold.

Lee McAllister has been appointed engineer in charge of the Bureau of Reclamation office in Salem, Ore. He replaces **C. C. "Cap" Fisher** who is retiring after 35 years of service with the Bureau. Fisher came to the organization in 1903 as one of the first employees in the Northwest. His career has been varied and colorful and he has played an important role in the development of land and water resources of Idaho, Oregon and Washington.

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James D. Church is district airport engineer for west Texas with the Civil Aeronautics Administration at Big Spring. Church's former district which comprised west Texas, New Mexico and Oklahoma Panhandle has been subdivided into separate offices for each state. Other key men stationed in the Big Spring offices are **W. F. Frey,** review engineer; **W. E. Peugh,** planning engineer; **W. K. McFall,** assistant district engineer; and **C. E. Rhomer,** engineering draftsman.

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Roy M. Harris, chief of the Division of Public Health Engineering, Washington Department of Public Health, resigned that position Aug. 15 to accept the position of chief sanitary engineer for Standard Oil Co. of New Jersey. His first assignment will

be with the Creola Oil Co. in Venezuela. Harris returned early this year to the Washington Department of Public Health after a 5-year military leave of absence during which he served with the Navy Civil Engineer Corps, attaining the rank of commodore prior to his release from active service. **Emil C. Jensen,** formerly assistant and acting chief of the division, has succeeded Harris.

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Stuart B. Show, chief of California's national forest for the past 20 years, is leaving the U. S. Forest Service to become director and chief silviculturist in the forestry division of the United Nations Food and Agriculture Organization on October 1. Show, who will be stationed at the division's international headquarters in Washington, D. C., began his Forest Service career in 1906 in the Shasta National Forest. His entire forestry service has been spent in California.

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A. E. Anderson, Northwest division manager for E. I. DU PONT DE NEMOURS CO. with headquarters in Seattle, retired from active service on August 31st after 39 years with the organization. Anderson is well known throughout the Pacific Northwest as a mining engineer and an authority on explosives problems.

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Commander John L. Mason has returned to civilian life and is now associated with the engineering office of Clyde C. Kennedy in San Francisco. He served in the Bureau of Yards and Docks, Washington, as contract superintendent, 5th Naval District; and as Executive Officer, Public Works Department, Naval Shipyard, Mare Island, Calif.

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Carl Feiss has been named director of the new School of Architecture which will be established at the Civic Center campus of the University of Denver with the opening of the fall quarter. Feiss was formerly planning director of the planning commission of the City of Denver and is now planning director of the department of development at the University of Denver, Colo.

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William T. Grayson, heavy duty contractor in Pocatello, Ida., for many years, is now associated with **Neil K. Chase,** Pocatello realtor, operating as heavy construction contractors under the name of Grayson-Horner Construction Co.

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F. G. Rothganger has been elected president of the East Bay Engineers Club at Oakland, Calif. Other newly elected officers are **Thomas B. Bridges,** secretary-treasurer; **Herman V. Leffler,** recording secretary; and **A. Vander Naillen, Jr., G. L. Harrison, Henry Leninger, Romaine Myers** and **Victor Saure,** members of the advisory board.

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Chester L. Decker is a structural engineer with the Bureau of Reclamation at Denver, Colo., in the office of Design and Construction. He is concerned with detail and design of reinforced concrete power houses and pumping plants.

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Fred A. Von Eberstein, Sr., retired in August from the Seattle district, U. S. Engineers, after 12 years as a construction engineer for the government. Von Eberstein came to Seattle in 1940 and was chief of the material cost survey section of that division. Before joining the Army Engineers he was a contractor at Jacksonville, Fla.

J. E. SAMSON, left, and K. C. DANSTROM, right, have headquarters at Vista, Calif., while the San Diego Aqueduct is being constructed. Samson is chief of surveys for the Navy, and Danstrom is division engineer.

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Art C. Sutton has taken a few months' leave of absence from Western Pipe & Steel Co., during which time he will be engaged on a construction job at a mining project. After completion he will return to San Francisco to be with his former company.

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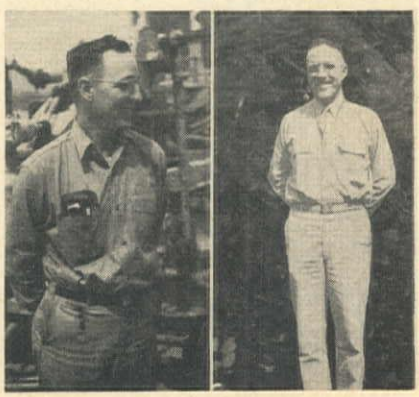
William Day of Roosevelt, Utah, has been appointed as a member of the Utah State Engineering Commission. At the time of his appointment to the commission post, Day was a county commissioner of Duchesne County.

J. B. PARSON, left, and DOUGLAS J. FIFE, right, now operate a heavy duty contracting firm at Brigham City, Utah. Both men spent many years with Olof Nelson Construction Co. Fife then served with the Utah Construction Co. and later with the U. S. Engineers. Parson served with the armed forces in Pacific and European areas. WAYNE R. DAVIS is their plant foreman.



Richard H. Taylor is now cost engineer for the Guam Dredging Contractors on a Navy Project at Apra Harbor, Guam, in the Mariannas Islands. He was formerly cost engineer for the Pacific Bridge Co. on drydock and other construction at Pearl Harbor, Hawaii.

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Lt. Col. Charles H. Franklin has been discharged from the Corps of Engineers and returned to his partnership with **Ernest J. Kump** and **Mark Falk.** The three have formed the architecture and engineering firm of Franklin, Kump & Falk in San Francisco.

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Thomas E. Furness, E. E. Grider, Joseph C. Metzguer, Royal J. McMurdie and **Myrra Williams,** all of Salt Lake City, Utah, have filed articles of incorporation for the Zion Construction Co. of Idaho, Inc., in Idaho Falls.

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E. C. Metz was named acting district engineer for the Civil Aeronautics Administration district office at Santa Fe., N. M. The Santa Fe office is one of six being established in the Southwest.

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Fritz Zapf has been appointed city engineer and superintendent of the street department of Redondo Beach, Calif. He was formerly senior civil engineer for the City of Alameda.

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Dean L. Condon of Seattle, Wash., former Major in the Corps of Engineers, has been recalled to active duty and reported to Ft. Lewis, Wash., for orders.

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Robert L. Chew was recently appointed port engineering clerk, and **Phineas M. Peel,** port construction inspector by the Board of Port Commissioners at Oakland, Calif.

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W. J. Triggs is in the general concrete and cement contracting business in Tacoma, Wash. He was formerly with the Tacoma Gravel Supply Co.

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Howard J. Smith has been appointed executive secretary of the newly organized Central Arizona Project Association in Phoenix, Ariz.

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Walter A. Dugger, formerly with the San Francisco and Sacramento districts of the United States Engineer Department, is now doing inspection work for the City of Salt Lake, Utah.

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S. S. Gorman is now design superintendent for the Public Works Department at the San Francisco Naval Shipyard, and will also continue as project manager there.

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C. A. Tiffany, recently discharged from the Navy after serving two years as a structural engineer, is now with Northwest Testing Laboratories in Seattle.

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Kenneth S. Fitch has been appointed Director of Public Works in Burlingame, Calif.

SUPERVISING THE JOBS

T. W. Myall is general superintendent of all jobs Howard S. Wright & Co. is doing in Seattle and is project manager on the sales and garage building the contractor is erecting at Boren and Olive Way for Smith-Gandy, Inc. Other men on this project are **Clarence J. Williams,** general superintendent; **Howard H. Spence,** assistant; **Ira Meyers,** carpenter foreman; **Garvin Brakel,** labor foreman, and **M. D. Hillyard,** office manager. On the Sears-Roebuck warehouse the Wright company is building, **Everett J. Peters** is general superintendent; **R. B. Miles,** assistant superintendent; **James Duckett** and **George Hammer,** carpenter foremen; **M. B. Mitchell** and **W. L. Brown,** labor foremen; **S. M. Ford,** cement foreman; **Harold Huckabay,** clerk, and **C. H. Flynn,** office manager. On both jobs, **Chelse Boynton** is resident engineer and **S. C. Brandstrom** is concrete foreman.

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J. M. Sawyer is project manager on the Dos Pueblos Dam, 7½ mi. west of Goleta, Calif. Being built by Macco Construction Co. of Los Angeles for Signal Oil Co., the dam is 110 ft. high, 500 ft. long, of earth and concrete with concrete spillway and appurenances. **Joe Schaufele** is resident engineer; **E. F. "Ben" Davies,** general superintendent; **Bob Gordon,** day superintendent; **"Red" Darr,** night superintendent; **John Whitlow,** master mechanic; **Ted Rowe,** office manager; **John E. Combs,** inspector.

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Roger Neal is project manager on a class A factory building Stronach Construction Co. of Los Angeles is building at 939 S. Western Ave. in Los Angeles for the Wilshire Press. **H. R. Conkline** is general superintendent and **Paul Gilbert** is carpenter foreman. On another Stronach job, store buildings under construction at Adams and Hill Sts., Los Angeles, **Verne T. Davis** is general superintendent. Gilbert is also carpenter foreman on this job, along with **Bill Joyce** and **Bob Finley. J. C. Sanders** is labor foreman and **W. L. Davis** is office manager.

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T. J. Schott is general superintendent for Peter Kiewit Sons' Co., Seattle, for 14 miles of surfacing and paving Secondary Highway No. 5, between Tenino and McKenna, Wash. Assistant superintendent is **Floyd Reinhardt;** general foreman, **"Ikey" Taylor;** job engineer, **M. B. Winegar;** and state engineer **Ray M. Williams.**

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Ed Nicholas is supervising construction of sewers, curbs, gutters, and widening, grading and surfacing of highway 99 from 85th to 115th Sts. in Seattle for R. L. Mess & Co. **Paul Larkin** is a key operator on the $220,000 job.

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Frank Lindahl is superintendent of construction for Elder & Owens of Alameda, Calif., on a factory and office building going up on Hegenberger Rd. in Oakland for Shasta Pump Co. at a cost of $50,000.

Richard Ellis is project manager for the Austin Co. of Seattle on a two-story grocery warehouse being constructed on 4th Ave. South in Seattle. General superintendent is **C. V. Rettig,** office manager is **William McVay** and foremen are: **Frank Teeter,** carpenter; **Eddie French,** steel, and **Gordon J. McConville,** labor.

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Cliff Clark is superintendent for L. H. Hoffman, Portland, Ore. on the new Sears-Roebuck addition in Portland. **E. W. MacBrayne** is engineer; **Bob Perron, Fred Malvic** and **Gus Billstrom,** carpenter foremen; **H. H. Troub, Ray Hines, L. C. Mikesell** and **Frank Newman,** labor foremen; **J. E. Fitzgibbons,** steel foreman; and **K. R. Bland,** timekeeper.

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E. E. Smith is supervising redecking of Mont-Lake bridge in Seattle for Hawkins & Armstrong of that city. Inspector for the city is **Gus Nelson.** Superintendent for the sub-contractor of steel work, Pacific Car & Foundry Co., is **Paul Collop** and steel foreman is **A. E. Mallow.**

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On the furniture store that Stronach is building at Menlo and Olympic Blvds. in Los Angeles, **P. L. Vail** is general superintendent; **Whit Taff,** engineer; **Gene Dykstra,** carpenter foreman; **George Norris,** steel superintendent; **Al Davis,** steel foreman; **Jim Bennett,** labor foreman, and **G. R. O'Melveny,** office manager.

* * *

Dan McDonald is general superintendent on the Ford Motor Co. parts depot that General Construction Co. is erecting in Seattle. **Ed Ekren** is project manager and **Frank E. Breniser** is carpenter foreman for General Construction Co. **A. G. Hedeen** is resident engineer for the Ford Co. **Le Roy Tarp** is foreman for brick and stone subcontractor, Roy W. Tarp & Co.

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Carl Johnson is general superintendent for Henrik Valle Construction Co. of Seattle on the six-story and penthouse building going up at 4th and Pacific in Bremerton, Wash. **Troy M. Pence** and **Charlie Jenkins** are carpenter and brick foremen, respectively, and **Charles Barker** is hoist engineer.

* * *

Les Smith is job superintendent on the 3.9 mi. of access road being built at the Hungry Horse Dam site in Montana for $479,474 by S. Birch & Sons and McLaughlin, Inc., of Great Falls and C. & F. Trucking Co. of Butte. **Bill Sorsen** is in charge of blasting operations.

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Louie Mignon is project manager for Thompson Construction Co. on the carpenters' hall being built in Bremerton, Wash. **M. S. Buck** is general superintendent; carpenter foremen are **Carl Bock, Chester Sowa,** and **William Motzkus;** steel foreman is **Harry Black,** and labor foreman is **John Pontus.**

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John Vineyard is general superintendent for Northwest Construction Co. on revision of three sections of the state highway from Auburn to Enumclaw, Wash. **Joe P. Haley** is resident engineer, and operators are **Jim Nucci, F. M. Jerome, G. W. Edmondson, A. R. Harley, George Lee** and **A. J. Lewis.**

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Fred Merritt is in Questa, N. Mex., as job superintendent of 20.5 mi. of highway construction near the Colorado state line. W. T. Bookout Construction Co. of Las Vegas, N. Mex., has the $123,828 contract, and the crusher foreman is **R. E. Atwater.**

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A. H. Bauer is supervising 8½ mi. of highway construction from Santa Rita to Crazy Horse Summit, north of Salinas, Calif., for A. Teichert & Son of Sacramento. **G. C. Weeshoff** is resident engineer; **A. G. Harrisberger,** concrete foreman; **C. J. Homan, W. H. Akens** and **J. E. Stinson,** grade foremen; **G. M. Augusta,** equipment superintendent; **W. A. Peckham,** office manager, and **N. A. Prior, A. A. Thorne, E. A. Pierce** and **Edward C. Millard,** operators.

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John Usrey has the general superintendency for L. Henri Duvall & Son on construction of the Olympic Sausage Co. factory in Seattle. Engineering on the project is being done by General Engineering Co., and steel foreman is **W. Riley Mays.**

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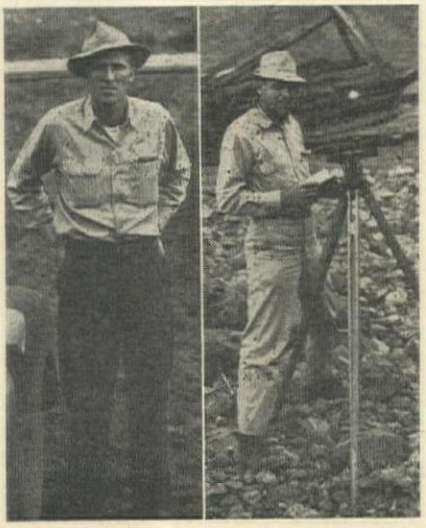
J. Howard Gaskill, general superintendent of Morrison-Knudsen Co., Inc., building operations, is overseeing the erection of a combined bus terminal and motel at Winnemucca, Nev., for the Boise-Winnemucca Stages.

* * *

In Mt. Vernon, Wash., the Sellen Construction Co. of Seattle is building a poultry killing plant for the Washington Cooperative Farmers Association. **Arthur J. Nyberg** is general superintendent; **Sigmund Ivars-**

ON THE JOB at the Rector Creek dam, 11 miles north of Napa, are D. L. ROSS, left, general superintendent for Parker & Ball, contractors, and MEDILL THIEBAUD, right, resident engineer.



son, resident engineer; **Adolph Nelson,** carpenter foreman; **Bert Coldwell,** general foreman; and **I. Fuller,** steel foreman.

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W. L. "Bill" Fairey, Jr., and **W. D. "Bill" Hammond, Jr.,** are superintendent and assistant superintendent respectively on highway repair work Fairey-Hammond, Inc., is doing between Santa Maria River and Nipomo, Calif., on Highway 101. Both Fairey and Hammond were Japanese prisoners of war for four years. **Herb Holman** is resident engineer and **Cecil Mallory** is grade foreman. During construction on this job they must pilot 50 to 60 cars and trucks each way every four minutes.

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Dewey Wheeler is general superintendent for S. Birch & Sons Construction Co., Great Falls, on the $500,000 highway contract between Bozeman and Livingstone, Mont. **Don E. Burton** and **Geo. Ellington** are foremen; **P. S. Meysembourg,** master mechanic; **R. E. McCormick,** engineer; **H. G. Peterson,** accountant; and **Jim McDonald,** timekeeper.

* * *

I. L. Gebhard is project manager for Western Contracting Corp. of San Francisco on the 13 mi. section of the Delta-Mendota Canal near Patterson, Calif. Job superintendent on the $3,530,067 project is **D. G. Hall,** project engineer is **W. F. Boone,** accountant is **R. W. Grimes,** and concrete superintendent is **George Adair.**

* * *

Mike Borgford is general superintendent for The Harrison Bros. Co., Tacoma, on 4.3 miles of highway grading and surfacing from Cavaleros Corner to Snohomish, Wash. **J. M. Harrison** is project manager; **Larry Nicula** and **E. C. Rogers,** grading foremen.

* * *

Sam Bergstrom is supervising grading and draining of 1.9 miles of highway between Rocky Point and Ostrander, Wash., for K. L. Goulter & Co. of Seattle. **Harry Dahl** is resident engineer; **Jake Davis,** grading foreman, **Earl Chandlee,** shop foreman; and **N. B. Thomas, D. Giessen,** night foremen.

* * *

On the F.P.H.A. veteran housing project going up in Inglewood, Calif., under contract to Daley Bros., **Frank Daniels** is general superintendent; **W. F. Maxwell,** field superintendent; **Charles Clinton** and **A. D. Jackson,** carpenter foremen; **Roy Laster** and **Jessie Fikes,** labor foremen, and **Charlie Snodgrass,** timekeeper.

* * *

Marcus M. Howell is now project manager for Kern & Kibbe of Portland on construction of a bridge at Kelso, Wash. **E. K. Ward** is resident engineer; **R. F. Roddy,** general superintendent; **Fred Johnson,** pile-driving foreman; and **R. C. Holcomb** is assistant superintendent.

* * *

R. J. "Rolly" Roeber is general superintendent for Peter Kiewit Sons' Co., Seattle, for construction on highway No. 99, south of Kelso, Wash. Other key men are **Rod Miller, Bill Buchler, Rex Snodderly, E. G. Nettleton, Clyde Praytor, Bob Papousek, John A. Clark** and **John Dunton.**

* * *

A. R. Milnar is general superintendent for Chalmers & Borton of Hutchinson, Kan., on elevator construction of a flour mill at Ogden, Utah for the Farmers Grain Corporation. **Walter Otis** is assistant superintendent; **Clair Lund,** engineer; and **Carlos Regan** and **Henry Gillon,** labor foremen.

* * *

Mike Hansler is general superintendent and **Henry E. Ericson** is general foreman for the McDonald Building Co., on the construction of an office and warehouse building at Tacoma, Wash. Other key men on the job are **Clarence Hockstra, Bill Tokarczyk, Barney Lott** and **Barney Sather.**

* * *

Roy R. Jones is job superintendent for N. M. Ball Sons of Berkeley, Calif., on the $470,026 highway construction job between Del Monte Junction and Seaside Junction in Monterey County. The engineer is **William T. Spencer;** office manager, **Leonard S. Ball;** concrete structure foreman, **E. H. "Tommy" Thomas;** mechanic, **George Best.**

* * *

A. S. Nystedt is superintendent and **Arthur Johansen** is general foreman for Wick & Dahlgren, Seattle, Wash., on the veterans housing project at Kellogg, Idaho. Labor foremen are **Bert Campbell** and **Mark Parsons;** project engineer, **Frank H. Keck;** office manager, **M. Neubauer;** rigger foreman, **Tom Pulakis;** and timekeeper, **A. M. Bunnell.**

* * *

Walter Peterson has the general superintendent spot at the Naval Station, Tacoma, Wash., new pier construction being built by Manson Construction and Engineering Co.

of Seattle. Assistant superintendent is **Ole Ronmark,** job engineer is **John T. Wilson.** Other key men are **L. B. Dexter, Ted Jelle, Stanley Allen, Peter Schmidt, R. J. Hillis, Gunner Langaker, George Hurst, Joe Olsen, Ole Peterson, Hans Thornquist, John Danielson, Clarence Berg, I. K. Currier,** and Navy inspector, **Hugh Thomson.**

* * *

William Adams is general superintendent for Daley Brothers of San Francisco on the demounting of a housing project at Bremerton, Wash., which will be reconstructed for veteran housing. Assisting Adams is **"Sam" Samways;** carpenter foreman is **A. L. Poage** and rigger foreman is **R. M. Currie.**

* * *

Charles J. Zeigler is with Sound Construction and Engineering Co. in Seattle as general superintendent on a Standard Oil office building at 6th and Olive Way. Carpenter superintendents on the reinforced steel and concrete, double basement building are **Robert Baker** and **Gordon Fuller;** labor foreman is **Mack Gillis** and office manager is **H. W. Tevis.**

* * *

Lawrence W. Tholen is superintendent for M. & K. Construction Co., San Francisco on the Arthur St. Overpass in Portland, Ore. Other key personnel are **Frank R. Brockschink, Jr.,** engineer; **Charles E. Hartford,** carpenter foreman; **Charles E. Chandler,** labor foreman; **Lloyd A. Corey,** pile driver foreman; and **Joseph T. Skelton,** state resident bridge engineer.

* * *

M. S. "Bill" Ross is superintendent for R. B. Warren of Pleasant Grove, Utah on contract for the Salt Lake Aqueduct. **Thos. H. Beall** is office manager, **Larry Crease** is general foreman, **Godfrey Nelson** is master mechanic and **Irwin Jones** is grade foreman.

* * *

J. A. Moore is resident engineer for the civic stadium project at Seattle, Wash. **J. B. French** is project manager for the Puget Sound Bridge & Dredging Co. of Seattle on the job, and **Carl G. Anderson** is general superintendent.

* * *

Alec Pushee has the superintendent spot on the telephone building under construction at 5th and Grand Sts. in Los Angeles by P. J. Walker of that city. Pushee's assistant is **Harry Sage; Hubert Brown** is resident engineer, **Jack Greenman** is carpenter foreman, **Mike Waters** is labor foreman and **C. E. Carlson** is office manager.

* * *

H. S. Bingham is acting as general superintendent for Sellen Construction Co. of Seattle on the erection of the railway office and freight depot at Tacoma, Wash. **A. L. Anderson** is lay-out man, and **V. M. Kinsberg** is saw-man.

* * *

Harry T. Walker is superintendent for the Utah Construction Co. at the shops in Salt Lake City for pipe for the Salt Lake Aqueduct. **Russ Cullard** is master mechanic, **Fred Zumwalt** is engineer and **R.E. Conner** is office manager. **Andy Broaddus** is in charge of work at the aqueduct.

* * *

Tom Gould, formerly of Pequot Lakes, Minn., is now doing land leveling as a heavy duty operator with Yolo Developing Co. in Sacramento, Calif.

George E. Dawson is foreman for L. W. Bentler on a store building in the Sacramento, Calif., area. They just finished construction of a 129 by 240 ft. store building without a pillar or post in Reno, Nev.

* * *

Bill Hawkins is superintendent on the Fred Meyer Company warehouse at 44th and Laurelhurst in Portland, Ore. Other key men are **Will Clausen,** engineer-architect; **Harry Krombein,** carpenter foreman; and **Carl Munstedt,** steel foreman.

* * *

Edward A. Peres is general superintendent for Granite Construction Co., of Watsonville, Calif., on 1.6 mi. of highway repair work between Y Junction and Sargeant on Highway 101. **A. L. Lamb** is resident engineer for the California Division of Highways.

* * *

Rod Kendall has the position of general superintendent with Woodworth & Co., Inc., of Tacoma for paving on Highway No. 5, Tacoma, Wash. **Roy Green** is resident engineer with **Johnny Clarence** as general foreman.

* * *

F. F. "Mac" McKinnon is superintendent for Olof Nelson & Sons, Logan, on the $240,000 highway contract from Salt Lake City to Magna, Utah. **Aaron Smith** is assistant superintendent and **Cecil Jones** is in charge of the hot plant.

* * *

Fred Waits is general superintendent for Mead-Donnell of Los Angeles on a warehouse at 17th Place and Vermont Ave., Los Angeles. **Leroy Briggs** is general foreman; **Henry Johnson,** labor foreman, and **"Blackie" Thrasher,** steel foreman.

* * *

E. Selene is general superintendent for the construction of the one-story, concrete and brick Walton Fruit Co. warehouse and office building at Bellingham, Wash. Other key men with the Selene Construction Co. of Bellingham are **E. Skogstrand,** carpenter foreman; and **Byron Chisom,** brick foreman.

E. SELENE

William R. Bushelle is general superintendent on construction of the main building superstructure that Guy F. Atkinson Co. was contracted to construct for $494,179 at Unit No. 2 of the Harbor Steam Plant at Wilmington, Calif. **Al Nemitz** is carpenter superintendent there, **H. S. Walker** is office manager and purchasing agent, and **C. H. Yates** is engineer.

* * *

L. S. Garlick is now general superintendent for Construction Engineers & Contractors of Tacoma on the construction of a restaurant building at the Narrowsview Addition, Tacoma, Wash.

* * *

Sinclair McClellan is now general superintendent for the Austin Co. of Oakland on the construction of a $1,000,000 cannery building in Santa Clara Co., Calif. Carpenter foreman is **William Nicholson;** labor foreman, **Harry Montel;** steel foreman, **Bob Clark;** and office manager, **Bill Stevenson.**

* * *

J. W. Fainter is in Ysleta, Tex., as job superintendent for Holland Page of Austin, Tex., on construction of water and sewer improvements for the town. **M. A. Withers, Jr.,** is office manager for the project.

* * *

W. E. Swanson is general superintendent for Gibbons and Reed Co. of Salt Lake City on Riverdale bridges and overpasses at Logan, Utah. **Dugal Young** of Young & Smith, Salt Lake City, is supervising the structures under a sub-contract.

* * *

M. McEachern is general superintendent, **W. Blake** is foreman and **Robert E. Edwards** is master mechanic for Piombo Bros. Construction Co. of San Francisco on a housing project at Strawberry Point, south of San Rafael, Calif.

* * *

W. M. Elkins has the general superintendent spot with the Gaasland Construction Co., on the construction of a store building at Mt. Vernon, Wash. Carpenter foreman is **Walter Sackman.**

* * *

C. P. Weaver is general superintendent for Stone and Webster of Los Angeles on construction of a chemical plant in San Jose, Calif. Carpenter superintendent is **F. V. Buxton.** International Chemical Co. awarded the contract for the plant.

* * *

A. G. Nystedt is general superintendent for Sam Bergesen of Tacoma on the construction of the Tacoma Ice Palace. Carpenter foreman is **A. Albert,** labor foreman is **Mel Johnson.**

* * *

Bill Madson is general superintendent for C. M. Syar of Vallejo on 2.5 miles of highway construction north of Willits, Calif. Other key personnel are **Merrill Weekley, Tom Shaw, Roy Frazier** and **Tom Stapleton.**

* * *

Ivan Breunshak is supervising construction of 6 miles of highway at Cougar, Wash., for Peter Kiewit & Sons Co. of Seattle. The job superintendent is **R. J. Roeber;** engineer for the Federal Bureau of Public Roads Administration is **C. C.**

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Slavens; engineer, **Rodney Miller**; dirt foreman, **Al Herring**; master mechanic, **Elmer Buckler**; and oiler, **Arvid Adamson.**

* * *

Alex L. Simpson is general superintendent for the Walsh Construction Co. on their $30,000,000 Alcoa Aluminum Co. contract for construction of a rolling mill in Davenport, Iowa. **Charles Young** is the project manager.

* * *

Victor J. Erickson and **E. V. Anderson** are general superintendent and assistant superintendent for Sellen & Harris on the construction of new homes in the Highlands district of Tacoma, Wash.

* * *

W. E. "Curley" Dale is supervising the building of a factory at 57th and Santa Fe Sts., Los Angeles, for Buttress & McClellan. **D. F. "Frank" Hanson** is foreman on the job.

* * *

Herman Deaton is supervising treatment of 8.8 mi. of Highway 78 in Collin Co., Tex., from Farmersville to Lavon. **R. W. McKinney** of Nacogdoches was awarded the contract for $142,392.

* * *

E. E. Friegang is general superintendent and **R. E. Wootan** is general foreman for C. F. Davidson Co. of Tacoma for the construction of a one-story and mezzanine warehouse at Tacoma, Wash.

* * *

George B. Gunnell is supervising construction of a Northwestern Auto Works factory building at Fountain and Western Aves. in Hollywood for contractor Ray V. Anderson.

* * *

Ed Hallmark is superintendent for J. H. Welsh of Phoenix, Ariz., on the $96,803 sewage construction project in Tempe, Ariz. **B. M. Cockrill** is project manager and **H. Thompson** is purchasing agent.

* * *

L. M. Bale is job superintendent for the Olson Construction Co. of Lincoln, Neb., on the new Ranch Inn Motel project at Elko, Nev.

* * *

A. B. Levy is superintendent for E. B. Darby of Pharr, Tex., on construction of 1.1 mi. of bridges and approaches on Highway 336 in Hidalgo Co. The project will cost $219,731.

* * *

G. F. King is general superintendent for R. A. Heintz for construction on Highway No. 99, north of Albany to Salem, Ore. **Joe Begley** is master mechanic.

* * *

F. J. Vandenburg is general superintendent for Atherton Construction Co. of Seattle on construction of a sales and office building at Mt. Vernon, Wash.

* * *

B. B. "Red" Patton is blade operator on the highway construction job Dimmitt & Taylor of Los Angeles has on Highway 101 near Goleta, Calif.

* * *

L. M. Robinson is structural foreman on the new highway contract of the Silver State Construction Co., near Imlay, Nev.

UNIT BID SUMMARY

Sewerage . . .

California—Los Angeles County—State—Sewer, Grade.

Mike Radich & Co., Burbank, was low before the Division of Highways, Sacramento, with a bid of $389,655 to grade, construct a sanitary sewer and storm drain on and adjacent to Santa Ana Parkway between Soto and Indiana Sts. in the city of Los Angeles. All unit bids submitted follow:

(1) Mike Radich & Co. $389,655
(2) Haddock Co. 424,004
(3) Charles T. Brown Co. $430,033
(4) Peter Kiewit Son's Co. 498,397

	(1)	(2)	(3)	(4)
2,100 cu. yd. removing concrete	4.00	9.90	5.10	8.00
Lump sum, clearing and grubbing	$3,500	$4,125	$1,200	$3,000
127,000 cu. yd. roadway excavation	.80	.65	.80	.79
49,000 cu. yd. structure excavation	2.00	2.30	2.50	2.95
315,000 sta. yd. overhaul	.005	.015	.004	.004
Lump sum, dev. water sup. and furn. watering equip.	$3,000	$1,575	500.00	375.00
1,400 M. gals. applying water	2.00	1.95	1.80	2.30
3 tons liquid asphalt, SC-2 (prime coat, P.M.S.)	40.00	53.00	41.00	125.00
580 tons P.M.S.	4.50	7.00	8.25	6.00
1,000 tons asphalt concrete	4.50	6.00	8.25	6.40
150 cu. yd. Class "B" P.C.C. pavement	15.00	20.00	15.00	18.90
850 cu. yd. Class "A" P.C.C. structures	38.00	81.00	45.00	51.50
725 cu. yd. Class "C" P.C.C. pipe reinforcement	14.00	17.25	14.00	13.50
200 cu. yd. Class "A" P.C.C. curbs and sidewalks	30.00	30.00	35.00	37.00
80 lin. ft. 18-in. R.C.P. (standard strength)	4.50	3.65	4.85	9.30
70 lin. ft. 18-in. R.C.P. (1,500 D)	4.50	3.65	4.85	9.35
70 lin. ft. 21-in. R.C.P. (standard strength)	5.50	4.25	5.65	9.60
350 lin. ft. 21-in. R.C.P. (1,500 D)	5.50	4.15	5.65	9.50
120 lin. ft. 21-in. R.C.P. (2,000 D)	5.85	5.00	6.25	10.50
100 lin. ft. 24-in. R.C.P. (standard strength)	5.50	4.55	6.30	9.20
40 lin. ft. 27-in. R.C.P. (1,250 D)	6.00	5.30	7.70	9.50
330 lin. ft. 27-in. R.C.P. (1,500 D)	6.40	5.30	7.75	9.50
70 lin. ft. 27-in. R.C.P. (1,750 D)	6.50	5.55	8.30	9.60
170 lin. ft. 30-in. R.C.P. (1,250 D)	7.00	6.10	8.65	9.55
270 lin. ft. 30-in. R.C.P. (1,500 D)	7.15	6.15	8.70	9.60
600 lin. ft. 30-in. R.C.P. (1,750 D)	7.30	6.25	8.80	9.75
20 lin. ft. 30-in. R.C.P. (2,000 D)	8.00	7.50	9.50	10.60
290 lin. ft. 33-in. R.C.P. (1,500 D)	8.00	7.10	9.80	10.50
280 lin. ft. 36-in. R.C.P. (2,000 D)	9.50	8.75	11.30	12.40
70 lin. ft. 39-in. R.C.P. (1,250 D)	9.50	8.75	11.40	13.30
70 lin. ft. 42-in. R.C.P. (1,250 D)	10.25	9.50	12.10	13.90
580 lin. ft. 45-in. R.C.P. (1,250 D)	11.00	10.30	12.95	14.10
90 lin. ft. 45-in. R.C.P. (1,750 D)	11.50	10.90	13.30	14.50
840 lin. ft. 48-in. R.C.P. (1,150 D)	12.50	11.00	13.40	15.90
390 lin. ft. 48-in. R.C.P. (1,500 D)	12.75	11.30	13.90	16.20
700 lin. ft. 48-in. R.C.P. (2,000 D)	15.00	13.65	15.65	18.40
120 lin. ft. 54-in. R.C.P. (1,750 D)	15.00	13.65	15.90	18.25
140 lin. ft. 60-in. R.C.P. (1,150 D)	16.00	14.75	17.05	18.80
290 lin. ft. 66-in. R.C.P. (1,750 D)	22.00	20.00	21.35	24.80
600 lin. ft. 15-in. plain concrete pipe	1.75	1.75	3.40	6.90
1,250 lin. ft. 6-in. vitrified clay pipe (standard strength)	2.00	.90	2.95	6.15
1,120 lin. ft. 8-in. vitrified clay pipe (standard strength)	3.00	1.05	1.86	5.35
1,500 lin. ft. 8-in. vitrified clay pipe (extra strength)	3.50	1.15	1.92	5.40
2,120 lin. ft. 15-in. vitrified clay pipe (extra strength)	4.00	2.15	4.25	7.50
260 lin. ft. 18-in. vitrified clay pipe (extra strength)	5.00	2.80	5.00	7.35
60 lin. ft. pipe shaft manholes	15.00	15.00	15.00	18.00
390 lin. ft. Type "B" manholes	25.00	24.50	25.00	26.50
80 lin. ft. Type "S" drop manholes	25.00	26.50	25.00	33.00
25 lin. ft. Type "F" junction chambers	25.00	25.00	30.00	28.00
15 lin. ft. lamp hole "X"	40.00	4.80	10.00	17.00
5 ea. remodeling manholes	100.00	50.00	50.00	81.00
9 ea. temporary plank covers (drainage structures)	20.00	76.00	40.00	48.00
72,000 lb. bar reinforcing steel	.09	.085	.09	.085
20,000 lb. miscl. iron and steel	.25	.29	.28	.23

Bridge and Grade Separation . . .

California—Los Angeles County—State—Four Bridges

James I. Barnes Construction Co., Santa Monica, was low bidder with a proposal of $1,672,266 to the California Division of Highways for grading and paving with asphaltic concrete 0.7 mi. of Pacific Coast Highway between Dominguez Channel and San Gabriel Ave., in the cities of Los Angeles and Long Beach and construction of four bridges. The largest single item is structure excavation at an estimated cost of over a half million dollars. Next in importance is imported borrow at a cost of $300,000. The unsatisfactory foundation material will be unwatered by the use of vertical sand drains. The following unit bids were submitted:

(1) James I. Barnes Construction Co. $1,672,266
(2) Griffith Company 1,710,475
(3) Macco Construction Co. 1,756,854
(4) Guy F. Atkinson Co. 1,793,247
(5) Peter Kiewit Sons Co. $1,862,841
(6) Warren Southwest, Inc. and C. G. Willis & Sons 1,999,056

	(1)	(2)	(3)	(4)	(5)	(6)
410 cu. yd. removing concrete	4.00	5.00	6.00	7.00	4.65	4.00
13 ac. clearing and grubbing	80.00	60.00	100.00	50.00	75.00	130.00
7,000 cu. yd. roadway excav.	.70	.60	.70	.50	.56	.80
21,450 cu. yd. structure excav.	2.65	2.20	3.00	3.00	3.65	2.00
24,700 cu. yd. ditch and channel excav.	.75	.71	1.50	.60	1.00	.60
20,000 sq. yd. compacting original ground	.06	.03	.10	.12	.07	.10
133,600 lin. ft. vertical holes (sand drains)	.80	.86	.85	1.00	.80	1.13
20,000 tons sand backfill (sand drains)	1.50	2.10	2.25	3.00	1.80	2.20
625,000 tons imported borrow	.48	.44	.48	.49	.60	.36
37,500 tons imported subgrade matl.	1.80	1.95	1.65	1.75	1.75	2.00
53,000 sq. yd. preparing Class "C" subgrade	.10	.11	.10	.06	.25	.12
Lump sum, develop. water and furnish. equip.	$3,000	$3,500	$2,000	$5,000	$5,000	600.00
6,000 M. gals. applying water	1.70	1.60	1.50	.75	2.25	1.65
Lump sum, finishing roadway	$2,500	$1,000	$5,000	$3,000	$1,500	$1,500
7 tons liquid asph. SC-2 (prime coat)	30.00	17.00	50.00	21.00	15.00	18.00
1,400 tons plant-mixed surf.	4.50	3.25	5.50	4.50	4.00	3.80
21,500 tons asphalt conc.	3.80	3.90	3.71	4.50	4.00	3.85
25 tons asph. emulsion (seal coat)	22.00	31.00	25.00	30.00	28.00	19.75
7,716 cu. yd. Class "A" P.C.C. struct.	26.00	32.60	36.00	30.40	36.00	42.00

(Continued on next page)

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. . . ask him to take you to some nearby jobs to see the latest Lorains at work. Talk to the owner — ask him about performance, service, costs, etc.

. . . ask him to point out design features that mean money in your pocket — get copies of new literature that show details of construction.

. . . ask your Lorain distributor to help you select the type of mounting, front end and machine size for the most profitable application on your jobs.

. . . ask to see his facilities for servicing Lorains — his parts and shop equipment for prompt delivery and repairs.

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Coast Equipment Company, San Francisco 1
A. H. Cox & Co., Seattle 4, Washington
Bunting Tractor Co., Inc., Boise, Twin Falls, Gooding, Fairfield, and Burley, Idaho; LaGrande, Oregon
Connelly Machinery Company, Billings and Great Falls, Montana
Sanford Tractor & Equipment Co., Reno, Nevada
The Mountain Tractor Co., Missoula, Montana
The Tractor & Equipment Co., Sidney, Montana
P. L. Crooks & Co., Portland 10, Oregon
Lee Redman Company, 2020 West Grant St., Phoenix, Arizona

685 cu. yd. Class "A" P.C.C. footing blocks	24.00	18.00	30.00	15.00	36.00	53.00
3,788,000 lb. furnishing struct. steel	.09	.088	.08	.095	.081	.076
3,788,000 lb. erecting struct. steel	.02	.024	.02	.025	.023	.0437
1,171,000 lb. furnishing bar reinf. steel	.045	.044	.04	.05	.049	.053
1,171,000 lb. placing bar reinf. steel	.0175	.017	.02	.015	.017	.04
42,380 lin. ft. furnishing timber piles	.45	.55	.44	.50	.55	.62
940 ea. driving timber piles	25.00	21.00	27.00	20.00	18.00	12.00
1,700 lin. ft. furnishing cast in place conc. piles	2.60	2.70	2.50	2.50	4.00	3.10
40 ea. driving piles (cast in place)	30.00	50.00	35.00	35.00	50.00	19.30
22,920 lin. ft. furnishing steel piles	2.10	2.15	2.10	2.00	2.50	2.75
337 ea. driving steel piles	45.00	37.00	50.00	40.00	43.00	24.25
180 ea. steel pile splices	27.00	15.00	25.00	20.00	4.60	22.75
1,300 cu. yd. Cl. "A" P.C.C. curbs, gutters & s.w.	25.00	21.00	24.00	22.00	24.00	25.00
950 lin. ft. pipe handrail	3.00	3.90	1.70	2.00	2.00	4.55
2,800 lin. ft. chain link fence	1.30	1.60	1.30	1.60	1.50	1.60
4 ea. walk gates	50.00	56.00	40.00	60.00	50.00	60.00
1,200 lin. ft. 18-in. R.C.P. (std. str.)	3.50	3.00	4.00	3.00	4.25	4.80
540 lin. ft. 24-in. R.C.P. (std. str.)	4.50	3.80	5.00	4.00	5.40	6.00
520 lin. ft. 36-in. R.C.P. (std str.)	8.50	6.80	10.30	7.00	8.80	10.50
2,700 lin. ft. 15-in. plain conc. pipe	2.50	1.40	4.00	1.50	2.65	3.25
4 ea. remodel exist. manholes	100.00	180.00	125.00	60.00	130.00	150.00
29,000 lbs. misc. iron and steel	.17	.18	.21	.20	.18	.16
18,300 ea. mesembryanthemum edule cuttings	.03	.04	.04	.03	.036	.035
2,445 lin. ft. steel railing	4.50	5.00	4.35	5.00	.15	7.00
40 ea. portable timber barricades	25.00	30.00	10.00	25.00	27.00	40.00
Lump sum, electrical equipment	$44,000	$46,000	$40,000	$41,849	$44,643	$47,000
Lump sum, removing existing bridge	$2,500	$3,500	$2,500	$2,437	$8,000	$1,200
964 ea. 9.5-ft. 16-ga. stringers	12.00	13.00	11.00	9.00	11.00	9.85
254 ea. 9.5-ft. 14-ga. stringers	13.00	16.00	13.00	10.00	12.25	11.25
76 ea. 9.5-ft. 12-ga. stringers	15.00	20.00	17.00	14.00	15.00	14.00
250 ea. 7.4-ft. 16-ga. spacers	9.00	7.60	6.50	6.00	7.40	6.00
156 ea. 9.6-ft. 14-ga. spacers	11.50	12.00	9.50	8.50	10.25	8.75
157 ea. 11.8-ft. 12-ga. spacers	16.00	20.00	16.00	14.00	15.00	13.40
47 ea. 7.4-ft. 16-ga. bottom spacers	8.50	7.00	6.00	6.00	8.00	5.30
15 ea. 9.6-ft. 14-ga. bottom spacers	11.00	11.00	9.50	8.00	10.75	8.00
15 ea. 11.8-ft. 12-ga. bottom spacers	15.00	18.00	15.00	13.00	15.00	12.40
70 ea. 9.5-ft. 8-ga. stringer stiffeners	6.00	5.00	4.00	4.00	6.40	3.75
1,950 lin. ft. 8-ga. columns	2.00	2.20	2.00	1.60	2.30	1.90
77 ea. 12-ga. column caps	1.50	1.00	1.00	2.00	2.70	1.40
92 ea. 14-ga. column splicers	1.25	.85	1.00	1.50	3.80	1.20
154 ea. 16 x 16-in. 1-ga. bearing plates	4.00	3.50	3.00	3.00	7.50	2.90
146 ea. 20 x 20-in. 1-ga. bearing plates	5.00	5.00	4.00	4.00	8.40	3.75
14 ea. 24 x 24-in. 1-ga. bearing plates	6.00	7.00	6.00	5.00	9.70	5.10

California—Shasta County—State—Steel Girder

Pacific Bridge Co., San Francisco, submitted the only bid to the State Division of Highways in Sacramento for construction of a steel plate girder bridge across the Sacramento River at Redding, with a proposal of $739,546. Its unit bids follow:

Lump sum, clearing and grubbing	$3,000
4,200 cu. yd. structure excavation, Type "A"	28.00
1,050 cu. yd. structure excavation, Type "B"	5.00
1,600 cu. yd. structure backfill	4.00
2,975 cu. yd. Class "A" P.C.C. (structure)	60.00
1,350 cu. yd. Class "A" P.C.C. (footing block)	40.00
60 lin. ft. rubber waterstops	5.00
1,825,000 lb. furnishing structural steel	.116
1,825,000 lb. erecting structural steel	.025
20,810 lin. ft. furnishing steel piling	1.60
519 ea. driving steel piles	25.00
100 ea. steel pile splices	30.00
300 cu. yd. sacked concrete riprap	25.00
570 sq. yd. flexible rock filled mattress	10.00
2,100 lin. ft. steel railing	7.50
485,000 lb. furnishing bar reinf. steel	.05
485,000 lb. placing bar reinf. steel	.02
Lump sum, misc. items of work	$5,000

Irrigation . . .

Washington—Grant County—Bur. of Reclam.—Earthwork and Lining

Utah Construction Co. and Winston Bros. Co., San Francisco, Calif., with a total proposal of $2,871,976, submitted the lowest bid to the Bureau of Reclamation on construction of the first portion of the West Canal, one of the principal features of the Columbia Basin irrigation project. Schedule 1 is for earth canal with concrete lining and Schedule 2 is for two siphons. The canal has a trapezoidal cross-section throughout. In Section 1, approaching Dry Coulee Siphon No. 1, the invert is 38 ft. wide and the water depth 16.4 ft., with concrete lining 4½ in thick. In Section 2, downstream from the outlet of Dry Coulee Siphon No. 2, the invert is 50 ft. wide and water depth of 19.12 ft., the canal being unlined. In Section 3, between the two siphons the invert is 12 ft. wide and the water depth is 16.85 ft., with a 4½ in. concrete lining. The siphons are 25 ft. inside diameter and constructed of concrete 24 in. thick. The following unit bids were submitted:

	Schedule 1	Schedule 2	Total
(1) Utah Construction Co. and Winston Bros. Co.	$1,662,802	$1,208,994	$2,871,796
(2) J. A. Terteling & Sons, Inc.	1,403,930	1,505,545	2,909,475
(3) Guy F. Atkinson Co., etc.	1,743,802	1,320,640	3,064,475
(4) N. Fiorito Co.	1,810,970	.....	.....
(5) Morrison-Knudsen Co., Inc.	2,119,960	1,957,825	4,077,785

SCHEDULE NO. 1	(1)	(2)	(3)	(4)	(5)
1,044,000 cu. yd. excav., common, for canal	.23	.12	.20	.44	.28
704,000 cu. yd. excav., rock for canal	.92	.725	.90	.44	1.15
300,000 stas. cu. yd. overhaul	.02	.02	.04	.05	.03
245,000 cu. yd. compacting embankments	.23	.20	.30	.20	.30
500 cu. yd. excav., common, for channels	.58	.60	1.00	1.50	1.00
50 cu. yd. excav., rock, for channels	4.00	2.00	5.00	3.00	4.00
6,350 cu. yd. excav., common, for structures	.87	1.00	.90	1.50	2.00
4,750 cu. yd. excav., rock, for structures	2.90	2.50	1.90	3.00	3.00
116,000 sq. yd. preparing rock foundation	1.15	1.00	1.58	1.15	1.00
124,000 sq. yd. trimming earth foundation	.58	.50	.80	.75	1.00
10,600 cu. yd. backfill	.35	.20	.40	.25	1.00
200 cu. yd. compacting backfill	2.65	3.00	7.00	2.00	4.00
100 sq. yd. dry-rock paving	5.00	2.00	7.00	6.00	10.00
870 cu. yd. concrete in structures	40.00	45.00	50.00	60.00	70.00
16,250 cu. yd. reinf. conc. in canal lining	12.00	13.00	12.70	18.00	16.00
16,250 cu. yd. unreinf. conc. in canal lining	12.00	13.00	12.70	18.00	16.00
108,000 lb. placing reinf. in structures	.035	.04	.04	.06	.06
1,300,000 lb. placing reinf. in canal lining	.029	.023	.025	.04	.035

(Continued on next page)

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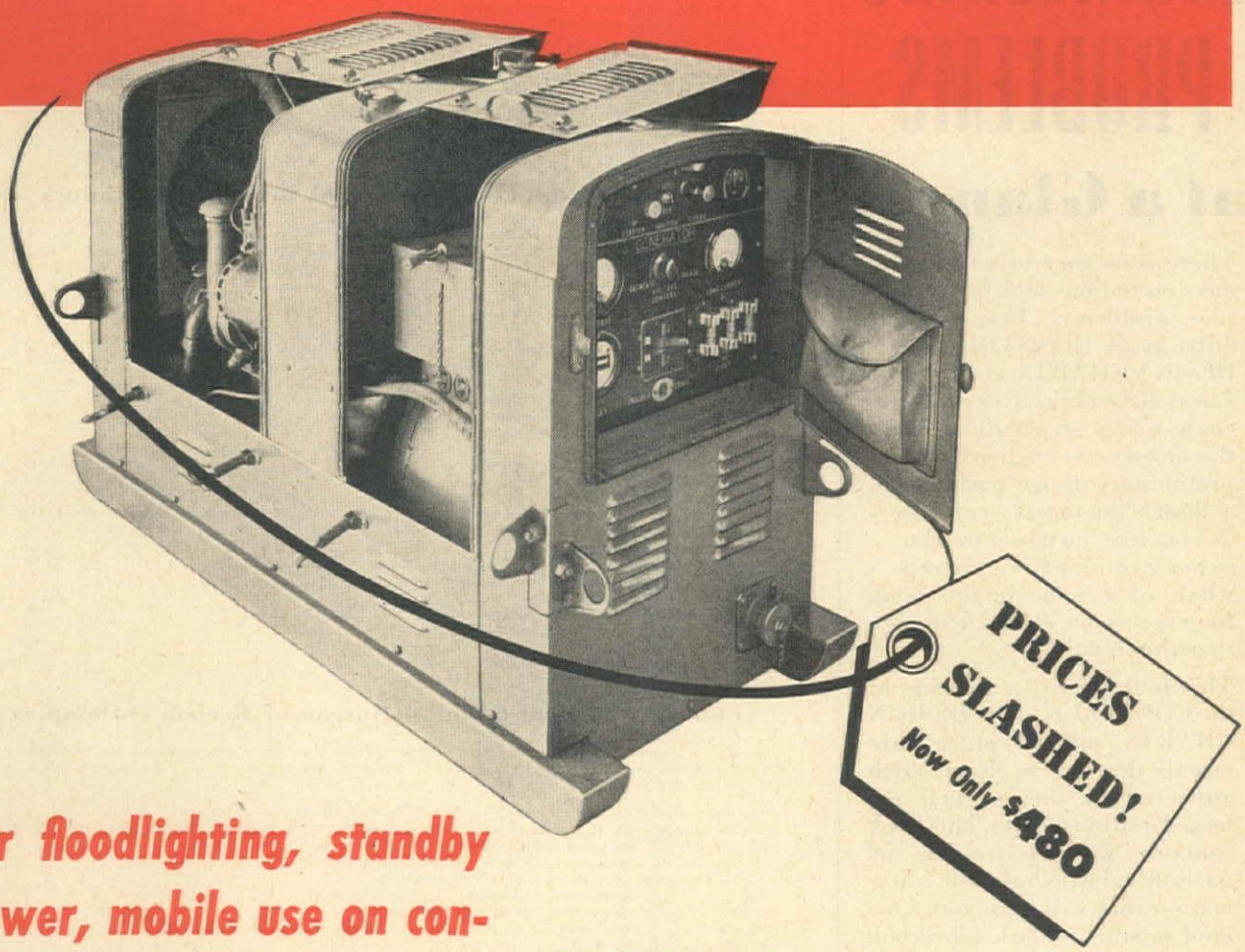

For floodlighting, standby power, mobile use on construction jobs. Produces 3,000 watts of light.

This 3 KVA all-purpose engine-generator set that serves as prime source of electricity or fits into present circuits as a standby unit is now available for immediate shipment. Built to U. S. Army specifications, the units have been used only for test runs or standby service. Priced below the original cost, this 3 KVA 3-phase or single-phase unit is sturdy and fully enclosed against weather.

PARTS: Ample supply of parts is available.

SPECIFICATIONS:

ENGINE: Gasoline, 4-cylinder Hercules model ZXB, develops 11 horsepower at generator speed.

GENERATOR: 3 KVA AC., 115, 120 or 125 volts, *3-phase or single-phase,* 60-cycle at 1200 rpm, 50-cycle at 1100 rpm.

EQUIPMENT: Self-starter which operates on a vehicle-type, 6 volt battery (battery extra), oil filter, oil bath air cleaner, manual choke, gasoline gauge, gas strainer. *Control panel:* Main switch, circuit breaker and fuses, frequency meter, voltmeter and ammeter, charging ammeter, oil pressure gauge.

WEIGHT: 900 lbs. Compactly built, the unit consists of engine, generator, switch board, and gas tank, all mounted on skids for easy transportation.

HOW TO BUY: List price of $480.00 f.o.b. Sidney, Nebraska, Anniston, Alabama or Los Angeles, California. Terms, cash; or 10% cash with order, balance sight draft bill of lading. 30% discount to dealers.

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World's Largest Chrysler Dealer

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200 sq. ft. placing elastic joint-filler	.92	1.00	1.00	1.00	2.00
200 lin. ft. placing rubber water stops	1.15	1.00	1.50	1.00	2.00
29 M.F.B.M. erecting timber in structures	100.00	80.00	75.00	60.00	90.00
5,000 lin. ft. underdrains with uncemented joints	1.15	1.00	1.75	2.50	2.00
1,000 lin. ft. sewer pipe with cemented joints	.58	.60	1.00	1.50	1.20
130 lin. ft. 15-in. concrete pipe	1.75	1.00	1.75	1.50	1.50
60 lin. ft. 18-in. concrete pipe	2.30	1.25	2.00	1.50	2.00
130 lin. ft. 30-in. concrete pipe	3.45	2.00	3.00	3.00	3.50
66,000 lb. install gates and gate hoists	.08	.125	.07	.15	.10
600 lb. install miscel. metal work	.35	.50	.40	.30	.25
400 lin. ft. install electrical conduits	1.15	1.00	1.00	1.00	.70
100 lb. install electrical conductors	1.15	1.00	1.00	1.50	2.00
SCHEDULE NO. 2					
202,000 cu. yd. excav., common, for structures	.30	.20	.20	.....	.29
44,500 cu. yd. excav., rock, for structures	1.90	1.25	1.10	.....	1.85
50,000 sta. cu. yd. overhaul	.02	.02	.04	.....	.03
146,000 cu. yd. backfill	.29	.20	.16	.....	.45
4,000 cu. yd. compacting backfill	2.30	2.50	5.75	.....	4.00
41,300 cu. yd. concrete in structures	16.10	23.00	19.70	.....	29.00
14,820,000 lb. placing reinf. bars	.022	.026	.024	.....	.035
166,000 lb. placing metal water stops	.12	.20	.08	.....	.10
1,800 lb. install blow-off valves	.23	.50	.20	.....	.40

Oklahoma—Jackson County—Bur. of Reclam.—Earthwork and Struct.

Stamey Construction Co., Hutchison, Kansas, was the low bidder with a proposal of $337,147 to the Bureau of Reclamation for construction of earthwork and structures between Sta. 610 and Sta. 1147 of the Altus canal. The following unit bids were submitted:

(1) Stamey Construction Co. $337,147
(2) James & Phelps Construction Co..... 364,651
(3) Claussen-Olson-Benner, Inc. $452,533

	(1)	(2)	(3)
265,000 cu. yd. excav. for canal	.20	.21	.30
153,000 cu. yd. excav. from borrow pits	.15	.21	.30
1,155,000 sta. cu. yd. overhaul	.01	.01	.02
90,000 cu. yd. compacting embankments	.05	.07	.10
14,000 cu. yd. excav. for drainage channels and dikes	.30	.30	.30
26,700 cu. yd. excav. for structures	.75	.75	1.00
25,000 cu. yd. backfill	.20	.35	.30
12,300 cu. yd. compacting backfill	1.00	1.00	1.00
7,400 sq. yd. dry-rock paving	3.25	4.00	5.00
Lump sum, removing and replacing riprap	.....	.....	.....
3,100 cu. yd. concrete in structures	45.00	45.00	50.00
4,650 bbl. furnishing and handling cement	3.00	3.75	3.80
330,000 lb. placing reinf. bars	.04	.04	.05
85 M.F.B.M. erecting timber in structures	75.00	60.00	100.00
4,200 lb. placing metal water stops in joints	.15	.25	.40
96 lin. ft. laying 18-in. concrete pipe	1.50	1.00	1.50
684 lin. ft. laying 24-in. concrete pipe	2.00	1.50	2.00
112 lin. ft. laying 30-in. concrete pipe	2.50	2.25	2.50
26,200 lb. installing gates and gate hoists	.10	.15	.15
8,700 lb. installing miscellaneous metalwork	.15	.15	.20

Colorado—Grand County—Bureau of Reclam.—Pumping Plant

Granby Constructors were the only bidders to the Bureau of Reclamation for constructing the Granby Pumping Plant, part of the Colorado-Big Thompson Project in Estes Park, Colo. Their bid was rejected and the job will be re-advertised later. The unit bids follow:

Lump sum, diversion and care of Soda Creek during const. and unwatering found	$12,000
360,000 cu. yd. excav. for canal, struct., conduits, pumping plant, anchors, pipes, and surge tank	1.05
80,000 cu. yd. excavation for concrete discharge conduit and structure	.50
4,000 cu. yd. excavation for pipe trenches and switchyard structures	3.60
1,070 sq. yd. asphaltic coating on foundations	.50
60,000 cu. yd. excavation, hill south of pumping plant	.65
19,000 cu. yd. excavation, stripping borrow pits	.60
500,000 cu. yd. excavation in borrow pits and transportation to sluiced fill	.55
83,400 cu. yd. backfill	.60
200 cu. yd. gravel backfill	6.00
24,300 cu. yd. compacting backfill	1.85
435,000 cu. yd. placing sluiced fill	.32
6,800 cu. yd. dumped riprap	1.70
300 sq. yd. dry-rock paving	7.00
2,100 cu. yd. gravel surfacing	3.60
1,400 cu. yd. concrete in intake structure	43.00
2,760 cu. yd. concrete in pumping plant substructure	17.50
11,800 cu. yd. concrete in pumping plant intermediate structure	53.00
1,400 cu. yd. concrete in pumping plant superstructure	95.00
1,170 cu. yd. second-stage concrete in pumping plant	35.00
Lump sum, cooling concrete	$4,000
12,400 cu. yd. concrete in conduits and discharge structure	37.50
2,400 cu. yd. concrete pipe anchors, pipe encasement, and base for surge tank	34.00
500 cu. yd. concrete in switchyard structures	55.00
7,118,000 lb. placing reinforcement bars	.06
4,450 lin. ft. painting reinforcement bars	.70
220 lin. ft. constructing control joints	7.00
2,100 sq. ft. placing joint filler	.70
10,000 lin. ft. placing metal sealing strips	1.75
26,000 lb. placing metal water stops	.85
200 lin. ft. placing rubber water stops	1.75
385 lin. ft. constructing asphalt seals	1.40
400 lin. ft. forming holes for 4-in. drains	5.00
6,800 sq. ft. placing cellulated glass insulation on roofs	.50
6,800 sq. ft. placing coal-tar-saturated felt roofing	1.75
100 sq. yd. damp-proofing interior wall	1.40
2,200 sq. yd. placing bonded concrete floor finish	5.00
1,260 sq. ft. installing glass block panels	2.60
270,000 lb. installing butterfly valves, controls, and operating mechanisms	.09
26,000 lb. installing gate frames and guides	.13
8,750 lb. installing bulkhead gate	.20
54,000 lb. installing drainage and unwatering pumps	.10
207,000 lb. installing cranes	.11
165 track ft. installing transfer track rails on ties	7.00
46,000 lb. installing crane runway and transformer track rails	.10
52,000 lb. erecting structural-steel framework	.13
65,000 lb. installing trashrack metalwork	.10
400,000 lb. installing pump inlet and outlet pipes	.09
275,000 lb. installing surge tank	.10
10,200 sq. ft. installing lagging on surge tank	.35
55,900 lb. installing metal tubing, pipe, fittings, and valves less than 6 in. diam	.45
163,200 lb. installing meal tubing, pipe, fittings, and valves 6 in. and greater diam	.17
1,500 lb. installing siphon breaker valve	.20
650 lin. ft. laying 8-in. clay sewer pipe with cemented joints	4.40

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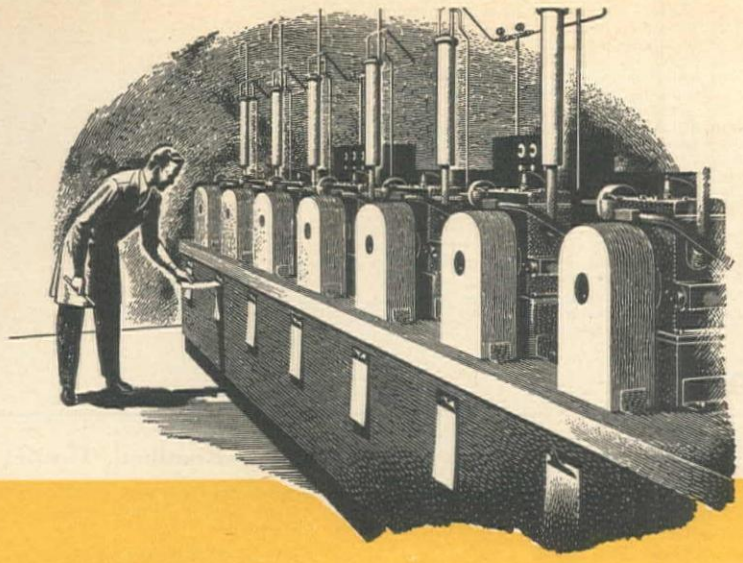

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8,000	lb. placing metal tubing and fittings for concrete-cooling system	.70
200	lb. placing construction-joint grout tubing and fittings	.85
4,700	lb. installing metal inserts	.70
4,000	lb. installing pipe handrails	.70
5,600	lb. installing metal stairways	.45
4,800	lb. installing embedded metal frames for openings in floors and walls	.45
88,700	lb. installing metal gratings, floor plates, and cover plates	.25
11,400	lb. installing oil storage tanks	.25
600	sq. ft. installing metal accordion doors	2.60
600	sq. ft. installing metal swinging doors	2.60
60	sq. ft. installing metal fire doors	2.60
800	sq. ft. installing metal-sash windows	2.60
840	lb. installing metal louvers	.85
14,000	lb. installing miscellaneous metalwork	.70
12,200	lin. ft. installing embedded electrical metal conduit 1¼ in. or less in dia.	1.75
11,100	lin. ft. installing embedded electrical metal conduit betw. 1¼ in. and 3 in. in dia.	2.20
8,400	lin. ft. installing embedded electrical nonmetallic conduit	.85
2,200	lb. installing ground wires	.85
1,100	lin. ft. constructing guardrails	1.35
1,110	tons transporting freight for gov't. or agents, other than contractor, betw. railhead and site	4.00

Tunnel . . .

New Mexico—Otero County—PRA—Roadbed, Tunnel

Henry Thygesen Co. and Frank P. Llewellyn of Albuquerque, were low with a bid of $640,100 on construction of a roadbed 28 ft. wide and a tunnel 26 ft. wide, total length of 4.4 mi., through Lincoln National Park on the Alamogordo-Pinon route. Unit bids were as follows:

(1) Henry Thygesen Co. and Frank P. Llewellyn $640,100
(2) Lowdermilk Bros. 664,602
(3) Colorado Constructors, Inc. $678,128
(4) Engineers' estimate 573,675

		(1)	(2)	(3)	(4)
471,000	cu. yd. unclassified excavation	.80	.85	.88	.72
5,900	cu. yd. unclassified excav. for structures	2.50	3.00	4.00	2.60
26,000	cu. yd. unclassified excav. for borrow, Case 1	.65	.40	.50	.55
800,000	sta. yd. overhaul (1000 ft. free haul)	.025	.03	.03	.015
45,000	cu. yd. mi. special overhaul of borrow (1000 ft. free haul)	.20	.25	.25	.20
4.4	mi. finishing earth graded roads	600.00	750.00	400.00	500.00
175	cu. yd. concrete, Class A	50.00	55.00	45.00	45.00
21,600	lb. reinforcing steel	.10	.12	.11	.11
95	M.F.B.M. untreated timber	120.00	150.00	120.00	125.00
135	cu. yd. Class B stone masonry	25.00	35.00	30.00	25.00
50	lin. ft. 18-in. C.G.S.M. culvert pipe	3.00	3.00	3.00	3.00
3,248	lin. ft. 24-in. C.G.S.M. culvert pipe	3.90	3.65	3.75	3.50
882	lin. ft. 30-in. C.G.S.M. culvert pipe (14 gage)	5.25	4.40	4.60	4.50
200	lin. ft. 30-in. C.G.S.M. culvert pipe (12 gage)	5.75	5.55	5.60	5.50
472	lin. ft. 36-in. C.G.S.M. culvert pipe (12 gage)	7.00	6.95	7.50	7.00
432	lin. ft. 36-in. C.G.S.M. culvert pipe (10 gage)	8.50	8.25	8.60	8.50
5,600	cu. yd. hand laid rock embankment	4.00	5.25	5.00	4.00
60	lin. ft. 6-in. perforated C.G.S.M. pipe underdrain	2.00	6.00	5.00	3.50
330	sq. yd. grouted rubble gutter	5.20	5.00	5.00	4.20
1	ea. cattle guards (26-ft.)	$1,200	$1,500	$2,000	$1,300
1,700	lin. ft. barbed wire fence	.20	.30	.25	.15
11,500	cu. yd. tunnel excavation	10.25	9.25	8.80	9.00
300	cu. yd. tunnel enlargement excavation	17.00	9.25	20.00	12.00

Highway and Street . . .

Oregon—Multnomah County—State—Hydraulic Embankment

General Construction Co., Portland, submitted a low bid of $1,057,370 for 6.2 mi. of hydraulic-placed roadbed embankment requiring approximately 3,200,000 cu. yd. embankment in place, 7,400 lin. ft. corrugated metal culvert pipe, and 1,900 cu. yd. ditch and culvert excavation. It is a State Highway Department project on the Troutdale-Wahkeen Creek section of the Columbia River highway. Units bids are as follows:

(1) General Construction Co. $1,057,370
(2) Franks Dredging Co. $1,091,735

		(1)	(2)
Lump sum,	clearing	$21,000	$40,000
1,900	cu. yd. structural excavation, unclassified	2.00	3.00
3,200,000	cu. yd. hydraulic embankment, in place	.31	.306
5,000	cu. yd. extra for filling cellular wall	.80	1.50
850	lin. ft. 18-in. corrugated metal pipe, protected invert	4.00	4.00
1,100	lin. ft. 18-in. extra strength corrugated metal pipe, protected invert	4.50	4.25
1,300	lin. ft. 24-inch corrugated metal pipe, protected invert	7.00	5.50
2,800	lin. ft. 24-inch extra strength corrugated metal pipe, protected invert	7.10	6.00
450	lin. ft. 30-inch extra strength corrugated metal pipe, protectedf invert	9.50	7.50
230	lin. ft. 36-inch corrugated metal pipe, protected invert	11.00	9.00
650	lin. ft. 36-in. extra strength corrugated metal pipe, protected invert	12.00	10.00

Nevada—Eureka County—State—Grade and Surf.

Strong Co., Springville, Utah, with a bid of $580,125, was low before the Nevada Department of Highways, Carson City, for construction of 9 mi. of State Highway 1, from Dunphy east. Nearly half of the total bid is made up of excavation costs. Contract was awarded to the low bidder. The following unit bids were submitted:

(1) Strong Co. $580,125
(2) W. W. Clyde & Co. 592,502
(3) Hunt & Frandsen 621,796
(4) Dodge Construction, Inc. 657,480
(5) Isbell Construction Co. $665,265
(6) Floyd S. Whiting 674,534
(7) Westbrook & Pope 699,299

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
150	hr. tractor with bulldozer	10.00	8.00	11.00	9.50	10.00	9.00	9.00
250	hr. motor grader, scarifier	7.50	6.50	6.50	6.50	6.00	7.00	7.00
120	hr. 1½ cu. yd. dump truck	4.00	3.50	3.50	3.75	3.50	3.50	3.50
180	hr. ½ ton pickup	3.00	2.50	2.50	2.50	3.00	2.50	3.00
19,574	ton 1-in. gravel base detours	.73	.70	.80	.80	.70	.70	.98
545	ton roadmix detours	23.72	22.00	23.00	23.00	24.00	25.00	23.00
8.57	mi. roadmix detours	600.00	500.00	400.00	500.00	600.00	500.00	500.00
Lump sum,	special detours	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500	$2,500
Lump sum,	signs	$3,000	$1,500	500.00	$1,500	$5,000	500.00	$3,000
5,406	lin. ft. remove fence	.10	.05	.07	.05	.05	.05	.04
1	cu. yd. remove concrete	20.00	20.00	25.00	20.00	50.00	10.00	50.00
956	lin. ft. remove culvert pipe	1.25	1.00	1.00	1.50	1.50	1.00	1.00
39	ea. remove culv. inlets and outlets	10.00	10.00	10.00	20.00	10.00	10.00	10.00

(Continued on next page)

PACIFIC WIRE ROPE COMPANY
LOS ANGELES 21, CALIF., U.S.A. *BRANCHES:*
SAN FRANCISCO HOUSTON PORTLAND

454,901	cu. yd. roadway excav.	.47	.47	.51	.57	.45	.60	.65
1,065	cu. yd. drainage excav.	1.00	.50	.50	1.00	1.00	.40	1.50
178	sta. V-type ditches	10.00	5.00	3.00	6.00	6.00	7.50	5.00
33,921	cu. yd. borrow	.30	.25	.35	.25	.30	.25	.35
138	sta. slope rounding	20.00	5.00	5.00	10.00	25.00	5.00	5.00
1,612,354	yd. sta. overhaul	.015	.015	.015	.015	.01	.015	.01
40,143	yd. mi. overhaul	.15	.15	.20	.20	.20	.20	.11
1,316	cu. yd. structure excav.	2.00	1.50	1.50	2.00	2.00	2.00	2.00
2,133	cu. yd. backfill	.50	1.50	1.00	1.00	1.50	1.00	1.50
Lump sum,	roadside cleanup	500.00	500.00	500.00	500.00	500.00	500.00	500.00
12,522	M. gal. water	1.50	1.75	2.00	2.00	2.75	2.50	2.00
572	hr. power roller	5.00	5.00	5.00	4.75	5.00	5.00	6.00
3,774	hr. tamping roller	5.00	5.00	7.00	7.50	7.50	6.00	6.00
93,300	ton gravel base	.52	.70	.50	.50	.60	.70	.50
42,949	ton 1-in. gravel base roadway	.59	.80	.80	.90	1.00	.70	.98
310	ton liq. asph. MC-1 (prime)	26.57	25.00	25.00	25.00	27.25	25.00	24.00
38	ton liq. asph. MC-2 (seal rdmx.)	25.00	25.00	24.00	25.00	26.50	25.00	23.00
107	ton liq. asph. SC-5 (seal plantmx.)	24.00	25.00	22.00	25.00	25.00	25.00	23.00
832	ton screenings	3.00	3.50	4.00	5.00	6.00	4.00	5.00
536	ton liq. asph. SC-2 (shoulders)	23.00	23.00	22.00	23.00	24.00	25.00	23.00
6.88	mi. 8 & 10-ft. roadmix shoulders	300.00	350.00	400.00	400.00	500.00	400.00	300.00
11.29	mi. 4 & 6-ft. roadmix shoulders	200.00	200.00	500.00	300.00	300.00	350.00	300.00
955	ton liq. asph. SC-5 (plantmix)	22.00	23.00	22.00	23.00	23.25	24.00	22.00
15,915	ton Class F-2 plantmix surf.	2.00	2.25	2.50	2.50	3.00	2.50	3.00
250	cu. yd. Class A concrete	50.00	40.00	50.00	50.00	50.00	40.00	50.00
33	cu. yd. Class B concrete	50.00	40.00	50.00	50.00	50.00	40.00	50.00
31,150	lb. reinf. steel	.10	.10	.10	.10	.12	.10	.10
3.75	M.F.B.M. untreated Douglas fir	200.00	200.00	160.00	200.00	250.00	100.00	300.00
490	lin. ft. 18-in. corr. metal pipe	3.00	2.25	2.50	3.25	3.00	3.00	3.00
982	lin. ft. 24-in. corr. metal pipe	4.00	3.50	4.00	4.25	4.25	4.00	3.75
202	lin. ft. 30-in. corr. metal pipe	6.00	4.50	5.00	5.00	5.25	7.00	4.50
268	lin. ft. 36-in. corr. metal pipe	7.00	7.00	7.50	7.50	8.00	8.00	5.50
92	lin. ft. 48-in. corr. metal pipe	8.00	9.00	10.00	9.50	10.25	10.00	11.00
118	lin. ft. 36-in. corr. metal pipe (8 ga.)	10.00	10.00	11.00	10.50	11.50	10.00	8.00
102	lin. ft. 48-in. corr. metal pipe (8 ga.)	12.00	16.00	14.00	12.50	14.50	12.00	14.00
262	lin. ft. relay culvert pipe	1.00	1.50	1.50	1.50	2.00	1.00	1.00
2	cu. yd. grouted hand-laid riprap	30.00	30.00	25.00	12.50	25.00	20.00	50.00
33	ea. move culv. headwalls	30.00	25.00	25.00	20.00	30.00	20.00	20.00
6,610	lin. ft. metal guard rail	2.25	2.00	2.50	1.75	4.00	2.00	2.00
88	ea. culvert markers	5.00	5.00	5.00	5.00	6.00	4.00	5.00
100	ea. guide posts	5.00	5.00	5.00	5.00	6.00	5.00	5.00
90,843	lin. ft. construct fence	.20	.16	.15	.20	.20	.20	.25
5,406	lin. ft. reconstruct	.10	.10	.10	.15	.15	.10	.25
7	ea. 16-ft. steel gates	50.00	35.00	50.00	50.00	60.00	30.00	50.00
67	ea. monuments	6.00	6.00	5.00	6.00	6.00	5.00	5.00
1	ea. 16-ft. timber cattle guard	$1,500	700.00	500.00	750.00	750.00	500.00	$1,250
3,400	lin. ft. paved ditches	1.00	.60	1.00	1.00	2.00	.25	.50
Lump sum,	rem. and reconst. 26-ft. cattle guard	$2,500	500.00	$1,000	$1,000	$1,500	750.00	$1,000

Montana—Flathead County—State—Grade, Surf.

Union Construction Co., Inc., Great Falls, bid low to the State Highway Commission, Helena, with a proposal of $730,942 for 6.1 mi. of grading and surfacing on the Belton East section of the Belton-Glacier Park Station highway. Three bidders and amounts submitted are:

(1) Union Construction Co., Inc. $730,942
(2) Clifton & Applegate 761,470
(3) McLaughlin, Inc. $787,001

		(1)	(2)	(3)
738,947	cu. yd. unclass. excav. and borrow	.825	.88	.93
796	cu. yd. culvert excavation	2.00	3.00	2.50
92,956	mi. yd. overhaul	.30	.30	.20
18,330	cu. yd. selected material	1.25	1.30	1.25
68.71	acre clearing	500.00	400.00	400.00
32.82	acre grubbing	300.00	200.00	200.00
800	cu. yd. binder	.10	.01	.05
1,600	mi. yd. overhaul on binder	.10	.01	.05
550	M. gal. watering	1.50	2.00	2.00
122	units rolling	6.00	6.00	5.00
1,080	lin. ft. 24-in. corr. metal pipe culv.	5.00	5.00	4.50
106	lin. ft. 30-in. corr. metal pipe culv.	6.00	6.00	5.30
140	lin. ft. 36-in. corr. metal pipe culv.	8.00	9.00	7.50
120	lin. ft. 60-in. sec. plate C.M. culv.	35.00	30.00	27.50
270	cu. yd. cement rubble masonry	35.00	30.00	32.00
23.40	cu. yd. Class A concrete	55.00	60.00	48.00
2,826	lb. reinforcing steel	.20	.20	.20
1	ea. concrete project marker	25.00	20.00	15.00
34	ea. concrete station marker	7.00	6.00	8.00

California—San Mateo County—State—Grade, Pave.

Guy F. Atkinson Co. of South San Francisco was low bidder at $627,782 to grade and pave with Portland cement concrete on crusher run base about 2.2 mi. of the Bay Shore freeway from Broadway in Burlingame to State St. in San Mateo. Unit bids submitted are as follows:

(1) Guy F. Atkinson Co. $627,782
(2) Macco Construction Co. and Morrison-Knudsen Co., Inc. 696,493
(3) Charles L. Harney $760,213
(4) Fredrickson & Watson Construction Co. 874,927

		(1)	(2)	(3)	(4)
1,250	cu. yd. removing concrete	4.00	4.30	4.00	3.00
Lump sum,	clearing and grubbing	$5,400	$12,500	$2,750	$2,000
53,000	cu. yd. roadway excavation	.50	.90	.48	.64
5,700	cu. yd. structure excavation	1.75	1.85	3.90	2.75
1,750	cu. yd. ditch and channel excavation	.90	1.25	1.20	1.50
77,000	sq. yd. compacting orig. ground	.04	.02	.06	.09
150,000	sta. yd. overhaul	.006	.02	.006	.01
240,000	tons imported borrow, Type A	.75	.77	1.05	1.50
10,000	tons imported borrow, Type B	1.00	1.15	1.40	1.70
1,000	lb. seed (slope erosion protection)	.45	.68	.75	.50
32,500	sq. yd. scarifying landscape area	.03	.13	.04	.08
8,600	sq. yd. preparing Class C subgrade	.14	.25	.13	.10
Lump sum,	dev. water supply and furn. watering equipment	$2,000	$1,000	$1,275	$3,000
5,400	M. gals. applying water	1.75	1.60	1.90	1.60
118	sta. finishing roadway	17.00	25.00	16.50	16.00
28,750	tons crusher run base	2.00	2.30	2.60	2.43
35	tons asphaltic emulsion (paint bdr. and seal coat)	18.70	25.00	27.00	35.00
115	tons screenings (seal coat)	5.00	6.20	4.75	5.75
4,600	sq. yd. prep., mixing and shaping surf. (B.S.T.)	.14	.37	.13	.30
20	tons liq. asphalt SC-2 or 3 (B.S.T.)	18.00	23.00	25.00	30.00
2,570	tons plant-mixed surfacing	4.60	6.20	6.00	6.00
70	tons liq. asph. SC-1 (prime coat)	17.00	23.00	21.50	21.00
4,700	tons asphalt conc. leveling course	4.80	6.00	6.00	6.10
3,200	tons asphalt conc. Type "A" surface	5.10	6.40	6.00	6.10
575	lin. ft. asphalt conc. raised bars	1.00	1.30	1.20	1.45

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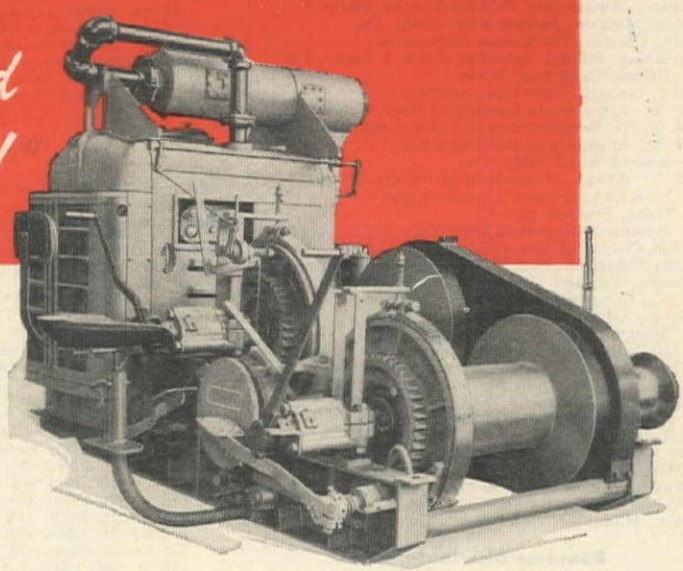
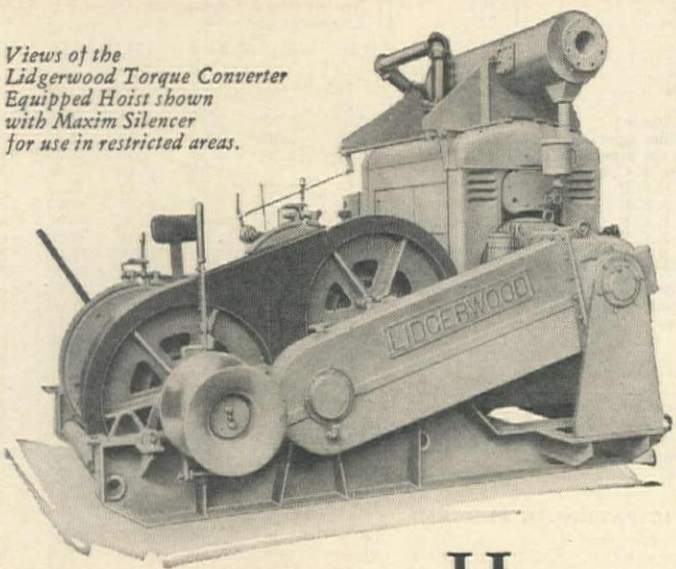
the NEW LIDGERWOOD

Torque Converter Equipped Hoist

...Lifts heavy loads and "floats" them into place!





Views of the Lidgerwood Torque Converter Equipped Hoist shown with Maxim Silencer for use in restricted areas.

Principal Features:

- 100 H.P. Diesel Hoist
- Rating 10,000 lb. line pull
- At 210 feet per minute
- All Steel Construction
- Anti-Friction Bearings
- Grouped Levers at Operator's Seat

Here's a new and advanced type hoist that makes light work of many heavy load lifting tasks for industry! It is especially suitable for setting steel in buildings, on bridges, or on many other construction and industrial jobs. Its remarkable flexibility and responsive speed literally "floats" loads into place.

The simplicity of this Lidgerwood Torque Converter Equipped Hoist makes light work of operation, too. For it offers 100% speed and load control by a single lever.

Powered by a husky Diesel or Gasoline engine that cannot stall when under load, this hoist gives you all the smooth, flexible control you've obtained in the past with steam hoists—with the important added advantages of greater economy and lighter weight.

Designed, built and tested by Lidgerwood, this compact hoist is another example of modern design that stems from 72 years of leadership in manufacturing hoisting equipment.

Let this better hoist put your heavy loads on the spot. You may order it built in sizes from 75 H.P. to 150 H.P. or larger.

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
149 BROADWAY, NEW YORK 6, N. Y.

8,700 cu. yd. Portland cement concrete (pavement)	12.50	11.70	13.00	11.25
1,300 tons sand cushion	2.50	2.70	3.00	3.00
7,800 ea. tie bolt assemblies	.55	.68	.65	.55
395 cu. yd. Class "A" P.C.C. (structures)	50.00	50.00	44.00	50.00
4,100 cu. yd. heavy stone riprap	5.50	4.00	8.00	9.25
1,000 cu. yd. salvaged riprap	1.75	2.50	4.00	5.75
810 cu. yd. Portland cement concrete curbs and gutters	28.00	31.00	25.00	30.00
2,600 ea. curb dowels	.25	.16	.26	.24
1,500 cu. yd. Portland cement concrete parking strips	12.00	15.00	13.75	14.25
212 cu. yd. Portland cement concrete sidewalks	25.00	25.00	20.00	23.00
25 ea. monuments	3.50	6.20	4.00	4.60
11 ea. center line monuments	18.00	25.00	21.00	14.00
4,150 lin. ft. metal plate guard railing	2.20	3.00	2.00	2.05
120 lin. ft. reconstructing guard railing	1.80	1.85	1.75	3.50
65 ea. culvert markers	3.50	6.00	3.00	3.00
65 ea. guide posts	3.20	6.00	4.50	3.75
9,300 lin. ft. chain link fence	1.35	1.30	1.50	1.40
7 ea. walk gates	55.00	64.00	68.00	60.00
790 lin. ft. 12-in. R.C. pipe	1.50	1.50	1.50	1.80
200 lin. ft. 15-in. R.C. pipe	2.00	2.00	1.90	2.25
2,190 lin. ft. 18-in. R.C. pipe	2.50	2.70	2.50	2.90
290 lin. ft. 21-in. R.C. pipe	3.00	3.40	3.00	4.00
750 lin. ft. 24-in. R.C. pipe	4.00	4.00	4.00	4.50
2 ea. 18-in. automatic drainage gates	50.00	180.00	50.00	46.00
1 ea. 24-in. automatic drainage gate	70.00	125.00	70.00	65.00
84 lin. ft. 6-in. vitrified clay pipe	.60	.75	.65	.80
471 lin. ft. 15-in. vitrified clay pipe	2.00	2.50	2.20	2.25
2 ea. brick manholes	125.00	250.00	170.00	235.00
1 ea. frames and covers for manholes	50.00	60.00	54.00	60.00
1,600 lin. ft. salvaging exist. pipe culv.	1.20	1.80	1.15	1.20
26 ea. frames and grates for inlets	60.00	80.00	54.00	70.00
15 ea. manholes adjusted to grade	40.00	100.00	31.00	60.00
41,500 lb. bar reinforcing steel	.07	.08	.09	.08
2,400 lb. misc. iron and steel	.35	.50	.31	.25
12 ea. lighting standards	400.00	400.00	375.00	375.00
1,120 lin. ft. 1½-in. conduit	1.85	2.20	1.00	2.70

Wyoming—Laramie County—State—Grade.

Sharrock & Pursel of Casper were awarded the contract by Wyoming Highway Department to grade, drain and do miscellaneous work on 12.1 mi. of the Cheyenne-Wheatland road on their low bid of $287,027. Bidders and amounts submitted follow:

(1) Sharrock & Pursel $287,027
(2) Platte Valley Construction Co. 289,188
(3) H. W. Read 321,605
(4) Peter Kiewit Sons' Co. 343,093
(5) Inland Construction Co. $363,077
(6) Forgey Construction Co. 366,932
(7) Northwestern Engineering Co. 422,172
(8) Engineers' estimate 274,580

	(1)	(2)	(3)	(4)	(5)	(6)	(8)
955,000 cu. yd. excavation	.16	.14	.17	.19	.23	.23	.15
18,000 cu. yd. sta. overhaul	.015	.015	.015	.015	.015	.015	.015
125,000 cu. yd. mi. haul	.12	.20	.15	.20	.20	.14	.20
17,000 M. gal. watering (emb.)	2.00	2.00	2.50	2.25	1.75	2.50	1.50
4,000 hr. sheep's foot roller operation	2.00	3.50	2.50	3.00	2.40	2.25	3.50
700 cu. yd. excavation for pipe culverts	.50	1.00	2.50	1.50	1.60	1.00	1.50
178 lin. ft. 24-in. siphon R.C.P.	8.00	8.00	7.50	9.00	7.50	7.00	5.00
168 lin. ft. 12-in. std. R.C.P.	2.55	2.50	2.10	3.00	2.40	2.00	2.00
84 lin. ft. 18-in. std. R.C.P.	3.90	4.00	3.75	5.00	4.00	3.60	3.50
2,780 lin. ft. 24-in. std. R.C.P.	5.50	5.50	5.25	6.00	5.70	5.00	4.50
972 lin. ft. 36-in. std. R.C.P.	10.00	9.00	9.30	11.00	10.00	8.50	6.50
176 lin. ft. 42-in. std. R.C.P.	12.00	12.00	12.35	15.00	13.50	11.00	8.50
316 lin. ft. 48-in. std. R.C.P.	16.00	16.00	16.00	19.00	17.50	14.00	10.00
40 cu. yd. Class 1 riprap	5.00	6.00	10.00	10.00	9.00	6.00	6.00
50 cu. yd. grouted riprap	7.00	15.00	15.00	15.00	15.50	11.00	8.00
128,500 lin. ft. std. r/w fence	.12	.12	.11	.12	.11	.12	.10
110 ea. end panels	12.00	10.00	6.00	9.00	11.00	8.00	8.00
175 ea. brace panels	6.00	8.00	8.00	7.00	7.00	7.00	6.00
16,640 lin. ft. portable snow fence	1.25	1.50	1.90	1.40	1.25	1.50	1.25
30 ea. r/w markers	10.00	8.00	7.00	15.00	10.00	7.50	7.00
2 ea. R.C. project markers	15.00	20.00	25.00	25.00	20.00	20.00	20.00
60 cu. yd. structure excavation	1.00	2.00	2.00	2.50	2.00	1.50	1.50
525 hr. mechanical tamping	3.00	4.50	4.50	5.00	4.00	3.75	5.00
18 cu. yd. Class A concrete	50.00	60.00	50.00	45.00	40.00	50.00	50.00
940 lb. reinforcing steel	.07	.12	.10	.10	.13	.10	.15
550 lb. structural steel	.10	.30	.20	.15	.16	.15	.20
NON-PARTICIPATING IN FED. AID							
0.2 mi. rem. and reset. tele. line	200.00	300.00	800.00	600.00	300.00	500.00	200.00
4 ea. 30-ft. telephone poles	20.00	20.00	35.00	15.00	20.00	30.00	30.00
20 rod telephone wire	.15	.10	.50	.40	.30	.50	.50

New Mexico—San Miguel County—State—Surface

Brown Bros., Albuquerque, bidding $425,466, submitted the lowest proposal to the State Highway Department and was awarded the contract for construction of 8.9 mi. of U. S. 85 between Watrous and Las Vegas. The following unit bids were submitted:

(1) Brown Bros. $425,466
(2) Armstrong & Armstrong 435,546
(3) Skousen Construction Co. 485,300
(4) Allison & Haney $462,129
(5) W. T. Bookout Construction Co. 467,278
(6) Peter Kiewit & Sons 489,804

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, removal of old structures	500.00	500.00	400.00	750.00	$1,000	500.00
198,100 cu. yd. excav., unclassified	.23	.26	.30	.30	.23	.37
1,085 cu. yd. excav. for structures	2.00	3.00	3.00	1.75	5.00	2.50
380 cu. yd. excav. for pipe culverts	2.00	2.50	3.00	2.00	3.00	2.00
307,500 sta. yd. overhaul	.02	.02	.02	.02	.035	.015
264,300 ¼ mi. yd. haul	.06	.06	.08	.08	.07	.06
1,070 hr. mechanical tamping	4.00	3.75	4.00	3.50	5.00	5.00
2,360 hr. rolling, sheepsfoot roller	5.00	4.00	4.00	5.00	6.00	6.00
1,190 hr. rolling, steel tired roller	5.00	4.75	5.00	5.00	6.00	6.00
90 hr. rolling, pneumatic tired roller	5.00	6.00	5.00	6.00	7.00	5.00
120,900 ton ballast	.98	1.00	1.02	1.00	1.00	.95
37,250 ton leveling course	1.17	1.15	1.17	1.15	1.20	1.10
7,500 M gal. watering	1.50	2.00	2.50	3.00	2.00	2.00
1,995 cu. yd. Class "AE-AR" conc.	28.00	27.50	28.00	27.00	28.00	36.00
8,350 sq. yd. waterproofing conc.	.50	.50	.50	.50	1.00	.80
274,450 lb. reinforcing steel	.07	.07	.065	.08	.085	.08
5 ea. cattle guards, 9-ft. roadway	600.00	450.00	600.00	450.00	700.00	600.00
2 ea. reinf. conc. monument and marker	50.00	50.00	50.00	50.00	50.00	50.00
94,000 lin. ft. galv. barb wire fence	.11	.11	.08	.12	.12	.15
5 ea. gates (Texas type)	5.00	10.00	10.00	7.00	10.00	10.00
139 ea. bracing	2.00	3.00	2.50	2.00	5.00	6.00
44 ea. treat timber warning posts	6.00	6.00	6.00	6.00	7.00	5.00
80 ea. right-of-way and station markers	4.00	4.00	3.00	3.00	7.00	5.00

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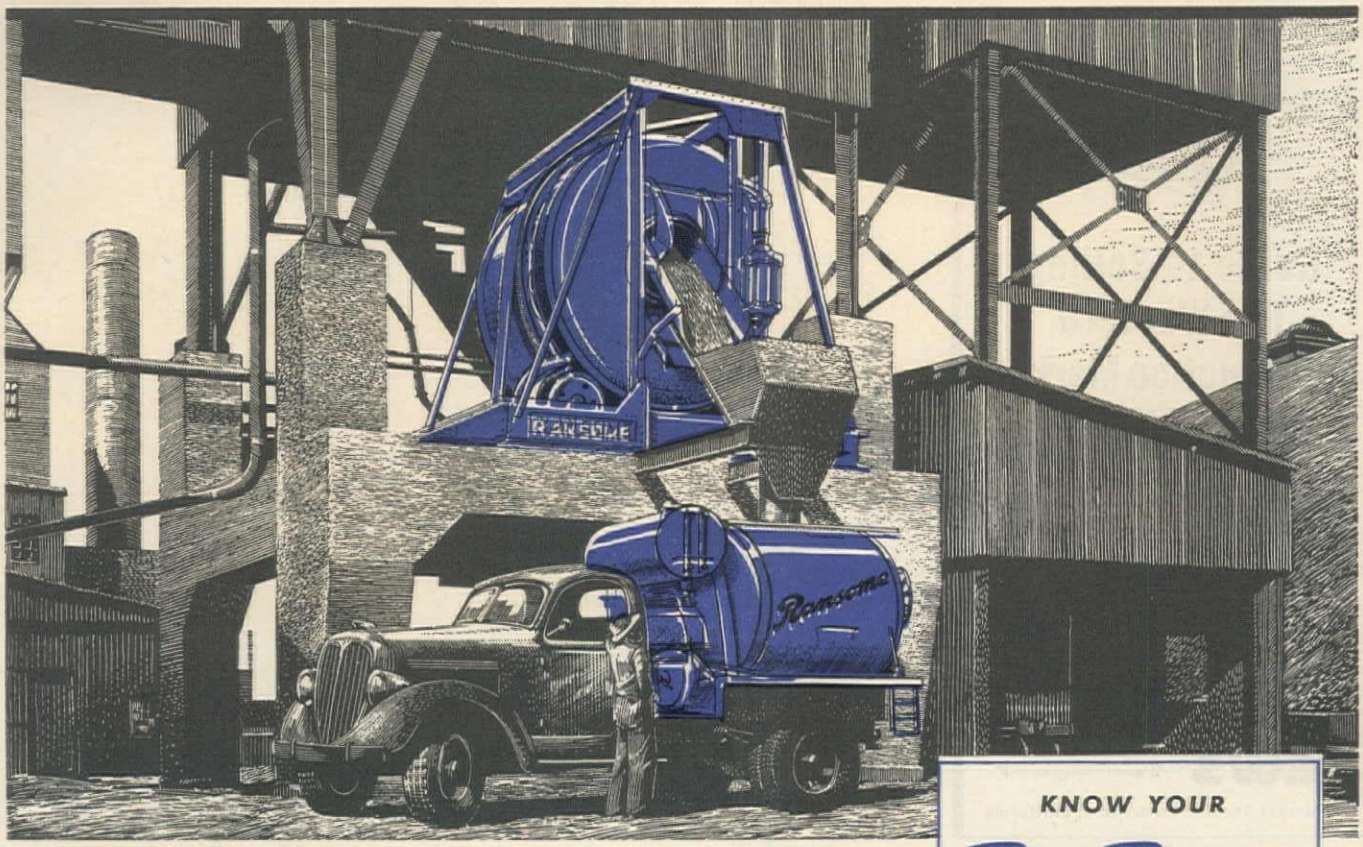
PUSH BUTTON CONTROL FOR A GIANT



Easy control, always an important feature of Ransome design, is carried a step further in the latest models 56S, 84S, and 126S Blue Brute "Big" Mixers. A new 4-way solenoid valve has been added for improved remote control of the discharge chute, considerably simplifying operation. Merely pressing a button gives operator instant control over chute — allowing faster, more accurate discharge into truck mixers, hoist buckets or hoppers.

OTHER IMPROVEMENTS INCLUDE:

Drum rollers turning independently on two Timken roller bearings . . . Extra-heavy roller shafts of heat-treated alloy steel, adjustable to allow for wear and to keep the drum always properly centered . . . Countershaft mounted on self-aligning bearings . . . Drum roller tracks machined to a true circle, for smoother operation and longer service life . . . Enclosed V-belt drive, with helical gears running in an oil bath . . . Ransome's exclusive mixing action for fast, thorough mixing.

These are a few of the reasons why Ransome Blue Brute "Big" Mixers are first choice for low-cost, trouble-free performance in central mixing plants and on so many big construction jobs. Your nearby Worthington-Ransome Distributor has the whole story. Call him and he'll be glad to give you additional proof that *there's more worth in Worthington-Ransome.*

R6-15

KNOW YOUR

BLUE BRUTES

Your Blue Brute Distributor will gladly show you how Worthington-Ransome Blue Brute Mixers and other construction equipment can put your planning on a profitable basis. His name is listed on Page 38. Blue Brutes include:

RANSOME EQUIPMENT

Pavers, Concrete Spreaders and Finishers*, Portable and Stationary Mixers, Pneumatic Placing Equipment, Truck Mixers, Plaster & Bituminous Mixers and Accessories.

WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Contractors' Pumps* and Accessories.

*To be announced.

BUY BLUE BRUTES

Truck Mixers
Capacities:
2, 3, 4½ cu. yds.

Portable Mixers
Capacities:
3½, 6, 11, 16, 28 cu. ft.

Big Stationary Mixers
Capacities:
28, 56, 84, 126 cu. ft.

Pneumatic Placer
Capacity:
7, 14, 28 cu. ft.

WORTHINGTON

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

5.9	mi. obliterating old road	200.00	300.00	300.00	500.00	200.00	400.00
17,600	lin. ft. contour ditches	.10	.04	.06	.10	.10	.10
15	cu. yd. rock and wire check dams	10.00	12.00	25.00	12.00	35.00	10.00
800	bbl. cutback asph. Type MC-1	4.50	4.75	4.50	4.50	5.00	5.50
4,160	bbl. cutback asph. Type MC-3	4.50	4.75	4.40	4.50	5.00	5.50
13,160	ton top course surfacing	1.15	1.15	1.27	1.15	1.20	1.10
8.854	mi. mixing asph. and aggr.	700.00	750.00	800.00	750.00	600.00	700.00
890	bbl. 200-300 asph. (for seal coat)	4.50	5.00	4.50	4.50	5.50	6.00
1,560	ton aggregate, seal coat	5.00	4.50	5.00	5.00	5.00	6.00
1,292	lin. ft. std. reinf. conc. pipe culv., 24-in. diam.						
420	lin. ft. std. reinf. conc. pipe culv., 30-in. diam.						
308	lin. ft. std. reinf. conc. pipe culv., 36-in. diam.						
				NO BID			
1,292	lin. ft. corr. met. culv. pipe, 24-in. diam.	2.75	3.20	4.00	3.50	4.75	3.50
420	lin. ft. corr. met. culv. pipe, 30-in. diam.	3.25	3.75	6.70	4.50	5.50	4.00
308	lin. ft. corr. met. culv. pipe, 36-in. diam.	5.30	5.80	9.50	6.75	8.00	6.00

Montana—Sweet Grass County—State—Surf.

Big Horn Construction Co., Sheridan, Wyo., was low bidder at $174,564 on 8.1 mi. of grading, surfacing and bituminous surface treatment on the Big Timber-Harlowton Highway. Unit bids were as follows:

(1) Big Horn Construction Co. $174,564
(2) Max J. Kuney Co. 181,983
(3) McLaughlin, Inc. 190,989
(4) Union Construction Co., Inc. 191,699
(5) Inland Construction Co. $199,141
(6) S. Birch & Sons Construction Co. 202,651
(7) Nilson-Smith Construction Co. 214,596

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
234,100	cu. yd. unclass. excav. and borrow	.27	.32	.38	.35	.37	.40	.44
1,472	cu. yd. culvert excav.	1.00	1.65	1.25	1.00	1.20	1.50	1.50
306,600	sta. yd. overhaul	.01	.01	.01	.01	.015	.015	.01
13,004	yd. mi. overhaul on borrow	.15	.12	.15	.20	.20	.35	.20
39,916	tons base course cr. grav. surf.	.81	.90	.64	.85	.74	.70	.84
11,761	tons Gr. "A" top course cr. grav. surf.	1.09	1.00	.85	1.00	.92	.85	1.09
1,368	tons stone chips	6.00	2.00	6.00	5.00	4.80	6.00	6.00
2,200	cu. yd. binder	.01	.10	.05	.01	.20	.01	.10
4,400	yd. mi. overhaul on binder	.01	.01	.05	.01	.20	.01	.10
4,600	M. gal. watering	2.00	1.40	1.75	1.50	1.60	1.75	1.50
307	unit rolling	5.50	6.00	7.00	6.00	6.70	5.00	6.00
37,950	gal. pr. coat oil. MC-1	.10	.12	.11	.12	.126	.13	.15
37,950	gal. seal coat oil. 150-200 P.A.C.	.10	.12	.12	.15	.126	.13	.15
506	lin. ft. 15-in. reinf. conc. pipe culv.	2.75	2.50	2.00	2.00	2.10	2.50	2.00
1,256	lin. ft. 24-in. reinf. conc. pipe culv.	5.00	4.75	4.00	4.00	3.96	5.00	4.00
352	lin. ft. 36-in. reinf. conc. pipe culv.	9.00	11.00	8.00	8.00	8.65	9.50	8.50
188	lin. ft. 48-in. reinf. conc. pipe culv.	14.50	15.00	15.00	16.00	16.80	14.50	14.00
308	lin. ft. 18-in. corr. met. syphon pipe	3.00	3.50	3.50	2.25	3.90	3.25	3.00
854	lin. ft. 24-in. corr. met. syphon pipe	5.00	5.00	4.50	4.50	6.00	3.00	4.00
226	lin. ft. 30-in. corr. met. syphon pipe	6.00	6.50	5.50	6.00	7.90	6.00	5.50
176	lin. ft. 36-in. corr. met. syphon pipe	8.00	11.00	8.00	10.00	10.40	9.00	7.50
142	lin. ft. 48-in. corr. met. syphon pipe	10.00	14.00	12.00	20.00	12.70	11.50	9.50
2.22	cu. yd. Class B concrete	50.00	60.00	60.00	50.00	60.00	60.00	50.00
1,365	sq. yd. grouted riprap	6.00	4.00	7.00	5.00	7.80	5.00	4.90
2	ea. conc. proj. markers	20.00	12.00	20.00	10.00	9.60	10.00	17.50
64	ea. conc. right-of-way monuments	3.50	3.50	4.00	6.00	5.40	4.00	3.00
43	ea. conc. sta. markers	5.50	5.00	6.00	3.00	3.60	6.00	5.00
1,220	ton stock piled gravel	1.00	1.00	.80	1.00	.86	.35	1.00

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information may be secured concerning employment conditions, wage rates, etc., by writing directly to the contractor. When available, the names of the supervisory personnel will be published in the "Supervising the Jobs" columns.

CONTRACTS AWARDED

Large Western Projects...

Bechtel-McCone Corp., San Francisco, Calif., will build a $2,500,000 distillation unit, buildings, towers and tanks at Avon, Calif. for Tide Water Associated Oil Co. The same corporation will also build a $2,250,000 crude oil distillation unit at El Segundo, Calif. for the Standard Oil Co.

McNeil Construction Co., Los Angeles, has been contracted by the U. S. Gypsum Co. of South Gate to construct a $2,500,000 paper mill building at 8430 Quartz Ave., South Gate, Calif.

Craftbuilt Homes, Inc., of San Francisco is spending $1,080,000 to construct 144 residences in Beyersford Heights, North Sacramento, Calif.

Robert E. McKee of Dallas will build a dining hall, laundry and bedroom addition to women's state college, Denton, Texas, for $1,238,665.

The Austin Co., Seattle, received an $11,000,000 contract for the expansion of a pulp-paper plant at Camas, Wash., for the Crown Zellerbach Corp., Portland, Ore.

Puget Sound Bridge & Dredging Co., Seattle, Wash., and **Johnson, Drake & Piper** of Minneapolis, Minn., will receive $7,500,000 for housing construction on Adak and Attu in the Aleutians, from the Bureau of Yards and Docks at Washington, D. C.

C. L. Peck of Los Angeles has the Broadway Department Store contract for $1,500,000 for the construction of a store addition at Colorado and Euclid Aves in Pasadena, Calif.

Utah Construction Co., San Francisco, will build a $1,677,000 cereal manufacturing plant in Lodi, Calif. for the Sperry Division of The General Mills Co.

George Dunlap of Piedmont and **Daniel Nelson,** Fresno, will construct 200 residences in Santa Clara, Calif. for themselves. The cost will be $1,000,000.

Pacific Pipeline Construction Co., Los Angeles, received a $900,000 contract from the Pacific Public Service Co. of San Francisco for the construction of a gas pipe line system from Pittsburg to Suisun Bay, Kirby Hill and West Rio Vista gas field in Calif.

Baldwin Locomotive Works of Eddystone, Penna. have received a $2,199,586 contract from the Bureau of Reclamation to supply 5 hydraulic turbines for the Davis Dam power plant.

Dinwiddie Construction Co., of San Francisco will construct a 6-story building in San Jose, Calif. for Roos Bros., San Francisco. The amount of the award is $1,000,000.

Highway and Street...

California

HUMBOLDT CO.—**Mercer-Fraser Co.,** Second and Commercial Sts., Eureka—$13,166 to pave various sts. in Arcata—by City Council, Arcata. 8-23

IMPERIAL CO.—**Tanner Construction Co.,** 731 N. Ave., Phoenix, Ariz.—$244,795 for 12.7 mi. grade., surf. and improving

shoulders betw. Calexico and El Centro—by Division of Highways, Sacramento. 8-12

KERN AND INYO COS.—**Brown & Doko,** Box 23, Pismo Beach—$45,914 for 1.3 mi. hwy. improvement, betw. Mojave and Olancha—by Division of Highways, Sacramento. 8-22

LOS ANGELES CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$132,046 to grade, pave, etc. Santa Barbara Ave., betw. Crenshaw Blvd. and Rodeo Rd., Los Angeles—by Board of Public Works, Los Angeles. 8-2

LOS ANGELES CO.—**J. E. Haddock, Ltd.,** 3538 E. Foothill Blvd., Pasadena—$285,710 to grade, pave and surface on Arroyo Seco Parkway, betw. College and Bernard Sts., Los Angeles—by Division of Highways, Sacramento. 8-21

LOS ANGELES CO.—**Vido Kovacevich Co.,** 5300 Imperial Highway, South Gate—$68,222 to improve Palomar and other streets in San Marino—by Dubros Realty Corp., San Marino. 8-9

MARIN CO.—**Marin Gravel Co.,** Point Reyes—$17,458 to resurface Franks Valley Rd., Bolinas Bay Rd. and Sir Francis Drake Blvd.—by Board of Supervisors of Marin Co., San Rafael. 8-16

MARIN CO.—**A. G. Raisch,** 2048 Market St., San Francisco—$35,971 to widen 4th St., from Marquard Ave. to W. city limits—by City Council, San Rafael. 8-19

ORANGE CO.—**John J. Swigart Co.,** 20530 S. Normandie Ave., Torrance—$23,862 to resurface six streets in Huntington Beach—by City Council, Huntington Beach. 8-16

PLUMAS CO.—**Predrickson & Watson Construction Co.,** 873 81st Ave., Oakland—$367,267 for 9.9 mi. grade and surf., Rt. 83 near Almanor and Plumas-Lassen Co. line—by Division of Highways, Sacramento. 8-12

RIVERSIDE CO.—**Arthur A. Johnson,** 421 Pearl St., Laguna Beach—$54,935 for 15.4 surf. 1.3 mi. N. of Imperial Co. line and .5 mi. S. of San Bernardino Co. line—by Division of Highways, Sacramento. 8-26

SACRAMENTO CO.—**L. G. Lentz,** 1620 11th Ave., Sacramento—$22,920 to improve Richards Blvd. for a distance of approx. 2100 ft.; and N. 10th St., betw. B St. and Richards Blvd. approx. 1500 ft.—by County Board of Supervisors, Sacramento. 8-20

SAN FRANCISCO CO.—**Eaton & Smith,** 715 Ocean Ave., San Francisco—$31,500 for grade., etc., at the Cow Palace, Rio Verde and Wallbridge Sts., San Francisco—by Division of Highways, Sacramento. 8-28

SAN FRANCISCO CO.—**Fay Improvement Co.,** 760 Market St., San Francisco—$4,538 to repair racks and seal coat panhandle driveway, Golden Gate Park, San Francisco—by Board of Park Commissioners, San Francisco. 8-23

SAN JOAQUIN CO.—**Claude C. Wood,** Box 599, Lodi—$19,447 to improve sts. in Lodi—by City Council, Lodi. 8-16

SAN MATEO CO.—**Piombo Bros. & Co.,** 1571 Turk St., San Francisco—$185,265 for 2.9 mi. grade betw. Canada Rd. and Alameda de las Pulgas—by Division of Highways, Sacramento. 8-12

SAN MATEO CO.—**L. C. Smith,** First and Railroad Aves., San Mateo—$43,174 for street improvements in Mayfair Village, South San Francisco—by City Council, South San Francisco. 8-22

SAN MATEO CO.—**L. C. Smith,** First and Railroad Aves., San Mateo—$13,990 for street improvements in Polhemus Acres, Atherton—by City Council, Atherton. 8-29

SAN MATEO CO.—**Union Paving Co.,** Babcock Bldg., San Francisco—$81,300 for grade., pave., etc., various sts. in Redwood City—by City Council, Redwood City. 8-7

SAN MATEO CO.—**Union Paving Co.,** Babcock Bldg., San Francisco—$53,451 to improve streets in Laurel Village, San Mateo—by City Council, San Mateo. 8-21

SANTA CLARA CO.—**Union Paving Co.,** Babcock Bldg., San Francisco—$284,563 to improve streets S. of Oregon Tract, Palo Alto—by City Council, Palo Alto. 8-2

SOLANO CO.—**C. M. Syar,** Box 1431, Vallejo—$38,128 to improve portions of various streets in Vallejo—by City Council, Vallejo. 8-9

TRINITY CO.—**N. M. Ball Sons,** Box 430, Berkeley—$190,381 for 6 mi. hwy. work on Tule Creek-Butter Creek Forest Development Rd.—by Public Roads Administration, San Francisco. 8-8

TRINITY CO.—**Harms Bros. and M. W. Brown,** Rt. 4, Box 2220, Sacramento—$109,658 to grade and drain 4.6 mi. of the Hayfork-Butter Creek project—by Division of Highways, Sacramento. 8-2

TULARE AND FRESNO COS.—**Westbrook & Pope,** Rt. 9, Box 841, Sacramento—$231,198 for 4.9 mi. hwy. work on Ten Mile-Hume Forest Development Rd., Sequoia National Forest—by Public Roads Administration, San Francisco. 8-8

Colorado

CONEJOS CO.—**Edward Selander,** 2309 S. Federal Blvd., Denver—$42,644 for 3.3 mi. oiling State Hwy. 15, from La Jara W. toward Capulin—by State Highway Commission, Helena. 8-21

MOFFAT CO.—**Colorado Constructors, Inc.,** Denver—$60,893 for 10.6 mi. oiling U. S. Hwy. 40, betw. Massadona and Elk Springs—by State Highway Commission, Helena. 8-21

Idaho

BONNEVILLE CO.—**Burns Construction Co.,** Idaho Falls—$32,955 for 1.5 mi. reconditioning Idaho-Montana Hwy., from Idaho Falls westerly—by Bureau of Highways, Boise. 8-21

BONNEVILLE CO.—**Lobnitz Bros.,** Sonna Bldg., Boise—$32,871 for 6.4 mi. of surf. and seal coat, the Shelly-New Sweden Rd., betw. Shelly and Idaho Falls—by Bureau of Highways, Boise. 8-16

MADISON AND TETON COS.—**Western Construction Co.,** Box 628, Pocatello—$26,316 for 36.2 mi. seal coat U. S. Hwy. 20 Alternate, betw. Canyon Creek and Idaho-Wyo. state line—by Bureau of Highways, Boise. 8-16

Montana

CUSTER CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha, Neb.—$267,649 for 7.5 mi. grade., drain. and surf. on section A of the Miles City-Terry Rd.—by State Highway Commission, Helena. 8-2

FLATHEAD CO.—**S. Birch & Sons Construction Co. and McLaughlin, Inc.,** Ford Bldg., Great Falls, and **C. & F. Trucking Co.,** Box 4, Butte—$479,494 for constr. of 3.9 mi. access rd. to Hungry Horse Dam site about 20 mi. NE. of Kalispell—by Bureau of Reclamation, Washington, D. C. 8-7

Nevada

DOUGLAS CO.—**B. H. Stoutenberg** and **Morisette & Haukland,** Carson City—$149,848 for 4.2 mi. hwy. constr., betw. Walley's Hot Spring and junction with Hwy. 395; and junction of Hwy. 395, 3.2 mi. N. of Minden and the Tahoe-Douglas airport —by Department of Highways, Carson City. 8-23

LANDER AND EUREKA COS.—**Strong Co.,** Springville, Utah—$354,174 for 5 mi. clearing, base and surf., slightly W. of Lander-Eureka Co. line to .30 mi. E. of Dunphy—by Department of Highways, Carson City. 8-23

WASHOE CO.—**Isbell Construction Co.,** 1300 E. 4th St., Reno —$187,353 to pave various streets and for curbs and gutters, Reno—by City Council, Reno. 8-2

New Mexico

CATRON CO.—**Colorado Constructors, Inc.,** 735 W. 39th Ave., Denver, Colo.—$531,269 for 4.5 mi. hwy. constr. of Forest Project 22-B3, Alpine-Reserve—by Public Roads Admin., Santa Fe. 8-16

LEA CO.—**G. I. Martin,** 520 S. Tulane, Albuquerque—$133,489 for 13 mi. blacktopping betw. Lovington and the Texas line on State Hwy. 83—by State Highway Department, Santa Fe. 8-23

LUNA & HIDALGO COS.—**Walter L. Denison,** 207 S. Hermosa St., Albuquerque—$92,289 for 9.2 mi. constr. of streets in Deming and 1.9 mi. of streets in Lordsburg—by State Highway Department, Santa Fe. 8-6

ROOSEVELT CO.—**R. P. Skousen,** Springer Bldg., Albuquerque—$59,575 for 5.9 mi. of street constr. in Portales—by State Highway Department, Santa Fe. 8-6

SAN JUAN AND SANDOVAL COS.—**Floyd Haake,** 1201 Sierra Vista, Santa Fe—$193,943 for 21 mi. blacktopping on State Hwy. 44, betw. Bloomfield and Cuba—by State Highway Department, Santa Fe. 8-23

SAN JUAN AND SANDOVAL COS.—**Skousen Construction Co.,** Springer Bldg., Albuquerque—$149,892 for 12 mi. blacktopping on State Hwy. 44, betw. Bloomfield and Cuba—by State Highway Department, Santa Fe. 8-23

TAOS CO.—**Allison & Haney,** Box 1507, Albuquerque—$17,769 for 3.2 mi. of street constr. in Taos—by State Highway Department, Santa Fe. 8-6

TAOS CO.—**W. T. Bookout Construction Co.,** Box 298, Las Vegas—$123,828 for 20.5 mi. constr. betw. Questa and Colo. state line on State Hwy. No. 3—by State Highway Department, Santa Fe. 8-6

Oregon

CLACKAMAS CO.—**Kuckenberg Construction Co.,** 11104 NE. Holman, Portland—$255,055 for 2.3 mi. advance clearing, Clackamas River Rd., Mt. Hood National Forest—by Public Roads Administration, Portland. 8-9

DESCHUTES CO.—**Babler Bros.,** 4617 SE. Milwaukee Ave., Portland—$23,885 for 10.4 mi. oiling, Alfalfa Market Rd. section of Powell Butte Secondary Hwy. and Alfalfa Co. Rd.—by State Highway Commission, Salem. 8-8

DOUGLAS CO.—**J. C. Compton Co.,** Box 86, McMinnville—$243,791 for 7.1 mi. widening and 7.8 mi. paving on Dixonville-Marks Ranch section of N. Umpqua Co. Rd.—by State Highway Commission, Salem. 8-6

LANE CO.—**J. C. Compton Co.,** Box 86, McMinnville—$13,650 for street improvements in Eugene—by City Council, Eugene. 8-3

LANE CO.—**White Bros. Co.,** Walla Walla—$230,157 for 6. mi. grade. of Box Canyon Rd., 30 mi. E. of Eugene—by State Highway Commission, Salem. 8-12

LINN CO.—**Lloyd Calkins,** Ocean Lake—$48,295 for .23 mi. slide correction, Hogg Rock section of Santiam Hwy.—by State Highway Commission, Salem. 8-7

MULTNOMAH CO.—**Porter W. Yett,** 3525 NE. 17th, Portland—$78,977 for .77 mi. hwy. widening and .81 mi. pave. on West Gresham section of Mt. Hood Hwy.—by State Highway Commission, Salem. 8-6

MULTNOMAH CO.—**Porter W. Yett,** 3525 NE. 17th, Portland—$34,735 for 1.9 mi. resurf. on Sandy Blvd. section of Columbia River Hwy., Portland—by State Highway Commission, Salem. 8-6

TILLAMOOK & WASHINGTON COS.—**Warren Northwest, Inc.,** Box 5072, Portland—$224,540 for 11.3 mi. resurf. and furnish. crushed materials in stockpiles on McNamar's Camp-Washburn section of Wilson River Hwy.—by State Highway Commission, Salem. 8-7

AMERICAN CONCRETE CYLINDER PIPE

. . . a development of

American PIPE & CONSTRUCTION CO.

. . . installed in main water supply line for Escondido (Calif.) Mutual Water Co.

Installation of 17,000 feet of 21", 24" and 27" diameter American Concrete Cylinder Pipe for the Escondido Mutual Water Company, Escondido, California. Maximum operating design pressure on the water supply line—150 pounds.

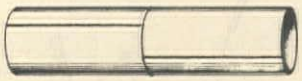
Sixteen years ago the company began the development of a new type of concrete cylinder pipe in the small and medium diameters. This pipe was to provide the water works engineers with a product of high strength, durability and maximum carrying capacity—at minimum cost. The result was American Concrete Cylinder Pipe. It possesses all these characteristics, *plus ease and simplicity of installation*. Important manufacturing features are shown at the right. The advantages are proven in performance—nearly one-half million feet having been installed in major water supply lines in the West during the past five years.

Available in diameters from 16" upwards, this product assures permanence and maximum performance at lowest cost. Write us today for complete descriptive literature.

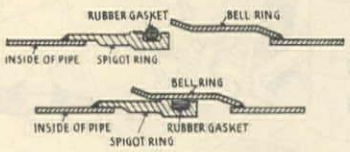
TWO BULLETINS . . . for your information.

Interesting data and factual information have been assembled into these two bulletins. They describe the use of Reinforced Concrete Cylinder Pipe in present main water supply lines in the Los Angeles and San Diego areas. Write for them!

5 FEATURES OF COMPOSITE PIPE DEVELOPED BY AMERICAN—



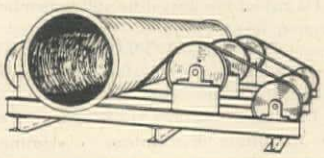
1. Welded steel cylinder.



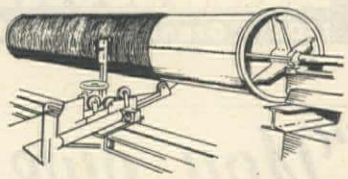
2. Special joint rings welded to cylinder, endless rubber gasket in groove. Complete assembly tested.

   (a) In position for closure in field.

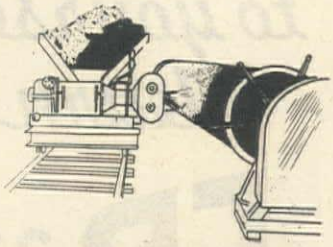
   (b) Approximate position after closure.



3. Concrete lining placed in cylinder by centrifugal process.



4. Special reinforcement wrapped on cylinder under measured tension.



5. Concrete protective coating applied on outside.

AMERICAN PIPE & CONSTRUCTION CO. ***manufactures and installs:***

Lock-Joint Concrete Cylinder Pipe
PRESTRESSED Lock-Joint Concrete Cylinder Pipe
AMERICAN Concrete Cylinder Pipe
Hume Centrifugal Concrete Pressure Pipe

THE COMPANY **also manufactures concrete pipe for storm sewers, sanitary sewers, culverts, highway and airport drainage, and many other uses.**

MAIN OFFICE AND PLANT ADDRESS
4635 Firestone Blvd., South Gate, Calif.
Mailing Address:
P. O. Box 3428, Terminal Annex, Los Angeles 54.
OFFICES AND PLANTS
Oakland, San Diego, South Gate, California
Portland, Oregon

Texas

BELL CO.—**Dean Skinner,** Dallas Highway—$57,031 for 7.8 mi. grade., drain. and surf. on Hwy. 436, from Belton to Little River—by State Highway Department, Austin. 8-16

BURNET CO.—**Phillips Paving Co.,** San Angelo—$19,000 to improve streets in Marble Falls—by City Council, Marble Falls. 8-23

CAMERON AND HIDALGO COS.—**E. B. Darby,** Pharr—$77,720 for 7.2 mi. of grade., base and surf. from Santa Rosa N. and 2.5 mi. S. of Donna on Hwys. 506 and 493—by State Highway Department, Austin. 8-28

DALLAS CO.—**Austin Road Co.,** Eagle Ford Rd., Dallas—$75,621 to pave Cockrell and other streets in Dallas—by City Council, Dallas. 7-29

DALLAS CO.—**L. H. Lacy Construction Co.,** 2601 Yale Blvd., Dallas—$18,636 for street improvements on Quonset Hut Project near Veterans Hospital, Ledbetter St. at Lancaster Rd.,Dallas—by City Council, Dallas. 8-1

DALLAS CO.—**Martin & Brown & Associates,** 1202 Hendricks St., Dallas—$72,069 to pave on Walmsley, Kings Hwy. and Taft, Dallas—by City Council, Dallas. 7-29

DALLAS CO.—**Ransdell Construction Co.,** Liberty Bank Bldg., Dallas—$24,366 to pave alleys in various parts of Dallas—by City Council, Dallas. 8-1

DALLAS CO.—**Texas Bitulithic Co.,** 111 Commerce St., Dallas —$88,187 to pave Amherst and other streets in Dallas—by City Council, Dallas. 7-29

DALLAS CO.—**Uvalde Construction Co.,** Box 253, Dallas—$100,888 to extend Live Oak from Dumas to Skillman—by City Council, Dalias. 8-19

DALLAS CO.—**R. L. Wallace,** 911 Cordova St., Dallas—$19,-702 to pave various alleys in Dallas—by City Council, Dallas. 8-1

DAWSON CO.—**L. L. Cooper,** Dallas—$103,933 for 10.9 mi. grade., struct., base and surf. on Hwy. 177, from Patricia to 3 mi. S. of Lamesa—by State Highway Department, Austin. 8-15

DEWITT CO.—**A. N. McQuown, Ltd.,** 2414 Jarrett, Austin—$30,069 for 5.7 mi. grade., drain. structs. and base on Hwys. 236 and 237, from Yorktown to 3 mi. E. and from Cuero SE. to Guadalupe River—by State Highway Department, Austin. 8-16

DIMMIT CO.—**M. B. Killian & Co.,** Sunset Road, San Antonio —$112,333 for 13.8 mi. grade., struct., base and base preservative on Hwy. 133, from Catarina to La Salle Co. line—by State Highway Department, Austin. 8-16

EASTLAND CO.—**Wallace & Bowden,** 5513½ E. Grand Ave., Dallas—$248,635 for 3.5 mi. base and triple asphalt surf. on U. S. Hwy. 80, E. of Ranger Junction to Hwy. 16—by State Highway Department, Austin. 8-16

FALLS CO.—**L. H. Lacy & Co.,** 2601 Yale Blvd., Dallas—$42,-229 for 4.9 mi. grade. and surface on Hwy. 147, from Marlin City limits to .5 mi. E. of McClanahan—by State Highway Department, Austin. 8-20

GARZA CO.—**Holland Page,** Box 1181, Austin—$118,160 for 8.1 mi. grade., struct., base and surf. from Post N. on Hwy. 122 —by State Highway Department, Austin. 8-16

GONZALES CO.—**Holland Page,** Box 1181, Austin—$10,121 for 6.1 mi. reshaping base course and surf. on Hwy. 77, from U. S. Hwy. 87 to Schoolland—by State Highway Department, Austin. 8-16

JIM WELLS CO.—**Heldenfels Bros.,** Rockport—$66,886 for 15.3 mi. flexible base and base preservative on Hwy. 624, from Nueces Co. line NW. through Orange Grove—by State Highway Department, Austin. 8-20

KIMBLE CO.—**M. B. Killian & Co.,** Sunset Road, San Antonio —$263,075 for 10.2 mi. grade., struct. and base on U. S. Hwy. 83—by State Highway Department, Austin. 8-15

LIPSCOMB AND HEMPHILL COS.—**Bell & Braden,** Herring Hotel Bldg., Amarillo—$296,263 for 15.2 mi. grade. and surf. on Hwy. No. 305, from Lipscomb to Glazier—by State Highway Department, Austin. 8-16

LYNN CO.—**Southern Contracting Co.,** 1901 Meadowbrook Dr., Austin—$125,694 for farm-to-market rds. near Tahoka and cemetery rd. one-half mi. S. of Tahoka—by Lynn County Commissioners, Tahoka. 8-5

McMULLEN CO.—**Valley Construction Co.,** Mid-Continent Bldg., Fort Worth—$95,103 for 13.4 mi. grade., flex. base and surf. on Hwy. 63, from Live Oak Co. line to Tilden—by State Highway Department, Austin. 8-16

MEDINA CO.—**M. B. Killian & Co.,** Sunset Road, San Antonio —$34,538 for 8.2 mi. grade., reconditioning and surf. from Hondo to 8.2 mi. S.—by State Highway Department, Austin. 8-16

MEDINA CO.—**Holland Page,** Box 1181, Austin—$45,494 for 11.3 mi. flexible base and asphalt surf. on U. S. Hwy. 90 E. of Hondo to 8.5 mi. NW. of Devine on Hwy. 173—by State Highway Department, Austin. 8-16

MITCHELL CO.—**Thomas & Ratliff,** Rogers—$85,686 for 7.8 mi. grade. and structs., base and surface on Hwy. 17 and 644 SE. of Colorado City—by State Highway Department, Austin. 8-23

MOORE AND SHERMAN COS.—**Bell & Braden,** Herring Hotel Bldg., Amarillo—$113,642 for 18.1 mi. of grade., drain. structs., base and surf. on Hwy. 119 and 28—by State Highway Department, Austin. 8-20

NUECES CO.—**Brown & Root, Inc.,** Box 1139, Austin—$83,096 for 5 mi. of resurfacing with hot-mix asphalt in Corpus Christi—by City Council, Corpus Christi. 8-23

NUECES CO.—**M. J. Construction Co.,** Beeville—$261,014 for 7.5 mi. grade., struct., flexible base and surf. on U. S. Hwy. 77, from Robestown to 2.3 mi. N. of Driscoll—by State Highway Department, Austin. 8-16

PALO PINTO CO.—**Long Brothers,** 400 S. Waddill St., McKinney—$41,006 for 7.2 mi. grade., struct., road bed treat. and base preservative on Hwy. 4, from Palo Pinto to Long Camp—by State Highway Department, Austin. 8-15

TARRANT CO.—**Texas Bitulithic Co.,** Box 5297, Dallas—$14,408 for base and surf. on Bideker St., Fort Worth—by City Council, Fort Worth. 8-26

TRAVIS CO.—**Holland Page,** Box 1181, Austin—$278,239 for 5.4 mi. base. and surf. on Hwy. No. 29, from U. S. Hwy. 81 N. of Austin to U. S. Hwy. 290 E. of Austin—by State Highway Department, Austin. 8-16

WILBARGER CO.—**A. L. Bucy,** Brownwood—$50,899 for 7.7 mi. grade., culvert widening, base and surf. of Hwy. 432—by State Highway Department, Austin. 8-16

WILBARGER, WICHITA AND ARCHER COS.—**Texas Bitulithic Co.,** Box 5297, Dallas—$215,864 for 28.2 mi. hot mix

asphalt pave. on Hwys. 70, 287, 277 and 82—by State Highway Department, Austin. 8-16

Utah

BOX ELDER CO.—**W. W. Clyde & Co.,** Springville—$447,259 for 5.2 mi. bitum. covered hwy., betw. Willard and Brigham—by State Road Commission, Salt Lake City. 7-30

CACHE CO.—**Olof Nelson Construction Co.,** Box 413, Logan—$29,987 for 4.9 mi. bitum. surf., betw. Newton and Clarkston—by State Road Commission, Salt Lake City. 7-30

Washington

CLARK CO.—**Frank Parsons Co.,** Forest Grove—$11,335 for reconstr. of FM. 72 S. of Brush Prairie and E. of Manor—by County Commission, Vancouver. 8-16

CLARK CO.—**Smith Bros. Construction Co.,** Vancouver—$27,692 for 1 mi. hwy. reconstr. on Shephard Rd., betw. Camas and Washougal—by County Commission, Vancouver. 8-16

COWLITZ AND SKAMANIA COS.—**J. D. Shotwell,** Puget Sound Bank Bldg., Tacoma—$169,139 for 12.9 mi. hwy. improvement on St. Helens Forest Highway—by Public Roads Administration, Portland, Ore. 8-19

KING CO.—**B. J. Anderson,** Seattle—$19,897 for 1.9 mi. road constr. near North Lake—by County Commissioners, Seattle. 8-13

KING CO.—**J. J. Badraun,** 109 N. 122nd St., Seattle—$60,296 to constr. beam type guard rail on State Hwy. No. 15, Stevens Pass to Scenic—by Department of Highways, Olympia. 8-12

KING CO.—**R. L. Moss & Co.,** Box 37, Zenith—$216,558 for 1.4 mi. clear., grade., pave. State Hwy. No. 1, Seattle N. to N. 115th St., Seattle—by Department of Highways, Olympia. 8-12

LINCOLN AND SPOKANE COS.—**Charles A. Power,** Box 1220, Spokane—$155,193 for 2.5 mi. grade., drain. and pave. State Hwy. 2, betw. Lincoln Co. line and Stevens Creek—by Department of Highways, Olympia. 8-12

PACIFIC CO.—**C. W. Thomas & Son,** Winlock—$41,411 for 1.7 mi. grade. and surf. of Bay Center dike rd.—by Department of Highways, Olympia. 8-24

PEND OREILLE CO.—**Anderson & McAndrews,** Tacoma—$13,930 for constr. of reinf. box culvert and spillway on State Hwy. 6, Panhandle spillway—by Department of Highways, Olympia. 8-14

PIERCE CO.—**Guy J. Norris,** Seattle—$42,986 for 1.9 mi. grade. and surf. on Eatonville cutoff, and mfg. and stockpile crushed stone surf. on State Hwy. 5, from Alder to Elbe—by Department of Highways, Olympia. 8-24

SNOHOMISH CO.—**Associated Sand & Gravel Co.,** 2508 Colby, Everett—$36,265 for bitum. surf. treatment, Stanwood-Bryant Rd. and Arlington Heights Rd.—by Department of Highways, Olympia. 8-12

THURSTON CO.—**J. F. Forbes,** Olympia—$14,066 for 6.4 mi. light bitum. surf. on County Rd., St. Clair Cut-off Ruddell Rd., Springer Rd. and Hogum Bay Rd.—by Department of Highways, Olympia. 8-12

WAHKIAKUM CO.—**J. D. Shotwell,** Puget Sound Bank Bldg., Tacoma—$74,780 for 6 mi. ballasting, surf. and stockpiling, State Hwy. No. 12, Cathlamet to Skamokawa and Grays River to Deep River—by Department of Highways, Olympia. 8-12

WHATCOM CO.—**Goetz & Brennan,** Seaboard Bldg., Seattle—$156,508 to grade Glacier Canyon Rd., Mt. Baker National Forest—by Public Roads Administration, Portland. 8-8

YAKIMA CO.—**Curtis Gravel Co.,** Box 106, Spokane—$31,552 for 3.2 mi. of ballast., surf. and stockpiling crushed stone surf. of State Hwy. 3-A, betw. Mabton and Byron—by Department of Highways, Olympia. 8-12

Wyoming

CARBON CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha, Neb.—$146,391 for 4 mi. of surf., seal coat, etc. on the Baggs-Savery Rd.—by State Highway Department, Cheyenne. 8-2

CARBON CO.—**Woodward Construction Co.,** Box 1046, Rock Springs—$98,241 for 14.8 mi. pave., etc., Muddy Gap-Rawlins Rd.—by State Highway Department, Cheyenne. 8-2

CROOK CO.—**Hopkins & McPherson,** Laramie—$28,245 for 14.5 mi. surf. and miscellaneous work on Moorcroft-Osnoto-Carlile Rd.—by State Highway Department, Cheyenne. 8-2

Bridge & Grade Separation...

California

LOS ANGELES CO.—**Guy F. Atkinson Co.,** Box 259, Long Beach—$639,100 for constr. of reinf. conc. 6-lane traffic bridge at Willow St., Long Beach—by City Council, Long Beach. 8-30

NAPA CO.—**Minton & Kubon,** 200 Davis St., San Francisco—$12,258 to reconstr. farm road undercrossing 4 mi. N. of Vallejo—by Division of Highways, Sacramento. 8-23

SAN DIEGO CO.—**Carroll & Foster,** 2260 Main St., San Diego—$79,508 for constr. of reinf. conc. overcrossing, Balboa Parkway at Pascoe St., San Diego—by Division of Highways, Sacramento. 8-12

SAN DIEGO CO.—**M. H. Golden Construction Co.,** 3485 Noell St., San Diego—$98,197 for constr. of reinf. conc. undercrossing on Balboa Parkway at 6th St., San Diego—by Division of Highways, Sacramento. 8-12

Colorado

DOUGLAS CO.—**J. H. & N. M. Monaghan & Associates,** Rt. 1, Derby—$130,825 to constr. reinf. conc. bridge and approaches, betw. Franktown and Colorado Springs—by State Highway Department, Denver. 8-23

Idaho

ADA CO.—**Mendenhall & Whitney,** Provo, Utah—$20,979 for constr. of 36.9 ft. conc. bridge over Ridenbaugh Canal on Vista Ave.—by Bureau of Highways, Boise. 8-16

Oregon

CROOK CO.—**Kuckenberg Construction Co.,** 11104 NE. Holman, Portland—$386,780 for constr. of bridges and 6.4 mi. grade. on Ochoco Hwy., near summit of Ochoco Mts.—by Public Roads Administration, Portland. 8-9

Texas

HILL CO.—**Ernest Lloyd,** Box 1120, Fort Worth—$65,457 for piers for Kimball's Bend crossing, Brazos River Bridge on Hwy. 167—by State Highway Department, Austin. 8-15

Utah

MORGAN CO.—**F. R. Knowlton,** Layton—$26,915 for conc. bridge over Weber River at Morgan—by State Road Commission, Salt Lake City. 7-30

Washington

FRANKLIN CO.—**David Nygren,** Lloyd Bldg., Seattle—$33,096 to constr. reinf. conc. overcrossing over Union Pacific Railroad, Palouse Falls State Park Rd.—by Department of Highways, Olympia. 8-12

KING CO.—**Goetz & Brennan,** Seaboard Bldg., Seattle—$216,051 for 1.1 mi. of grade., drain. and constr. 2 reinf. conc. bridges over Tye River on State Hwy. No. 15—by Department of Highways, Olympia. 8-1

Water Supply...

California

ALAMEDA CO.—**Erickson, Phillips & Weisberg,** 3341 Telegraph Ave., Oakland— $117,351 to constr. a prestressed reinf. conc. reservoir, near intersection of Colton Blvd. and Saroni Drive, Oakland—by East Bay Municipal Utility District, Oakland. 8-9

SACRAMENTO CO.—**Pacific Pipe Line Construction Co.,** 2128 San Pablo Ave., El Cerrito—$150,981 to furnish pipe and install water main NE. Sacramento—by City Council, Sacramento. 8-20

SAN MATEO CO.—**Harry Lee,** 216 California Dr., Burlingame—$12,682 to lay water main in Daly City—by City Council, Daly City. 8-14

Montana

DEER LODGE CO.—**H. E. Calef,** Cut Bank—$20,954 for constr. of water and drainage systems for state hospital at Warmsprings—State Board of Examiners, Helena. 7-30

Texas

DALLAS CO.—**E. L. Dalton & Co.,** Great National Life Bldg., Dallas—$30,360 for water mains and sanitary sewer S. section of Wynnewood addition, Dallas—by City Council, Dallas. 8-19

DALLAS CO.—**E. E. Farrow,** 2808 Inwood Rd., Dallas—$28,867 to constr. water mains and sanitary sewers in Proctor, Coronado and other sts., Dallas — by City Council, Dallas. 7-30

DALLAS CO. — **Pittsburg Des Moines Steel & Iron Works,** Praetorian Bldg., Dallas—$59,900 for wash water tank and tower at Bachman Water Purification Plant, Dallas—by City Council, Dallas. 7-30

Washington

KING CO.—**Argentieri & Colarossi,** 1819 Weller, Seattle — $36,372 to install water mains in W. Monroe St., Holden St. and 43rd Ave., Seattle — by Board of Public Works, Seattle. 8-10

SPOKANE CO.—**Clifton & Applegate Co.,** Box 1437, Spokane—$42,495 for excavation work on water reservoir site at 10th and SE. Blvd., Spokane—by City Water Department, Spokane. 8-13

Sewerage . . .

Arizona

MARICOPA CO.—**J. H. Welsh,** 807 S. Central, Phoenix—$96,803 for constr. of sewage system, including pumping plant, house connections, etc. in Tempe—by City Council, Tempe. 8-9

MARICOPA CO.—**J. H. Welsh,** 807 S. Central, Phoenix—$19,373 to supply equipment and constr. sewage improvements in Glendale—by City Council, Glendale. 8-2

PINAL CO.—**Arizona Concrete Pipe Co.,** 1746 W. Fillmore, Phoenix—$11,560 for sanitary sewers in blocks 5, 6, 7 and 8, Montecito tract No. 2, Maricopa—by Improvement District, Montecito. 8-16

California

CONTRA COSTA CO.—**H. L. Tucker, Jr.,** El Cerrito—$39,371 to install sanitary sewers, El Cerrito—by Stege Sanitary District, El Cerrito. 8-12

FRESNO CO.—**L. Merritt,** 9651 S. Alameda Blvd., Los Angeles — $19,335 for sewer constr. in Butler and Southern Homesites, Fresno — by City Council, Fresno. 8-9

LOS ANGELES CO.—**Bob Bosnyak,** 3014 Worthen Ave., Los Angeles—$126,672 for sanitary sewers in Galbreth and other sts., Pasadena—by City Council, Pasadena. 8-29

LOS ANGELES CO. — **Frank Chutuk,** 1242 S. Bonnie Beach Place, Los Angeles—$17,976 to install sanitary sewers and resurf. streets in Camelia Ave., betw. Moorpark St. and Dilling St., Los Angeles—by Board of Public Works, Los Angeles. 8-9

LOS ANGELES CO.—**Edward Green,** 3001 Coolidge Ave., Los Angeles—$17,502 for constr. of storm drain, Mt. Helena Ave. and Las Flores, Los Angeles—by Board of Public Works, Los Angeles. 8-9

LOS ANGELES CO. — **George Miller,** 3032 Bandini Blvd., Los Angeles—$270,956 for outfall trunk sewer, Unit No. 1, 1400 ft. N. of Lomita Blvd. to intersection of Lakme Ave. and Lomita Blvd., Wilmington—by County Sanitation District No. 3, Los Angeles. 8-19

LOS ANGELES CO.—**Steve P. Rados,** 2975 San Fernando Rd., Los Angeles—$507,662 to install reinf. conc. pipe storm drain on N. side of Willow St., betw. American Ave. and flood control channel; and to constr. pump station, Long Beach—by City Council, Long Beach. 8-23

LOS ANGELES CO.—**R. A. Wattson Co.,** 5528 Vineland Ave., North Hollywood—$168,053 to install trunk sewer slightly S. of 223rd St. to Pacific Ave., Long Beach—by County Sanitation District No. 3, Los Angeles. 8-19

LOS ANGELES CO.—**R. A. Wattson Co.,** 5528 Vineland Ave., N. Hollywood—$26,488 to constr. sanitary sewers and resurf. sts. in Back Ave. and Dilling St. Sewer District, Los Angeles—by Board of Public Works, Los Angeles. 8-2

SAN BERNARDINO CO. — **Concrete Conduit Co.,** 899 La Cedena Ave., Colton—$177,004 for constr. of sewage treatment plant in Loma Linda—by County Board of Supervisors, San Bernardino. 8-28

SAN JOAQUIN CO. — **A. E. Downer,** 1429 N. Baker St., Stockton—$15,002 to constr. main and lateral sewers in parts of Avondale and North Stockton subdivisions, Knights addition and Sharps Lane, Stockton—by City Council, Stockton. 8-16

SAN JOAQUIN CO. — **Stockton Construction Co.,** 40 W. Clay St., Stockton—$35,650 for storm sewers in Seven Oaks addition, Unit No. 1, Stockton—by City Council, Stockton. 8-29

SAN JOAQUIN CO. — **Stockton Con-**

struction Co., 40 W. Clay St., Stockton—$15,979 for constr. of sanitary sewer from Sharp's Lane and 13th St. to SW. corner of municipal golf links and from pumping unit to present sewer in Sharp's Lane, Stockton—by City Council, Stockton. 8-29

SANTA CLARA CO.—**C. Dudley DeVelbiss**, Eastshore and Huntington Ave., Richmond—$34,890 to install trunk sewer line in Palo Alto—by City Council, Palo Alto. 8-14

Oregon

LANE CO. — **Empire Construction Co.**, 4506 S. E. 39th, Portland — $77,470 to constr. the Amazon intercepting sewer in Eugene—by City Council, Eugene. 8-3

Texas

BEXAR CO.—**T. H. Lee**, Texas Theatre Bldg., San Antonio—$25,645 for sewage collecting system and to install water mains, San Antonio—by City Council, San Antonio. 8-28

CLAY CO.—**Hasie & Green Engineering Co.**, Box 1139, Lubbock—$53,000 to plan sanitary sewer, revamp sewer line, new sewage plant, Henrietta—by City Council, Henrietta. 8-21

DALLAS CO.—**F. S. Oldt & Co.**, 403 S. Haskell St., Dallas—$33,027 for constr. of sanitary sewers at Gaston-Garland Rd., Mockingbird Lane-Coit Rd. and other sections of Dallas—by City Council, Dallas. 7-30

TARRANT CO.—**F. S. Oldt Co.**, 403 S. Haskell, Dallas—$10,456 for sewer lines in 24, 25 and 27 Ridglea addition, Fort Worth—by City Council, Fort Worth. 8-28

TAYLOR CO.—**Rea & Malloy**, 1003 S. Staples, Corpus Christi—$77,648 for interceptor as part of sewer system, Abilene—by City Council, Abilene. 8-21

TRAVIS CO.—**Cullum & Hodgson**, Great National Life Bldg., Dallas—$35,783 for sanitary sewer adjacent to Waller Creek, between 51st St. and Airport Blvd. and Georgetown Rd. to St. John Ave., Dallas—by City Council, Dallas. 8-1

Washington

CHELAN CO.—**Goodfellow Bros., Inc.**, Wenatchee—$162,976 to install sewage system in Leavenworth — by City Council, Leavenworth. 8-21

PIERCE CO.—**Valley Construction Co.**, 7708 Rainier Ave., Seattle—$395,503 to install trunk sewers in Tacoma—by Board of Contracts and Awards, Tacoma. 8-3

Waterway . . .

California

ALAMEDA CO. — **Olympian Dredging Co.**, 525 Market St., San Francisco—$140,125 for dredging and berthing areas at Naval Supply Depot, Oakland—by U. S. Engineer Office, San Francisco. 8-8

LOS ANGELES CO. — **Bryce Trucking & Construction Co.**, 1306 E. Anaheim Blvd., Wilmington—$74,800 to furnish, transport and deposit earth material in NE. portion of E. Basin, Los Angeles Inner Harbor—by Los Angeles Harbor Commission, San Pedro. 8-9

MARIN CO.—**Associated Dredging Co.**, 465 California St., San Francisco—$11,305 for 42,500 cu. yds. dredging Section B, San Rafael Channel, San Rafael—by U. S. Engineer Office, San Francisco. 8-14

MARIN CO.—**San Francisco Bridge Co.**, 503 Market St., San Francisco—$22,678 for 133,400 cu. yds. dredging Section A, San Rafael Channel, San Rafael—by U. S. Engineer Office, San Francisco. 8-14

ORANGE CO. — **E. G. Perham**, 1128 Stearns Dr., Los Angeles—$82,750 for bank protection at San Juan Creek, Doheny Beach State Park—by Division of Water Resources, Sacramento. 8-30

Oregon

LANE CO.—**Glenn Stevenson**, Portland—$21,163 to repair asphalt revetment on R. bank of Willamette River at Harrisburg bend—by Army Engineer Office, Portland. 8-21

Texas

KAUFMAN CO. — **Adams Construction Co.**, Kaufman—$11,514 for levee repairs—by District Engineer, Galveston. 8-14

Dam . . .

California

CONTRA COSTA CO.—**Excavators, Inc.**, Pittsburg—$21,836 for earth-filled dam and appurtenant structs. on Edwards Creek, Crockett—by Board of John Swett Union High School District, Crockett. 8-8

LASSEN CO.—**D. Gerald Bing.**, 2440 Marshall Way, Sacramento—$39,550 to repair Tule Lake Dam and diversion works—by

State Division of Water Resources, Sacramento. 8-28

Irrigation . . .

Arizona

YUMA CO.—**Macco Construction Co.,** 815 N. Paramount Blvd., Clearwater—$254,333 for constr. of earthwork, lining, structs., "A" canal and laterals, Unit No. 1, Yuma-Mesa Division, Gila Project—by Bureau of Reclamation, Yuma. 8-23

California

SAN FRANCISCO CO.—**Associated Engineers,** 981 Folsom St., San Francisco—$73,797 to install irrigation unit No. 1, Golden Gate Park, San Francisco — by Board of Park Commissioners, San Francisco. 8-27

Idaho

CANYON CO.—**Henry L. Horn,** 216 E. Logan St., Caldwell—$170,701 for constr. of earthwork, structs., "C" line E. canal laterals 1.7 to 7.7-1, 9 and Conway Gulch lateral; approx. 8 mi. N. of Caldwell—by Bureau of Reclamation, Boise. 8-23

Montana

PRAIRIE CO.—**Malcolm G. Long,** Treasure State Bldg., Billings—$256,031 for 3 schedules to constr. the Fallon pumping plant and laterals on the Buffalo Rapids project near Fallon—by Bureau of Reclamation, Terry. 8-14

Oklahoma

JACKSON CO. — **Stamey Construction Co.,** 10 W. 21st St., Hutchinson, Kan.—$337,147 for constr. of last 10 mi. section of Altus Canal—by Bureau of Reclamation, Washington, D. C. 8-8

Oregon

JEFFERSON CO.—**Adler Construction Co.,** 3416 W. Smith, Seattle, Wash.—$189,470 for earthwork and structs. near Madras and 7 mi. S., Deschutes Project—Bureau of Reclamation, Bend. 8-22

Utah

UTAH CO.—**Carl B. Warren,** Pleasant Grove—$162,498 to constr. earthwork, pipelines, tunnel and struct. in the Jordan Narrow siphons. 6 mi. NW. of Lehi—by Bureau of Reclamation, Provo. 8-2

Power . . .

Arizona

COCHISE CO.—**Dykes Electric Co.,** Casa Grande—$40,404 to constr. 26.5 mi. transmission line, convert 17 mi. of line and install light. protection on 32 mi. of line, Cochise—by Sulphur Springs Valley Electric Cooperative, Wilcox. 8-2

California

LOS ANGELES CO.—**Blaw-Knox Construction Co.,** Box 109, Anaheim—$400,000 to furnish, deliver and install power piping system at the Harbor steam plant, Unit 2, Los Angeles—by Water and Power Department, Los Angeles. 8-16

Kansas

TREGO CO.—**Caster Electric Construction Co.,** 1016 Baltimore Ave., Kansas City, Mo.—323.5 mi. of line to serve 319 consumers—by Western Cooperative Electric Association, Wakeeney. 8-19

Montana

BIG HORN CO.—**Peter Kiewit Sons' Co.,** Omaha National Bank Bldg., Omaha, Neb.—$164,881 for 136.7 mi. of line to serve 222 consumers — by Big Horn Electric Cooperative, Inc., Lodge Grass. 8-19

Wyoming

PARK CO.—**Samuels & Franklin,** Mining Exchange Bldg., Denver, Colo., and **Gibbons & Reed Co.,** 259 W. 3rd South St., Salt Lake City, Utah—$366,399 for Heart Mt. power plant, on Shoshone River, 4 mi. W. of Cody—by Bureau of Reclamation, Cody. 8-21

Building . . .

Arizona

COCONINO CO.—**Schumaker and Evans Construction Co.,** 4007 W. 6th St., Los Angeles, Calif.—$48,064 for 32 family dwelling units, at Arizona State College, Flagstaff—by Federal Public Housing Authority, San Francisco, Calif. 8-16

MARICOPA CO.—**M. W. Bobo,** 1462 E. McKinley St., Phoenix—$200,000 for constr. of one- and part two-story factory bldg.,

951-969 E. Jackson St., Phoenix—by Coronado Furniture Co., Phoenix. 8-23

MARICOPA CO. — **Shumaker and Evans Construction Co.,** 4007 W. 6th St., Los Angeles, Calif.—$72,096 for 48 dwelling units at Phoenix—by Federal Public Housing Authority, San Francisco, Calif. 8-16

MARICOPA CO.—**P. W. Womack Construction Co.,** 1712 S. Central Ave., Phoenix—$141,262 for additions to high school bldg., Tolleson—by High School District of Tolleson. 8-23

California

ALAMEDA CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$120,000 for constr. of 3-story, reinf. conc. factory bldg., 1604 4th St., Berkeley—by Pacific Paint & Varnish Co., Berkeley. 8-23

ALAMEDA CO.—**John E. Branagh,** 105 Sheridan Ave., Piedmont—$437,000 for constr. of 4-story, reinf. conc. and struct. steel laboratory bldg., campus, Berkeley—by Regents of University of California, Berkeley. 8-29

ALAMEDA CO.—**H. J. Christensen Co.** and **W. E. Lyons Construction Co.,** 3454 Harlan St., Oakland—$51,685 for one-story, steel frame temporary warehouse bldg., at United Engineering Shipyard, Alameda—by United Engineering Co., San Francisco. 8-27

ALAMEDA CO.—**Elder & Owens,** 2206 Encinal Ave., Alameda —$50,000 for constr. of factory and office bldg. at 680 Hegenberger Rd., Oakland—by Shasta Pump Co., Oakland. 8-23

ALAMEDA CO.—**M & K Corp.,** Financial Center Bldg., San Francisco—$123,600 to convert barracks, storehouses and mess hall to family units, Oakland—by U. S. Engineer Office, San Francisco. 8-2

ALAMEDA CO.—**Oliver M. Rousseau, Inc.,** 725 Tehama St., San Francisco—$919,930 for 501 dwelling units at Oakland—by Federal Public Housing Authority, San Francisco. 8-16

BUTTE CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco —$145,000 for 2-story, reinf. conc. cheese factory bldg., in Gridley —by Farmers Cooperative Creamery, Gridley. 8-16

CONTRA COSTA CO.—**Bechtel-McCone Corp.,** 220 Bush St. San Francisco—$2,500,000 to constr. crude oil distillation unit, control bldg., switch bldg., towers, tanks, etc., at Avon—by Tide Water Associated Oil Co., Avon. 8-1

CONTRA COSTA CO.—**Biltwell Construction Co.,** 4745 Geary St., San Francisco—$213,556 for 101 family dwellings at Pittsburg and Port Chicago—by Federal Public Housing Authority, San Francisco. 8-16

CONTRA COSTA CO.—**De Luca & Son,** 1745 Filbert St., San Francisco—$400,400 for addt. to Orinda Filter Plant, San Pablo Creek Hwy. near Orinda—by East Bay Municipal Utility District, Oakland. 8-2

CONTRA COSTA CO. — **Willis F. Lynn,** 1040 Folger Ave., Berkeley—$52,290 for 7-room, prefabricated school bldg., Concord—by Elementary School District, Concord. 8-21

CONTRA COSTA CO.—**Swinerton & Walberg Co.,** 225 Bush St., San Francisco, and **Ben C. Gerwick, Inc.,** 112 Market St., San Francisco—to constr. an office bldg. and machine shop at Long Wharf Terminal, Richmond Refinery, by Standard of California, San Francisco. 8-26

CONTRA COSTA CO.—**W. C. Tait Co.,** 461 Market St., San Francisco—$300,000 for constr. of steel frame foundry bldg. and office bldgs. on Giant Hwy., Richmond — by Parr-Richmond Terminal Corp., San Francisco. 8-27

FRESNO CO.—**Fisher & McNulty,** Mattei Bldg., Fresno—$650,000 to constr. 5-story, L-shaped, reinf. conc., physicians and dentists office bldg. at NE. corner of Van Ness Ave. and Amador, Fresno—by Professional Building Corp., Fresno. 8-5

IMPERIAL CO.—**The 45th District Agricultural Association,** Box 308, Imperial—$135,000 to constr. a number of bldgs. at the Imperial County Fairgrounds—by self. 8-9

LOS ANGELES CO.—**Austin Co.,** 777 E. Washington Blvd., Los Angeles—$150,000 to build addition to hangar facilities bldg. at 5900 W. Century Blvd., Venice—by United Air Lines, Los Angeles. 8-2

LOS ANGELES CO.—**Austin Co.,** 777 E. Washington Blvd., Los Angeles—$150,000 for constr. of iodine plant, Centinela Ave., betw. Inglewood Blvd. and Sepulveda Blvd., Los Angeles—by Dow Chemical Co., Pittsburgh, Pa. 8-12

LOS ANGELES CO.—**Bechtel-McCone Corp.,** 3780 Wilshire Blvd., Los Angeles—$2,250,000 to constr. crude oil distillation unit, El Segundo—by Standard Oil Co., San Francisco. 8-9

LOS ANGELES CO.—**Bechtel-McCone Corp.**, 3780 Wilshire Blvd., Los Angeles—$1,000,000 for constr. of one-story, struct. steel, conc. and brick printing plant, Fruitland Ave. and Soto St., Vernon—by Pacific Press, Inc., Los Angeles. 8-9

LOS ANGELES CO.—**Bechtel-McCone Corp.**, 3780 Wilshire Blvd., Los Angeles—$1,000,000 for constr. of 7-story, reinf. conc. plant, Los Angeles—by General Mills Co., Minneapolis, Minn. 8-6

LOS ANGELES CO.—**M. Burgbacher & Sons**, 1801 Bluff Road, Montebello—$105,000 for 15 two-story, 9-room duplex residences on Sienna Dr. and E. 2nd St., Long Beach — by Belmont Properties, Long Beach. 8-2

LOS ANGELES CO.—**Culver City Housing Corp.**, 1500 Lincoln Blvd., Venice—$382,400 to build 50 six-room, frame and stucco dwellings in Venice and W. Los Angeles areas—by various owners. 8-23

LOS ANGELES CO.—**L. E. Dixon, Inc.**, 409 S. California St., San Gabriel—$100,000 for 3-story and basement, reinf. conc. bldg., 2512 S. Main, Los Angeles—by Charles Lefkowitz, Los Angeles. 8-22

LOS ANGELES CO—**C. W. Driver, Inc.**, 111 W. 7th St., Los Angeles—$107,200 to constr. a one-story and mezzanine, reinf. conc. garage bldg., 1914 Santee St., Los Angeles—by Knudsen Creamery Co., Los Angeles. 8-9

LOS ANGELES CO.—**Escherich Bros.**, 234 W. 37th Place, Los Angeles—$110,000 for constr. of 2-story and basement, frame and stucco apartment bldg., 522 S. Kingsley Dr., Los Angeles—by Mrs. H. E. McClelland, Los Angeles. 8-9

LOS ANGELES CO.—**Fluor Corp., Ltd.**, 2500 S. Atlantic Blvd., Los Angeles—$85,500 for 2-story and basement office bldg. addition, Los Angeles—by self. 8-9

LOS ANGELES CO.—**G. O. Gartz**, 3908 N. Mission Rd., Los Angeles—$125,000 to constr. milk bottling and processing plant, SW. corner Sunnyslope St. & Foothill Blvd., Pasadena—Supreme Dairy Farms, Pasadena. 8-9

LOS ANGELES CO.—**Grant & Bruner, Ltd.**, 405 S. Hill St., Los Angeles—$112,000 for one-story, reinf. conc. addition to bakery bldg. at 8800 Venice Blvd., Culver City—by Helms Bakery Co., Culver City. 8-9

LOS ANGELES CO.—**Ernest A. Kaiser**, 8825 Olympic Blvd., Beverly Hills—$248,836 to erect 210 dwelling units at university, 405 Hilgard Ave., W. Los Angeles—by Federal Public Housing Authority, San Francisco. 8-16

LOS ANGELES CO.—**McNeil Construction Co.**, 5860 Avalon Blvd., Los Angeles—$2,500,000 for one-story papermill bldg. at 8430 Quartz Ave., South Gate—by U. S. Gypsum Co., South Gate. 8-2

LOS ANGELES CO.—**William J. Moran Co.**, 1011 S. Fremont Ave., Alhambra—$112,000 for one-story, conc. and frame factory bldg. at SW. corner of 8th St. and Rio Vista Ave., Los Angeles—by Bakewell Products, Los Angeles. 8-16

LOS ANGELES CO.—**Wm. P. Neil Co., Ltd.**, 4814 Loma Vista Ave., Los Angeles—$147,000 for constr. of one-story, conc. block warehouse, at 50th and Magnolia, Vernon—by Western Auto Supply Co., Los Angeles. 8-16

LOS ANGELES CO.—**Harvey A. Nichols Co.**, 936 E. Slauson Ave., Los Angeles—$150,000 for one-story, masonry storage bldg. at 326 W. "C" St., Wilmington—by

Bekins Van & Storage Co., Los Angeles. 8-16

LOS ANGELES CO.—**John R. O'Neal,** 6031 Whitworth Dr., Los Angeles—$97,500 to constr. 15 five-room, frame and stucco dwellings on W. 80th Place, Venice—by self. 8-2

LOS ANGELES CO.—**C. L. Peck,** 354 S. Spring St., Los Angeles—$1,500,000 for constr. of department store addition, Colorado and Euclid Aves., Pasadena — by Broadway Department Store, Los Angeles. 8-16

LOS ANGELES CO.—**C. L. Peck,** 354 S. Spring St., Los Angeles—$250,000 for 2-story and basement, reinf. conc. restaurant bldg., 4137 Crenshaw Blvd., Los Angeles—by Ontra Cafeteria, Los Angeles. 8-16

LOS ANGELES CO.—**C. L. Peck,** 354 S. Spring St., Los Angeles—$200,000 for one-story, reinf. conc. bldg., Stocker and Crenshaw Blvd., Los Angeles — by United-Rexall Drug Co., Los Angeles. 8-16

LOS ANGELES CO.—**C. L. Peck,** 354 S. Spring St., Los Angeles — $150,000 for constr. of one-story and basement, reinf. conc. bank bldg. at Santa Barbara Ave. W. of Crenshaw Blvd.—by Security-First National Bank, Los Angeles. 8-16

LOS ANGELES CO.—**C. L. Peck,** 354 S. Spring St., Los Angeles — $120,000 for constr. of auto sales and service bldg., at Wilshire Blvd. and La Perr, Beverly Hills —by Greer-Robbins Co., Los Angeles. 8-16

LOS ANGELES CO.—**T-S Construction Engineers, Inc.,** 530 W. 6th St., Los Angeles—$90,000 for one-story, reinf. conc. garage bldg. at 10690 Santa Monica Blvd., West Los Angeles — by Sunbury Realty Co., Los Angeles. 8-9

LOS ANGELES CO.—**Paul W. Trousdale,** 650 N. Sepulveda Blvd., W. Los Angeles—$630,000 for 90 six-room, frame, shingle and plaster dwellings on Tupper, Vincennes, Gladhill and Plummer Sts., Van Nuys—by Cedrous Development Company, Los Angeles. 8-20

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$150,000 to constr. a cafeteria and recreation room on the 5th floor of the Times Bldg., 202 W. 1st St., Los Angeles—by Southwest Co., Los Angeles. 8-2

LOS ANGELES CO.—**Del E. Webb Construction Co.,** Continental Bldg., Los Angeles—$290,000 to build 2-story, reinf. conc. hospital, NW. corner 6th St. and Lafayette Pl., Los Angeles—by Board of Supervisors, Lafayette Park Hospital, Los Angeles. 8-20

MARIN CO.—**Biltwell Construction Co.,** 4745 Geary St., San Francisco—$129,600 for 96 dwelling units at Sausalito—by Federal Public Housing Authority, San Francisco. 8-16

MARIN CO.—**Younger Construction Co.,** 575 Mission St., San Francisco—$110,000 for school bldg. on Butterfield Road; and 6-room, prefabricated school replacement on Woodlawn Ave., San Anselmo — by School District of San Anselmo. 8-19

ORANGE CO.—**Consolidated Steel Corp., Ltd.,** 5700 S. Eastern Ave., Los Angeles—$92,000 for constr. of steel frame and corrugated iron warehouse bldgs. at 2111 W. 17th St., Santa Ana—by Towner Manufacturing Co., Santa Ana. 8-9

ORANGE CO.—**A. L. Stricker,** Box 666, Laguna Beach—$100,000 for apartment and food locker bldg., Laguna Beach—by Mrs. Maurice Brown, Laguna Beach. 8-16

SACRAMENTO CO.—**Craftbilt Homes, Inc.,** 1445 Bush St., San Francisco—$1,080,000 for constr. of 144 two- and three-bedroom, frame and stucco dwellings in Beyersford Heights, lots 21 to 164, North Sacramento—by self. 8-21

SACRAMENTO CO. — **Lawrence Construction Co.,** 3020 V St., Sacramento—$59,482 for 5-classroom addition to elementary school, Edison and Watt Aves., North Sacramento—by Elementary School District, Sacramento. 8-28

SAN FRANCISCO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$60,000 to constr. Class C transportation docks, Townsend and 7th Sts., San Francisco—by Walkup Drayage & Warehouse Co., San Francisco. 8-2

SAN JOAQUIN CO.—**Utah Construction Co.,** 1 Montgomery St., San Francisco—$1,677,000 to constr. 6-story, reinf. conc. cereal mfg. plant at Lockeford Extension and Turner Road, Lodi—by General Mills Co., Minneapolis, Minn. 8-6

SANTA BARBARA CO.—**Paul Spencer Construction Co.,** 832 W. 5th St., Los Angeles—$457,685 for 239 dwelling units at Santa Barbara—by Federal Public Housing Authority, San Francisco. 8-16

SANTA CLARA CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$164,920 to constr. one-story, frame and stucco studio bldg., The Alameda at Davis St., San Jose—by Goushea Co., Chicago, Ill. 8-9

SANTA CLARA CO.—**Dinwiddie Construction Co.,** Crocker Bldg., San Francisco—$1,000,000 for constr. of 6-story and

basement, reinf. conc. and struct. steel frame bldg., corner Santa Clara and First Sts., San Jose—by Roos Bros., San Francisco. 8-28

SANTA CLARA CO.—**George Dunlap,** 1400 Oakland Ave., Piedmont, and **Daniel Nelson,** 3125 Olive Ave., Fresno—$1,000,000 for constr. of 200 dwellings on 51-acre site on Homestead Rd., Saratoga Ave. and Gould St., Santa Clara—by self. 8-16

SANTA CLARA CO.—**Wells P. Goodenough,** 49 Wells Ave., Palo Alto—$285,000 constr. of 3-story and basement addition to clinic, 300 Homer Ave., Palo Alto—by Palo Alto Clinic, Palo Alto. 8-9

SHASTA CO.—**James Black,** 2060 Eureka, Redding—$250,000 for constr. of 50-cabin motel, shop bldgs., tavern, service station, etc., at the Head of Lake Shasta—by self. 8-23

VENTURA CO.—**OFCCO Construction Co., Inc.,** 2650 Cherry Ave., Long Beach—$200,000 to remodel compressor station, Ventura—by Southern Counties Gas Co., Los Angeles. 8-20

YOLO CO.—**M & K Corp.,** Financial Center Bldg., San Francisco—$186,720 for 60 family dwelling units at Davis—by Federal Public Housing Authority, San Francisco. 8-16

Colorado

DENVER CO.—**Thos. Bate & Sons,** 2311 10th St., Denver—$378,762 to alter department store bldg. at 16th and Arapahoe Sts., Denver—by Daniels & Fishers Stores Co., Denver. 8-2

MESA CO.—**Newstrom-Davis & Co.,** 2000 W. 8th Ave., Denver—$157,227 for constr. of 2-wing addition to hospital bldg., and solarium addition to dormitory, Grand Junction—by State Home for Mental Defectives, Grand Junction. 8-23

Montana

FLATHEAD CO.—**Dudley Construction Co.,** Great Falls — $91,288 for constr. of warehouse at Hungry Horse Government Camp, 8 mi. E. of Columbia Falls — by Bureau of Reclamation, Washington, D.C. 8-7

Nevada

CLARK CO.—**Aldous & Company,** 8467 W. 3rd St., Los Angeles, Calif.—$300,000 for two 26-unit apartment bldgs. on Charleston Blvd., Las Vegas—by Huntridge Development Co., Las Vegas. 8-20

WASHOE CO.—**Bard Construction Co.,** Lyon Bldg., Reno—$175,000 to reconstr. 5-story office bldg., corner of 2nd and Center Sts., Reno—by Ted Jones, Reno. 8-12

Oregon

MARION CO.—**Austin Co.,** Dexter Horton Bldg., Seattle, Wash.—$561,300 for constr. of one-story, reinf. conc. cannery bldg., 1675 Oxford St., Salem—by Paulis Bros., Salem. 8-23

MULTNOMAH CO.—**Bingham Construction Co.,** Builders' Exchange Bldg., Portland—$300,000 for 2-story, conc. mill bldg., Portland—by Jantzen Knitting Mills, Portland. 8-16

MULTNOMAH CO.—**C. M. Corkum Co.,** 430 S.W. Harrison, Portland—$80,000 for constr. of addition to nurses' home at sanitarium, Portland—by Board of Directors, Portland Sanitarium, Portland. 8-2

MULTNOMAH CO.—**Donald M. Drake Co.,** Lewis Bldg., Portland—$500,000 for constr. of battery factory at NW Yeon and 35th Ave., Guild's Lake, Portland—by Willard Storage Battery Co. of California. 8-16

MULTNOMAH CO.—**Donald M. Drake Co.,** Lewis Bldg., Portland—$200,000 cost-plus basis for constr. of laundry bldg. addition and separate boiler plant at hospital, Portland—by Board of Directors, Good Samaritan Hospital, Portland. 8-12

MULTNOMAH CO.—**Hord & Stuart,** Builders Exchange Bldg., Portland—$42,000 for constr. of 2 dry kilns, Portland—by Southeast Portland Lumber Co., Portland. 8-2

Texas

DALLAS CO.—**W. A. Colwell,** 6128 Morningside, Dallas—$70,000 to constr. one-story warehouse, 6124 Denton Dr., Dallas—by B. C. Miller, Dallas. 8-5

DALLAS CO.—**Cowdin Bros.,** 411 S. Haskell St., Dallas—$300,000 to constr. warehouse—by Titche-Goetteinger Co., Dallas. 7-30

DALLAS CO.—**Vivrett & Vivrett,** Southland Life Bldg., Dallas—$58,000 to constr. one-story factory bldg. at 920 Belleview St., Dallas—by Bolnick Hat Co., Dallas. 7-31

DENTON CO.—**Robert E. McKee,** Box 2848, Dallas—$1,238,665 for constr. of dining hall, laundry and bedroom addition to state college, Denton—by Supervisors of Texas State College for Women, Denton. 8-21

EL PASO CO.—**Ponsford Bros.,** Box 1412, El Paso—$362,605 to convert bldgs. at Fort

Bliss and William Beaumont General Hospital into family quarters—by U. S. District Engineer, Albuquerque, N. Mex. 7-30

NUECES CO.—**E. E. Harrison,** Box 162, Corpus Christi—$218,998 for one- and two-story, fireproof vocations bldg., Corpus Christi—by Independent School District, Corpus Christi. 8-16

NUECES CO.—**A. E. Hinman,** 229 Ohio St., Corpus Christi—$110,000 to constr. sheet iron and steel frame planing mill and lumber yard, 2602 Comanche St., Corpus Christi—by Hawn Sash & Door Co., Corpus Christi. 8-5

TRAVIS CO.—**Board of Regents of University of Texas,** Austin — $359,656 for constr. of 600 housing units, Lake Austin Blvd., Austin—by self. 8-7

Washington

CLARK CO.—**Austin Co.,** Dexter-Horton Bldg., Seattle—$11,000,000 for expansion of pulp-paper plant, Camas—by Crown-Zellerbach Corp., Portland, Ore. 8-16

CLARK CO.—**Ross B. Hammond,** 1241 Williams Ave., Portland, Ore.—$196,145 to build 5-story, reinf. conc. hosp. addition, 500 E. 12th St., Vancouver—by Board of Management, St. Joseph's Hospital, Vancouver. 8-20

CLARK CO.—**Heinrichs, Beedle & Hearn,** 112 W. Eighth St., Vancouver—$100,000 for constr. of one-story, reinf. conc. warehouse bldg., Vancouver—by Bennett Hardware Co., Vancouver. 8-23

KING CO.—**Nelse Montersen Construction Co.,** 1021 Westlake N., Seattle—$304,000 for addition to school, 4628 S. 144th, Seattle—by King County Central School District No. 406, Seattle. 8-16

KING CO.—**E. F. Shuck,** Fourth and Cherry Bldg., Seattle—$75,000 for conc. and steel warehouse bldg., at 3600-10 Airport Way, Seattle—by J. A. Campbell Co., Seattle. 8-22

Territories

ALEUTIAN ISLANDS — **Puget Sound Bridge & Dredging Co.,** 2929 16th Ave., S. W., Seattle, Wash. and **Johnson, Drake & Piper,** Minneapolis, Minn. — $7,500,000 constr. of housing for Navy dependents on Adak and Attu—by Bureau of Yards and Docks, Washington, D. C. 8-9

HAWAIIAN ISLANDS—**James W. Glover, Ltd.,** 1036 Waimanu St., Honolulu—$478,750 to constr. 250 family dwelling units—by Federal Public Housing Authority, San Francisco, Calif. 8-9

Miscellaneous . . .

Arizona and Nevada

MOHAVE AND CLARK COS.—**Baldwin Locomotive Works,** Eddystone, Penna.—$2,199,586 to supply five 62,200 horsepower hydraulic turbines for installation at Davis Dam power plant 35 mi. W. of Kingman—by Bureau of Reclamation, Washington, D. C. 8-29

California

LOS ANGELES CO.—**Ansco Construction Co.,** 1225 Atlantic, Long Beach—$44,277 to grade and to constr. retaining wall on 19th St., betw. Junipero and Stanley; and

other sts., Signal Hill—by City Council, Signal Hill. 8-23

SAN DIEGO CO.—**L. E. Dixon Co.,** 609 S. Grand Ave., Los Angeles—$709,130 for constr. of El Monte pipeline, Section 3, Grossmont tunnel—by City Council, San Diego. 8-28

SAN FRANCISCO CO.—**DeLuca & Son,** 1745 Filbert St., San Francisco—$48,820 for site work, involving rough grade., installing sewer, water and gas mains, outside lighting, converting hospital into apartments, etc., Naval Receiving Hospital, Crocker-Amazon Playgrounds, Geneva Ave., San Francisco—by City and County Housing Authority, San Francisco. 8-13

SAN MATEO CO.—**Edward Keeble & F. H. Brown,** Box 669, San Mateo—$80,250 for street constr., installing sanitary sewers and storm drains, etc., in and near Millwood Subdivision—by County Board of Supervisors, Redwood City. 8-8

SAN MATEO CO.—**L. C. Smith,** First and Railroad Aves., San Mateo—$209,097 for street and sewer improvements in San Mateo—by City Council, San Mateo. 8-22

SAN MATEO CO.—**Union Paving Co.,** Babcock Bldg., San Francisco—$123,584 for constr. curbs, gutters, storm and sanitary sewers, etc., Brentford subdivision No. 2, South San Francisco—by City Council, South San Francisco. 8-16

SOLANO CO. — **Pacific Pipeline Construction Co.,** 2268 E. Firestone Blvd., Los Angeles—$900,000 for constr. of new natural gas pipe line system from Pittsburg to Suisun Bay, Kirby Hill and W. Rio Vista gas field—by Pacific Public Service Co., San Francisco. 8-27

Idaho

CLEARWATER CO. — **F. H. Atley,** Lewiston—$66,640 to furnish crushed rock surf. for 7.8 mi. of State Hwy. No. 11 betw. Weippe and Pierce—by Bureau of Highways, Boise. 8-10

Montana

FLATHEAD CO.—**S. Birch & Sons,** Ford Bldg., Great Falls—$401,377 for sts., sidewalks, curbs and gutters, drainage, sewer and water distribution system for govt. camp at Hungry Horse Dam, near Kalispell—by Bureau of Reclamation, Washington, D. C. 8-13

Oregon

UNION AND BAKER COS.—**Morrison-Knudsen Co., Inc.,** Box 450, Boise, Ida.—unit price per cubic yd. basis for grade. and extension of sidings on 100 mi. of line from La Grande to Huntington—by Union Pacific Railroad Co., Omaha, Neb. 8-6

Washington

GRANT CO.—**J. G. Shotwell,** Albuquerque, N. M.—$172,600 for conc. aggregates from the Odair deposit betw. Coulee City and Odair, for use in constr. on Columbia Basin project—by Bureau of Reclamation, Washington, D. C. 7-31

Territories

ALASKA—**C. F. Lytle Co.,** Sioux City, Iowa, and **Green Construction Co.,** Des Moines, Iowa—$248,916 for 42 mi. of bank widening, ditching and culvert track box work from Nenana to Fairbanks—by Alaska Railroad Commission, Anchorage. 7-20

PROPOSED PROJECTS

Power . . .

California

KERN CO.—Pacific Gas & Electric Co. is planning construction of a $10,000,000, 80,000-hp. steam-operated generating plant and related substa. installations, 3 mi. W. of Bakersfield.

Montana

RICHLAND CO.—The Lower Yellowstone Rural Electric Cooperative, Inc., Sidney, received a $220,000 loan for system improvements, completion of previously approved construction and 121 mi. of new line to serve 273 consumers—by Rural Electrification Administration, Washington, D. C. 7-4

TETON CO.—Sun River Electric Cooperative, Inc., Fairfield, received loan of $57,000 for constr. of 53 mi. of line to serve 62 consumers—by Rural Electrification Administration, Washington, D. C. 7-20

Wyoming

GOSHEN CO.—The Wyrulec Company, Lingle, received $367,600 for 297 mi. of line to serve 291 consumers—by Rural Electrification Administration, Washington, D. C. 7-13

PARK CO.—Shoshone River Power, Inc., Cody, has a $112,000 REA loan to complete previously approved 64 mi. of line for 49 customers.

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

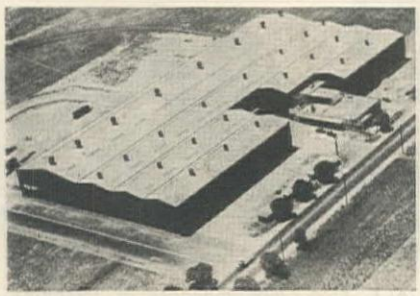
GARLINGHOUSE BROTHERS, construction and industrial equipment distributors and manufacturers, of Los Angeles, have announced an organizational change. Due to the variety of activities carried on by the present organization, three companies have been formed. Garlinghouse Brothers, Distributors, will continue as distributors for nationally known equipment manufacturers. The Gar-Bro Manufacturing Co. will continue to produce a complete line of concrete placing equipment; and the Gar-Bro Wheel Co. will manufacture a line of industrial and agricultural pressed steel wheels. All three companies will operate under the parent control of the original organization with **L. H. Garlinghouse** as General Manager, **A. F. Garlinghouse**, General Sales Manager, and **C. H. Jeffries**, Comptroller.

☆ ☆ ☆

Tom Hallinan is back with E. D. BULLARD CO., San Francisco manufacturers and distributors of industrial safety equipment, as sales representative in the company's Los Angeles office. Hallinan, formerly branch manager for Bullard at Denver, was discharged from military service recently.

☆ ☆ ☆

Located in the central manufacturing district southeast of the city of Los Angeles, Calif., a large new unit of JOSEPH T. RYERSON AND SON, INC., is



nearly completed. Twelfth in the Ryerson nation-wide system, it will be one of the biggest and best equipped steel-service plants in the entire West Coast area. It consists of a warehouse building and an office building. The Los Angeles district sales office is under the direction of **George W. Gilliland.**

☆ ☆ ☆

After spending many years representing TIDE WATER ASSOCIATED OIL CO. in their business relations with the construction industry, **Lloyd E. Holton** has resigned to become director of sales and advertising for DIXSON WAGONS, INC., of Alhambra, Calif. Holton is a director of the Northern California Chapter of A. G. C., and was treasurer and on the managing committee of the Pacific division of the Asphalt Institute until his resignation from the oil company.

☆ ☆ ☆

With the demand for hard metal carbide products expanding throughout the San Francisco Bay area, CARBOLOY CO., INC., Detroit, Mich., affiliate of GENERAL ELECTRIC CO., has appointed **C. W. Marwedel** of San Francisco as authorized distributor. Marwedel's two sons, **C. A.** and **E. F. Marwedel** operate as vice-presidents, the latter in charge of Oakland operations. **Ralph Vincent** is San Francisco general manager for the distributor.

☆ ☆ ☆

A five and one-half acre site in Richmond, Calif., will house a new plumbing supply plant of AMERICAN RADIATOR and STANDARD SANITARY CORP. To be located across the street from the Richmond enameling plant, also owned by American Radiator, it will manufacture brass goods for plumbing. The two plants together will be known as the Richmond Works and will be under the management of **Howard I. Detro.**

☆ ☆ ☆

All Somastic pipe coating operations in the 11 western states and in all foreign countries are being taken over by BECHTEL BROTHERS McCONE CO. of San Francisco and Los Angeles. Somastic was previously handled by INDUSTRIAL ENGINEERING CO. Somastic plants are maintained by Bechtel in the Los Angeles and San Francisco areas, while railhead and portable Somastic coating plants are dispatched as needed to job sites throughout the West and around the world.

☆ ☆ ☆

About 90,000 tons of synthetic and natural rubber will be consumed in mechanical goods this year, or about 18,400 tons more than in 1941, according to **W. S. Long,** Pacific Coast manager of the UNITED STATES RUBBER CO., mechanical goods division. Pointing out that both in rubber making and in fabricating, the West Coast industry will play an important part, Long said the amount to be used will exceed production of the California Synthetic Rubber Plant at Torrance, Calif. Industrial expansion on the Pacific Coast accounts for a great proportion of this year's sales, and especially in the construction field.

☆ ☆ ☆

H. R. Mack has been appointed Western truck tire manager, U. S. tire division of the UNITED STATES RUBBER CO., Los Angeles. Adding seven new marketing areas to those he already had under his supervision as Pacific Coast truck tire manager, Mack will be in charge of distributing points at Dallas, Des Moines, Kansas City, Omaha, St. Louis and San Antonio, as well as the seven on the Pacific Coast. He will make his headquarters in the Los Angeles Tire Plant of U. S. Rubber.

☆ ☆ ☆

William J. McClung has just been appointed general manager of BETHLEHEM PACIFIC COAST STEEL CORP.'s steel plants and mill depots. He will be in charge of operations at plants in Seattle, South San Francisco and Los Angeles, and mill depots at Seattle, Portland, San Francisco and Los Angeles. His headquarters will be at the South San Francisco plant. McClung has spent the past 15 years at Bethlehem's Lackawanna, N. Y., plant, where he has been assistant to the general manager since March, 1945.

☆ ☆ ☆

Scheduled to travel south to Mexico City as new manager of RHEEM DE MEXICO

S.A., a new part of RHEEM MANUFACTURING CO. of San Francisco, **Raymond H. Van Saun** is still in this country arranging for shipment of machinery for the new factory now rising at Tlalnepantla, an industrial suburb of Mexico City. Before joining Rheem as assistant plant manager of the Richmond, Calif., plant, Van Saun was with CONTAINER CORP. OF AMERICA for 10 years.

☆ ☆ ☆

THE TRAILMOBILE CO., of Berkeley, has just completed the purchase of another entire block and is doubling the size of the plant at a cost of approximately $350,000. A new spur track will go directly into the building. Expansion was brought about because of a larger backlog of orders on hand than at any time in the firm's history, despite the fact that it is operating at its utmost capacity.

☆ ☆ ☆

Following the resignation of **Clarence Jensky, Clifford A. Patch** takes over as sales manager, Western division of JOSHUA HENDY IRON WORKS, Sunnyvale, Calif. Patch has been successively assistant chief engineer, turbine sales manager and chief project engineer at Hendy. **Charles A. Flannery,** former colonel in the Corps of Engineers, has joined Hendy as manager of general products sales. Before the war, Flannery was sales manager of plate fabrication for CONSOLIDATED STEEL CORP. and vice-president and West Coast manager of INDUSTRIAL ENGINEERING CO.

☆ ☆ ☆

PACIFIC NORTHWEST

JACK BESS, zone manager of INTERNATIONAL HARVESTER CO., Chicago, demonstrates a 66-page pyramid portfolio illustrating and describing the promotional program of the industrial power division to executives of the HOWARD-COOPER CORP., Portland, Ore., distributor. Seated, left to right, are L. W. GARDNER, president; G. S. YERBY, vice-president; W. A. WYLIE, sales manager, and MARK LAWTON, assistant sales manager.

☆ ☆ ☆

A new organization, IDAHO STEEL PRODUCTS CO., has taken over the steel warehouse and manufacturing department of the Sawtooth Co. at Boise, Ida., and moved into a new plant covering 10 ac. with buildings moved from the Coos Bay, Ore., shipyards. Officers of the new firm are **J. W. Buckingham,** president; **Cecil Grow,** vice-president; **R. J. Sproats,** secretary, and **Walter Yarbrough,** sales manager.

☆ ☆ ☆

FARNES AND MARTIG, INC., of Portland, Ore., will cover the state of Oregon as sales and service representatives for WHEELCO INSTRUMENTS CO. of Chicago, Ill.

INTERMOUNTAIN

Before the first of next year FRUEHAUF TRAILER CO. of Los Angeles will have a new sales and service branch building at Denver. One of the largest of Fruehauf's 60 factory branches, it will be located on an 11-ac. tract and have more than 33,000 sq. ft. of floor space. **E. E. Wright** is manager of the Denver branch, and **M. W. "Bud" Davis** is in charge of service.

☆ ☆ ☆

With completion of a new building and the remodeling of an old one, ARNOLD MACHINERY CO., INC., and its brother corporation TRACTOR-IMPLEMENT INC., of Salt Lake City, Utah, are now able to handle their expanded machinery distributorship adequately. Arnold Machinery distributes construction and farm

equipment, and Tractor-Implement's business is entirely wholesale. The warehouse and sales office for the latter is a building 200 ft. long by 55 ft. wide, with a 10-ft. dock running the length of the building. Three 40-ft. railroad cars can be unloaded at once, and there is room for a flat car behind the building for heavy machinery. Operations are built around the use of a fork-lift truck in the warehouse.

☆ ☆ ☆

In Billings, Mont., H. S. ENGINE CO. has been chosen to distribute Texrope drives, centrifugal pumps, welding equipment, electric motors and controls for ALLIS-CHALMERS MANUFACTURING CO., Milwaukee, Wis. **John D. Fradet** heads the Billings distributors.

☆ ☆ ☆

AMONG THE MANUFACTURERS

The new Danville, Ill., plant of the HYSTER CO., Portland, Ore., is now operating under a production schedule on lift trucks. Under the management of **Frank L. Ross,** vice-president in charge of all Eastern activities of Hyster, the new plant is expected to be in full production by fall. Operating personnel of the Danville plant includes **Jay Misenhimer,** factory manager; **Jim Woodley,** assistant factory manager; **William Morrow,** purchasing agent, and **Ray Smith,** office manager.

☆ ☆ ☆

After two and one-half years in the Army, **D. E. Fricker** has returned to LE ROI CO. of Milwaukee, Wis., as assistant to the advertising manager, to handle sales promotion work and trade shows. Prior to his Army duty, Fricker carried on the advertising work of the firm.

☆ ☆ ☆

Philip E. Barth and **Richard G. Edwards** were appointed general manager and general sales manager respectively of P. & F. CORBIN by the parent firm, AMERICAN HARDWARE CORP., New Britain, Conn. During the war Barth was a board member of the Price Adjustment Section, War Department, and previously he was associated with WINCHESTER-SIMMONS CO., WESTERN CARTRIDGE CO. and SARGENT & CO. Edwards, whose experience has been with PERFECT BURNER CO., CHASE BRASS & COPPER CO. and PATTERSON BROS., was appointed director of priorities of American Hardware in 1942, transferred to Corbin in 1943, and joined the Navy in 1944 as material-contractor officer at Tampa, Fla.

☆ ☆ ☆

Former manager of the Eastern region of WORTHINGTON PUMP AND MACHINERY CORP.'s construction equipment division, **Joseph W. Sargent** is now manager of construction equipment sales for AMERICAN AIR COMPRESSOR CORP. of North Bergen, N. J., which has the exclusive distributorship of Worthington-Ransome construction equipment for northern New Jersey.

☆ ☆ ☆

In a major reorganization of its manufacturing facilities, LIDGERWOOD MANUFACTURING CO. has sold its real estate in Elizabeth, N. J., and is moving machinery, equipment and personnel to its other plants, principally those at Superior, Wis., and Beacon, N. Y. Under the name of SUPERIOR-LIDGERWOOD-MUNDY CORP., 206 years of accumulated experience in designing and manufacturing hoists, conveying devices and marine equipment will be consolidated into a large and more efficient unit.

☆ ☆ ☆

For the second time this year one of the highest industrial advertising honors has gone to R. G. LE TOURNEAU, INC., Peoria, Ill. On June 23, the National Industrial Advertisers Association named Le Tourneau a winner in the product advertising division of its 23rd annual conference and exhibit. **Eugene E. Weyeneth** received the award as advertising manager, and

Arnold Andrews Advertising Agency, Milwaukee, Wis., which assisted in the winning campaign, received a similar award.

☆ ☆ ☆

Eugene K. Sheffield was elected president of NATIONAL CLAY PIPE MANUFACTURERS, INC. July 30. Sheffield, president and general manager of THE LOGAN CLAY PRODUCTS CO., Logan, O., and of the STRAITSVILLE BRICK CO., Straitsville, O., succeeds **Edward F. Clemens,** vice-president of the CANNELTON SEWER PIPE CO. Cannelton, Ind. Sheffield is one of the original founders and incorporators of the national association.

☆ ☆ ☆

Assistant treasurer of CATERPILLAR TRACTOR CO., Peoria, Ill., since 1944, **Virgil V. Grant** succeeds **W. J. McBrian** as treasurer. McBrian, who held the post since 1938, was elected a vice-president in May, 1944, which position he will still hold. Grant is a member of the National Association of Cost Accountants and the National Association of Credit Men.

☆ ☆ ☆

Major changes in the executive sales personnel structure of MASONITE CORP., Chicago, Ill., were announced recently. **Robert T. Miller,** chief sales engineer for a number of years, is now manager of the industrial division. **E. Howard Claypoole** has been succeeded as advertising manager and director of public relations by **Donald E. Allen,** former assistant advertising manager. **Elmer J. Graebner** was promoted to sales manager of the Cellufoam products division, succeeding **John Bluhm,** now general manager of the Cellufoam plant. **Thorn C. Hulbert** is now eastern manager of the firm, **Thomas G. Gaskin** is central division sales manager, and **Charles H. Smith** has succeeded **W. Page Prambes** as Pacific Coast division sales manager.

☆ ☆ ☆

Succeeding the late **Charles A. Menefee** as manager of INSLEY MANUFACTURING CORP.'s parts and field service department is **L. C. Gerow,** recently released from the Army with the rank of lieutenant-colonel. Gerow started with Insley in 1925 and for five years before his Army service he was chief inspector.

☆ ☆ ☆

As another step in its diversification program, PETTIBONE MULLIKEN CORP., Chicago, has acquired the DANIELS MURTAUGH CO., Cedar Rapids, Ia., manufacturers of heavy duty dragline buckets. **J. P. Murtaugh,** who has been vice-president and general manager of the acquired firm, will represent the new owner on the West Coast. **P. V. Larsen,** who was sales engineer and secretary of the company, will represent Pettibone Mulliken in the coal fields.

☆ ☆ ☆

Last July 1 **Sidney E. McCrum** became advertising manager of WICKWIRE SPENCER STEEL division of the COLORADO FUEL AND IRON CORP. McCrum was assistant advertising manager of Wickwire Spencer Steel Co. prior to the merger of that company with Colorado Fuel and Iron.

☆ ☆ ☆

Promoted from quality control engineer to director of quality control for all bearing divisions of THE TIMKEN ROLLER BEARING CO., Canton, O., **R. E. Wagenhals** will coordinate all quality control activities involved in the manufacture of Timken bearings. Wagenhals, a registered professional industrial engineer in Ohio, joined Timken in 1943.

Three new district sales engineers for Timken are **Sherman R. Lyle** to Cleveland, **William Earle Bryden** to Chicago and **Alfred J. Kinnucan** to New York.

☆ ☆ ☆

PAUL A. GIESSEL, left, and C. L. VADER, center, have been appointed assistant sales managers of DIAMOND IRON WORKS, INC., Minneapolis, Minn., and F. H. JUSENIUS, right, is new general sales manager of the firm's rock and gravel crushing machinery line and the Stoker division. Giessel, a mechanical engineer, returned to the company after three years as an Army major. Before Vader joined Diamond in 1942 he did construction work in the Northwest. Jusenius, formerly in charge of export sales for the company, used to be with R. G. LETOURNEAU, INC., and with BUCYRUS-ERIE CO. As a civil engineer he worked on the Colorado River Aqueduct in California.

☆ ☆ ☆

At a recent stockholders meeting, **David M. Klausmeyer, C. Alfred Campbell, Guy C. Dixon** and **Earl J. Breech** were elected to the board of directors of MARMON-HERRINGTON CO. of Indianapolis, Ind., increasing the number on the board to eight. Klausmeyer recently joined the firm as president. Campbell and Dixon are vice-president and treasurer respectively, and Breech is general manager and treasurer of MERZ ENGINEERING CO., a Marmon-Herrington subsidiary.

☆ ☆ ☆

After nearly 40 years in the automobile and allied industries, **John J. Palmer** has been named manager of the Newport News, Va., plant of GAR WOOD INDUSTRIES, INC., Detroit, Mich. Palmer was formerly vice-president of the HORACE E. DODGE BOAT AND PLANE CORP. whose properties were leased recently by Gar Wood for the Newport News plant where it will make motor boats, light road machinery and truck tanks. Gar Wood has purchased the former Bendix plant at Wayne, Mich., from the War Assets Administration and will transfer all its Detroit operations to the new site except its body plant. The new plant will manufacture equipment for trucks, bulldozers and tractors, burners, boilers, heating and ventilating units.

NEW EQUIPMENT

MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, California.

Front-end Loader

Manufacturer: American Tractor Equipment Corp., Oakland, Calif.

Equipment: Small-tractor, front-end loader.

Features claimed: ATECO Model L-HG, built for mounting on the Cletrac HG 42 track-type tractor, has a ⅜ or ½-cu. yd. bucket and high dumping clearance of 96 in. Its overall height of 90 in. in digging position and 60 in. when bucket is in carrying position permits work beneath all

normal ceilings and in restricted areas. Bucket pivot point is a few inches back of load center, thus increasing dumping distance. Two double-acting hydraulic rams, powered by a front-mounted pump, raise and lower the bucket. Weight of bucket and lift arms is counterbalanced with movable live weight. A track tie beam holds track frame rigid and eliminates motor frame twisting.

Camera Transit

Manufacturer: Fairchild Camera & instrument Corp., Jamaica, N. Y.

Equipment: Combination camera and surveyor's transit.

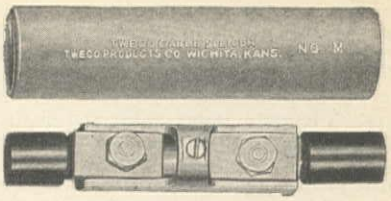
Features claimed: This combination of a camera of special design and a surveyor's transit was developed to meet specifications of the U. S. Navy Hydrographic Office. The unit consists of a type 5078-E K. & E. transit combined with a 4 x 5-in. plate camera. To provide sufficient mounting space for the camera, the telescope and standards were removed from the transit and a wide aluminum base plate was fitted around the base of the compass box and fastened to the upper limb of the transit. Thus the camera can be mounted between the standards on the axis normally occupied by a telescope. The telescope itself is on top of the camera. Made of light-weight aluminum alloys, it has an 8¼-in. f6.8 Goerz Aerotar lens and contains fiducial marks in the focal plane against which the glass plates are pressed to give maximum precision in the photograph.

Welding Cable Splicer

Manufacturer: Tweco Products Co., Wichita, Kans.

Equipment: Welding cable splicer.

Features claimed: This new product is a companion to the quickly detachable connectors manufactured by the company. The splicer provides a quick repair of broken cables or is useful in salvaging short lengths. A simple clamp connection on each end of the splicer and a fiber sleeve



to cover the splice assures an efficient connection and complete safety. Sizes are available for the full range of welding cables.

Accounting System

Manufacturer: Tallman Robbins & Co., Chicago, Ill.

Equipment: Contractors accounting system.

Features claimed: Tailormade for the

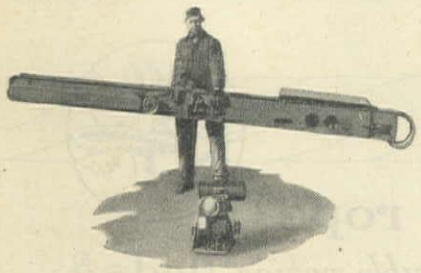
contractor and builder, this system is economical and complete, yet simple and easy to use. Just four forms: Cash Receipts, Cash Paid Out, Job Record, and Payroll Record, are all housed in one loose-leaf cover. Adequate index tabs and instructions accompany the forms. A most valuable feature is the quick and easy way to figure proper percentages to cover overhead, indirect costs and profits. All facts and figures for figuring taxes and checking the status of any particular job are easily available and variations from estimates are quickly noticeable.

Portable Conveyor

Manufacturer: Material Movement Industries, Chicago, Ill.

Equipment: Tote-all power conveyor.

Features claimed: This is a portable conveyor of exceptionally light weight, the 12-



ft. model weighing 135 lb. without motor. It is made of alloy steel and is corrosion and abrasion resistant. Two lengths are available—12 and 16 ft., both having an 8-in. belt. Power is furnished by gasoline engine mounted above the conveyor out of the way of dust, dirt and spill. The conveyor can be purchased without a power unit or with an electric motor. The unit can be easily transported by one man.

Manganese Steel Dipper

Manufacturer: American Brake Shoe Co., Chicago Heights, Ill.

Equipment: All manganese steel welded type dipper.

Features claimed: The use of austenitic manganese steel as the sole material of construction in these Amsco dippers, except for small parts, provides maximum resistance to fracture and wear. Over-lapping, rabbeted joints leave grooves for a welded bead. Parts are fitted together with round plugs, around which weld metal is deposited, so the body of the dipper is as strong and homogeneous as if made in one piece. At the same time one can remove a worn front and reweld a new one in place without destroying the back. The dipper is made in capacities of ¾ cu. yd. and up. Sizes ¾ yd. to 2 yd. are made in two body pieces, front and back. Sizes over 2 yd. come in four pieces, front, back and two side plates.

Prefabricated Building Forms

Manufacturer: Wm. M. Wilson, Los Angeles, Calif.

Equipment: Interchangeable, reusable forms for prefabricated units.

Features claimed: The Wilson system of prefabrication lends itself to any architectural design or engineering requirement. All forms are portable, interchangeable, reusable and collapsible, thus adaptable to either site construction or factory mass production. They are of two designs, and two standard wall thicknesses—4½ and 6 in. thick. Design No. 1 has an oval projection to provide grout holes on the edges of the section cast; design No. 2 has a flat face for square edges, door opening, cast in place columns or corners and jack or plate installation. Designs are interchangeable and can be used separately or together. They are said to effect economy, speed and efficiency in forming sections out of concrete, pumice, adobe or any other available aggregate.

Compressor Unit

Manufacturer: Davey Compressor Co., Kent, O.

Equipment: Compressor units in two designs.

Features claimed: Known as the 315-W (gas) and 315-WD (diesel), Davey's 1947 model produces 315 cu. ft. of free air per minute at 100-lb. pressure. It consists of two banks of three cylinders, each bank arranged in W form. This construction, along with a short 4-in. piston stroke, reduces compressor vibration to an absolute minimum and gives a cooler-operating, more efficient machine. There is also a decrease in dimensions and weight. Gasoline-driven units are 140 in. long, while diesel machines are 12 in. longer. Height is 72 in. and width 65 in. for both. Gas units weigh 7,400 lb. and diesel 7,800 lb. Over-all height and center of gravity is lowered by suspending springs on hangers installed at the sides of the frame.

Road Roller

Manufacturer: Construction Equipment & Manufacturing Co., Saint Paul, Minn.

Equipment: Pneumatic tired road roller.

Features claimed: Said to be new in prin-

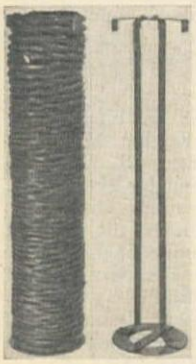
ciple, construction and operation, the Flat-Iron pneumatic tired roller was designed to smooth as well as compact stabilized bases, bituminous "cold lay" wearing surfaces and seal coat aggregates. It does not break the bond of cement in the process of setting. The natural "creeping" of material in front of the rolls is enough kneading for maximum density. Most of the compacting forces are vertical and downward.

Tubing Carrier

Manufacturer: Spiratube Division, The Warner Brothers Co., Bridgeport, Conn.

Equipment: Carrier for retractable tubing.

Features claimed: "Spira-Tote" is the name of a combination carrier and stowage rack for convenience in handling retractable tubing or storing it when not in use. It comes in different sizes for the different sizes of Spiratube. Hinged extension pieces at the top of the rack turn to permit the tubing to slip onto the rack, then move out, locking tubing in place.



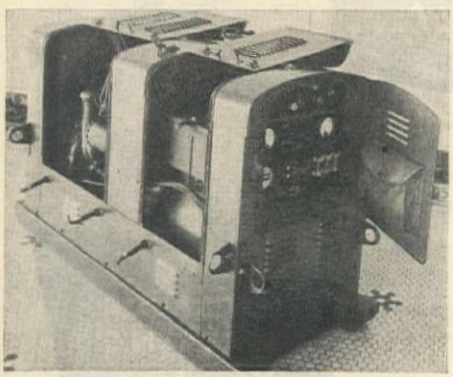
Engine Generator Set

Distributor: Ives, Greene-Haldeman Co., Los Angeles, Calif.

Manufacturer: Chrysler Co., Detroit, Mich.

Equipment: 3KVA engine generator set.

Features claimed: The firm has 3KVA engine generator sets immediately available at reduced prices. Either three-phase or single-phase, the sets are power units built to Army specifications and used only for test runs or standby service. They are good



for regular lighting or as emergency equipment in homes and have many uses in industrial or farm work. The gasoline engine in the unit is a Hercules Model ZXB of 9.5 horsepower; generator is Hobart 3KVA, 115, 120 or 125 volts, 60-cycle at 1200 rpm., 50 cycle at 1100 rpm. The unit is built on skids for easy moving and is fully enclosed against weather.

Single-axle Trailer

Manufacturer: Fruehauf Trailer Co. of California, Los Angeles, Calif.

Equipment: "Multi-rate," underconstructed trailer.

Features claimed: "Model 5" is a new single-axle trailer with "multi-rate" spring suspension, incorporating entirely new principles of underconstruction. It provides a rate of spring stiffness in exactly the correct ratio to the load carried, from empty to overload, which is accomplished through control of the active length of the spring. The manufacturer claims added trailer life, increased carrying capacity with almost no increase in axle weight, freer rolling, softer riding and more tire mileage as its advantages.

Cleaning Machine

Manufacturer: Sanstorm Manufacturing Co., Fresno, Calif.

Equipment: Sanstorm blast cleaning machine.

Features claimed: The Sanstorm is made in direct contravention to most other types of machines in that the compressed air blast is introduced into the machine through a nozzle orifice in the bottom of the abrasive tank. The tank is filled with an abrasive through a fill opening in the top. The abrasive is carried out the top through a pipe extending down the center of the tank to the nozzle orifice. It will not plug or clog, and makes dusting off the finished work easy. The special elbow which connects the outlet pipe and the blasting hose is on a swivel and will always swivel in the direction of the work without moving the machine.

Hydraulic Bulldozer

Manufacturer: The Oliver Corp., Cleveland, O.

Equipment: Hydraulic bulldozer for small tractors.

Features claimed: Possessing all the en-

gineering features of large type "dozers," the new "Imp" is entirely front-mounted, leaving the rear of the tractor free for installation of other equipment. It is simple to install and easily transported. Lifting, lowering, floating and hold positions are all hydraulically controlled from a single lever. It has a reversible cutting edge, rigid mold-board and push arms and is so constructed that the underframe mounting allows for a minimum width of cut. All thrusts are transmitted to the draw bar connections.

Air Hoist Safety

Manufacturer: Gardner-Denver Company, Quincy, Ill.

Equipment: Spring-loaded brake for air hoist.

Features claimed: An improved safety feature just made available to users of pneumatic operated hoists provides for the automatic application of a spring-loaded brake if for any reason the air pressure fails. The design further provides for the automatic release of the brake when the throttle valve is moved in either direction. This is accomplished by air pressure which holds the brake in the off position as soon as the throttle is opened to actuate the tugger motor. The new brake is positive and smooth in action. It will hold in suspension any load within the capacity of the hoist and cannot be released until air is admitted to the motor and the load is picked up. This is a vital step in safe operation when handling heavy timber, steel and explosives. The Model HKK Single Drum Safety Hoist has a rated vertical lift of 2,000 lb. at 80 lb. air pressure.

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.

LOOKING AHEAD FOR FUNDS—**C. I. T. Corp.**, New York, N. Y., has just published two small pamphlets on how to finance purchases of construction equipment, one for contractors and the other for distributors. The booklet for contractors points out the advantages of financing the purchase of new equipment through C. I. T. and explains how contractors can arrange this financing. It emphasizes that contractors earn larger profits through the use of this "uniformly low cost financing service." The booklet for distributors explains a special financing plan for the construction industry that provides complete facilities through which distributors can "handle more business with less risk" by making it easier for them to buy, sell and rent equipment. In developing this plan, the views of manufacturers, distributors and contractors were obtained.

WATERPROOFING WITH AQUELLA—**Prima Products, Inc.**, New York, N. Y., explains in a 32-page booklet "The Truth About Aquella" its origin and history, and gives technical data concerning types of Aquella, mixing, colors, application and storage. It is a waterproof, dampproof and decorative surface coating for interior and exterior porous masonry surfaces. It expands minutely upon curing, thus insuring a quantitative filling of the pores and a better bond.

DWARF ORANGE PEEL BUCKETS—**The Hayward Company**, New York, N. Y., is manufacturing dwarf orange peel buckets in five sizes—the smallest designed for operation inside a 12-in. diameter pipe. The buckets will dig to any depth, the length of the operating lines being the only limit. Attachments and specialized uses of the buckets are explained and photographed in a 4-page color bulletin.

MOTOR GRADER — **Allis-Chalmers Manufacturing Company**, Milwaukee, Wis., has released a 32-page, illustrated catalog featuring its newly improved AD motor grader. The capacity, performance and design of the AD is stressed, giving special attention to clearance, blade construction and range, electric brakes, sturdy frame and its General Motors 2 cycle, 75 horsepower engine.

LOOKING TO DIESEL FOR POWER—**The Diesel Engine Manufacturers Association**, Chicago, Ill., has published an address delivered by Harvey T. Hill to college and university Diesel engineering instructors. Under the subject "Applications and Economics of the Diesel Engine," Hill tells why the demand for Diesel engines in the immediate future will far exceed the pre-war demand and gives four basic reasons for the stimulated market for Diesel power.

TESTING EFFECTIVENESS OF SELF-LOCKING NUTS — **The Elastic Stop Nut Corporation of America**, Union, N. J., has published a 16-page booklet listing four tests which will determine the

locking effectiveness of self-locking nuts and related fastening devices. Diagrams and photographs of vibration test apparatus simplify testing procedure. Tests for installation and removal torque, re-use torque, and wearing and plating as well as an explanation of evaluation of these tests in connection with individual fastener problems are explained in detail. The booklet was prepared by Dr. J. A. Sauer, Ph.D., head of the department of engineering mechanics, Pennsylvania State College.

CLEANING MATERIALS FOR METALS—**Kelite Products Inc.,** Los Angeles, Calif., has recently published a Metal Processing bulletin, made up of 12 pages of facts and photographs describing the pH controlled cleaning methods and materials made available by Kelite for the metal industries. Many cleaning problems found in metal processing and finishing operations are discussed briefly. Of interest is Kelite's suggestion service, as an aid in the planning or supervision of new production cleaning systems or in reorganizing and modifying old; also Kelite's Control Service Reports, designed to keep managers and superintendents advised as to the function and efficiency of their cleaning and processing operations.

MOVING THE EARTH—**Caterpillar Tractor Co.,** Peoria, Ill., in a recent brochure "Highways and Byways" gives an analysis of the equipment requirements of the impending road construction projects of the nation. This graphically illustrated 16-page booklet shows some of the initial operations in the nation-wide program of highway construction and improvement and delineates the equipment requirements throughout each project.

MOBILE ASSETS — **Mixermobile Manufacturers,** Portland, Ore., have issued three color pamphlets describing and pictorially showing the operating and mechanical advantages of their Scoopmobile, Towermobile and Mixermobile units.

CLAMSHELL PAY LOADS—**The C. S. Johnson Company,** Champaign, Ill., in a new 8-page booklet in color containing 29 photographs and drawings analyzes the advantages of modern all-welded construction in the design of clamshell buckets. Complete specifications for all three types of the Johnson All-Welded Clamshell Bucket are also included in the booklet.

POWER BY THE POUND—**Cummins Engine Company, Inc.,** Columbus, Ind., is distributing a 64-page booklet in which detailed descriptions of five series of Cummins Dependable Diesels—Series H, Series HS, Series NH, Series NHS and Series L are given. Each series except the Series L consists of a wide range of models designed for automotive, industrial or marine applications. The Series L is for industrial and marine applications only. Many vari-colored photographs, illustrations and charts are to be found throughout the booklet.

AMERICAN COMPLETE—**The American Hoist & Derrick Co.,** St. Paul, Minn., has just sent off the press an attractive red, yellow, black and white 28-page general catalog announcing its entire line of manufacture. Particular uses of the various products are clearly shown in 43 illustrations.

DRILL MOUNTING FOR MINERS—**Ingersoll-Rand Company,** Phillipsburg, N. J., announces a new air-operated drill-jumbo mounting for easier, safer work and faster set-ups than are accomplished by hand methods. Installed permanently on a mine car the unit does the work of setting up and transporting the drifters, drill steel, hose and accessories to the heading. Text, pictures and detail drawings in this new bulletin give a full description of the air-operated drill-jumbo mounting "DJM."

CHARTS FOR MATERIAL TESTING—**W. C. Dillon & Co., Inc.,** Chicago, Ill., have released a handsome, color brochure, containing a complete set of easy to follow tables showing factoring of specimen tests for every material. The Dillon Universal Tester to which these charts apply provides for complete testing; tensile, transverse, compression and shear. Dynamometers 0-250 to 0-10,000 pounds are interchangeable. Overall height, 37 in., weight, 132 pounds.

ARTISTS IN STEEL—**The American Institute of Steel Construction, Inc.,** New York, N. Y., a membership corporation representing the structural steel fabricating industry of the United States, has published a booklet telling of the purposes of the institute and services offered by it. The advantages of steel construction are pictorially shown and a list of publications and pictures dealing with such construction is given.

LET'S BE SAFE!—**E. D. Bullard Co.,** San Francisco, Calif., is distributing a chartreuse, brown and white broadside with an enclosed price list on the complete line of safety equipment that the company makes. Everything from window cleaners' belts to eye-arresting "danger" signs are noted in the catalog.

CORRUGATED STEEL PILING — **Caine Steel Co.,** Chicago, Ill., has published an attractive green, grey and white booklet with a scalloped top, on its product Corr-Plate steel piling, which is used for sewer work, bulkheads, retaining walls, dams, shore and flood protection and soil erosion projects. It presents diagrams, tables, dimensions and weights to figure the requirements of any piling job, select the amount needed and to estimate the cost of building with the only corrugated steel piling that is formed by the cold-rolling process.

IF YOU WANT TO STRETCH WIRE—**W. C. Dillon & Co., Inc.,** Chicago, Ill., provides clear and simple instructions for wire-stretching and stringing in a new bulletin amply illustrated with diagrams. It gives engineering information that anybody can use, for security, efficiency and saving.

OPPORTUNITY SECTION

INDEX TO ADVERTISERS
★ IN THIS ISSUE ★