WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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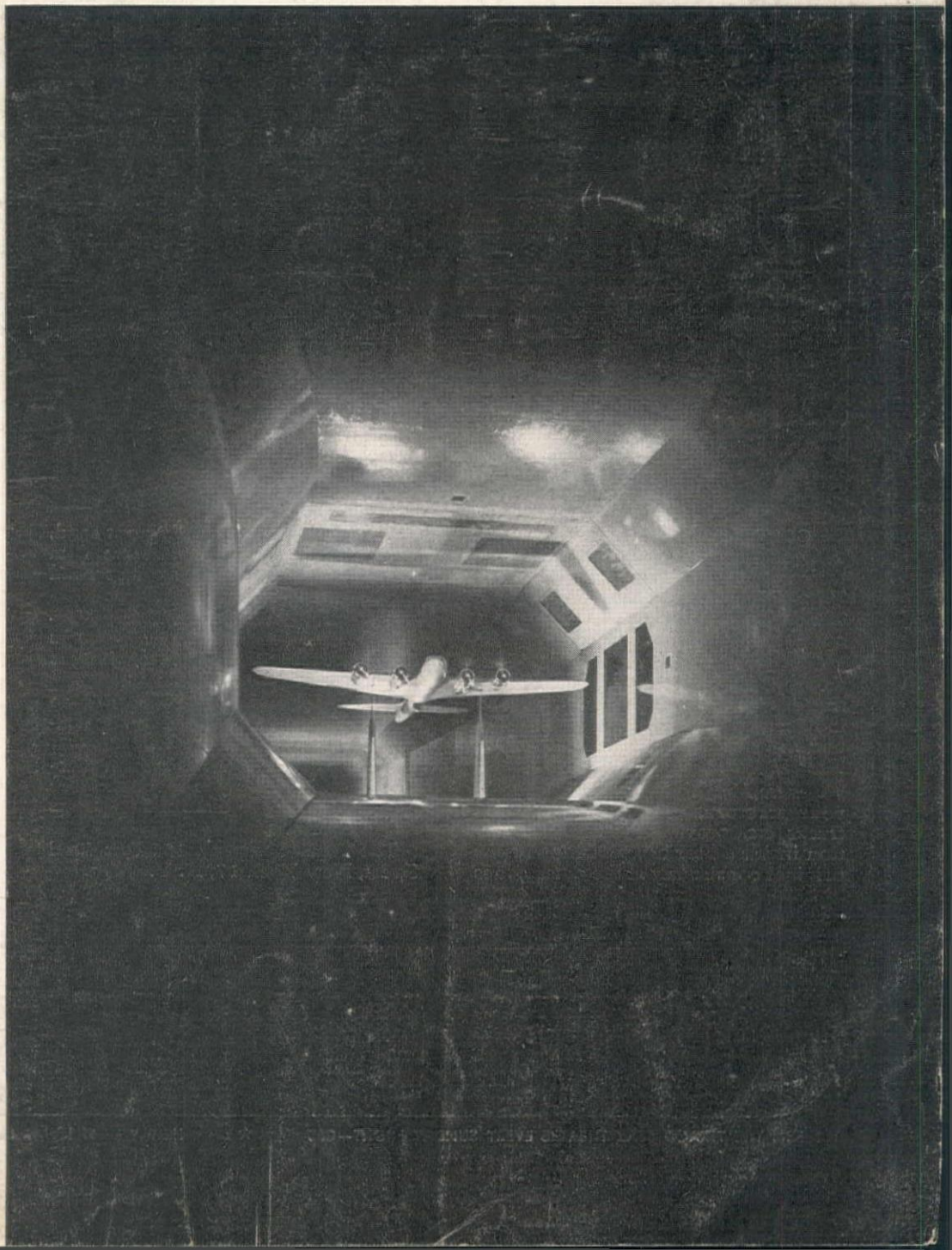
IN THIS ISSUE



SUPER HURRICANES approaching the speed of sound pass through this test section of the new Boeing reinforced-concrete wind tunnel. A model plane is shown in position for testing. Specifications limited construction tolerances in this 10 x 8-ft. section to 1/8 in. Air friction is held at a minimum by the use of a smooth finish. By the use of insulation the roar of the wind in the tunnel is scarcely audible in the adjoining quarters.

ONE-MAN

ROAD GANG

A GOOD example of how modern equipment helps contractors get their jobs done on schedule is this Le Tourneau Carryall and Caterpillar Tractor combination—a one-man operation.

On roads at home . . . on airfields at the front . . . wherever any type of contractors' equipment is used . . . one indispensable safeguard of dependable performance is effective lubrication . . . *Texaco!*

Texaco Marfak, for example, used in your tractors, shovels, bulldozers, trucks, etc., provides ideal film lubrication inside a bearing, yet maintains its original consistency at the outer edges . . . sealing itself in, sealing out sand, dirt, water. Its tough adhesive film cushions chassis parts against road shocks. Makes parts last longer.

For wheel bearings, use *Texaco Marfak Heavy Duty.* It stays in the bearings—off the brakes. Seasonal repacking is no longer required.

Texaco lubricants have proved so effective in service that they are definitely preferred in many fields.

Texaco Lubrication Engineering Service is available to you through more than 2300 Texaco distributing points in the 48 States.

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

FREE! 36-page booklet explains new low-cost protection against rust. Tells how to make equipment last years longer. Write for your copy.

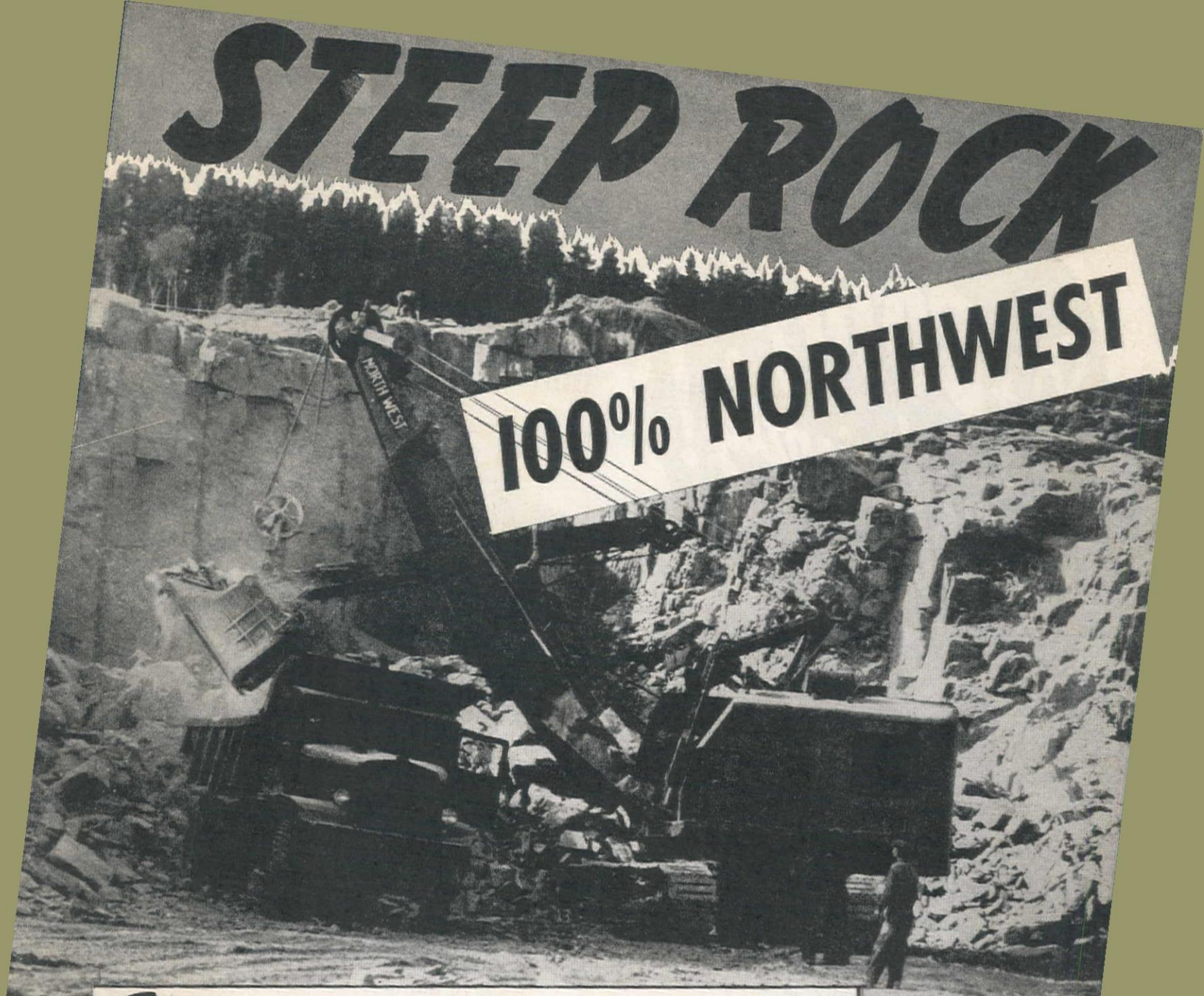
TEXACO

TEXACO MARFAK

TUNE IN THE TEXACO STAR THEATRE EVERY SUNDAY NIGHT—CBS ★ HELP WIN THE WAR BY RETURNING EMPTY DRUMS PROMPTLY

STEEP ROCK

100% NORTHWEST



HERE is the rock job that is commanding the attention of the contractors of both the United States and Canada. Here is rock that really is rock! It is significant that when C. A. Pitts moved in on the Steep Rock job he brought only his Northwests, leaving behind other shovel equipment he had used at Shipshaw.

Steep Rock is 100% Northwest as far as shovels and cranes are concerned. Sixteen of them are demonstrating the ability of the Northwest Dual Independent Crowd, the Northwest Cushion Clutch, Northwest Differential Steering, the "feather touch" clutch control, Uniform Pressure Swing Clutches and the many other Northwest features for handling rock jobs fast. If you have a *Real* Rock Shovel you'll have output in *any* kind of digging.

NORTHWEST ENGINEERING COMPANY
1736 Steger Bldg., 28 E. Jackson Blvd., Chicago 4, Illinois

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

NORTHWEST

SHOVELS • CRANES • DRAGLINES • PULLSHOVELS

Northwest Sales Agents: ARNOLD MACHY. CO., INC., 149 W. 2nd South St., Salt Lake City, Utah; 3707 Santa Fe Avenue, Los Angeles, Calif.
Branch Offices: 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash.; BALZER MACHY. CO., 2136 S.E. Eighth Ave., Portland, Oregon.

Do BOTH Jobs Efficiently!

SHORT HAULS ✔
LONG HAULS ✔

● With modern loading units and Bottom-Dump or Rear-Dump EUCLIDS you can move more dirt on both long and short hauls at lowest cost per yard. Using efficient digging and loading tools and Euclid equipment to haul economically is the surest way to keep costs down and profits up.

Euclids are designed for faster, easy loading under large shovels, elevating graders, draglines, transfer bins, etc. From bumper to bumper they are constructed for efficient off-the-highway service, and have proved their versatility and lower operating cost on hundreds of the toughest jobs.

If you need hauling equipment now for an essential project or are planning for future requirements, be sure to get literature and specifications on models for earth, rock, coal and ore. Your Euclid distributor will welcome an opportunity to provide information, or write us if you prefer.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

THE EUCLID ROAD MACHINERY CO.

3710 SAN PABLO AVENUE — PIEDMONT 8046 — EMERYVILLE, CALIFORNIA

CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque; INTERMOUNTAIN EQUIPMENT COMPANY, Boise; HALL-PERRY MACHINERY COMPANY, Butte; F. W. McCOY COMPANY, Denver; COLUMBIA EQUIPMENT COMPANY, Portland; A. H. COX & CO., Seattle; LANG COMPANY, Salt Lake City.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for August, 1944

J. M. SERVER, JR.
Editor

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PLAN TODAY TO PROFIT ON THE L

With the Faster Power of *TOURNAPULLS* You Can Extend Profitable Haul Distances . . . Save on Equipment Investment and Cut Cost per Yard . . . Try It.

The longer runways and straighter, wider highways, already planned for postwar, will require longer hauls than ever before. You can profitably handle those longer hauls with the rubber-tired power of Tournapulls. Operating from 2.6 to 14.9 m.p.h. Tournapulls get you cheap dirt on any haul from 300 feet to 3 miles.

COMPARE WITH CRAWLING TRACTORS

ONE-WAY HAUL DISTANCE—CU. YDS. PER HOUR*

Tractor-drawn Scrapers	400′	600′	800′	1,000′	2,000′	3,000′	4,000′	5,000′	6,000′
30-Yd. Capacity			175	153	97	71	56	46	39
23-Yd. Capacity		187	162	142	89	65	51		
18-Yd. Capacity	196	163	139	122	74				
15-Yd. Capacity	170	142	121	106	65				
With 15-Yd Super C Tournapull you get:	200	180	168	156	116	91	76	65	55

*All units pusher loaded on level.

Note that even on short hauls—400 to 1000 feet one-way—Tournapulls compete very favorably with larger crawler-scraper outfits. While on longer hauls—2000 to 6000 feet—Tournapulls move from 19% to 41% more than even a 30-yard crawler-scraper outfit.

LOWER FIRST COST . . . LOWER OPERATING COST

What's more, you get this extra yardage for less first cost and a lower hourly operating cost. Super C Tournapulls cost from $500 to nearly $7,000 less than crawler-scraper units of comparable hourly capacity. Hourly operating costs run approximately 4% to 21% less. Figure what that can mean to you on a 10,000-hour operating life.

See Your Dealer NOW

Why penalize yourself with more costly, slow-moving rigs when you can have faster-moving, job-proved Tournapulls? You'll move more yardage, more profitably.

A limited number of Super C Tournapulls are available for civilian use. See your LeTourneau distributor Now for priority requirements and delivery dates.

ONLY IN TOURNA JOB-PROVED, PR

TOURNAPULL DESIGN concentrates load weight on the front drive wheels to give you greater traction, quicker acceleration and faster turning.

PROVEN, CABLE-OPERATED SCRAPER—LeTourneau Carryall Scraper used with Tournapull is simi-

LETOURNEAU

PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED 2,000 BUILT AND SHIPPED

Manufacturers of TOURNAPULLS*, DOZERS, CARRYALL* SCRAPERS, POWER CONTROL UNITS, ROOTERS*, SHEEPS FOOT ROLLERS, TOURNAROPE*, TOURNATRAILERS*, TOURNAWELD*, TOURNACRANES*.

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

ONGER HAULS OF TOMORROW

Good haul roads enable you to attain higher average speeds, thus move more yardage. Here Harrison Construction Co., long-time user of LeTourneau equipment, uses seven Super C Tournapulls to construct new runways on a Knoxville, Tennessee, airport.

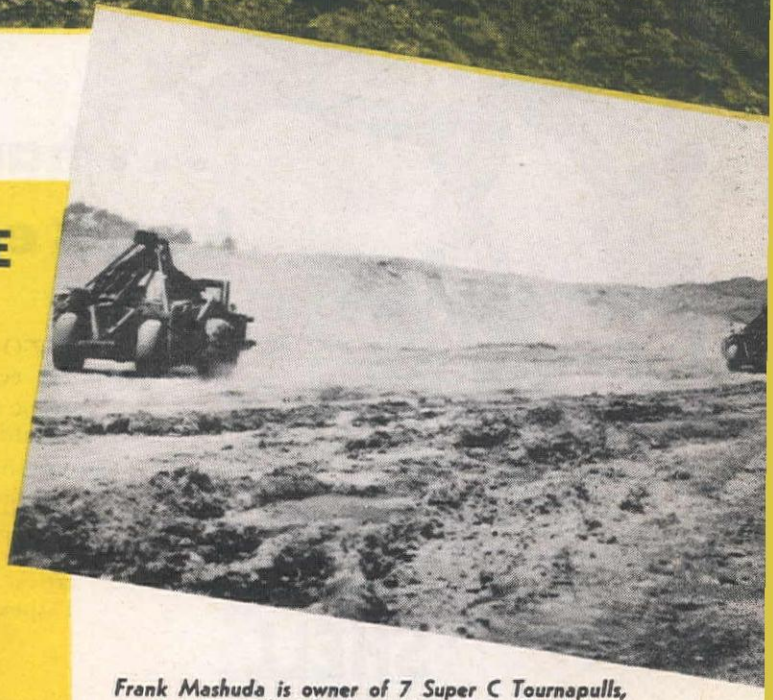
PULLS DO YOU GET ALL THESE OFIT-ASSURING FEATURES . .

lar in design and operation to thousands used so profitably with tractors in the past. It's cable-controlled, has a positive-ejection tailgate that wipes the bowl clean of even the stickiest mud.

LOAD, HAUL, SPREAD —Tournapulls, like all big-capacity scrapers, are designed for pusher loading. They load quickly, then haul and spread their own loads.

BIG, PNEUMATIC TIRES provide greater flotation and extra traction; same time cushion operating shocks to reduce repair costs; have few working parts.

INTERCHANGEABILITY —from Carryall to Crane, Wagon or Trailer widens use and profit possibilities of Tournapull prime mover.

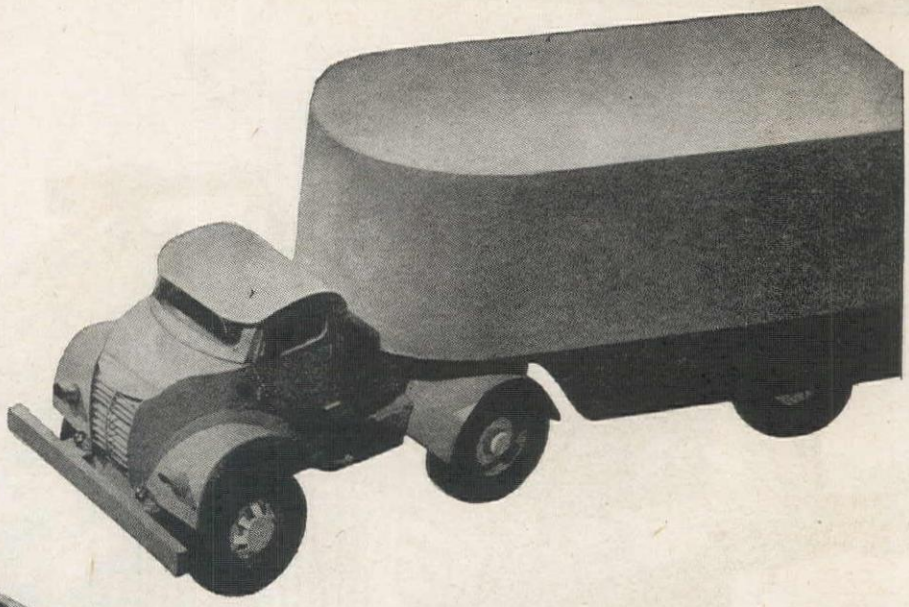


Frank Mashuda is owner of 7 Super C Tournapulls, used on 5000-foot hauls at Moon Township Airport near Pittsburgh, Pa.

TOURNAPULLS

RUBBER-TIRED POWER FOR FASTER EARTHMOVING

A "LAZY" oil can trap your trucks



. . . hard-working TALPEX keeps equipment on the "GO"

YOU'RE having trouble enough these days keeping your equipment on the move. Then why add to your woes by using a "lazy" oil . . . one that does only part of the job it should? Give your engines a break. Use Shell Talpex.

Many operators who have switched to this hard-working oil find their engines running for longer periods of time between overhauls, and with greater operating efficiency. The reason is simple. A "lazy" oil has only one or perhaps two of the properties necessary to efficient wartime engine operation. Shell Talpex has *all* of the necessary properties.

NEW SHELL TALPEX . . .

IS NON-CORROSIVE to alloy bearings. Protects all lubricated engine parts against corrosion.

HAS EXCEPTIONAL OXIDATION STABILITY. Holds to a minimum the formation of sludge, lacquer and other deterioration particles.

HAS HIGH DETERGENCY. Helps keep carbon, lacquer and foreign particles from adhering to pistons and rings, valves, ports.

HAS LOW CARBON-FORMING TENDENCY. Reduces ring sticking and wear. Lengthens engine life.

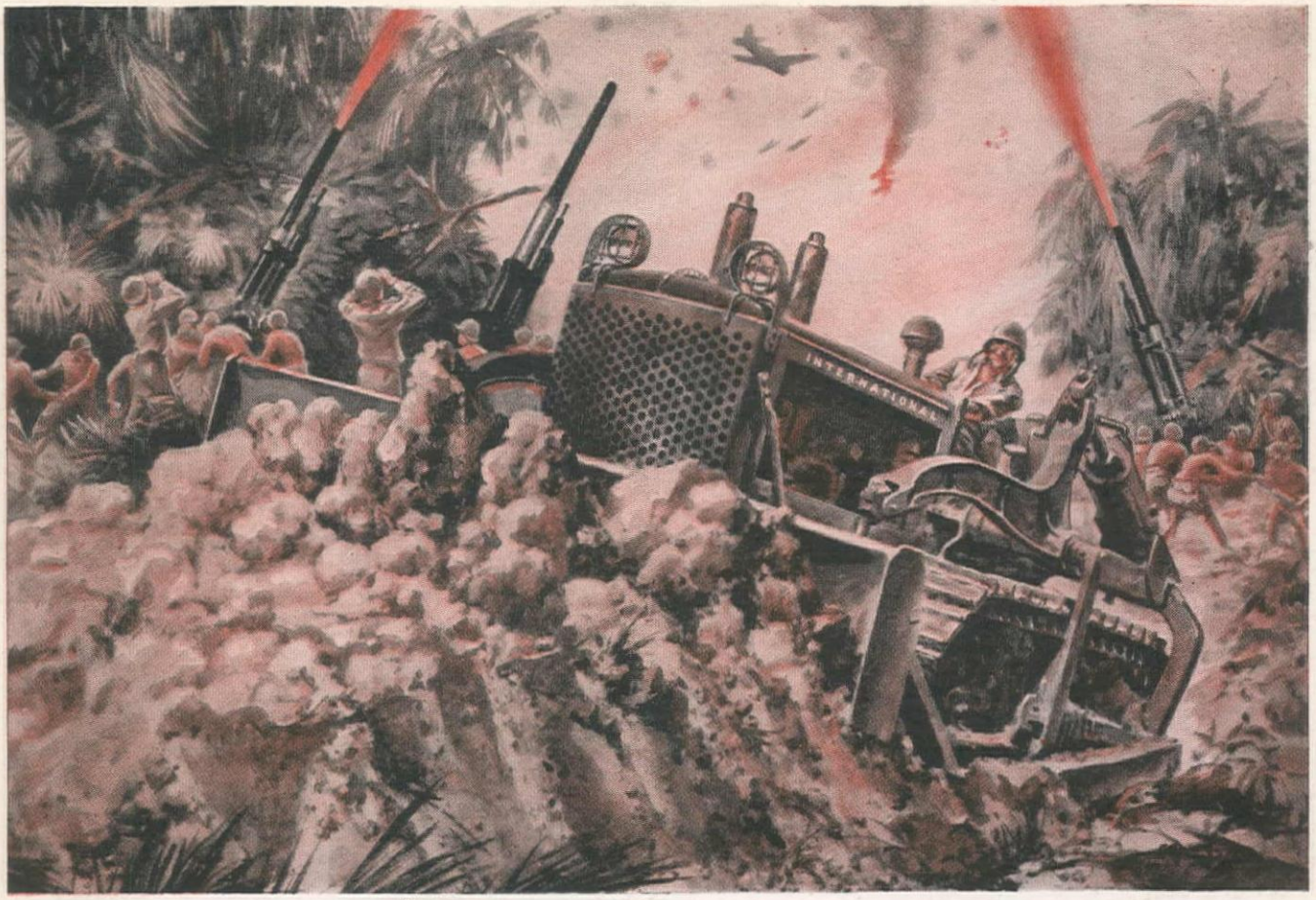
If the oil you now use doesn't have *all* these properties, it's "lazy" . . . should be changed to hard-working Shell Talpex. Ask the Shell man to show you why.

SHELL

TALPEX

THE NEW, ALL-PURPOSE, HEAVY-DUTY LUBRICANT

For trucks, busses, tractors, shovels, stationary and marine Diesels



TODAY A JUNGLE TOMORROW A RUNWAY

WILL THEY EVER mount a Diesel Tractor alongside the cannon on a courthouse lawn to honor this great combat weapon?

Anyway, it's an idea! For here's a peace-time builder that's a sensation on the battlefield, winning praises from GIs and Generals alike—moving dirt, rock, sand, frozen tundra and jungle swamp—by the ton and in a hurry.

Tens of thousands of International Tractors are serving the military—in the Army, the Navy, the Marine Corps and the Air Forces. Tractors pave the way for airpower, footpower and firepower . . . *All honor to the men who drive them!*

While these tractors are fighting on the battlefront, it's up to all tractor operators to conserve equipment here on the home front. *Make it last!* Harvester and the International Power Distributors stand ready to see you through.

If your need for new equipment is vital to the war effort, we will have equipment for you. If your need is less vital we will safeguard your present International Power with every service at our command.

And in the meantime, let's all remember that it's up to all of us to fight harder on the home front . . . fight on the food front—give to the blood bank—buy extra War Bonds—fight inflation. FOR VICTORY.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL INDUSTRIAL POWER DISTRIBUTORS:

Arizona—O. S. Stapley Co., Phoenix; **California**—Smith Booth Usher Co., Los Angeles; J. G. Bastian, Redding; Brown Tractor Co., Fresno, Madera, Reedley; J. H. Degnan, Inc., Hanford; Exeter Mercantile Co., Visalia and Exeter; Farmers Mercantile Co., Salinas, Hollister, Watsonville; Gallagher Tractor & Implement Co., Merced; Lohman Tractor and Implement Co., Napa; North Valley Tractor & Equipment Co., Chico; Stanislaus Implement & Hdwe. Co., Modesto; Stevenson Farm Equipment Co., Santa Rosa; Sutton Tractor & Equipment Co., Sacramento; Thompson-Sage, Inc., Stockton, Lodi, Tracy; Valley Equipment Co., San Jose and San Francisco; **Colorado**—H. W. Moore Equipment Co., Denver; **Idaho**—Intermountain Equipment Co., Boise; **Montana**—Industrial Equipment Co., Billings; **Nevada**—Allied Equipment, Inc., Reno; Clark County Wholesale Mercantile Co., Inc., Las Vegas; **New Mexico**—Hardin & Coggins, Albuquerque; **Oregon**—Howard-Cooper Corp., Portland and Eugene; **Utah**—The Lang Co., Salt Lake City; **Washington**—Howard-Cooper Corp., Seattle, Spokane, Walla Walla; Glenn Carrington & Co., Seattle (for Alaska); **Wyoming**—Wilson Equipment & Supply Co., Cheyenne.

INTERNATIONAL HARVESTER

Power for Victory . . . Power for Peace

Locomotive "No. 1," which puffed its way across the dales of mid-Wisconsin in 1851, was one of the trail blazers for the present magnificent transcontinental system of the Milwaukee Road.

Movement of vital war freight was speeded and tonnage increased when the Milwaukee Railroad installed General Motors Diesel Locomotives on the 225-mile mountain zone between Avery, Idaho, and Othello, Washington.

PATTERN FOR FINER TRANSPORTATION

WRITTEN into the grueling war job the railroads of America are doing, is the story of this mighty titan of the rails. This is the General Motors Diesel Locomotive. It is displaying the unusual stamina, speed and willingness to work ceaselessly which these urgent times demand. And with such tireless, low-cost, swift service these GM Diesel Locomotives are providing a pattern for finer transportation in the greater days to come.

★
KEEP AMERICA STRONG
BUY MORE WAR BONDS
★

GM
GENERAL MOTORS
DIESEL POWER

LOCOMOTIVES . . . . . ELECTRO-MOTIVE DIVISION, La Grange, Ill.

ENGINES . . 150 to 2000 H.P. . . CLEVELAND DIESEL ENGINE DIVISION, Cleveland 11, Ohio

ENGINES . . . 15 to 250 H.P. . . . . DETROIT DIESEL ENGINE DIVISION, Detroit 23, Mich.

Big Jobs move faster with O-P-E-N C-E-N-T-E-R traction

Caterpillar Diesel DW-10 tractor with Goodyear Sure-Grip tires pulling LaPlant-Choate CW-10 scraper on Goodyear All-Weather Earth-Movers, moving heavy clay on airport job.

THE trend in earth moving is to bigger yardages — faster speeds — longer hauls. That calls for tires that won't gum up and spin under peak loads — tires with a sharp, clean grip that keep pulling.

Look at the O-P-E-N C-E-N-T-E-R *self-cleaning* tread of the Goodyear Sure-Grip pictured here, and you'll see why it is the greatest traction tread ever built.

It has no dead-end tread pockets, no mud traps to pack up solid. Dirt and stones sluice out, keeping the massive lugs sharp and keen for deep biting.

That's why you'll have less slip and spin with Goodyear Sure-Grips. They don't waste power; they keep you moving—on schedule.

This, combined with Goodyear's exclusive multiple-compounded construction and the extra strength of Goodyear's low stretch Supertwist cord carcass, gives you the sturdiest, toughest, most efficient tire ever built for big power units.

You can easily check on that. Just ask any contractor who has changed to Sure-Grips. He'll tell you Goodyears pull more, go faster and last longer. Why not see for yourself.

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

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG for all rock work

ALL-WEATHER EARTH-MOVER for drawn vehicles

SURE-GRIP for mud and marsh

BUY WAR BONDS—BUY FOR KEEPS

GOODYEAR

THE GREATEST NAME IN RUBBER

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

Which of these Wire Ropes Would You Use?

Years ago wire rope was not the highly specialized product it is today, nor was there as much use for wire rope or so many *different* uses.

Because of the many kinds of equipment using wire rope, plus the many and varied applications of that equipment, many sizes, grades, and constructions of wire rope must be made.

This makes it difficult for wire rope users to select the correct rope.

If the equipment is used in the normal way under average conditions, the manufacturer of the equipment can and does offer suggestions as to the type of rope they believe is best.

But should the equipment be altered to suit special needs, or should conditions not be average, a different wire rope specification is usually necessary for the best service.

Many Factors Considered

In recommending the correct wire rope for your equipment, several factors need to be considered:

1. Safety Factor—This has to do with the amount of loading and whether it is steady or a shock load.

2. Bending Fatigue—This has to do with the number and size of sheaves, size of drum, and also speed of rope.

3. Abrasion.

4. Type of Equipment:

5. Use of Equipment:

Conditions of service on a given type of equipment vary so much that it is often helpful to know the type of rope previously used and the service it gave.

G-15 catalog

Then after a study of this information, wire rope can be recommended that experience proves will give the best service.

Sounds difficult, doesn't it? Really it isn't difficult when you have the advice and counsel of Macwhyte Wire Rope Engineers. Just write to Macwhyte Company, its distributors or mill depots. Tell them the make and model number of your equipment, explain briefly what it is being used for, and mention the size, grade, and construction of the rope you are now using.

Remember — Macwhyte makes the "Correct Wire Rope For Your Equipment."

Pictured above are but a few of the types of wire rope made by Macwhyte so that you may have the "Correct Rope For Your Equipment." There is a size, grade, and construction of Macwhyte Wire Rope that will give you low cost, safe service.

MACWHYTE PREformed WIRE ROPE — **Plus** Internal Lubrication, Selected Steels, Tested-Proved

The correct rope for your equipment

NO. 707

MACWHYTE COMPANY

Wire Rope Manufacturers

ARMY E NAVY

2909 FOURTEENTH AVENUE KENOSHA, WISCONSIN

Mill Depots: New York • Pittsburgh • Chicago • Fort Worth • Portland • Seattle • San Francisco. Distributors throughout the U.S.A.

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

ANSWER THIS SOS

YOUR COUNTRY DESPERATELY NEEDS IDLE EQUIPMENT

Even with the greatly expanded construction equipment industry producing FOUR TIMES its pre-war rate . . . there is still a serious shortage of construction equipment. Nearly all new machines go directly to our armed forces overseas, even a large number of used outfits. As military operations expand, and additional territory is reclaimed from the Axis, more and more will be needed. Besides this — vital industries are in desperate need of tractors, graders, shovels, cranes and other units.

Here is a chance to actively support the war effort — rent or sell idle machines to essential users. Apply for authorization at your nearest WPB office . . . or make the deal through your Allis-Chalmers dealer. He will buy your equipment and see that it is directed into war work. No authorization is required on sales to dealers.

"Your equipment was not built to become a monument of idleness. It was built to do a job. Its use is constructive and every effort should be made to see that the maximum amount of good comes from its existence on the home front at this time. We cannot afford the luxury of idle equipment stored away and waiting for peacetime work".*

*H. M. Hale, Director of WPB Construction Machinery Division, Equipment Bureau.

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

TAX RELIEF!
Special tax relief benefits are obtained on the gain from the sale of used construction equipment. Get all the facts from your Collector of Internal Revenue.

• • •

★ Buy War Bonds
★ Save Waste Paper
★ Turn In Scrap Metal
★ Be A Blood Donor
★ Pay Only Ceiling Prices

PROTECTION FOR OPEN AND ENCLOSED GEARS

The periodical check-up with a feeler gauge tells the story.

With LUBRIPLATE Lubricants, the teeth of gears are absolutely separated by a load carrying film. Metal cannot touch metal. LUBRIPLATE lowers operating temperatures and seals the gears against rust and corrosion. Yet, in spite of its protective qualities, LUBRIPLATE does not cause drag. Even the most delicate, high speed gears operate better with it. LUBRIPLATE reduces friction to a minimum.

Yes, open and enclosed gears as well as chains, slides, sleeve and anti-friction bearings and all contacting parts last longer and require less power to drive them when lubricated with LUBRIPLATE. Let us send you a copy of "The LUBRIPLATE Film" that tells the whole story. It is written especially for your industry.

Rx FOR YOUR MACHINERY

No. 3—Ideal for general oil type lubrication. Ring oiled bearings, wick feeds, sight feeds and bottle oilers.

No. 8—Because of its high film strength and long life reflects outstanding performance in most types of enclosed gears (speed reducers).

No. 107—One of the most popular grease type products for general application by pressure gun or cups.

No. 70—For a wide range of grease applications, especially at temperatures above 200 degrees F.

No. 130-AA—Known nationwide as the superior lubricant for open gears, heavy duty bearings, wire rope, etc.

BALL BEARING—This is the LUBRIPLATE lubricant that has achieved wide acclaim for use in the general run of ball and roller bearings operating at speeds to 5000 RPM and temperatures up to 300 degrees F.

LUBRIPLATE DIVISION
FISKE BROTHERS REFINING COMPANY
Newark, N. J. SINCE 1870 Toledo, Ohio

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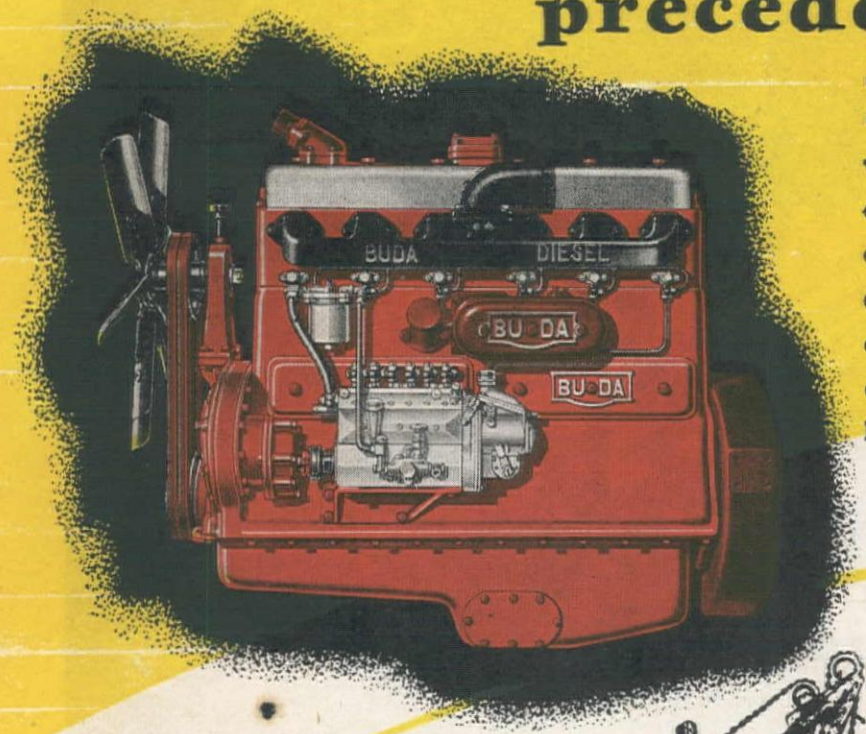
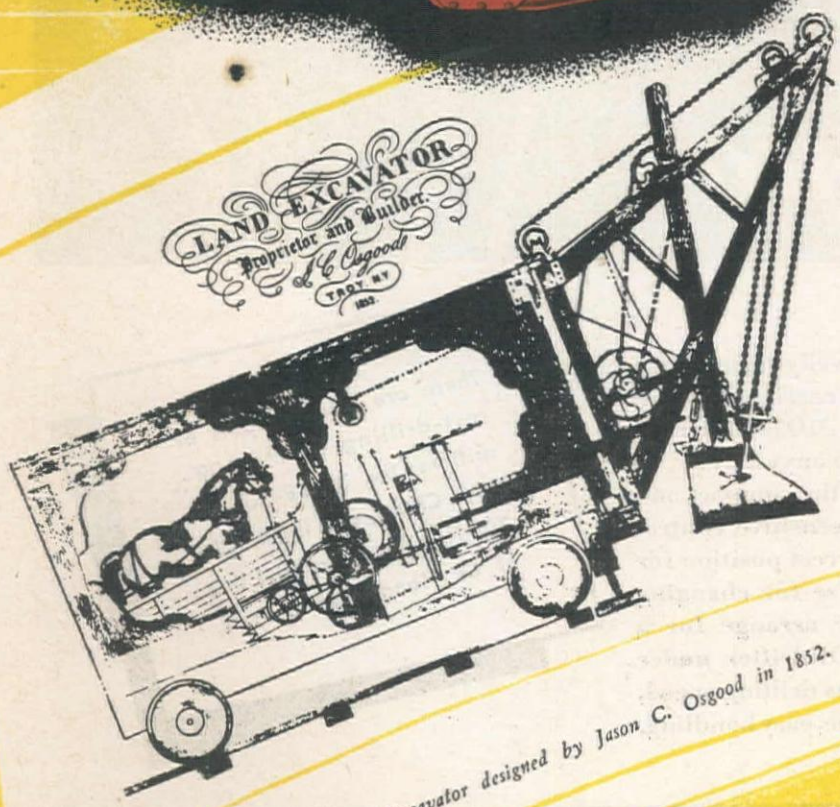
Power...

precedes progress



Excavating earth a century ago was a job that taxed the ingenuity of experts. The missing factor in equipment, otherwise fairly efficient, was modern power. Today you can have the finest, most efficient, economical power ever developed by specifying BUDA Diesels.



Two-Horse power Excavator designed by Jason C. Osgood in 1852.

BUDA
Service is Nation-wide

Write or wire for literatu

ARMY E NAVY

BU

15424 Commer
HARVEY (Chicago Su

16

For FAST, Low-Cost Drilling, CP-60 MOTORdrifter

FOR drilling in hard, seamy or ravelly formations, for tunneling from Jumbo drill carriages—there is no better drifter than the CP-60 MOTORdrifter. It will do a fast, low-cost drilling job anywhere.

The CP Motorfeed is powered by the compact and dependable rotary type motor. Its sensitive control enables the operator to maintain correct position for maximum drilling and quick reverse for changing steel. Write for further details or arrange for a demonstration of the CP-60 MOTORdrifter under your own conditions. You will like its drilling speed, low air consumption, low maintenance, easy handling.

There are three models of fast-drilling CP MOTOR-drifters: the 3" CP-50, the 3½" CP-60, and the 4" CP-70. There is a parallel line of CP Hand-Feed Drifters.

★★★★★★★★
PNEUMATIC TOOLS
LECTRIC TOOLS
cycle...Universal)
CK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY

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

★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

Then he said to himself

"A War Measure of First-Class Magnitude"

WHEN the standing of India was occupying the attention of Washington, Mohandas Karamchand Gandhi wrote to the India League of America:

> "I want you to look upon the immediate recognition of India's independence as a war measure of first-class magnitude."

For a man so definitely non-Hollywood in dress or words "FIRST-CLASS MAGNITUDE" amounts to a cataclysmic pronunciamento.

Again it shows that one who is fired by a great idea automatically adds emphasis to enthusiasm! And *that* is an important business measure.

You saw it well illustrated when war conversion was hurled at manufacturers . . . and when "impossible" schedules were handed them.

Men were far from enthusiastic. Remember?

But viewed in the light of subsequent experience, those quotas for air, land and sea weapons today seem modest. All because aroused men quickly found out first-hand what Arc Welding could do. And when it did the job well, they became enthusiastic . . . which brings triumph to any front.

Peterbilt

THE MAN-MOUNTAIN OF TRUCKS

IF YOU ARE DELIVERING groceries to back doors you have no more use for a PETERBILT than a cat has for two tails. But when you graduate from the "light weight" class and you get into hauling problems which involve tremendous loads, long distances, traction, reserve power for off-highway service—that's when you really need a PETERBILT.

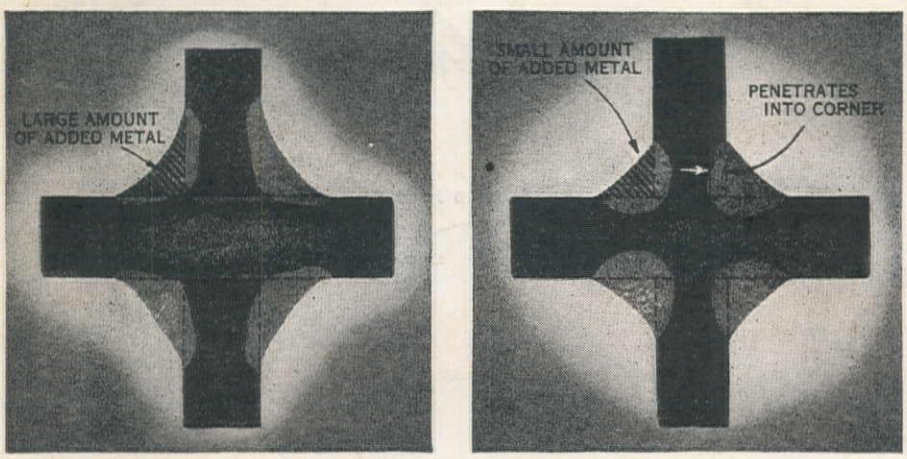
If you can establish your need for a heavy duty truck for hauling logs, lumber, cattle, fruit, grain or mixed cargo—or any service directly affecting the war effort, you can get a PETERBILT especially designed and constructed to meet your specific requirements. And if you are doing big things in a big way, PETERBILT is undoubtedly the truck you will want.

Peterbilt Motors Company

107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIF.

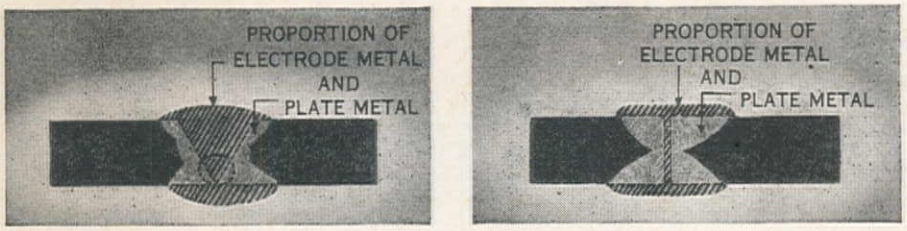
"A War Measure of First-Class Magnitude"...*he says*

CONVENTIONAL WELDING | **"FLEET-WELDING"**



TYPICAL FILLET WELDS

STRENGTH:	**Stronger than plate**	**STRENGTH:**	**Stronger than plate**
SPEED:	**5" per min.**	**SPEED:**	**12" per min.**
COST:	**100%**	**COST:**	**42%**



TYPICAL BUTT WELDS

STRENGTH:	**Stronger than plate**	**STRENGTH:**	**Stronger than plate**
SPEED:	**2" per min.**	**SPEED:**	**9" per min.**
COST:	**100%**	**COST:**	**25%**

LOOK, MAHATMA: While you pondered on the magnitude of political measures for winning, Lincoln Engineers were enthusiastically working out a very practical measure that is away out in front in magnitude:

"FLEET-WELDING"

A First-Class Production Measure ... of First-Class Magnitude

This new, revolutionary technique using "ARC-FORCE" to speed the welding of all types of joints in plate, shapes and sheet is bringing back reports of 25% to 75% faster welding . . . also savings in electrode material and power. Cases also are reported where back-chipping and plate beveling are eliminated.

The savings shown at left are typical of this new technique developed by Lincoln engineers.

A Lincoln engineer is available nearby to help you apply "Fleet-Welding" Technique. Write for Bulletin No. 440 which gives complete explanation of the simple technique and the welding procedures.

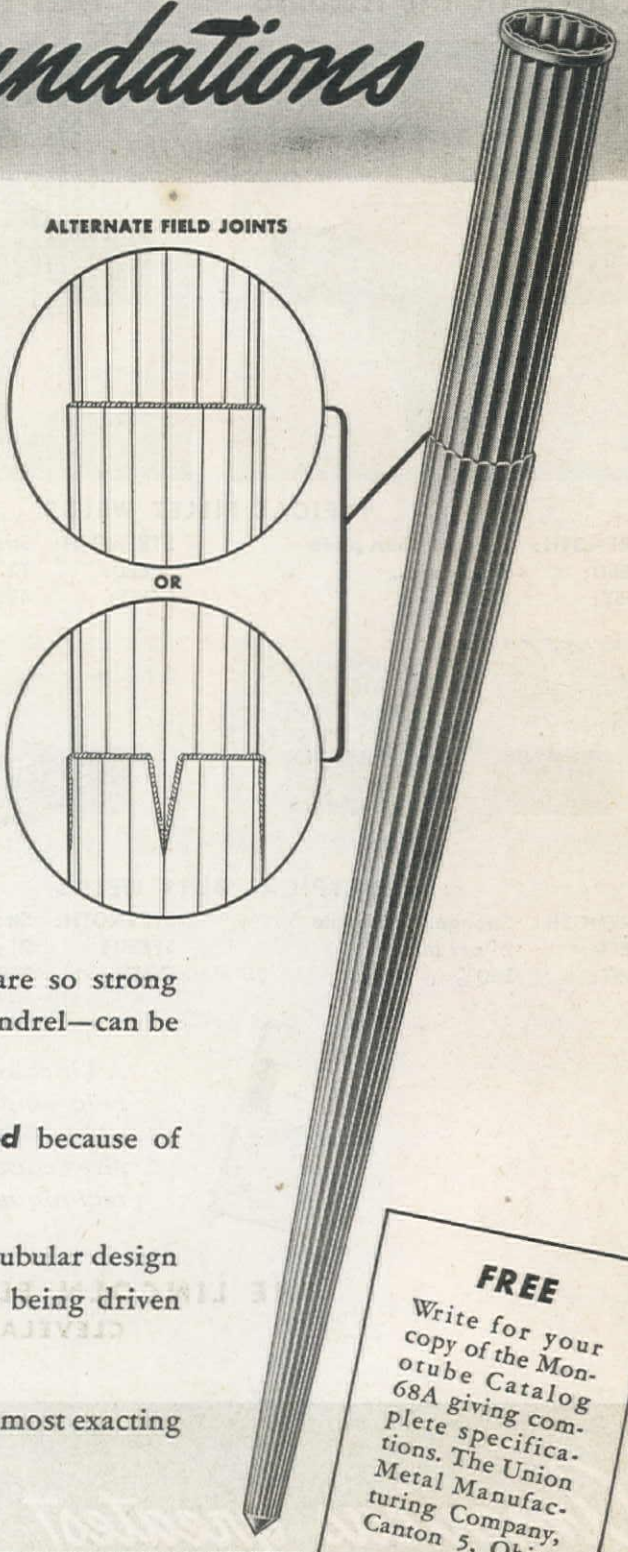
THE LINCOLN ELECTRIC COMPANY
CLEVELAND, OHIO

America's greatest natural **recourse**

ARC WELDING

MONOTUBE Tapered Piles

...First in Foundations



MEN who are responsible for the swift completion of engineering and construction projects—highway and railway bridges, overpasses, buildings, and airports—prefer Monotube tapered steel piles for these four important reasons . . .

(1) *Monotubes are easy to extend.* Extendible Monotubes are available for the quick and economical installation of varying pile lengths even in low headroom. Diagram shows two alternate field joints that help make the job easy.

(2) *Monotubes are simple to drive.* They are so strong and rigid they require no heavy core or mandrel—can be driven with average job equipment.

(3) *Monotubes can be handled with speed* because of their light weight.

(4) *Monotubes are quick to inspect.* Their tubular design permits a thorough top-to-toe check after being driven to required bearing.

Available in a gauge, size, and taper to meet the most exacting requirements in all soil conditions.

FREE

Write for your copy of the Monotube Catalog 68A giving complete specifications. The Union Metal Manufacturing Company, Canton 5, Ohio.

UNION METAL

Monotube Tapered Piles

How capacity and tractor speed effect

SCRAPER PRODUCTION

For obvious reasons, the following LaPlant-Choate scraper yardage table is *not* intended for estimating specific jobs. Its main purpose is to give you a conservative measuring stick for figuring the relative advantage of higher tractor speeds, or larger scraper capacities, on various length hauls. As such, we hope you will find it helpful in estimating the size, type and number of tractor-scraper rigs you will need for your post-war dirt-moving projects. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa.

ESTIMATED PAY YARDS PER HOUR WITH PRESENT LaPLANT-CHOATE SCRAPERS*

Scraper Model	Tractor Size	Struck Yds. Per Trip	Load, Dump	Turn & Time	Length of Loaded Haul in Feet								
					250	500	750	1000	1500	2000	3000	4000	5000
C-74	D-7	9.5	2.5	min.	122	100	83	69	58	47			
C-84	D-8	13.6	2.5		145	117	97	88	64	50	41		
C-86	D-8**	15.3	2.5		175	130	109	98	74	58	51	46	
C-104	D-8**	25	3.5			172	148	123	100	88	70	55	45
CW-10	DW-10**	8.75	2.5			125	102	92	88	81	73	64	54

*Based on a one-way haul on level grade with good dirt and well maintained hauling roads..(54 minute hour used to allow for unpredictable losses). Above figures will change considerably depending on the type and condition of the material you are loading. They also will vary with the condition and grade of the hauling road. Proper maintenance of hauling roads increases production, decreases maintenance on equipment and gets the job done quicker.

**Indicates pusher loading. In figuring operating costs per cubic yard of material on different length hauls, the operating cost of the pusher unit should be pro-rated and added to the operating cost of each scraper unit. You will find that one pusher can load 3 to 5 scrapers, depending on the length of haul.

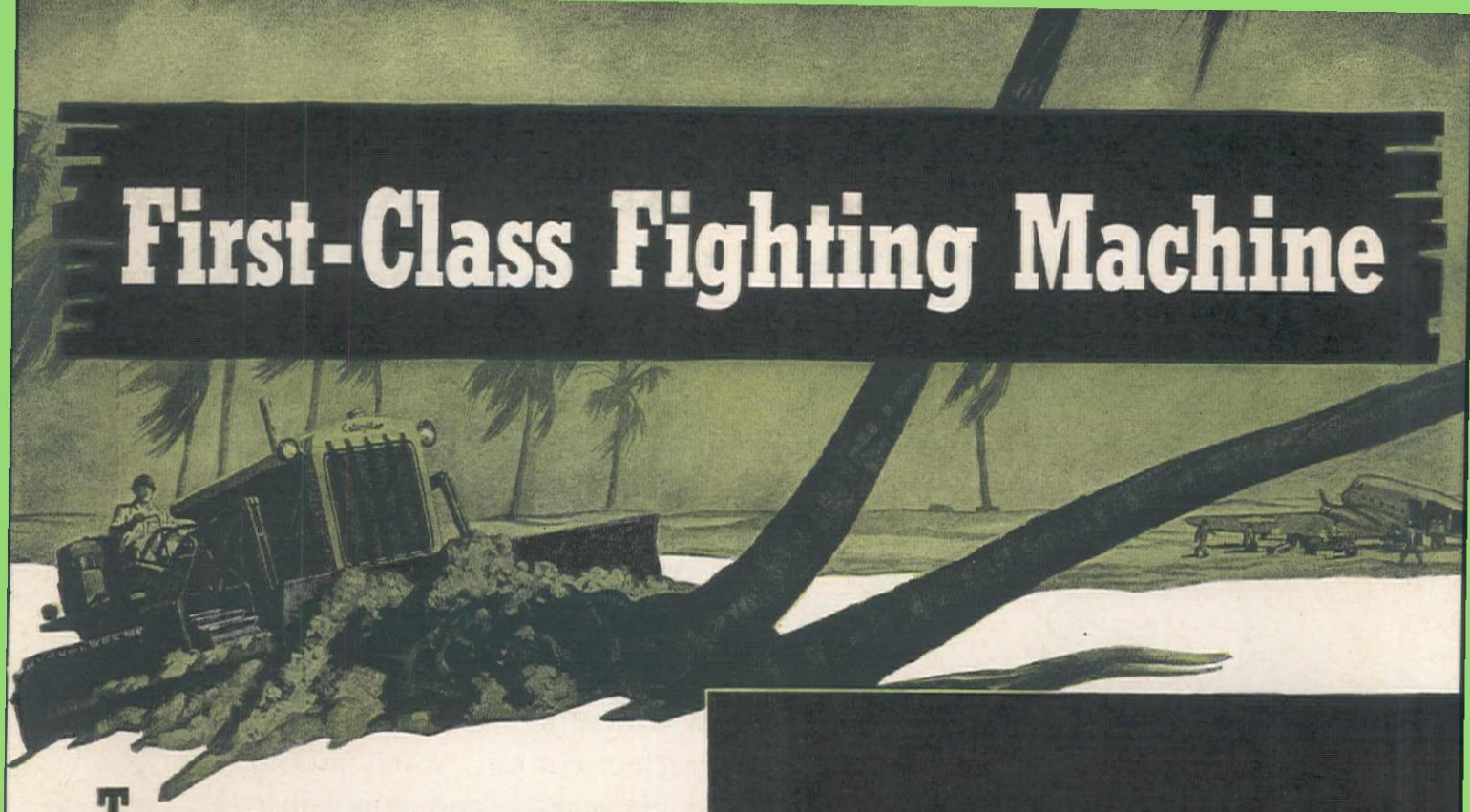
A Word About Tomorrow's LaPlant-Choate Scrapers

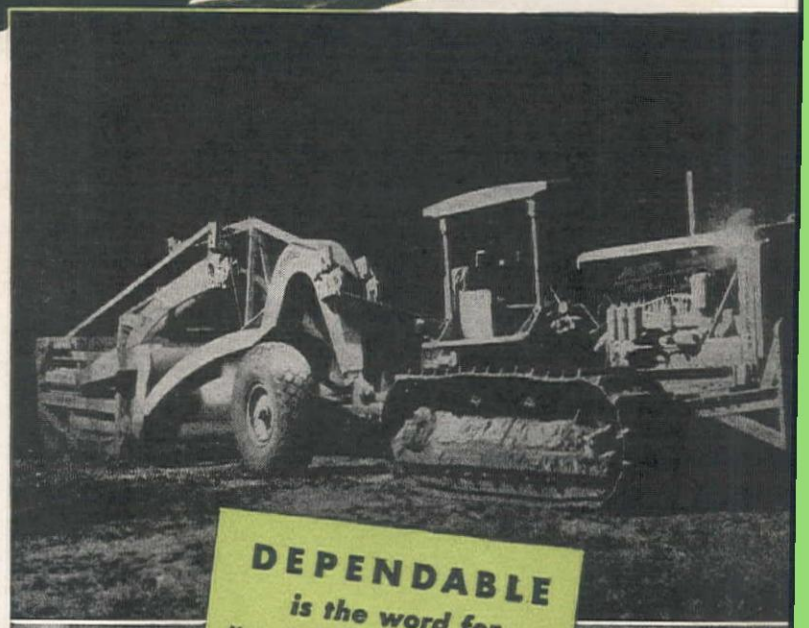
With tomorrow's LaPlant-Choate cable scrapers, you'll be able to get full loads faster and easier in all types of soil, including sand. In addition, you can count on greatly reduced weight, lower cable expense—plus a clean, open bowl that's free of overhead obstruction, for greater stability and for easy loading under shovel, drag line, or bin.

LaPLANT-CHOATE

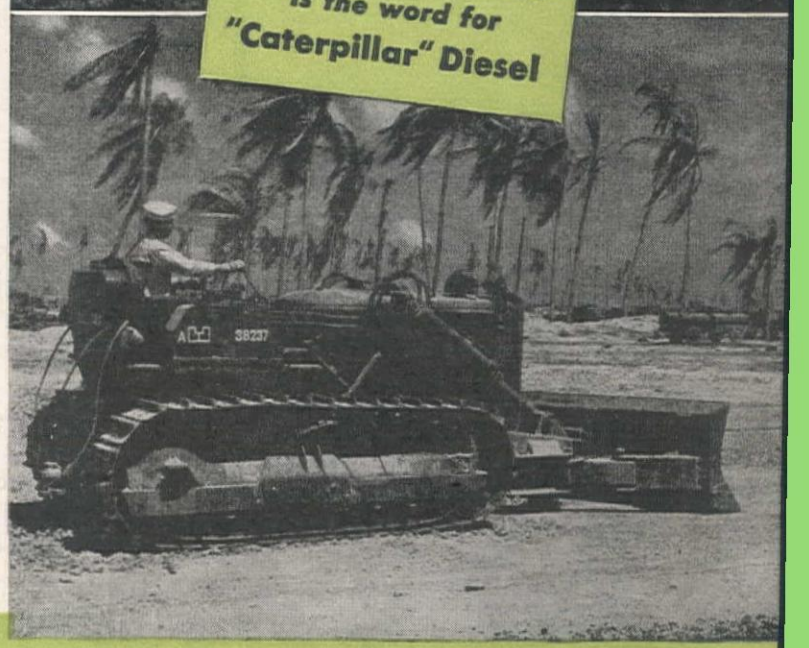
Earthmoving and Land Clearing Equipment

First-Class Fighting Machine





DEPENDABLE
is the word for
"Caterpillar" Diesel



TALK to a fighting man back from battle and you'll hear him speak of "Caterpillar" Diesel equipment with affection. He knows that, out there, when they need "workpower" they count on "Caterpillar" Diesels. War dramatizes the dependability of these husky power-plants. For a single power failure may cost lives.

It was in the years before the war on the highways, on construction jobs, in logging camps and oil fields and on farms that "Caterpillar" Diesels matched their dependability against the toughest kinds of jobs that could be found.

Through those years, the men who built them were watching them perform. Owners of "Caterpillar" equipment were urged to give it more and harder work to do. After many thousands of hours of service, engines were torn down and studied. At the first sign of an on-the-job weakness—no matter how slight—"Caterpillar" trouble-shooters went after it . . . *and corrected it!*

So, when the armed forces asked for dependable power, it was just a question of stepping up production of the same machines which had been proved over so many years.

When the war is done, the biggest production of "Caterpillar" Diesel Tractors, Motor Graders, Engines and Electric Sets in all history will be ready to tackle the countless tasks that peace will bring. They won't be streamlined "dream" models, but they will be modern, battle-tested "Caterpillar" Diesels—the same kind that are with our troops around the world today.

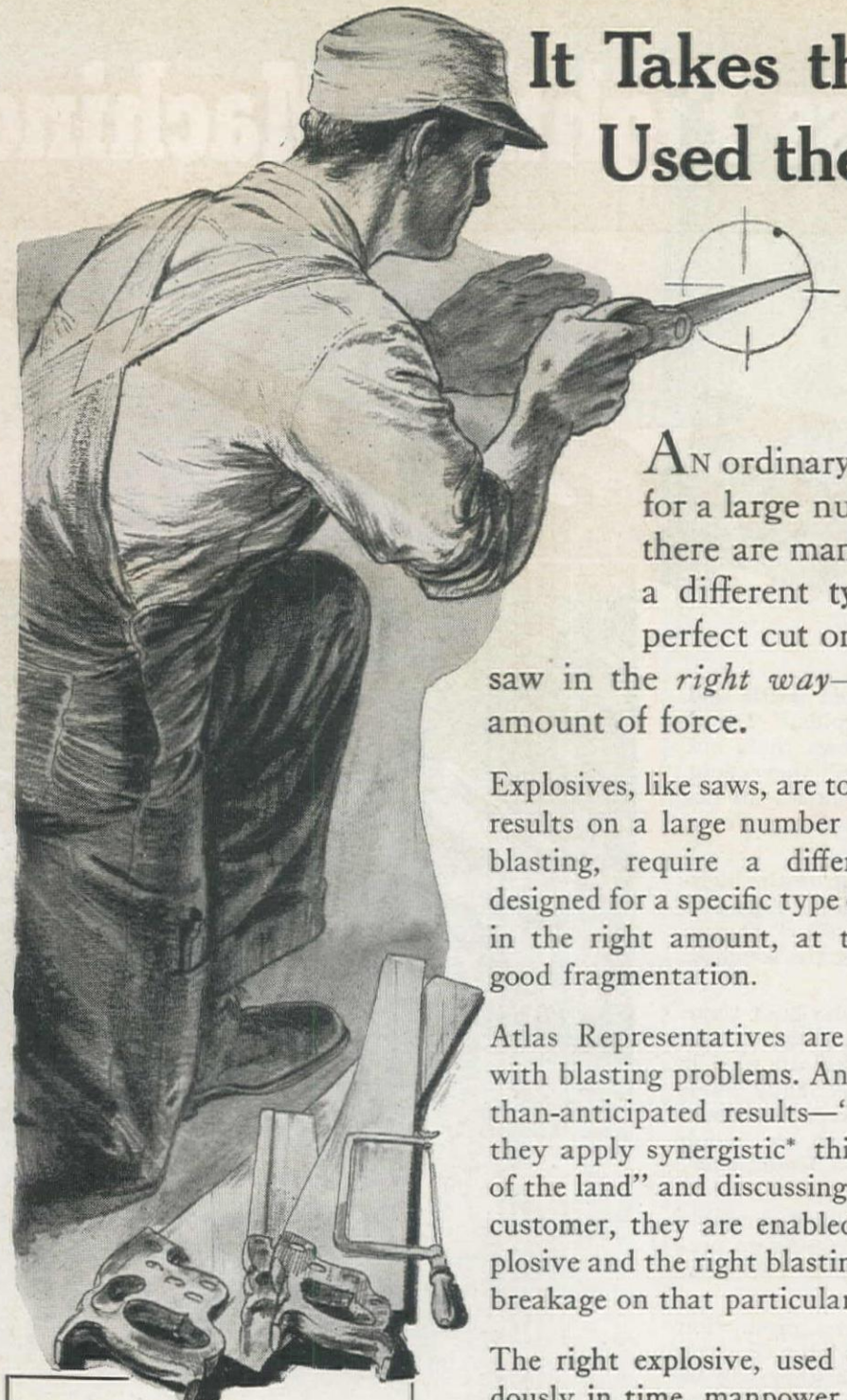
Meanwhile, your "Caterpillar" dealer is equipped to render complete and efficient service to help keep your present "Caterpillar" equipment on the job—working at peak efficiency.

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

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

TO WIN THE WAR: WORK—FIGHT—BUY WAR BONDS!



It Takes the Right Saw Used the Right Way!

AN ordinary crosscut saw can be used for a large number of sawing jobs. But there are many kinds of saws—each for a different type of job. You get the perfect cut only when you use the *right* saw in the *right way*—and apply just the right amount of force.

Explosives, like saws, are tools. Some explosives give good results on a large number of jobs. Other jobs, for good blasting, require a different explosive—an explosive designed for a specific type of shot. Use the *right* explosive in the right amount, at the right place—and you get good fragmentation.

Atlas Representatives are constantly aiding customers with blasting problems. And to give the customer better-than-anticipated results—"2 plus 2 equals 5" results—they apply synergistic* thinking. By analyzing the "lay of the land" and discussing ideas back and forth with the customer, they are enabled to recommend the right explosive and the right blasting formula for the best possible breakage on that particular job.

The right explosive, used the right way, saves tremendously in time, manpower and equipment use.

Have YOU a blasting problem you'd like us to tackle? Consult Atlas.

***Synergism:** The force that produces "2+2=5" results when both you and we get together and really "click."*

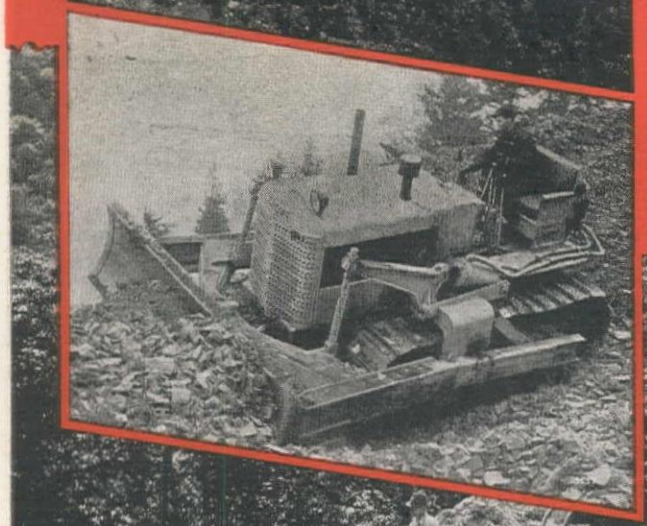
Offices in Principal Cities

ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

SAN FRANCISCO 4, CAL. ATLAS POWDER COMPANY SEATTLE 1, WASH.



"TOUGH GOING" brings out the True Value of CLETRAC Tru-Traction*

IN soggy tropical jungles . . . in muck and mud of Alaska . . . on bottomless roads in Russia . . . on the rugged hills of Italy . . . the mighty power of military crawler type equipment with *controlled differential steering* has been proved again and again.

Controlled differential steering is, and has been for 25 years, an *exclusive* operating feature with Cletrac. We call it *Tru-Traction,* because it gives power on *both* tracks at *all* times, and the ability to steer with the tractor under full control—uphill and down.

Today, practically all high speed military crawler type equipment uses *controlled differential steering* which is exclusive with Cletrac in the crawler tractor field.

In civil activities as in military movements . . . in logging camps . . . in highway construction . . . in oil fields . . . for heavy hauling, bulldozing or earth moving, wherever the going is tough—Cletrac can be depended upon to do the job—and do it economically.

A substantial number of Cletracs are being released for essential civilian use—allocated according to government regulations. Your Cletrac dealer will gladly assist you in making application for a new Cletrac if you can qualify as an essential user.

• • •

Illustrated at the right, below, is a folder recently published, telling of Cletrac's part in the war effort. A copy will be mailed on request.

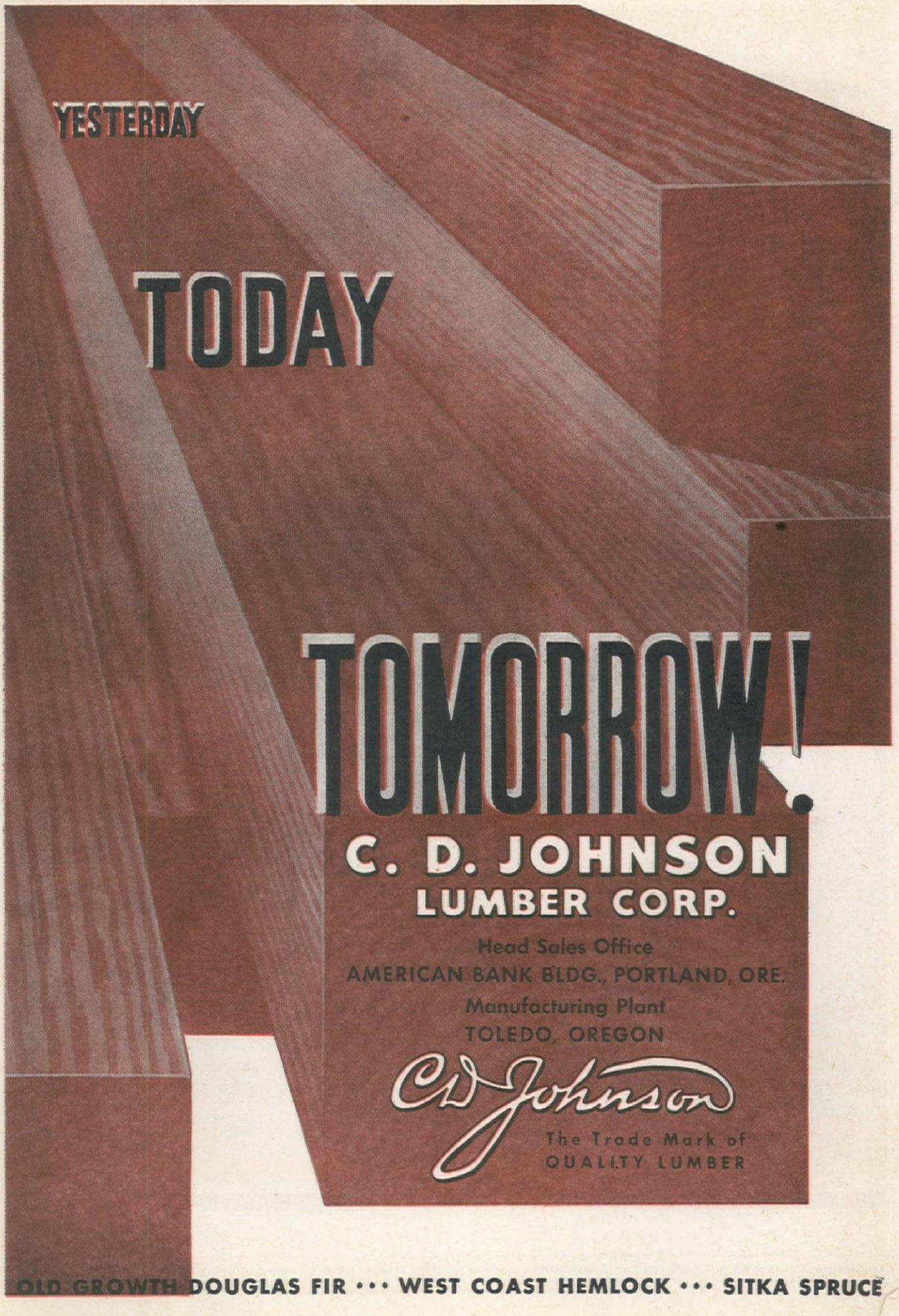
*Tru-Traction is power on both tracks at all times.

THE CLEVELAND TRACTOR COMPANY • CLEVELAND 17, OHIO

CLETRAC *Tru-Traction* TRACTORS

GASOLINE OR DIESEL

STATE OF CALIFORNIA—Gustafson Tractor Co., Eureka; Mechanical Farm Equipment Dist., Inc., San Jose; Raymond L. Comber, Modesto; Nelson Equipment Co., Los Angeles; Tractor & Equipment Co., San Leandro. STATE OF WASHINGTON—Burrows Motor Company, Yakima; A. C. Haag & Co., Spokane; Pacific Hoist & Derrick Co., Seattle. STATE OF OREGON—A. C. Haag & Co., Portland; Loggers & Contractors Machinery Co., Portland. STATE OF IDAHO—Idaho Cletrac Sales Co., Lewiston; The Sawtooth Company, Boise. STATE OF MONTANA—Western Construction Equipment Co., Billings, Montana. VANCOUVER, B. C.—A. R. Williams Machinery Co., Vancouver.


YESTERDAY
TODAY
TOMORROW!
C. D. JOHNSON
LUMBER CORP.
Head Sales Office
AMERICAN BANK BLDG., PORTLAND, ORE.
Manufacturing Plant
TOLEDO, OREGON
C D Johnson
The Trade Mark of
QUALITY LUMBER
OLD GROWTH DOUGLAS FIR ••• WEST COAST HEMLOCK ••• SITKA SPRUCE

TRENCHLINER

DIGGING TRENCHES...

. . . with the Parsons improved 250 Trenchliner gives you the advantage of full crawler traction for solid footing . . . multiple travel and digging speeds for easy or tough digging . . . long and wide crawlers . . . low ground pressure, approximately 7 pounds per square inch . . . digging depth of 12'-6" . . . digging width 16" to 42" . . . shiftable, telescopic boom . . . power shift arc conveyor. All of these and many more have proven the operating economy, high production ability and low maintenance cost records. Now is the time to prepare for economical trenching . . . with a modern Parsons Trenchliner.

THE PARSONS COMPANY
Newton, Iowa

Parsons Model 250

TRENCHING EQUIPMENT

PARSONS

Lund Machinery Co., 49 N. 2nd W. St., Salt Lake City 12, Utah; McKelvy Machinery Co., 319 S. Broadway, Denver 9, Colorado; Hall Perry Machinery Co., P. O. Box 1367, Butte, Montana; Harry Cornelius Co., 1717 N. 2nd St., Albuquerque 5, N. M.; Harron, Rickard & McCone Co., 2070 Bryant St., San Francisco 10, Calif.; Pacific Hoist & Derrick Co., 3200 4th Ave. S., Seattle 4, Washington; Niel B. McGinnis, 1401 S. Central Avenue, Phoenix 6, Arizona; Contractors Equipment Corp., 1215 S. E. Grand Avenue, Portland, Oregon.

48-PAGE PICTURE RECORD of typical jobs TIMBER STRUCTURES has done for AMERICAN INDUSTRY

"ENGINEERING IN WOOD" is a documented record of the importance of timber in building, and the type and kind of work performed by Timber Structures, Inc. for industry and government before and during the war.

The book is packed with photographic and word illustrations on the use of ring-connected timber trusses, columns, arches, and heavy framing in buildings ranging from small stores to huge industrial plants.

Examples have been chosen from these fields: Aviation, Bridges, Shipyards, Municipal, Industrial, Commercial, Specialties; with a special section on the techniques of Glued Lamination.

Contractors, architects, engineers and plant management men will find

- *"Engineering in Wood"* a worth-while addition to their reference and work files on current and post-war construction planing.
- For your free copy, simply fill in and mail the coupon or send a request on your letterhead.
- Prompt arrival of the book will be insured by addressing the Timber Structures office nearest you.

TIMBER STRUCTURES
WARD MAYER
INCORPORATED
ENGINEERING IN WOOD
Portland 8, Oregon New York 17, N. Y.
Eugene, Oregon Seattle 4, Washington

MAIL COUPON FOR LITERATURE

TIMBER STRUCTURES, Inc.
Send Book "Engineering in Wood"

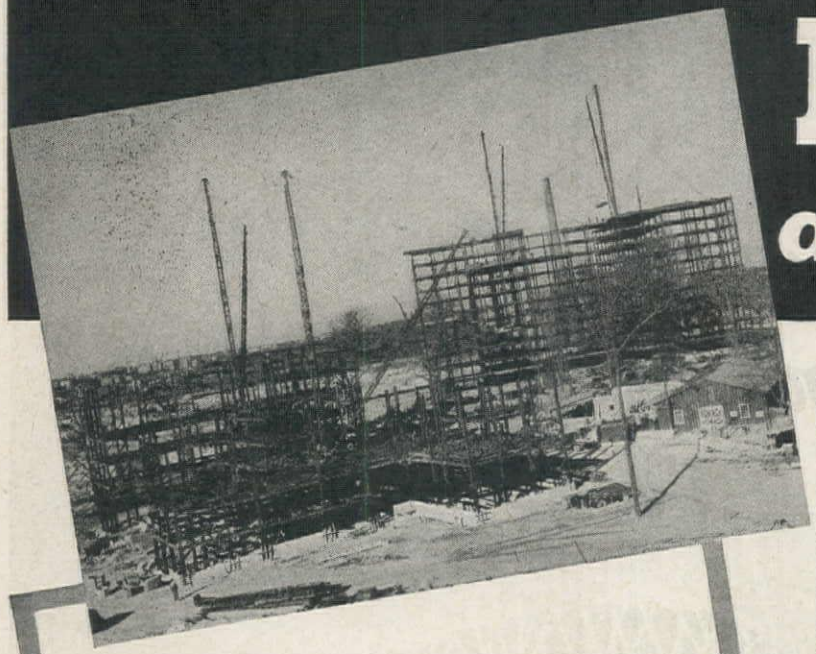
Name_____

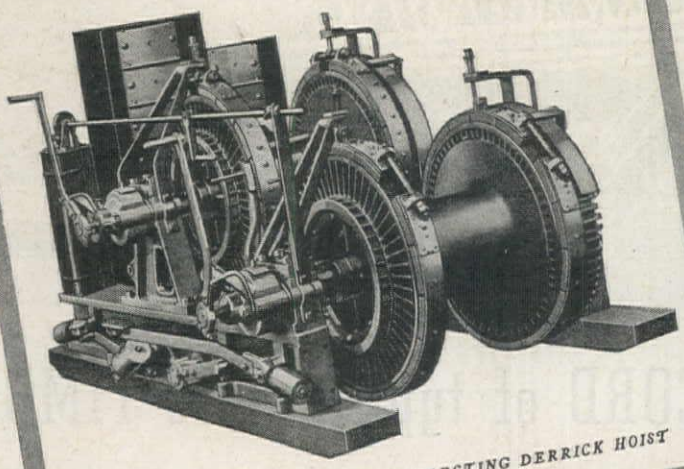
Address_____

Type of building or business . .

If *west* of the Mississippi, send to Portland 8, Oregon. If *east* of the Mississippi, send to 535 Fifth Avenue, New York 17, N. Y.

Building Construction... NOW and Later!





HEAVY DUTY ELECTRIC STEEL ERECTING DERRICK HOIST

The postwar period will see the resumption of much needed building construction for housing, industry and manufacturing throughout the world. Lidgerwood hoists, correctly designed and thoroughly job-tested, will be available then to take their part in this important work.

Lidgerwood hoists have a 71-year record of dependable, efficient operation in mine, quarry, and construction service. These steam, gasoline, electric and Diesel hoists are *built to fit the job* and Lidgerwood is currently supplying them to the government and to other war-related industries.

LIDGERWOOD
ESTABLISHED 1873
Manufacturing Company
MAIN OFFICE AND WORKS • ELIZABETH 8, NEW JERSEY

Represented in California by Industrial Equipment Co., Emeryville, California; in Washington and Oregon by Balzer Machinery Co., Portland, Oregon

ANNOUNCING

TIMBER ENGINEERING CO. INC. OF WASHINGTON, D.C.

has opened a

WESTERN SERVICE and SALES OFFICE
AT MONADNOCK BUILDING
681 MARKET STREET, SAN FRANCISCO
TELEPHONE GARFIELD 6296
ALDEN K. SMITH, MANAGER

TECO SERVICES

Mr. Smith will be able to give prompt and efficient service to all Western users of TECO connectors—write or 'phone him.

Immediate deliveries can be made of all TECO timber connectors and grooving tools from our warehouses in San Francisco and Portland. TECO termite shields for home and factory protection from subterranean termites are available for prompt shipment from Eastern warehouses.

Other TECO products being developed in the company's Product Development Shop and Wood Chemistry Laboratory include Post Spindles, Lock Dowels and Shear Developers. Keep posted—fill in and mail coupon for free booklets.

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

Monadnock Building, 681 Market Street, San Francisco

SPECIFY TECO CONNECTORS
SPLIT RINGS • SHEAR PLATES
GROOVING TOOLS

KEEP ME POSTED

Alden K. Smith,
Monadnock Building,
681 Market St., San Francisco

WCN

Put my name on your mailing list.

Name_____

Firm_____

Business_____

Street_____

City_____ State_____

ACCURATE SLAB FINISH...

Carriage and screed travel along specified crown as controlled by carriage wheels on the template tracks. True contour of the slab is assured by this mechanical method. Slab thickness errors are quickly detected.

DEPEND ON YOUR KOEHRING DISTRIBUTOR

to help you keep your equipment operating. Care for your Koehring equipment NOW, so it will serve you tomorrow. Koehring distributors have genuine Koehring parts. Koehring parts warehouses are at your service.

Corrects Surface Errors

With a Koehring Longitudinal Finisher, slab thickness errors are *immediately detected,* thereby eliminating concrete wastage. Crown specifications are followed accurately. Mechanical finishing is positive from beginning to end . . . . no variations usually occurring with the manual method. *BE SURE* of surface accuracy with Koehring Finisher. *BE SURE* of the same accurate finish througout the job, every shift, every day.

ARMY E NAVY

KOEHRING HEAVY DUTY

KOEHRING COMPANY • *Milwaukee 10, Wisconsin*

HEAVY-DUTY CONSTRUCTION EQUIPMENT

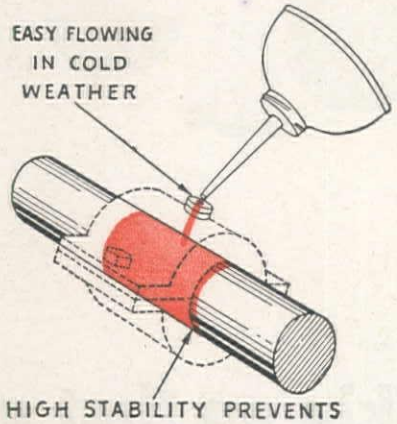
HARRON, RICKARD & McCONE CO., San Francisco-Los Angeles • PACIFIC HOIST & DERRICK CO., Seattle, Wash. • WESTERN CONSTRUCTION EQUIPMENT CO., Billings • CONTRACTORS EQUIPMENT CORP., Portland • LUND MACHINERY CO., Salt Lake City • NEIL B. McGINNIS CO., Phoenix, Ariz. HARRY CORNELIUS CO., Albuquerque, New Mexico • KOEHRING COMPANY WEST COAST PARTS WAREHOUSE, San Francisco, 10, California.

STANDARD ENGINEERS NOTEBOOK

VOL. 1-W NO. 6

Stable, uniform oil for general external lubrication

Because it is pure solvent-refined mineral oil, carefully manufactured, Calol Red Engine Oil may be used for almost all ordinary lubrication in an industrial plant.



It has a low carbon residue and pour test rating that gives it a wide application range. It is exceptionally stable in use and does not form objectionable deposits in or around bearings.

Calol Red Engine Oil is recommended for engine bearings, machinery and shafting that are lubricated by squirt cans, ring-, chain-, bottle-, drop-feed- or wick-oilers. It is also used in some circulating systems.

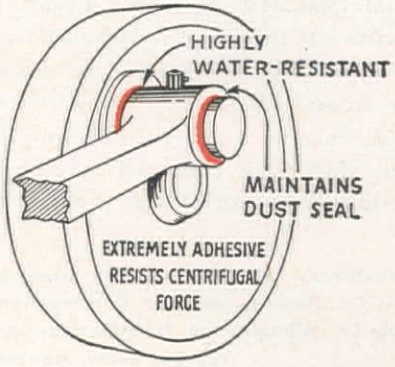
It is sold in five grades: 11, 15, 18, 20 and 25. The lighter grades may be filtered for re-use.

Grease lubrication under severe operating conditions

When heavy bearings are subjected to shock loads, must operate in dust or water conditions or when a lubricant that will not readily throw off is needed, Calol Multi-Service Grease is recommended.

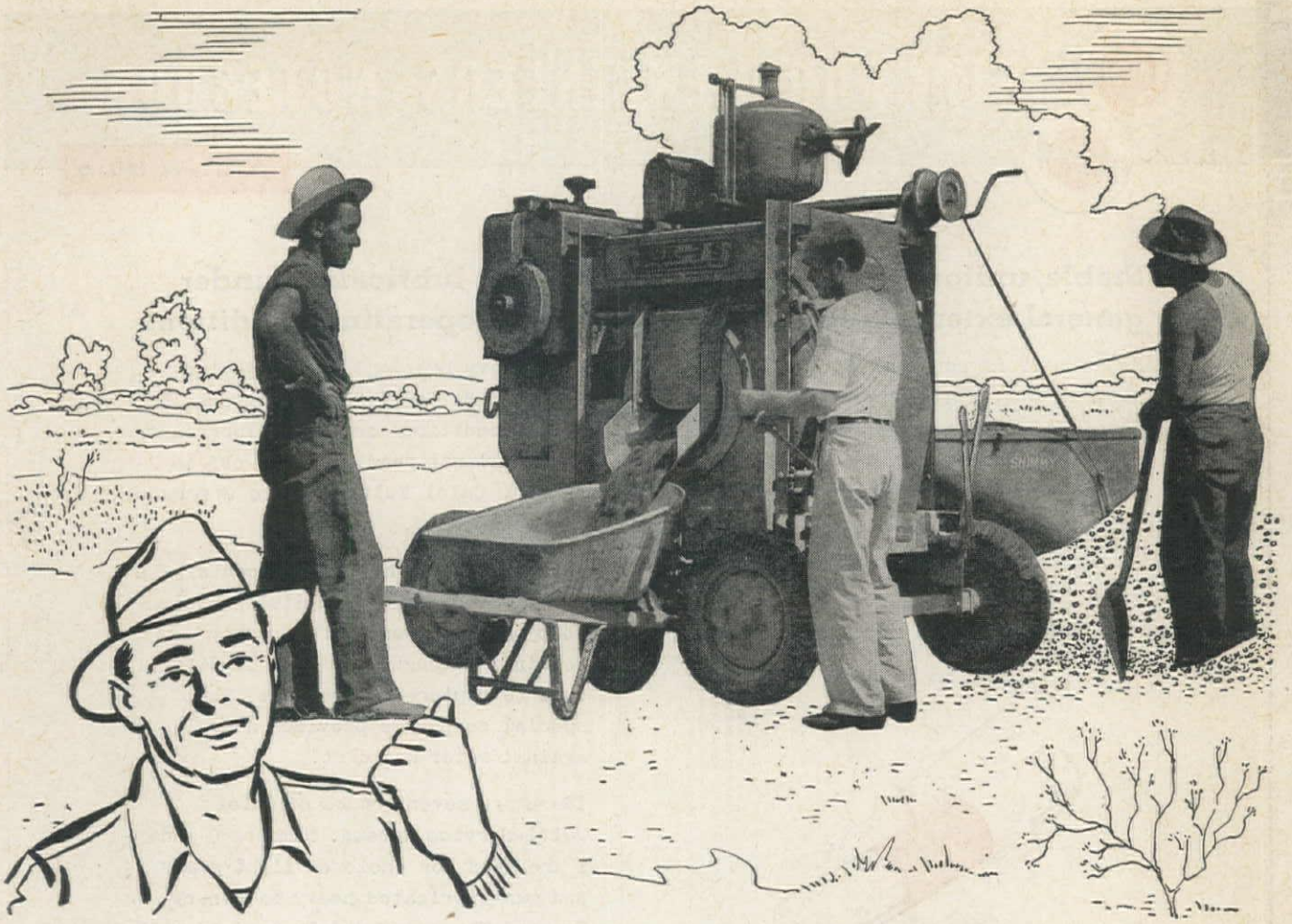
This black colored grease contains a heavy oil blended into its special soap base. The oil spreads over bearings a tough film that is difficult to rupture or displace. The special soap base provides a seal against water and dirt.

There are seven grades of Calol Multi-Service Grease. Numbers 0 and 1 are used for enclosed light gears and gun-lubricated heavy machinery. Two and Three are widely used on mill machinery. Four, Five and Six are exceptionally stiff and are particularly adapted for use on plain, low-speed journal bearings with large clearances.



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

STANDARD OF CALIFORNIA



You don't pound the skip on that one!

NO, SIR, you don't have to pound the skip of a Rex Mixer to get the batch into the drum. That "shimmy skip" kicks the batch right into the drum *fast.*

I remember how skeptical I was when the Rex Distributor first told me about the shimmy skip and how it would give me faster batches. "Shimmy?" I said, "What are you selling, concrete mixers or hula-hula dancers?"

"I can see you'll have to be shown," he answered. "Let's hop in my car and I'll show you one in action."

"Look," he said, when we'd arrived at the job, "notice how that shimmy skip really cuts down the charging time. The batch doesn't pocket or stick in the skip. It's a real time saver, and the shimmying action doesn't harm the drum because Rex Mixers are built tough... to stand up under the roughest kind of treatment. For fast charging or discharging, you can't beat a Rex Mixer."

•

RELY ON YOUR Rex Distributor. *He handles the complete line of Rex equipment for speeding up the mixing, hauling and placing of concrete and the moving of water. See him for Pumps, Pavers, Pumpcretes, Moto-Mixers and Mixers. You'll find him always ready and willing to help you locate new and used equipment, and to help you keep your present equipment in top running order.*

Arnold Machinery Co., Salt Lake City, Utah; Brown-Bevis Equipment Co., Los Angeles, California; Brown-Bevis Equipment Co., Phoenix, Arizona; Construction Equipment Co., Spokane, Washington; Contractors Equipment and Supply Co., Albuquerque, New Mexico; Corson Machinery Co., Ray—Denver, Colorado; Hall-Perry Machinery Co., Butte, Montana; Intermountain Equipment Co., Boise, Idaho; Loggers & Contractors Machinery Co., Portland, Oregon; Star Machinery Co., Seattle, Washington; Industrial Equipment Company, Emeryville, California.

REX

CONSTRUCTION MACHINERY

PIPE—like many other metal products—is produced and fabricated faster and at less cost with the help of LINDE METHODS

The oxy-acetylene processes shown here . . . flame-cutting, welding, wrinkle-bending, and flame-priming . . . are but a few of the Linde methods used daily to save time, money, and materials in fabrication of industrial piping . . . piping for synthetic rubber plants, power stations, petroleum refineries, ships, chemical units, and mills and factories of all kinds.

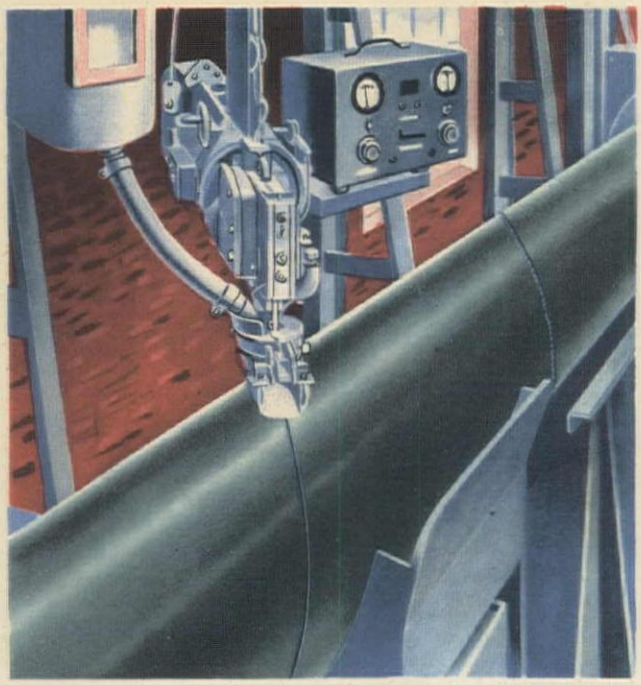
Linde's method of wrinkle-bending pipe, for example, quickly produces smooth-sweep bends to fit the system as work progresses . . . without need for fittings. Wrinkle-bending also is used to a great extent in the construction of overland pipe lines.

There are other Linde methods to speed construction . . . methods for flame-shaping steel plate for storage tanks by means of portable oxy-acetylene cutting machines . . . for flame-priming structural steel and plate to make paint last longer . . . and for cutting and welding together sections of pipe to fit a variety of needs.

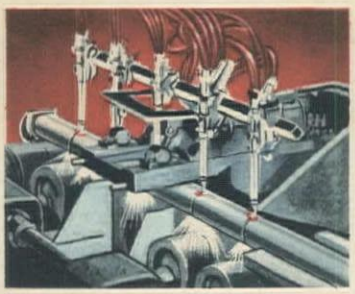
Linde-developed processes also are important in the production of pipe and tubing as well as in its fabrication. In the next three pages you can learn more about some of these Linde developments. The pictures and captions may suggest useful applications in your business.

Methods developed by THE LINDE AIR PRODUCTS COMPANY

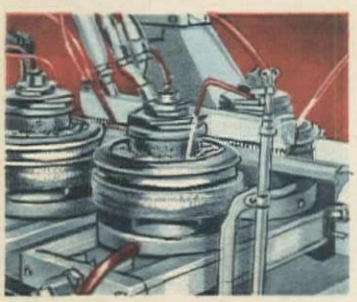
MAKING PIPE



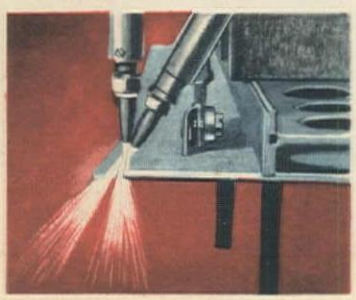
UNIONMELT Welding – Makes high-quality welds in steel of any thickness at unusually high speeds. This automatic electric welding process is used to fabricate spiral pipe, as well as to make storage tanks, ships, aircraft parts, and many other types of equipment.



Cutting Pipe Rounds – Oxy-acetylene machines like this cut billets to length; others gouge starting holes for piercing to make seamless pipe.

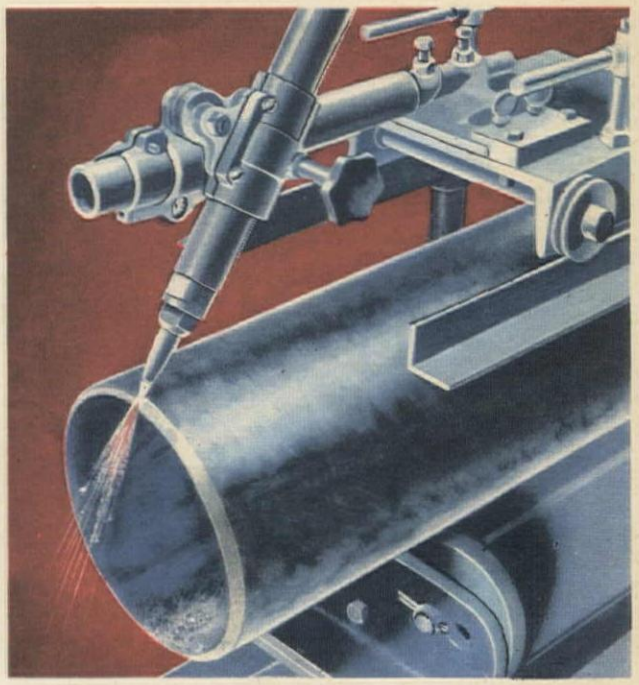


Tube Welding – In making welded tubing, edges of steel strip moving at high speeds through forming rolls are joined by oxy-acetylene flames.

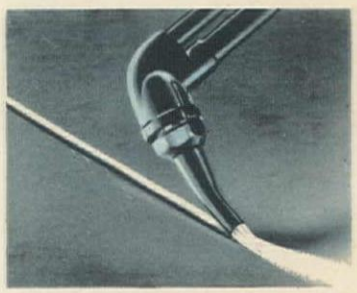


Preparing Plate-Edges – Flame-cutting equipment speeds trimming and beveling of plate preparatory to welded fabrication of large-diameter pipe.

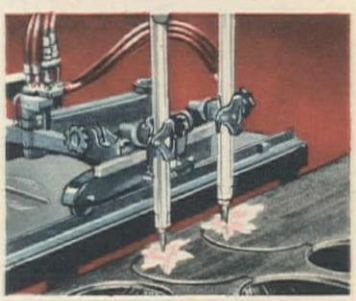
CUTTING PIPE



Beveling Pipe – The ends of pipe to be joined by welding must be cut uniformly—and, whenever the walls are more than 3/16 in. thick, the ends must be beveled to make possible complete weld penetration. This work is done quickly by oxy-acetylene cutting, using mechanized or manual equipment.



Gouging – Cutting blowpipes equipped with gouging nozzles quickly remove surface metal, such as temporary welds, without harm to adjacent areas.



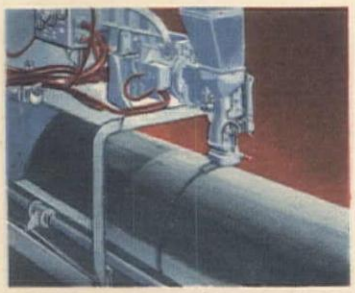
Fabricating Flanges – Flame-cutting machines quickly and accurately produce pipe flanges of any size or thickness from stock steel plate.

Reclaiming, Altering – Flame-cutting speeds on-the-job reclamation of old pipe, and extension or alteration of existing piping systems.

are important in the Production and Fabrication of Pipe

JOINING PIPE

Pipe Welding – Piping systems that are strong, compact, leak-proof, and practically maintenance-free can be fabricated into an integral unit by oxy-acetylene welding. The smooth interior and exterior walls of flame-welded piping provide high flow efficiency and make insulation easier where this is required.



Double-Lengthing – Joining pipe into long lengths at a central location reduces manual welding work in the field. Here it is being done by the UNIONMELT automatic electric process.

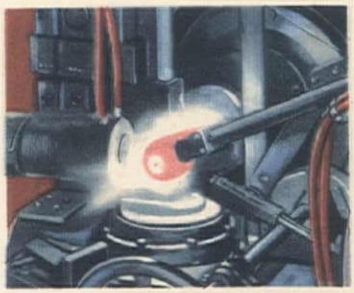
Fabricating Fittings – Oxy-acetylene welding, used with flame-cutting, makes it possible to produce fittings from stock pipe at low cost, as needed.

Joining Copper Tubing – Air-acetylene torches provide the exact amount of controlled heat for installing copper tubing and solder-type fittings.

FORMING AND TREATING

Please turn the page for additional information.

Flame-Hardening – Oxy-acetylene flames, followed by a water quench, impart a hard, wear-resistant case to surfaces of carbon or alloy steel. Here, this process is being applied to the tool joints of oil well drill pipe. It also is used on such parts as gears, shafts, and other parts subjected to abrasive wear.

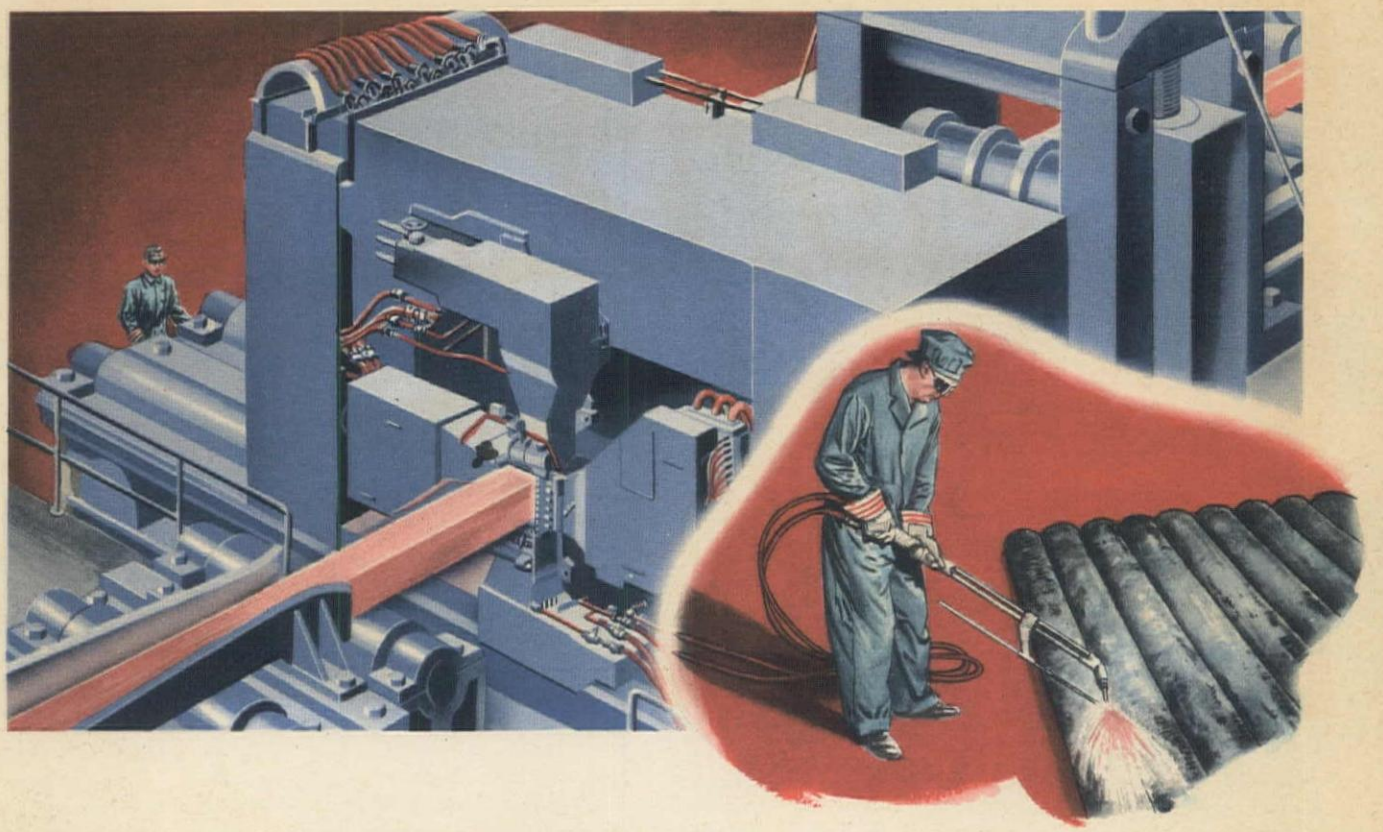


Flame-Spinning – Tubing heated by oxy-acetylene flames while spun rapidly can be quickly end-formed to eliminate deep-drawing operations.

Flame-Priming – Oxy-acetylene flames remove scale, rust, grease, and moisture from surfaces of pipe, tanks, and other steel preparatory to painting.

Flame-Straightening – Bent steel pipe, shafts, girders, or plates often can be trued up by applying oxy-acetylene flames at the right points.

LINDE METHODS SPEED PRODUCTION OF QUALITY STEEL USED FOR MAKING PIPE AND MANY OTHER PRODUCTS



A good example of how Linde-developed methods, based on the same principles as some of those shown on the three preceding pages, can be applied to fit specific needs of an industry is in the conditioning of semifinished steel. Oxy-acetylene flame-scarfing equipment, specially developed for steel mills, literally "skins" surface defects from billets, blooms, and slabs. This is done either as the steel rolls through on the production line by huge Linde machines such as the one shown above, or—after it has cooled and been removed from the roll table—by manually operated deseaming blowpipes as shown in the small drawing. This metal treatment results in higher yields of quality steel. In all industries where metal is worked, Linde methods can usually help to do the job faster, better, and at lower cost.

The folders shown at the left tell the story of the use of Linde methods in SHIPBUILDING, in STEELMAKING, and in METAL-FABRICATING. Copies will be sent to you upon request. Ask for Combination "A."

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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KABLE-ROOTER

Today, the shrill shrieks of the steam donkey and the rumble of the logging train are giving way to the hum of diesel motors on truck and tractor. A new symphony is being written to the rapid tempo of war. Yes, mountain music is changing.

IN KEEPING PACE with the day's demands for greater production, Isaacson Engineers have made great strides in cable operation. Combined with the highly successful Isaacson Kable Power Unit you have greater flexibility, more power and smoother operation. All are units designed for and adapted to the grueling conditions found in the rugged Pacific Northwest. With ownership of Isaacson Tractor Equipment goes assurance of having the finest your money can buy, tailored to your particular make of tractor and built to stand up under the most severe and punishing work schedules. Compact, sturdy tools for winning the war and the peacetime construction to follow.

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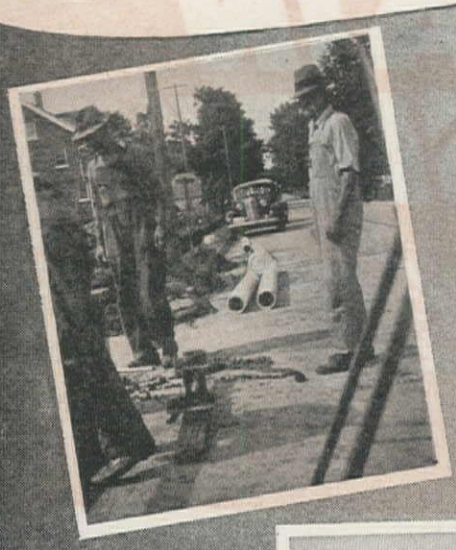
Snapshots from the



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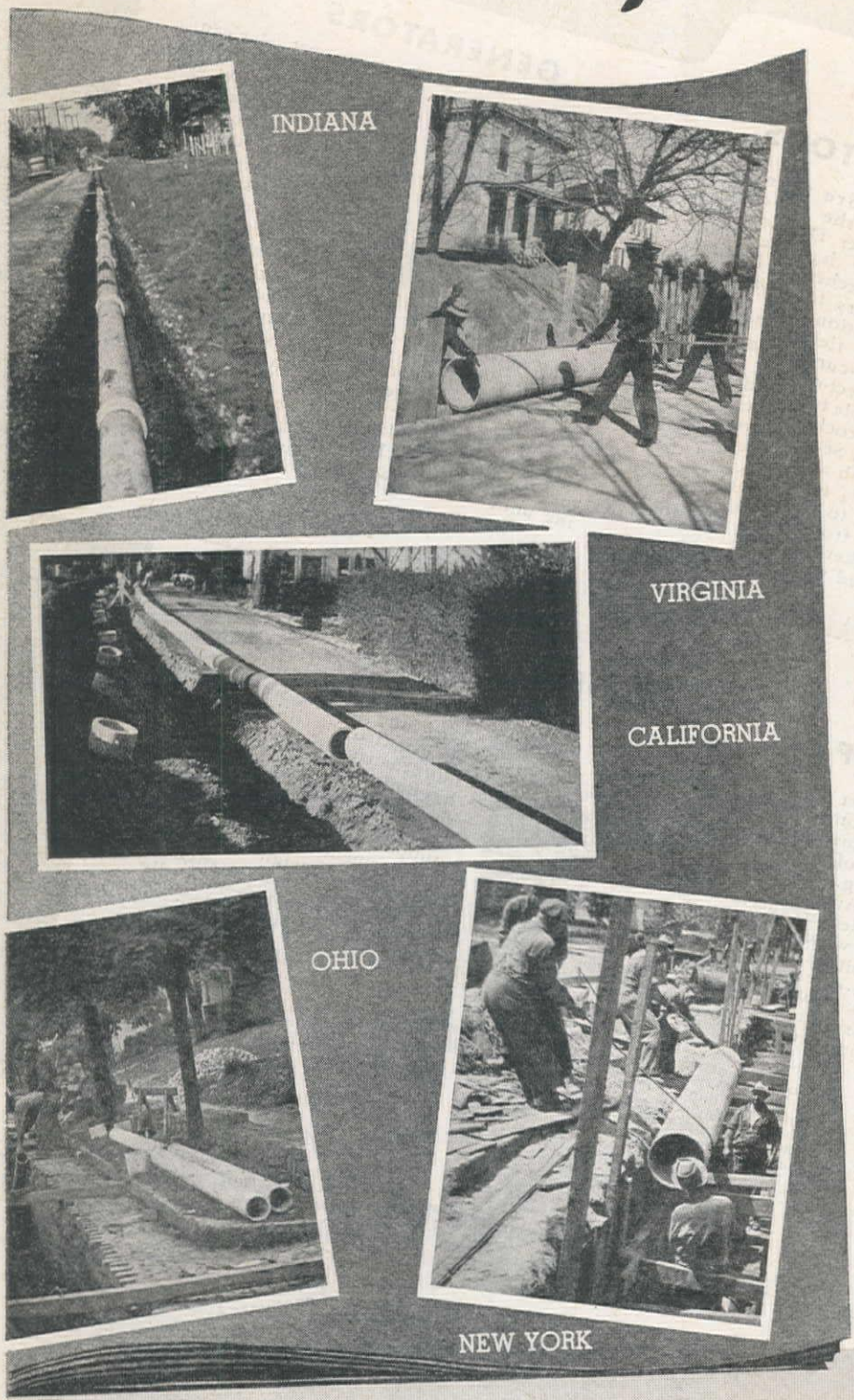
JOHNS-MANVILLE JM PRODUCTS

Johns-Manville

Transite Pipe Album

OF EFFICIENT, LOW-COST INSTALLATIONS



JOHNS-MANVILLE'S FILES contain literally thousands of photographs of Transite Pipe installations. In cities, towns and villages. In every state in the Union. Impressive visual evidence of the nationwide acceptance for the asbestos-cement pipe that offers these important advantages:

Easy Handling. Light-weight Transite Pipe requires fewer men for handling. Only the larger sizes need mechanical handling equipment.

Rapid Assembly. Even unskilled crews form tight joints easily, quickly with the Simplex Coupling.

Tight, Flexible Joints. Wide sweeps can be made with straight lengths because the Simplex Coupling stays tight even when the line is deflected as much as 5° at each joint.

Low Maintenance. Transite's corrosion-resistance and maintained strength contribute to its low maintenance costs.

Tuberculation No Problem. Non-metallic in composition, Transite cannot tuberculate. Its initial high-flow coefficient (C=140) can never be reduced by tuberculation.

Get the complete facts today by writing for Transite Pipe booklet TR-11A. For details on Transite Sewer Pipe for more efficient sewage disposal systems, ask for TR-21A. Johns-Manville, Los Angeles, San Francisco, or Seattle.

Transite Pipe is Again Available for Prompt Shipment

Asbestos TRANSITE PIPE

FOR EFFICIENT, ECONOMICAL WATER AND SEWER LINES

MODERNIZE with this

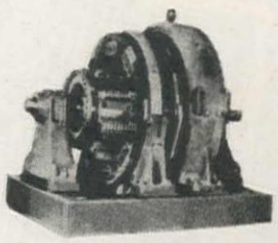
FOR POWER, PUMPING AND FLOW-CONTROL EQUIPMENT, HENDY, POMONA, CROCKER-WHEELER —THREE FAMOUS NAMES—ARE NOW UNITED IN ONE ORGANIZATION TO GIVE YOU FROM ONE SOURCE A COMPLETE LINE OF DEPENDABLE PRODUCTS FOR YOUR MODERNIZATION PROGRAM.

ELECTRICAL

MOTORS

For more than 50 years, the Crocker-Wheeler Division of Hendy has made a comprehensive line of motors for the construction and industrial field. Alternating-current motors from ¼ to 10,000 hp and direct-current motors from ½ to 5,000 hp are available for a wide range of applications. Typical of Crocker-Wheeler advanced engineering is the new Sealedpower squirrel-cage induction motor with added mechanical protection, available from ¾ to 20 hp, and the ac polyspeed motor, from 1 to 10 hp, which provides a stepless speed range from standstill to synchronous speed. All Crocker-Wheeler machines feature vacuum-impregnated windings.

GENERATORS

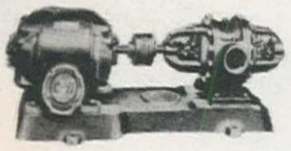


Crocker-Wheeler can furnish ac generators up to 10,000 kw at unity power factor and dc generators up to 7,000 kw to meet the most rigorous specifications for both main and auxiliary generating plants. They are available in both single and two-bearing construction, using belted or direct-connected exciters, open or enclosed types. As with Crocker-Wheeler motors, the coils of all generators are vacuum inpregnated with high-grade insulating varnish for long life. Where desired, entire generating plants can be furnished complete with gasoline, Diesel or steam-turbine driving unit, switch gear, and distribution panels.

HYDRAULIC

PUMPS

Hendy's Pomona Pump Division builds a complete line of pumps for industrial applications, capable of moving fluids up to 350,000 g.p.m.—at lifts up to 1,000 feet. Among Pomona's many design features are: water lubrication, which eliminates subsurface oil or grease chambers; semi-open impellers, which save power costs; and easy accessibility because all service points are at the surface.

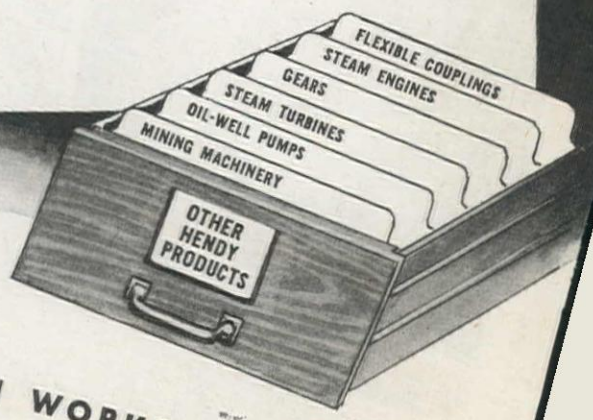


Pomona's Westco Pumps have multi-stage performance, enabling them to handle widely varying heads with only slight variation in capacity.

LARGE VALVES AND GATES

A wide range of Hendy flow-control units are available for dams and power, water and reclamation projects. For more than four decades, Hendy has built needle valves, butterfly valves, ring-seal gates, high-pressure and sluice gates—and supplied them to private and government agencies in both this and foreign countries. These control units range in size from 6" to 144"—manually or electrically controlled.

Standing 38 feet high and weighing 105,000 pounds, this huge ring-seal gate valve is one of two recently delivered to Puerto Rico.



49-C-1-V

JOSHUA HENDY IRON WORKS
ESTABLISHED 1856
SUNNYVALE, CALIFORNIA

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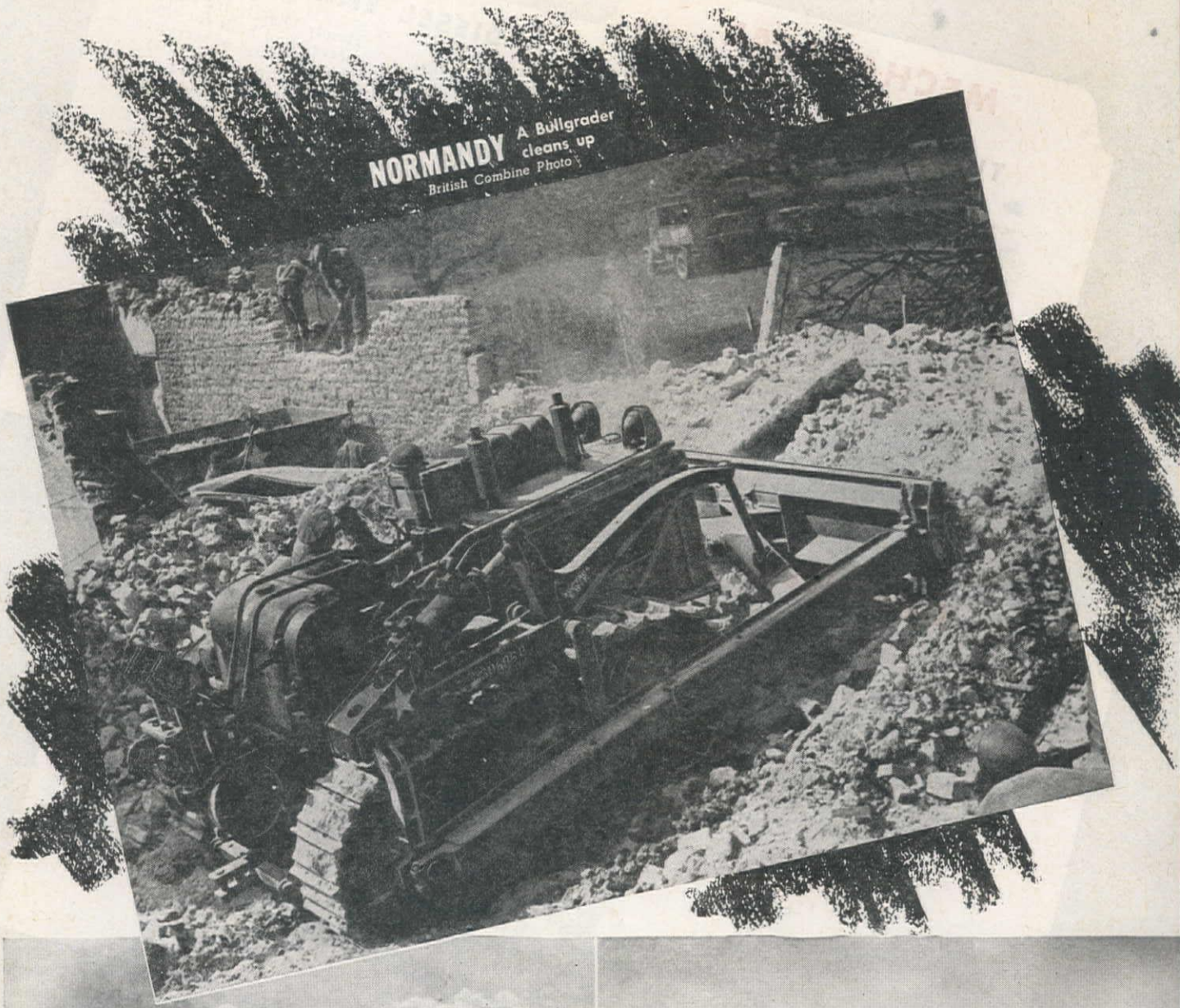
Branch Offices: BOSTON · BUFFALO · CHICAGO · CINCINNATI · CLEVELAND · DETROIT · HOUSTON · LOS ANGELES · NEW YORK · PHILADELPHIA · PITTSBURGH · SAN FRANCISCO · ST. LOUIS · WASHINGTON

THE WEAPON THE AXIS DIDN'T HAVE



NORMANDY A Bullgrader cleans up
British Combine Photo

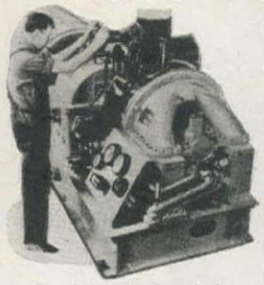
MARSHALLS A Dozershovel unloads bombs
Official U. S. Navy Photo

AUSTRALIA A Bullgrader hauls ammunition
Signal Corps Photo

HENDY EQUIPMENT

MECHANICAL

TURBO-GENERATORS



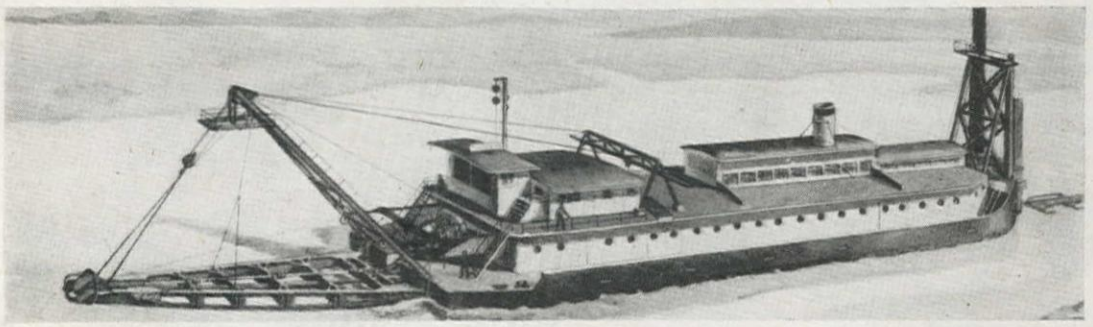
The Hendy Turbo-generators contain many features that contribute to high efficiency and economy of operation. For one example, its governor is a new type. It requires no stuffing boxes or soft packing and it uses anti-friction bearings in the linkages, providing extremely accurate governing. Extensive piping has been reduced to a minimum by the proper location of controls, filters, and coolers. This compact unit, designed and completely built by the Hendy organization, is engineered to meet today's exacting demands. Available for ac or dc output from 250 to 750-kw capacity. Larger units designed to your needs.

DIESEL ENGINES

Hendy Diesels are engineered and built for the toughest kind of service. Modern in design, they combine for the first time many features never before incorporated in a single engine; direct-actuated dual valves, overhead camshaft, hydraulic tappets which maintain correct tappet clearance at all times and eliminate manual adjustment, and unit-type fuel injectors which eliminate long, high-pressure fuel lines. Combined, these features prolong engine life, reduce maintenance, and greatly reduce the number of working parts. Hendy Series 50 Diesels, from 350-675 hp, are designed for industrial use, or for use with Hendy generators, as complete Diesel-electric generating plants.

DREDGES

Hendy, long identified with the dredge industry as a manufacturer and supplier of component parts for dredges, holds an exceptional position among dredge manufacturers in that it has the facilities—in its own plants—to build practically every part of the complete dredge, including steam turbines, Diesel engines, electric motors, generators, hoist equipment, pumps, gears and many other units. This places responsibility for the equipment with one manufacturer, assures better control of the manufactured parts, and speeds up the final assembly of the complete dredge. Hendy dredges are designed by one of the country's foremost dredge engineers, and his experience is available to you for help in designing a new dredge or in the conversion and modernizing of one now in service. This engineering knowledge covers every variety of dredge operating condition and assures you that Hendy dredges will be expertly engineered to meet your specific operating conditions in an economical manner. Call on Hendy for complete dredges, conversions or replacement parts.



For complete units, or parts used in modernization of existing equipment, take advantage of the undivided responsibility behind all Hendy Products—power, pumping and flow-control equipment designed and built for integrated operation. Complete information on Hendy products is available at the nearest Hendy office, or from division headquarters. Use the attached coupon to secure more information on all products bearing these famous names—Hendy, Pomona, Crocker-Wheeler—now consolidated under unified management. Check products on which you wish more detailed information. New bulletins are now available.

JOSHUA HENDY IRON WORKS
SUNNYVALE, CALIFORNIA

GENTLEMEN:
Please send us information on the types of equipment checked below.

- ☐ AC MOTORS
- ☐ DC MOTORS
- ☐ SEALEDPOWER MOTORS
- ☐ GENERATORS
- ☐ TURBO-GENERATORS
- ☐ DIESEL ENGINES
- ☐ DREDGES
- ☐ VERTICAL TURBINE PUMPS
- ☐ HORIZONTAL TURBINE PUMPS
- ☐ LARGE VALVES AND GATES

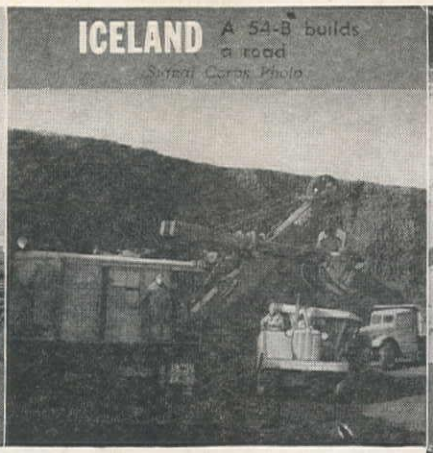
NAME .....

COMPANY..... TITLE.....

STREET.....

CITY..... ZONE..... STATE.....

ITALY A 20-B loads landing mats
Signal Corps Photo



ICELAND A 54-B builds a road
Signal Corps Photo

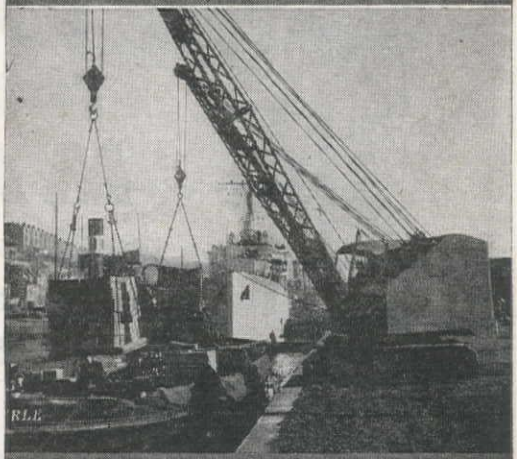
NEW GUINEA A 15-B grades an airstrip
Signal Corps Photo

NEW GEORGIA A 15-B builds a road
Signal Corps Photo

Shovels, bulldozers, cranes, and scrapers are doing the same basic things now they did before the war. Yet our enemies, for all their years of preparation, failed almost completely to recognize the potential military value of dirt moving equipment. In the hands of American men, long accustomed to brilliant use of machines, excavating equipment is truly a double-edged sword, efficient in war and peace. V-63

BUCYRUS ERIE

SOUTH MILWAUKEE, WISCONSIN



ENGLAND Two 22-B's unload rations
Signal Corps Photo

ALASKA A 4-wheel Scraper grades the Alcan Highway
Engineering News-Record Photo

ALEUTIANS A 22-B grades an airstrip
Official U. S. Navy Photo

QUICK QUIZ FOR CONSTRUCTION MEN

Are These Three Questions on Your Mind?

Q **Can "on the job" lubricating give machines "M. P. T."***

A Yes! In one case, by reducing track roller wear one-third over previous methods, time-outs for repairs were cut more than 30% . . . 30% more "M. P. T."* for the "cats." Another contractor lubricates track rollers in 2½ seconds adding "M. P. T."* to his machines. Do these examples show you how to speed up lubrication?

**More Productive Time*

Q **Can "on the job" lubrication pay for itself?**

A Certainly! Here's a typical case: a contractor paid $1000 for an Alemite Portable Service Station. In 90 days, at 12 hours a day, he had saved 1080 labor hours for lubrication at 67½c an hour. Total net labor saving $729, in the first 3 months! What's more there was a very substantial reduction in required maintenance and in the amount of lubricants used.

Q **Can oil and grease be made to beat summer heat?**

A Definitely. Alemite does it by putting an extra-wide operating range into its greases and oils. This gives them toughness, and resistance to heat and pressures that enable them to fight friction in hottest weather. One Alemite grease, No. 33, not only resists heat but it also repels water, endures tremendous loads, can't clog grease guns or bearing lubricant grooves. (Checked up on your lubricants lately?)

Lick "LUBRI-*chaos*" with Controlled "On the Job" Power Lubrication.

"Lubri-*chaos*" can rob you of money, machines and production. Worst of all, you may have "Lubri-*chaos*" in your set-up and not realize it, or today's heavy work schedules may have spotlighted it but given you no answer.

The *answer* is the Alemite method of handling and application of lubricants to your machines right on the job. This method is now proving its worth on construction projects everywhere. It's called the Alemite Portable Service Station and is destined to play an important role in peacetime competition.

Why not call in an Alemite Lubrication Specialist and talk over your lubrication situation. There is no obligation and you'll be gaining the advantage of the world's most modern lubricating methods. Write Alemite, 1819 Diversey Parkway, Chicago 14, Illinois, or Belleville, Ontario.

Alemite Portable Service Stations are complete power lubrication departments on wheels that carry lubricants to machines on the job. They include high- and low-pressure Alemite Barrel Pumps, Alemite Motor Oil dispenser, hose reels and gas engine air compressor. Write for new catalog.

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ALEMITE

First in Modern Lubrication

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for these 3 important reasons

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You can depend on National Carbide—the famous "carbide in the red drum". More than a quarter century of widespread use has established the economy, uniformity and productivity of this quality carbide.

National Carbide is available in all sizes for generator use—packed in standard size drums. For the address of your nearest National warehouse or distributor, write to Air Reduction's New York office, Dept. ME.

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Prompt deliveries in large or small quantities from more than 250 warehouses located in or near all major manufacturing centers. Also supplied by local dealers and distributors.

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Because National Carbide is screened with extreme care. It is carefully packaged under strict supervision in air-tight drums in order to prevent contamination and deterioration.

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AIRCO ACETYLENE GENERATORS

Ideal Team-mates for National Carbide

For dependable volume production of acetylene, use National Carbide in Airco Acetylene Generators. Five sizes to choose from—15 lb., 30 lb., 50 lb., 300 lb. and 500 lb. single or double rated. The first three sizes are portable types and the latter two are stationary. These generators are listed by the Underwriters Laboratories, Inc. Write to Air Reduction's New York office for descriptive folder ADC 619, Dept. ME.

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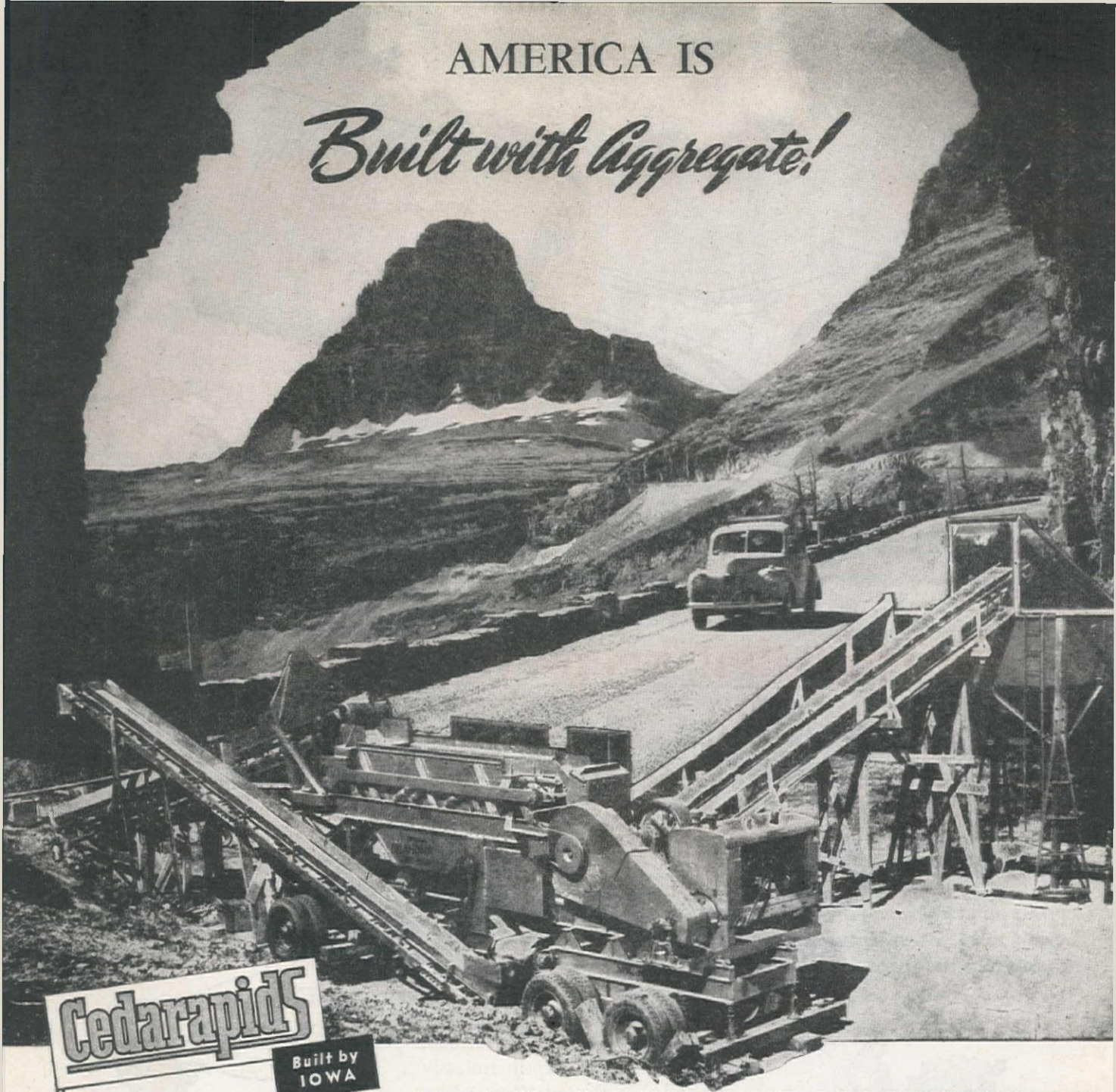
AMERICA IS

Built with Aggregate!



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GOOD HIGHWAYS MAKE GOOD NEIGHBORS

Whether highways link nations together, like the Alaska Military Highway or Pan American Highways, or are the Farm to Market secondary roads, their primary object is to bring people and goods closer together. Good roads are built with aggregate, and, under the contract system of construction, are symbolic of the freedom of the American way.

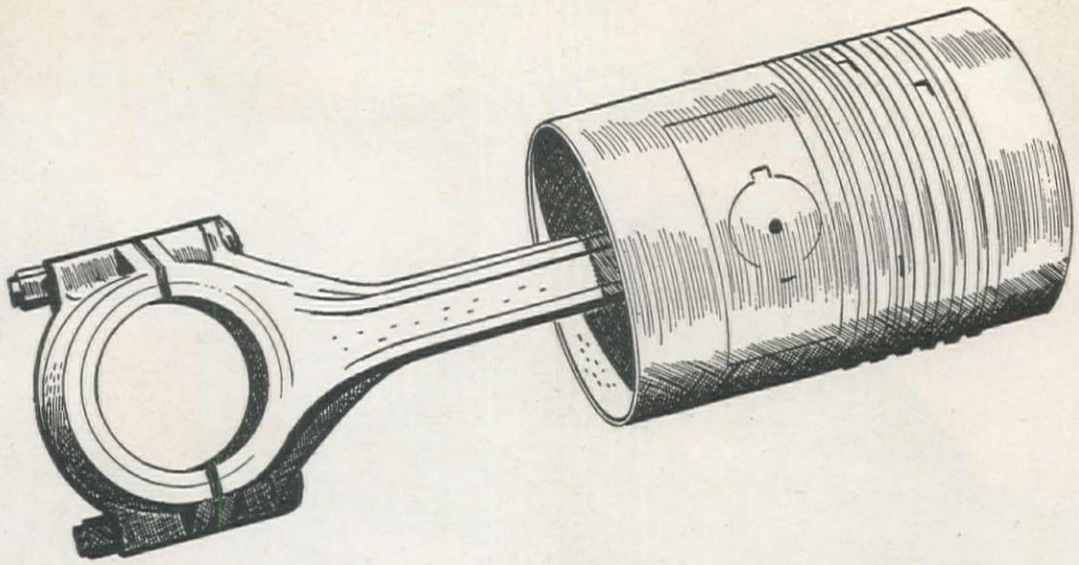
More and more aggregate producers are finding that the production of low cost aggregates is the result of refinements in crushing equipment developed by the combination of construction "know how" and American ingenuity which produced the line of Cedarapids plants. The Iowa line ranges from single units to complete plants which can be engineered to meet any aggregate production problem.

Come to Iowa first, it's Headquarters for aggregate producing equipment!

ARMY E NAVY

IOWA MANUFACTURING COMPANY

CEDAR RAPIDS, IOWA



A lubricant that keeps your Diesel clean!

During the process of combustion, all Diesel fuels deposit some carbon residues and asphaltic gummy matter on the cylinder walls, piston rings and grooves of engines. These deposits build up behind the rings, freezing them. Excessive blow-by then develops, pistons overheat and engines lose power.

You can keep your Diesel engines free from these sludge and carbon deposits and at the same time protect them from wear and corrosion by lubricating with DIESO-LIFE.

DIESO-LIFE is a high-grade lubricant containing a special detergent to wash out the partly burned fuel

residues as fast as they are formed. These residues are kept harmlessly suspended in the oil. Then, when you drain the oil, they flush out, leaving your engine *clean.* DIESO-LIFE keeps piston rings clean and free to flex with the power stroke, sealing combustion gases in behind the piston heads.

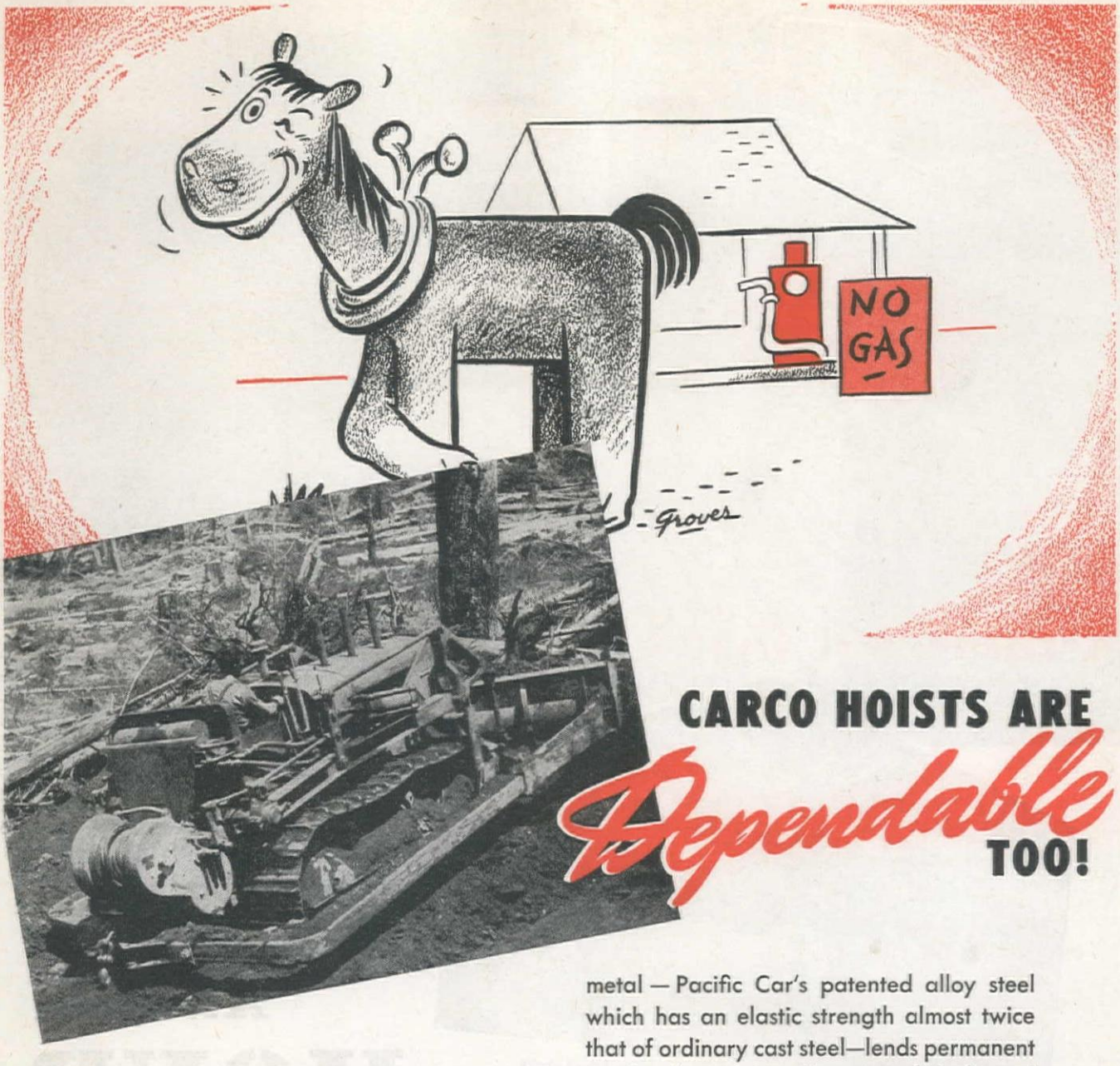
DIESO-LIFE is recommended for lubrication of both low and high speed Diesel engines.

DIESO-LIFE is now available in quantity shipments. It will not deteriorate with storage. You can have a supply delivered by phoning your local Union Oil Resident Manager.

For *clean,* efficient engine performance and for maximum, long-life protection against wear and corrosion, lubricate your engines with DIESO-LIFE.

DIESO-LIFE

Another
UNION OIL
Success-Tested Product



CARCO HOISTS ARE *Dependable* TOO!

PUT Carco Hoists at the head of the list among "work horses" you can depend on.

They get the hardest jobs done — with endurance to spare. Just one reason why these better hoists are the choice of lumber and construction men.

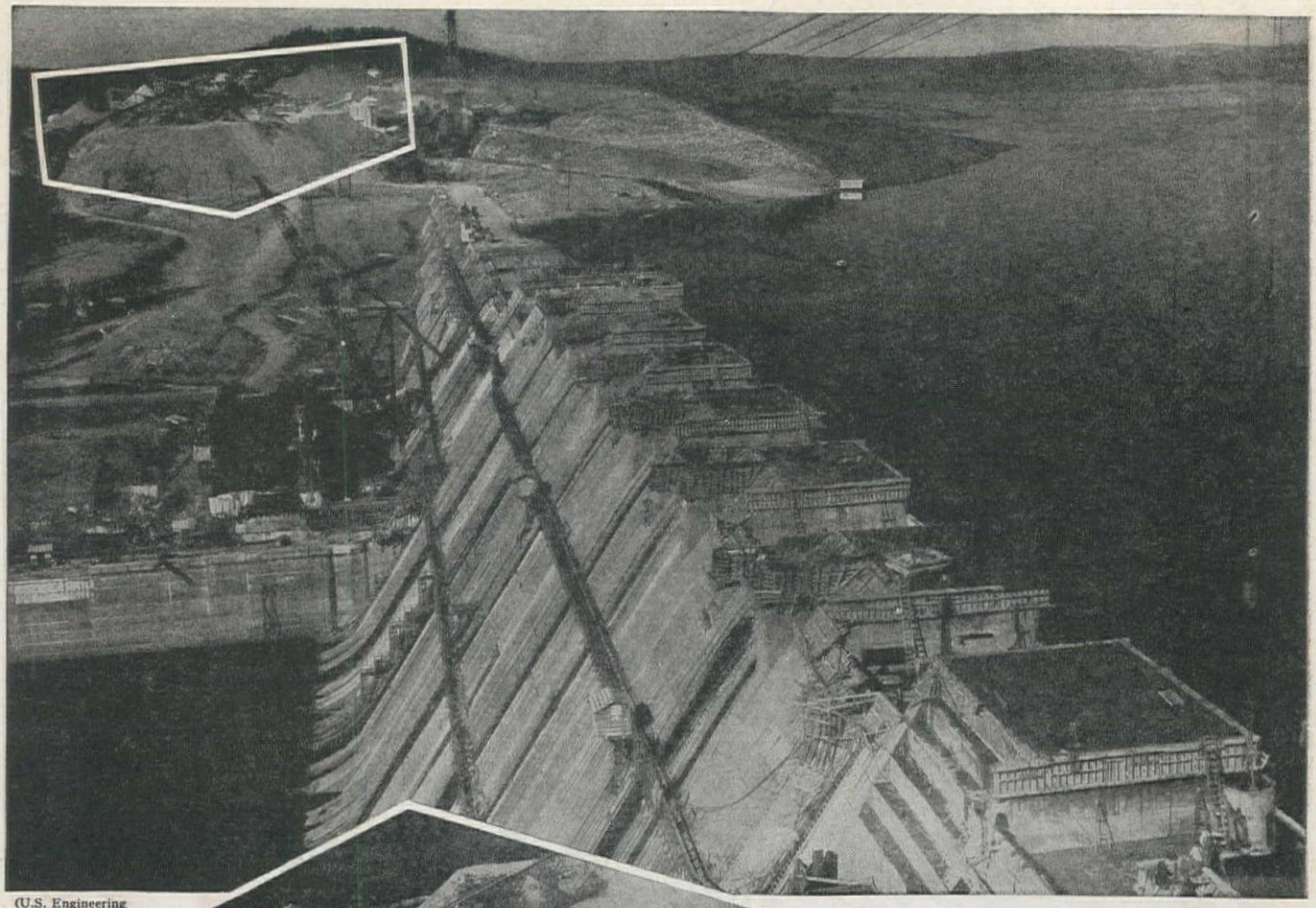
Every feature of Carco Hoists has been designed to insure dependability. Free-spooling prevents jams and snarls. Carco-metal — Pacific Car's patented alloy steel which has an elastic strength almost twice that of ordinary cast steel—lends permanent rigidity for precise alignment of shafts and gears. The sealed one-piece case protects gears, shafts and bearings against grit, dust, water. All gears run in a continuous oil bath.

Pacific Car is sending tremendous numbers of Carco Hoists to war today, where their dependability is saving lives on many battle fronts. Because of step-ups in production, some are available for essential jobs at home.

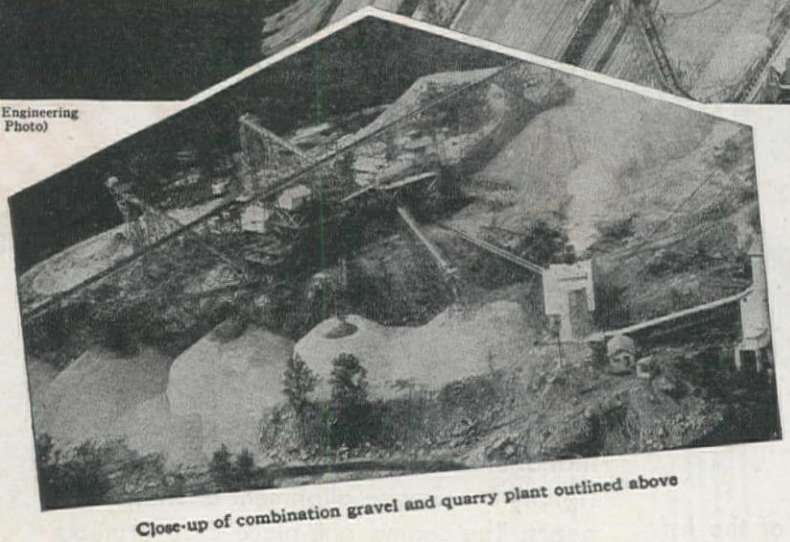
PACIFIC CAR AND FOUNDRY COMPANY

SEATTLE 4, WASHINGTON

Carco's "know-how" and production are going (in whole or part) into: bridges, hoists, cargo ships, corvettes, cranes, aircraft carriers, lighters, mine sweepers, gun emplacements, yarders, power line equipment, aircraft, railroad equipment, structural steel, logging equipment, motor coaches, diesel engines, machine guns, dry docks. steel castings, seaplane tenders, trucks.



(U.S. Engineering Dept. Photo)



Close-up of combination gravel and quarry plant outlined above

500 TONS AN HOUR

TELSMITH PLANT SPEEDS CONSTRUCTION OF NORFORK DAM . . .

On the North Fork River, near Norfolk, Arkansas, the huge Norfork Dam nears completion. For its 1,500,000 cu. yds. of concrete, Telsmith engineers designed an aggregate plant that produces 500 tons an hour. Sand and gravel come from the White River; limestone from a nearby quarry. Two correlated processing systems are used . . . producing four sizes of coarse aggregate, sand and limestone dust. Waste is held to a minimum. Telsmith plant-flexibility permits adding dust to sand when necessary. All plant machinery, except some conveyors and electrical equipment, is Telsmith-built. Its "very satisfactory" performance helped expedite concrete placement for Morrison-Knudsen Co. and Utah Construction Co., the general contractors. *Get Telsmith Complete Plant Bulletin EP-30.*

Q-19

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

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

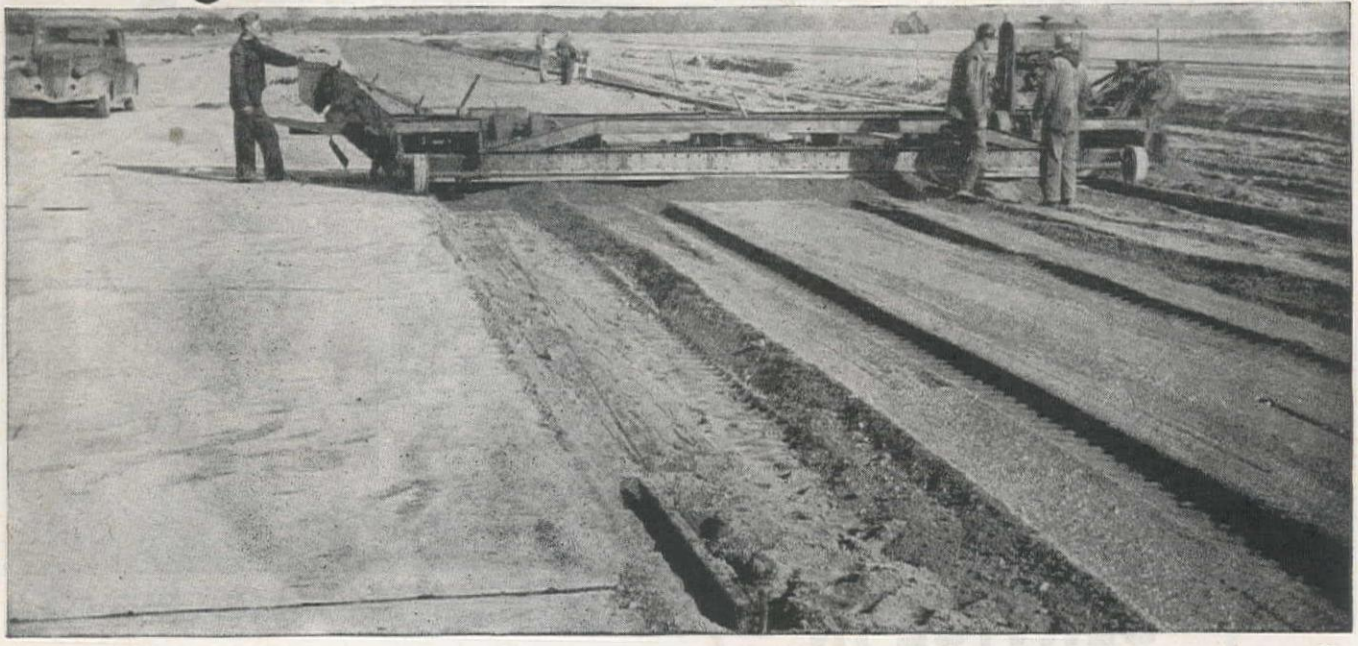
Clyde Equipment Co.
Seattle 4, Wash.

Clyde Equipment Co.
Portland 9, Ore.

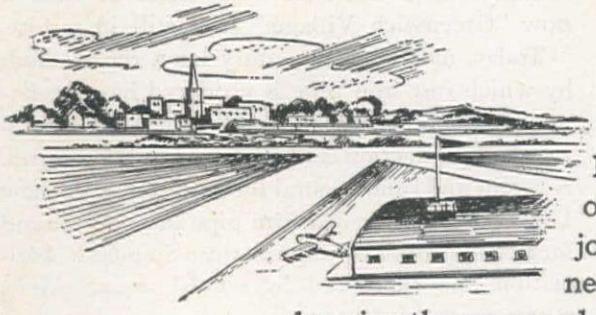
General Machinery Co.
Spokane 1, Wash.

Gordon Russell, Ltd.
Vancouver, B.C.

when Corntassel Corners builds an Airport...



...will you DO THE PAVING?



You can get the contract if you have the equipment for doing a better job for less money in a shorter time. Buckeye R-B Power Finegraders for preparing subgrade offer you big advantages on any paving job. They save labor by doing away with nearly all hand labor on the grade. By keeping the prepared grade always well ahead of the pavers they eliminate expensive delays. Less material is required because accurate subgrade reduces loss of yield to a negligible percentage. All types of soil, including sticky gumbo and rock-laden materials are readily handled. Write for full details today. Get ready for tomorrow's big paving jobs now!

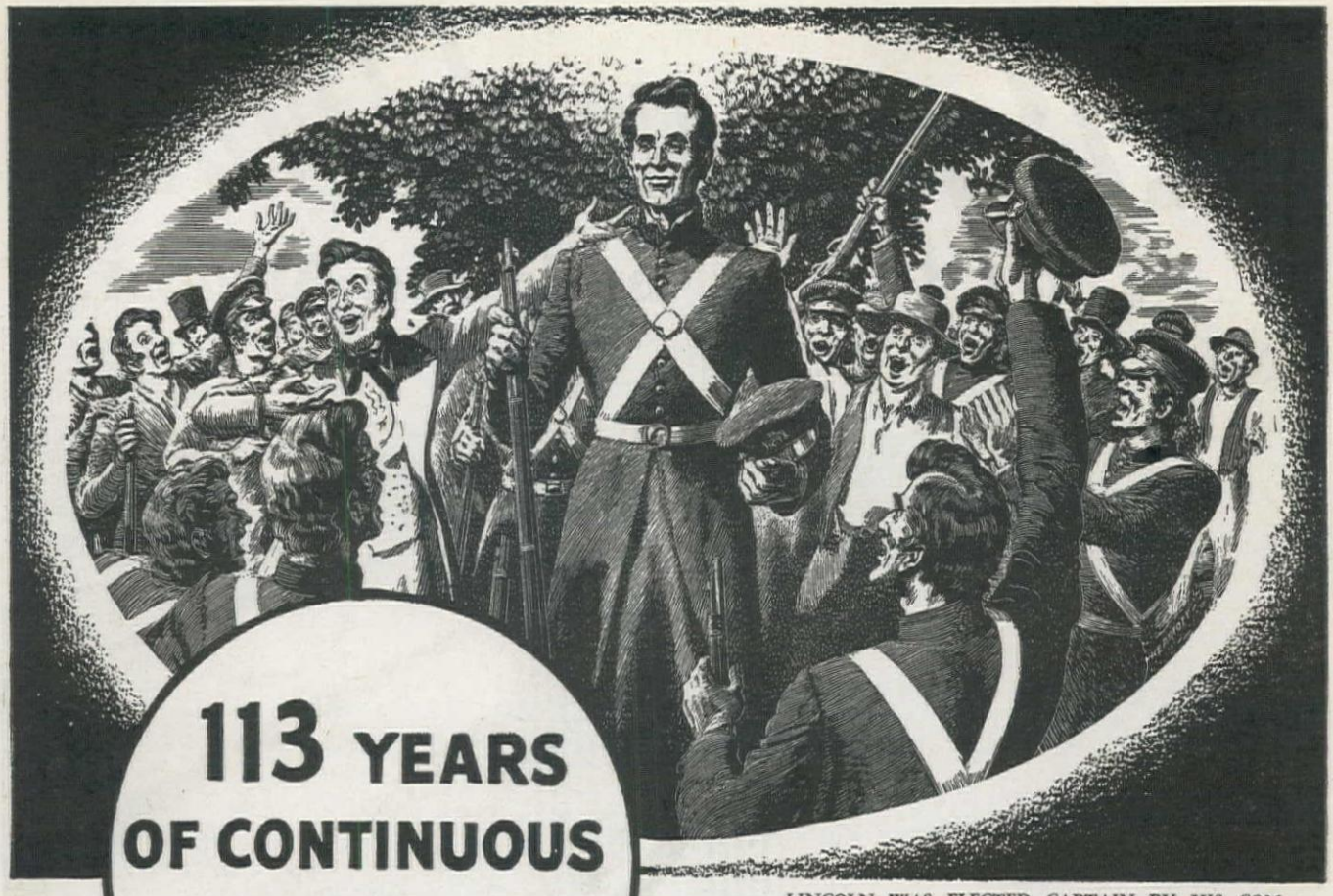
BUCKEYE TRACTION DITCHER CO.
FINDLAY, OHIO

RB POWER FINEGRADER

keep your eye on Buckeye

Buckeye

Tractor Equipment · Power Finegraders · Convertible Shovels
Road Wideners · Trenchers · Spreaders



LINCOLN WAS ELECTED CAPTAIN BY HIS COMPANY IN THE BLACK HAWK WAR—113 YEARS AGO.

113 YEARS OF CONTINUOUS SERVICE IN NEW YORK

[Section of New York's oldest cast iron water main, installed 113 years ago in "Greenwich Village" and still in service.]

IN 1831, when Abraham Lincoln enlisted in the Black Hawk Indian War, the Common Council of the City of New York authorized the installation of a cast iron water main in what is now "Greenwich Village." It is still in service.

Today, more than a century later, the methods by which cast iron pipe is produced have undergone revolutionary changes. Metallurgical, laboratory and production controls have been developed. A recent and fundamental forward step is the new Law of Design for cast iron pipe in underground service, approved by the American Standards Association and sponsored by official organizations representing pipe users.

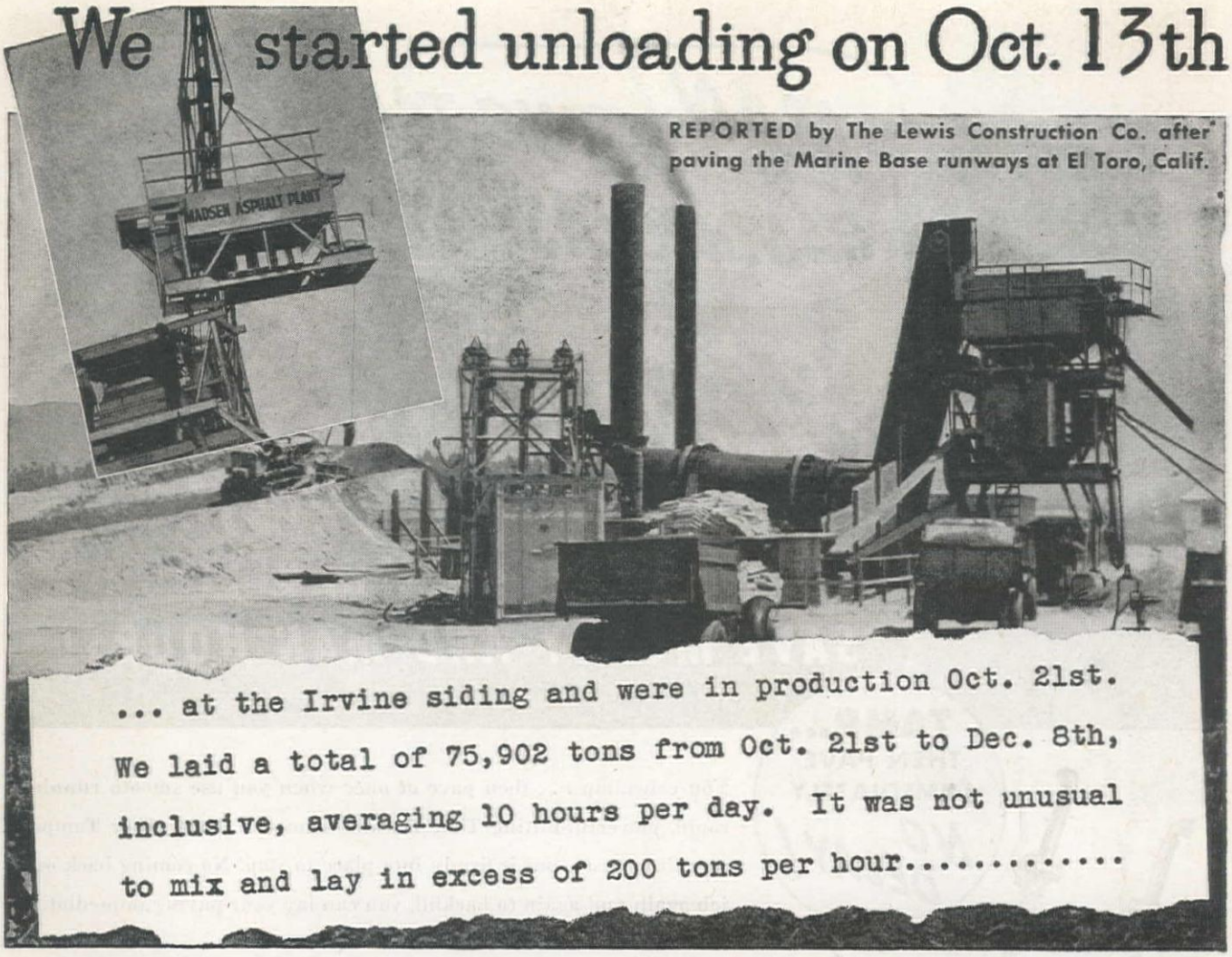
Thus, you can take it for granted that the cast iron pipe made today by our members, has not only *long life* as proved by generations of service the world over, but is more economical than ever.

CAST IRON

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

CAST IRON PIPE SERVES FOR CENTURIES

We started unloading on Oct. 13th



...with a Madsen Asphalt Plant

THE REPORT CONCLUDES, "We are attaching a detail of the daily tonnages and the hours worked".

This work sheet shows that 75,902 tons were produced in 44 days (466 hours). The average daily output for this 3000-lb. Madsen plant was 1650 tons; the average hourly output was 162.8 tons. The best day's production was 2412 tons in 12 hours.

How can a Madsen plant produce bituminous paving materials at a speed of more than twice its rated capacity? The answer is greater efficiency and improved methods. In a Madsen plant, the bituminous binder is sprayed in 7 seconds (timed by stop-watch) into the mixer from a direct center-line above the tumbling aggregates. The aggregates are spray coated as they are tossed by the mixer paddles. The binder must filter through the aggregate — not down the side of the mixer.

The deep Madsen Pug Mill Mixer exerts a heavy pressure on the aggregate which densifies the mix and forces the binder to penetrate and become uniformly incorporated with the aggregate. The large mixer gate dumps a batch (timed by stop watch) in 4 to 6 seconds. All plant operations are synchronized to the faster mixing speed of this twin-shaft pug mill mixer.

Learn more about the many time-saving, profit-making Madsen-patented features; write for catalog.

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

4 EXCLUSIVE MADSEN FEATURES

MAN! THIS TAMPER SURE HANDLES EASY AND RAMS HARD!

Thor BACKFILL TAMPERS

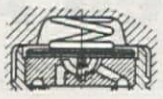
DO THE JOB QUICKER, BETTER... SAVE MONEY AND MAN HOURS!

TAMP... THEN PAVE IMMEDIATELY NO DELAY!

No. 50RRT LIGHT DUTY
Lifts and carries its own weight... does not tire the operator. This light duty Thor Tamper will do more work and ram more fill far more effectively than several men with hand tools.

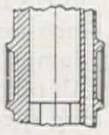
No. 60BFT HEAVY DUTY
For tamping clay and other stiff materials. Strong blows coordinate with the weight of the tool to provide perfect balance for easy handling.

You can tamp . . . then pave *at once* when you use smooth running, rapid, powerful-hitting Thor Backfill Tampers. These Thor Tampers *ram dirt hard*—put it firmly into place *to stay!* No coming back on a job again and again to backfill, you can lay your paving immediately!



AIR ECONOMY
Simple, efficient Thor Rocker Valve is designed to utilize every ounce of air that enters the machine. Gives long service with minimum wear. Tampers develop powerful blow under 90 pounds air pressure; will operate efficiently on 65 pounds.

POSITIVE LUBRICATION
Automatic lubrication system keeps oil distributed throughout the tools constantly. Keeps the valve block spring functioning perfectly. Reservoir holds sufficient oil for a full day's running.



EXHAUST DEFLECTOR
Easily adjustable, simple to operate. Can be turned in any direction to blow the air down and away from the operator's legs.

FOR MORE FACTS about these *sure-hitting* Thor Backfill Tampers and the complete line of associated Thor Paving Breakers, Rock Drills, and other contractors' tools write today for Catalog 42-A.

SPECIFICATIONS

	No. 50RRT	No. 60BFT
Bore of Cylinder	1¼"	1½"
Length Overall	48¼"	49"
Weight	22 lbs.	29 lbs.
Equipment	5" Dia. Rd. Mall. Iron Butt	6" Dia. Rd. Mall. Iron Butt

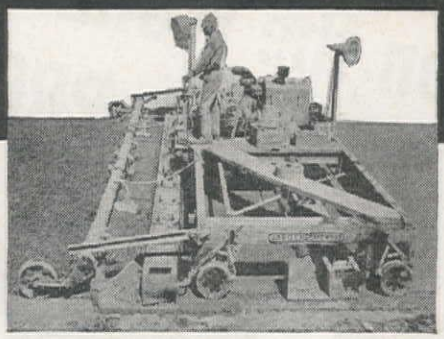
Thor *Portable Pneumatic and Electric Tools*

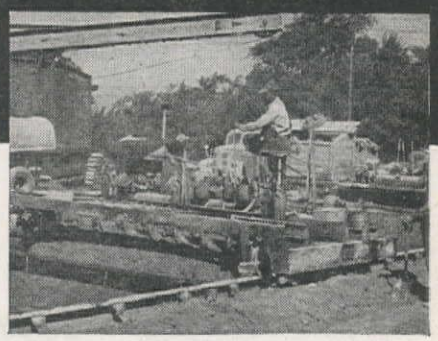
INDEPENDENT PNEUMATIC TOOL COMPANY

600 W. JACKSON BOULEVARD, CHICAGO 6, ILL.

Branches in Principal Cities

LOOK AHEAD WHEN YOU PLAN PAVING—Today's Jaeger Methods Meet Tomorrow's Specifications





1 CONCRETE RE-MIXED ON THE SUBGRADE by compacting spreader screw

Comparative tests by highway engineers of various States have proved conclusively that the Jaeger method of screw-spreading concrete produces a more uniform, denser and, therefore, longer wearing slab.

By its thoro and positive re-mixing and inter-mixing of piles dumped on the subgrade, both the segregation of coarse aggregates in the batch and the variations between different paver batches are eliminated; badly placed batches are redistributed to leave a uniform spread of material ahead of the Finishing Machine, with material placed so solidly against the road base and side forms as to eliminate the honeycomb problem and the entire mass compacted to weight and density approaching that of vibrated concrete.

As one prominent engineer states: *"It has been demonstrated that the quality of concrete can be improved and at the same time cost of production to the contractor can be reduced."*

It is logical to expect that re-mixing on the subgrade will be specified by Highway Depts. to insure higher strength, longer life pavements.

2 VIBRATION ON THE FINISHER, not on the concrete spreader.

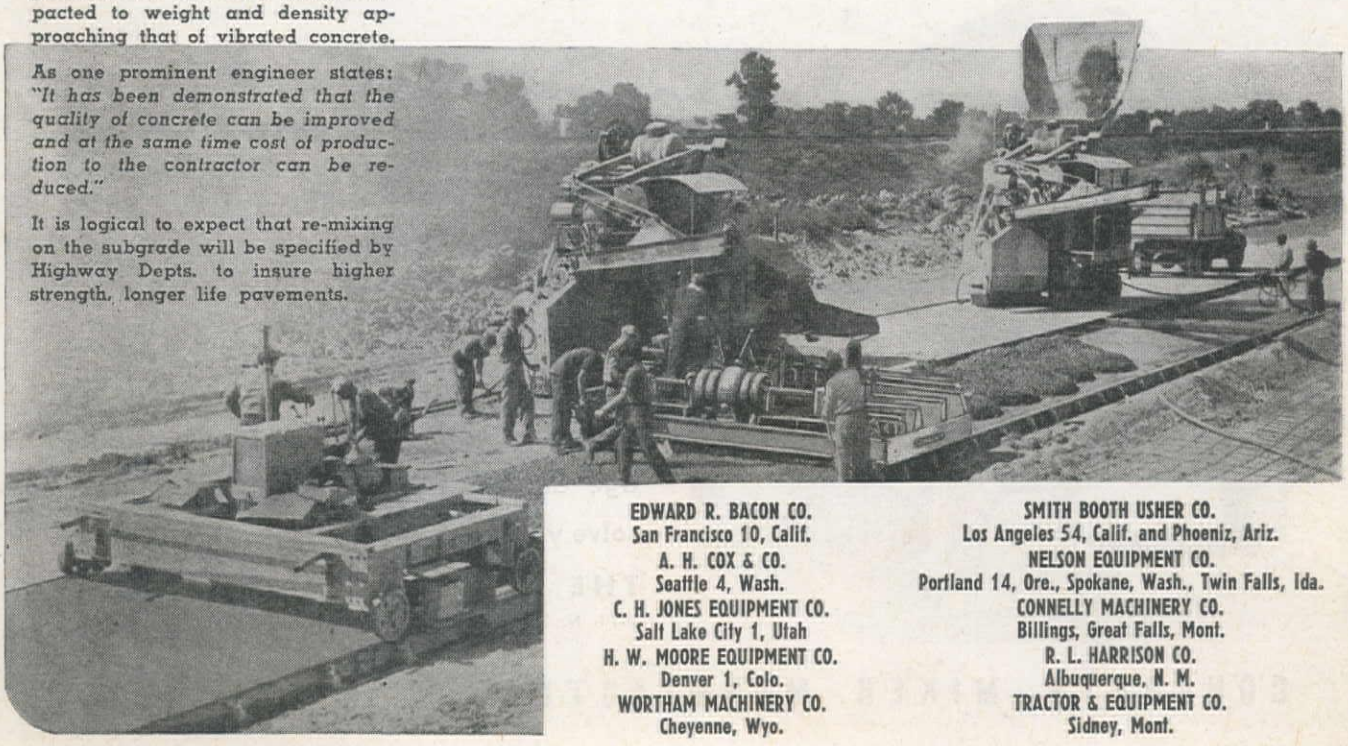
Although Jaeger can furnish a vibratory attachment for use on Spreaders, the recommended Jaeger method of *vibration on the Finisher* has proved superior for any true vibratory mix. On an efficiently run job, only the Finisher has time to go back for more than one vibratory pass, as often needed. Also, it is the machine which always finishes to form level, thus insuring an over-all vibrated surface.

To meet future specifications we recommend the Jaeger Vibratory Finisher with "bullnose" screed giving DEEP INTERNAL VIBRATION or, where conditions suit, use of a vibratory tube *on the Finisher*.

3 FAST MECHANIZED HANDLING for quick-drying air-entraining cements.

The Spreader-Finisher "team," originated by Jaeger, which made it possible to handle stiff, vibratory concrete at the dual-drum paver pace, also equips road builders to handle quick-drying air-entraining cements. Under hot, windy or dry air conditions the Jaeger "team" has the spreading and finishing capacity needed to keep close behind big pavers and complete the job before drying hinders a satisfactory finish. Also Jaeger, alone, has the independent, fast screed speeds often needed to prevent tearing of the sticky surface.

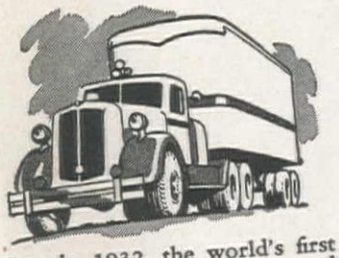
For further information, ask your Jaeger distributor or write us for contractors' and engineers' reports.



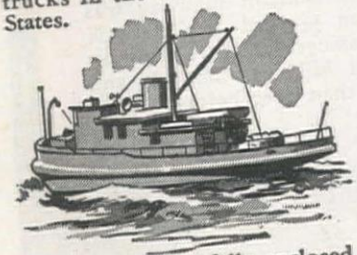
EDWARD R. BACON CO.
San Francisco 10, Calif.
A. H. COX & CO.
Seattle 4, Wash.
C. H. JONES EQUIPMENT CO.
Salt Lake City 1, Utah
H. W. MOORE EQUIPMENT CO.
Denver 1, Colo.
WORTHAM MACHINERY CO.
Cheyenne, Wyo.

SMITH BOOTH USHER CO.
Los Angeles 54, Calif. and Phoeniz, Ariz.
NELSON EQUIPMENT CO.
Portland 14, Ore., Spokane, Wash., Twin Falls, Ida.
CONNELLY MACHINERY CO.
Billings, Great Falls, Mont.
R. L. HARRISON CO.
Albuquerque, N. M.
TRACTOR & EQUIPMENT CO.
Sidney, Mont.

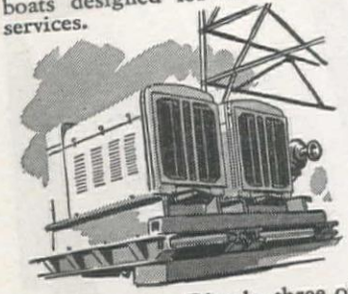
Cummins Diesel-powered trucks and shovels are a standard combination on major construction, material handling, metallic and non-metallic mining jobs. On the Mesabi Range, for instance, 30 to 40% of the total iron ore output is hauled by truck—the majority of them Cummins-powered.



Late in 1932, the world's first heavy-duty, diesel-powered freight truck went into service. The engine was a Cummins Diesel. Today, Cummins Diesels power approximately 90% of all franchise-operated, long-line, heavy-duty, diesel-powered trucks in the 11 Far Western States.



The world's first fully enclosed type marine diesel—now an accepted feature of marine engine design—was built by Cummins in 1928. Cummins Marine Diesels power fishing boats, work boats, pleasure craft and, today, many boats designed for the armed services.

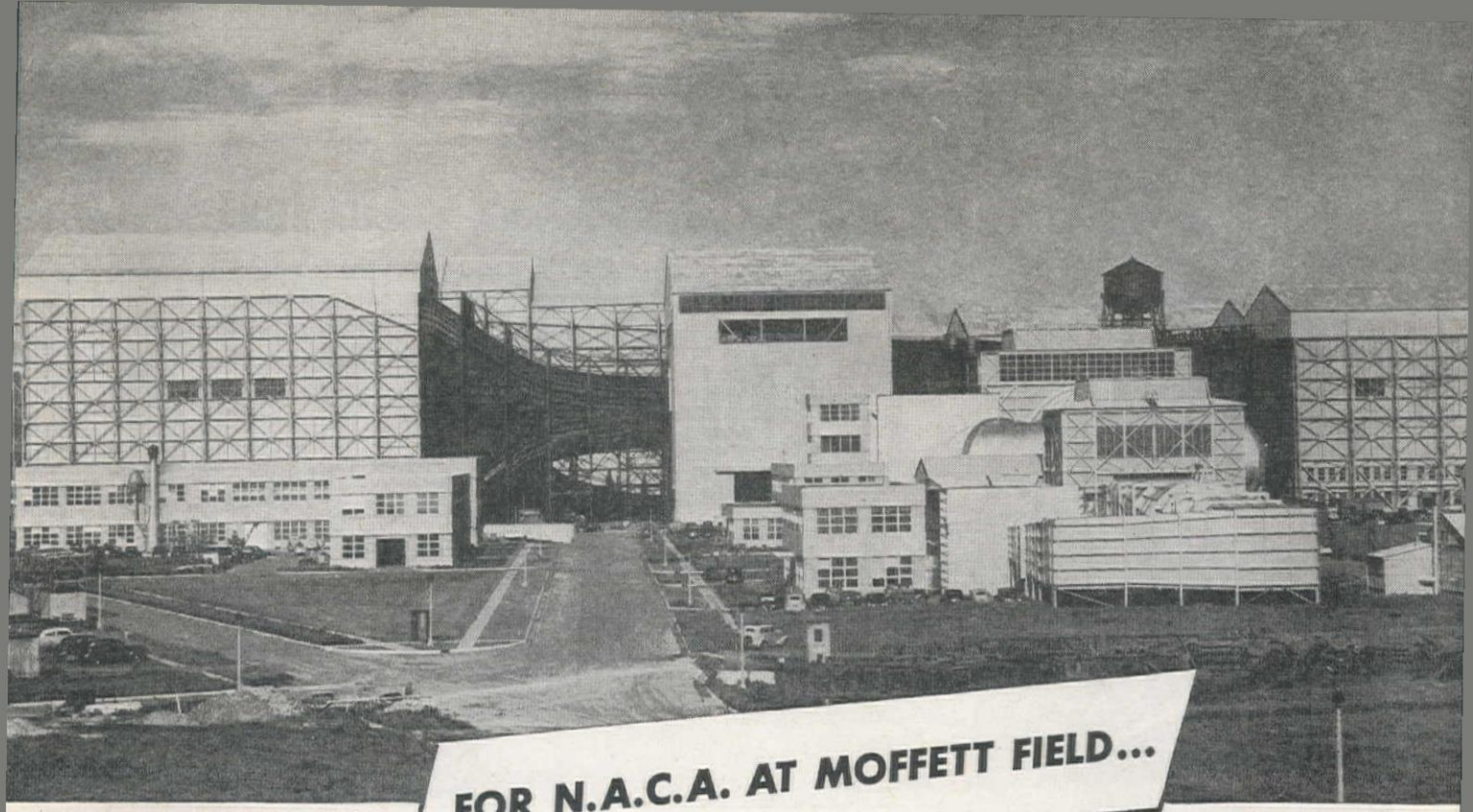


Four Cummins Diesels, three of them seven years old, powered the rig which this year drilled the world's deepest oil well. In this and many other heavy-duty services—logging, construction, and material handling—Cummins Diesels draw the *tough* jobs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets locomotive models

The End is Not in Sight

Even a casual comparison of the massive, lumbering diesel of yesterday with a trim, compact, modern-day Cummins Diesel will show that the diesel engine has come a long way in the 26 years that Cummins has been in the business. Yet, the end is not in sight because the same kind of thinking that led to Cummins' development of the original high speed diesel more than a decade ago promises still greater achievements in power efficiency tomorrow. This thinking is characterized by its refusal to become "set in its ways" . . . by its determination to fully explore every possibility for improving design, construction and materials . . . every possibility for giving you still more horsepower per pound and still more profits on your job through high speed diesels. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.

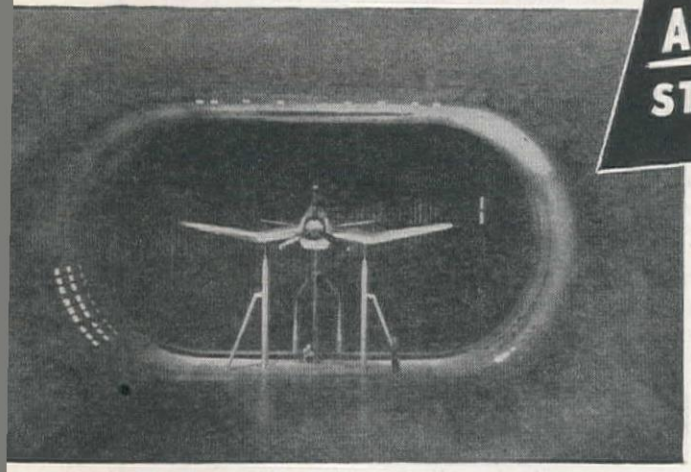


The towering $7,000,000 wind tunnel, rectangular in form, with several smaller-scale testing tunnels in foreground.

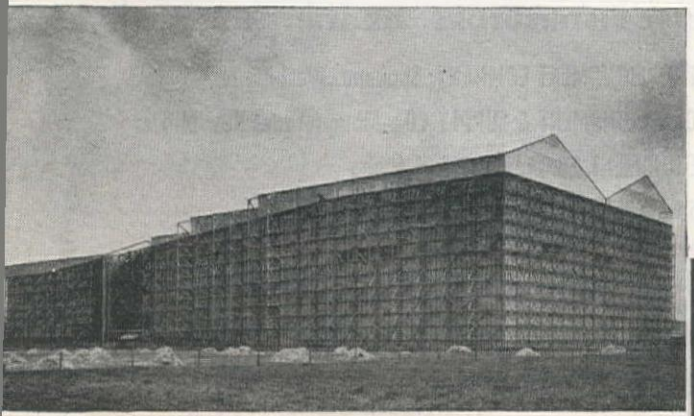
FOR N.A.C.A. AT MOFFETT FIELD...

The WORLD'S LARGEST Wind Tunnel

Another PITTSBURGH•DES MOINES STEEL FABRICATION ACHIEVEMENT



Full-size fighter plane on indicating mounts, in "test throat" of giant tunnel.



Rear view full scale wind tunnel.

Photos courtesy Ames Aeronautical Laboratory, National Advisory Commitee for Aeronautics.

"Hurricane Valley," they call it—this gigantic structure where technicians of the Ames Aeronautical Laboratory (of the National Advisory Committee for Aeronautics), test full-size warplanes in a 200 mile-an-hour gale.

Experienced wind tunnel engineers and craftsmen of Pittsburgh-Des Moines Steel Company know it as the largest and one of the most intricate of the *twenty-one* wind tunnels erected by P-DM in the past six years.

Covering eight acres of ground, with a length of 868 feet, 399 feet wide, and 180 feet high, this project typifies the mastery in steel fabrication and construction exemplified by the Pittsburgh-Des Moines organization in many different fields—worth remembering on your own next difficult problem! *Consultations readily arranged on request.*

PITTSBURGH • DES MOINES STEEL CO

PITTSBURGH, PA., 3420 NEVILLE ISLAND
DES MOINES, IOWA, 921 TUTTLE STREET

New York, Rm. 919, 216 Broadway · Chicago, 1224 First National Bk. Bld
Dallas, 1225 Praetorian Building · San Francisco, 627 Rialto Buildir
Seattle, 528 Eighth Avenue, South

Here is an interesting application of a DIAMOND No. 65 portable plant. The portable plant is put into the production line of a stationary gravel pit to speed production of classified and washed gravel. Note that the DIAMOND chip extractor is being used (directly above) to automatically produce chips from the portable plant. This use of the portable Rotor-Lift plant multiplied daily production several times.

DIAMOND PRODUCTS

Jaw Crushers. Roll Crushers. Hammermills. Conveyors — both portable and stationary. Conveyor rolls. Bucket elevators. Vibrating screens. Rotary scalping screens. Rotary combination scalping and scrubber screens. Feeders. Hoppers and bins. Grizzlies. Tar and asphalt kettles.

DIAMOND STRAIGHT-LINE-PRODUCTION

provides a continuous flow of properly crushed and sized material to bins or job . . . and AT LOWEST COST PER TON!

"Straight Line?" Yes! The shortest distance of travel from the pit to the bin or job. Diamond plants, either stationary or portable, are designed to cut out bottlenecks, backtracking, or any waste of time or movement that will prevent a fast, steady flow of material through the crushing, classifying and washing processes.

DIAMOND engineers have designed all portable plants, and lay out each individual stationary set-up, with this "Straight-Line" production principle in mind.

Likewise, each unit of DIAMOND equipment is designed to do its particular job efficiently and fast. Each is built ruggedly and with that extra stamina which assures the smooth, uninterrupted production that spells low production costs and highest, uniform quality.

No matter how small or how large—how temporary or how permanent—your crushing, screening, conveying, and washing job may be, let a DIAMOND dealer and DIAMOND engineers show you how DIAMOND equipment will do a better job and save on production costs!

CONTACT ONE OF THESE DISTRIBUTORS, OR WRITE US

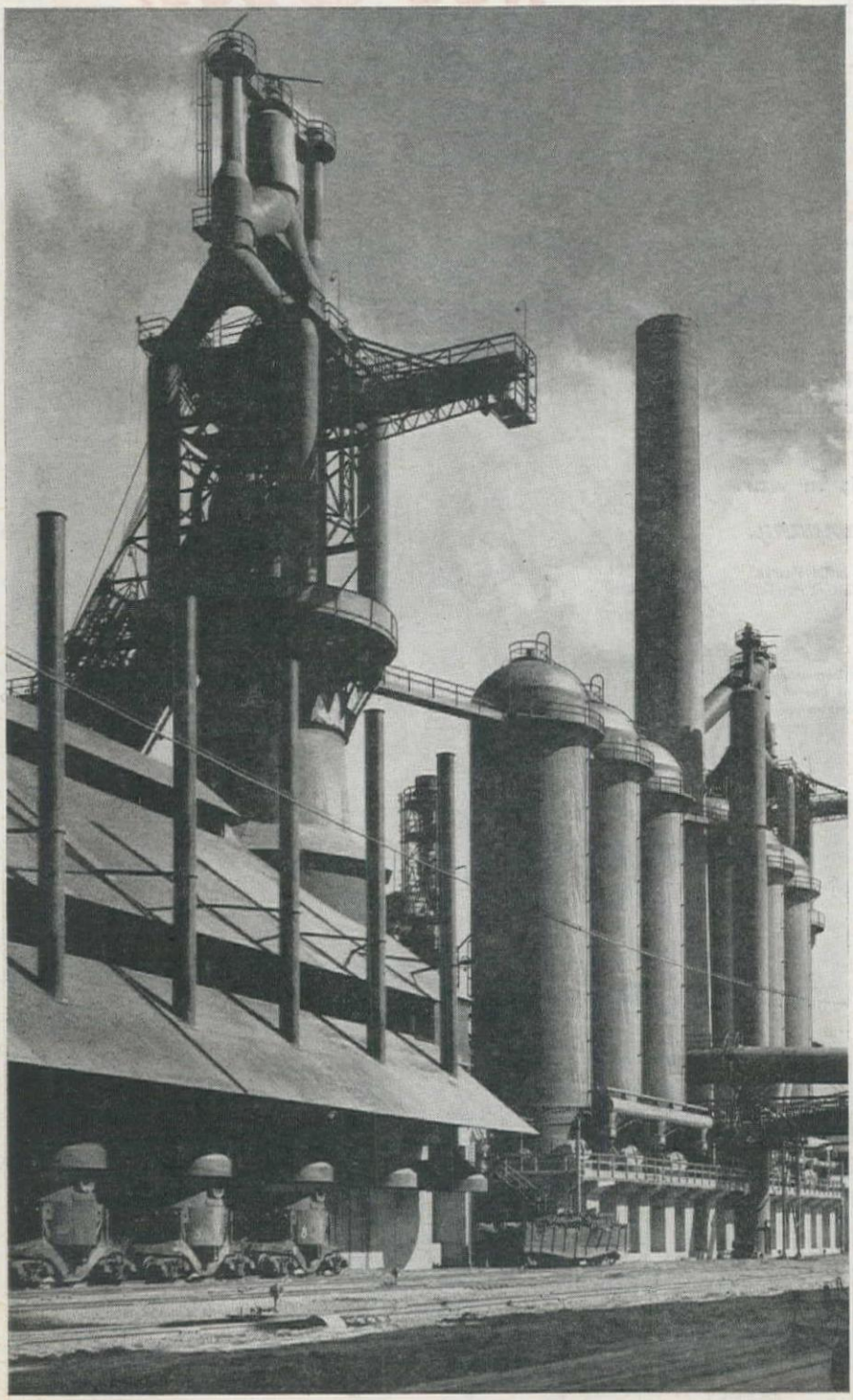
COAST EQUIPMENT COMPANY, San Francisco 1, California
GARLINGHOUSE BROS., Los Angeles 21, California
A. H. COX & CO., Seattle 4, Washington
LOGGERS' & CONTRACTORS' MACHY. CO., Portland 14, Oregon
CONSTRUCTION EQUIPMENT COMPANY, Spokane, Washington
CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque, New Mexico
WESTERN EQUIPMENT COMPANY, Boise, Idaho
C. H. JONES EQUIPMENT COMPANY, Salt Lake City, Utah

DIAMOND **DIAMOND IRON WORKS, INC.** DIAMOND
ESTABLISHED 1880
AND THE MAHR MANUFACTURING CO. DIVISION

1818 SECOND STREET NORTH MINNEAPOLIS 11, MINN.


Continental
Red Seal
Engines
POWER TO WIN
Continuous research, advanced engineering, outstanding manufacturing facilities, precision shop practice, plant coordination and engine-building experience have impregnated Continental Red Seal Engines with power-producing values that insure maximum dependable power.
The fact that 49½ % of all medium tanks are powered by Continental Red Seal Engines is further proof that Red Seal Power is The Power to Win, in peace as it is in war.
Charles W. Carter Company
SALES AND SERVICE
Continental Red Seal Engines and Parts
Los Angeles • Sacramento • San Francisco • Oakland • Fresno
ARMY E NAVY
Awarded to the Detroit and Muskegon plants of Continental Motors for High Achievement.

PIG IRON PRODUCTION *Takes a Jump*



At the left is one of the three giant blast furnaces we fabricated and erected at a new steel mill in Utah. The entire installation consists of the three furnaces and nine hot-blast stoves. When they are operating "full blast," pig iron production at this plant will run into thousands of tons per month.

When the nation's great industries require blast furnaces, tanks to solve complicated storage problems, pressure vessels of welded steel construction, tanks for storing liquids and gases under pressure and elevated water storage tanks . . . they come to a source that has the facilities, knowledge and experience to furnish the desired units with the utmost speed.

Throughout the war years our plants have fabricated steel for many LST ships and floating dry docks that we have built in newly established ship and dock yards. Despite this we have designed and fabricated innumerable units for the production lines of the petroleum industry, chemical and process industries and synthetic rubber plants. Each unit, that leaves our plant to fulfill a specific job for industry leaves behind an increased amount of experience that is available for the peacetime needs of the nation. Let us know your requirements.

Our dry dock yard at Eureka, Calif. now fly the "E" flag with two stars, significant of continued outstanding performance in the production of war material.

CHICAGO BRIDGE & IRON COMPANY

CHICAGO • HOUSTON • TULSA
SAN FRANCISCO • BIRMINGHAM

CLEVELAND • NEW YORK
PHILADELPHIA • WASHINGTON

Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PENNSYLVANIA

August, 1944

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 19, No. 8

Save a Little Money

STORIES ARE RIFE just now about waste along the Alaska Highway, of fabulous quantities of material and equipment being cast aside and burned. Not having been there, we can't testify to the veracity of the assertions. Doubtless some of our fellow editors who have recently organized junkets over the new road could be more authoritative on the point. We suspect it's true, but don't really know. We do have much testimony that the road as presently located, splendid as its workmanship may be, is of little value, either from a military or a peace time viewpoint.

We do know, however, of an Army camp in Oregon which was being discontinued, and because the authorities had no way of carrying (or didn't wish to be bothered with) hundreds of drums and 5-gal. tins of gasoline, they were chopped open with an ax, and the fluid for which any civilian would "give his eye teeth" was permitted to run into the ground. We know, because a representative of this publication saw it.

We do know, too, that after a magnificent start on a Pan-American highway, the Army Engineer forces were suddenly called off. On responsible authority, we have it that another million dollars would have completed vast stretches of it that will now revert to jungle, and when the attempt is later made to reopen it, will cost many millions.

We do know, too, of a vast aluminum and magnesium production program that was tremendously beyond the needs of the war, as evidenced by the fact that plant after plant is being shut down almost as soon as production "bugs" are ironed out.

Of course every citizen has heard instances of more or less petty graft and waste in the prosecution of the war, which if added together, must equal many billions of dollars.

Now the common excuse for such reports is this: "Well, the war is costing us $125,000,000 (or some other huge amount) a day, so this loss is less than one day's fighting." True enough, but the times this editor has heard that particular statement must add up to a month, and probably we've only heard it a few of the times it's been uttered. Of course there is the twin alibi that it was impossible to accurately chart the needs of the war effort and lend-lease, and it was inevitable that some over-planning would be done.

Actually neither of these hold water. Stealing gas coupons is just as serious, whether one or ten thousand are taken. It is no legitimate excuse for a defalcation to say that the thief didn't take much. When the cost of this war is coming out of the sweat of Americans, it is but confounding the felony to deprecate a loss because it was only a few million dollars. How many $25 war bonds are included in "a few million?"

As to planning, it's difficult indeed to believe that the minds which have made this the most efficient country in the world, that have so perfectly planned and executed the attacks in Africa, Europe and the South Seas, should suddenly go blank in the matter of home-front planning. The actual fact is, we're certain, that bureaucracy, with apparently unlimited funds at its disposal, has made no effort at all to plan, has simply ordered drunkenly, "More plants, more roads, more rationing." The oft-quoted statement of one of our leading bureaucrats that "We'll tax and tax, and spend and spend, etc.," is a very pointed illustration.

What is the purpose of this discussion? It is to point out the depth to which the tongue must be plunged into the cheek, when citizens are urged to "buy more bonds." No, gentle reader, we don't urge you to buy less! We are just as anxious as the next person to see the war ended, but our purpose is to urge that every American engaged in the war effort, and every government agency, from the top executives down, be more diligent in their stewardship of the taxpayer's and bond buyer's money. To be sure, let there be no holding back of funds for the successful prosecution of the war, but simultaneously let there be no callous waste of money or time or effort. Let the bond buyer be sure that every penny of his $18.75 goes to war and not to waste.

Power Withheld by Ickes

IT IS TRUE that when the Raker Act was passed by Congress permitting construction of the Hetch Hetchy power project by the City of San Francisco in Yosemite National Park, the provision was included that none of the power manufactured was to be handled by a private utility company. Permission was granted to the city to sell to Pacific Gas & Electric Co. for a certain period, but only temporarily. For the last year or so, the entire output of the municipal plant has been used to operate the aluminum plant at Riverbank, Calif., served directly from the city's lines, so no question has arisen. The value of power sold to the plant amounts to $2,400,000 annually.

Now, suddenly, the plant is shut down, because there is a surfeit of aluminum in the country, and Secretary Ickes takes this moment to insist that the provisions of the Raker Act be enforced. Now, this magazine takes no exception to the Raker Act, as an established policy, nor to the ruling of the Federal Court, stating that the city must dispose of the power to some other agency than the P. G. & E. by Aug. 28. The Court has done the only thing possible, when requested to do so by Mr. Ickes. The part of the deal which defies understanding, however, is the attitude of that individual in insisting that the step, which can have no other outcome but the complete shutdown of the 100,000-kw. power plant at a time when power is at a premium for war purposes, be taken right now. Is he concerned with winning the war, with maximum war production in the bay area, or with promoting a particular socialization program? A stay of execution of one year is being asked by the city, but it is doubtful if the court can grant it unless Harold consents. If he does not, one large electric power plant will gather moss while industry calls for power.

Construction Spoils Things

IT WAS CALLED to our attention that a writer in *The Los Angeles Times* a few days ago quoted from a book written 40 years ago to prove that irrigation of desert land was responsible for a change in the over-all weather of southern California.

The entire West Coast has been having a cool spring and summer this year, and the writer of 40 years ago looked forward to that very thing when he prophesied that irrigation would cool off the source of dry heat—the desert. Well, maybe so. Certainly not for many years past have the morning fogs persisted so long, or the sun been so reluctant to shine on the Coast cities.

Well, construction might just as well get the blame for that, too. If the weather suddenly turns hot and becomes "earthquake weather" and a shake ruins a lot of buildings, it can be said that greedy contractors caused it all so they would have more work, and that to foil these evil designs, the rebuilding had better be done by PWA.

POSTWAR PLANNING HEADQUARTERS

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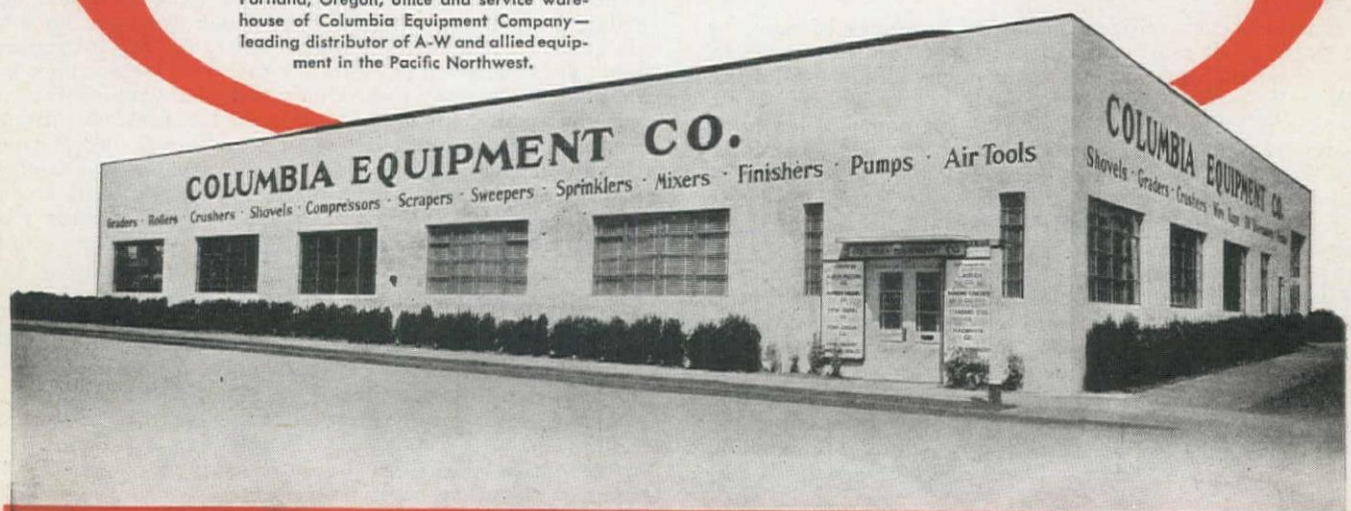

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WESTERN CONSTRUCTION NEWS
AUGUST • 1944

Anderson Ranch—
Progress on Highest Earthfill Dam

Idaho irrigation and power structure proceeding after release from WPB shutdown order—Diversion tunnel and dam foundation work completed, and placing of embankment now under way—Fill material is transported 8,000 ft. by conveyor belt, then moved to proper fill zone by shovel and truck

By ELLIS L. ARMSTRONG
Engineer
U. S. Bureau of Reclamation
Anderson Dam, Idaho

THE WORLD'S HIGHEST earthfill dam is under construction on the South Fork of the Boise river approximately 40 mi., air-line, southeast of Boise, Idaho. Anderson Ranch dam is located upstream from the 354-ft. concrete Arrowrock dam, which at the time of its completion in 1915, was the highest dam in the world. It is essentially a multi-purpose project embodying irrigation, flood control, silt control, and power development, and will cost more than 13 million dollars. It is now being rushed to partial completion to supply supplemental irrigation water to 340,000 ac. of highly developed farm land in the Boise valley to increase production of food crops considered essential by the War Food Administration. These lands, served with water stored in the now inadequate Arrowrock reservoir, experience serious water shortages annually. The new reservoir will prevent these shortages and provide control of floods during periods of heavy runoff. Ultimate development will provide 104,000,000 kw.-hr. of electric power annually to meet the growing demands of the region.

Anderson Ranch reservoir is a major unit in the comprehensive plan for the development of southwestern Idaho. It is located so that eventually it can furnish irrigation water for a large tract of desert land between Mountain Home and Boise, when a plan for diverting exchange water from the Payette Basin to the Boise Basin is completed. The reservoir capacity is 500,000 ac. ft., of which 75,000 ac. ft. is reserved as dead storage and removable storage for power purposes, 380,000 is for irrigation and flood control, and 45,000 is for flood control only. All water released from flood control and irrigation space can be used for power development up to the capacity of the plant. Initial investigations were carried on cooperatively by the Bureau of Reclamation, the Corps of Engineers, and the Department of Agriculture. The design and construction is being done by the Bureau of Reclamation.

Principal dimensions

The dam is 456 ft. high from the crest to the lowest part of the 200-ft. cut-off trench. It is the largest earthen structure ever built by the Bureau of Reclamation and will contain 8,800,000 cu. yd. of earth and rock.

The crest length of the dam is 1,350 ft., the crest width is 40 ft., and the thickness between the upstream and downstream toes is 2,500 ft. The upstream slope is 3:1 for the upper 114 ft., then 3½:1 to the river level except for a 50-ft. berm at elevation 3960, the top of the permanent cofferdam. Three feet of heavy rock riprap is provided for wave protection. Downstream slope is 2:1 for the upper 114 ft., then 2½:1 for the next 130 ft., then 8:1 to river level. A heavy

supporting rock fill underlain by a 6-ft. sand and gravel filter blanket is provided on the downstream slope.

The body of the dam will be rolled embankment, zoned to produce an impervious core supported by stable, free-draining sections and to effectively use materials from required excavations. A cut-off trench, 200 ft. wide at the bottom, was excavated through 125 ft. of river fill. Two cut-off walls extend across the bottom and up both abutments. A 150-ft. grout curtain is being formed under each of these walls and the rock between the walls is being blanket-grouted.

The spillway, designed for a maximum discharge of 20,000 sec. ft., is located on the left abutment. It is a concrete-lined, open channel type, cut in rock, varies from 53 to 100 ft. wide, is unusually steep having a maximum slope of 0.70, and discharges into a dentated sill stilling basin. The discharge will be regulated by two 25- by 20-ft. radial gates. The diversion and outlet tunnel is 1,500 ft. long with a circular section 20 ft. in diameter. The flow through the tunnel will be controlled by a 15- by 30-ft. fixed-wheel bulkhead gate operating on an inclined structure, and by a 15-ft. diameter penstock pipe installed in the tunnel and leading to the power units and to a battery of five 72-in. hollow-jet valves located in an outlet structure beneath the lower end of the spillway. Two 15,000 kva. vertical-shaft generators driven by 21,000 h.p. turbines will be housed in a reinforced concrete power house 70 ft. wide by 104 ft. long.

Five miles of new road construction was necessary to provide access to the dam. To replace Forest Service and County roads to be inundated by the reservoir, 24 mi. of 16-ft. gravel-surfaced road is being constructed. Clearing the reservoir area involves cutting and removing 4,000 ac. of merchantable timber and brush.

Contract award

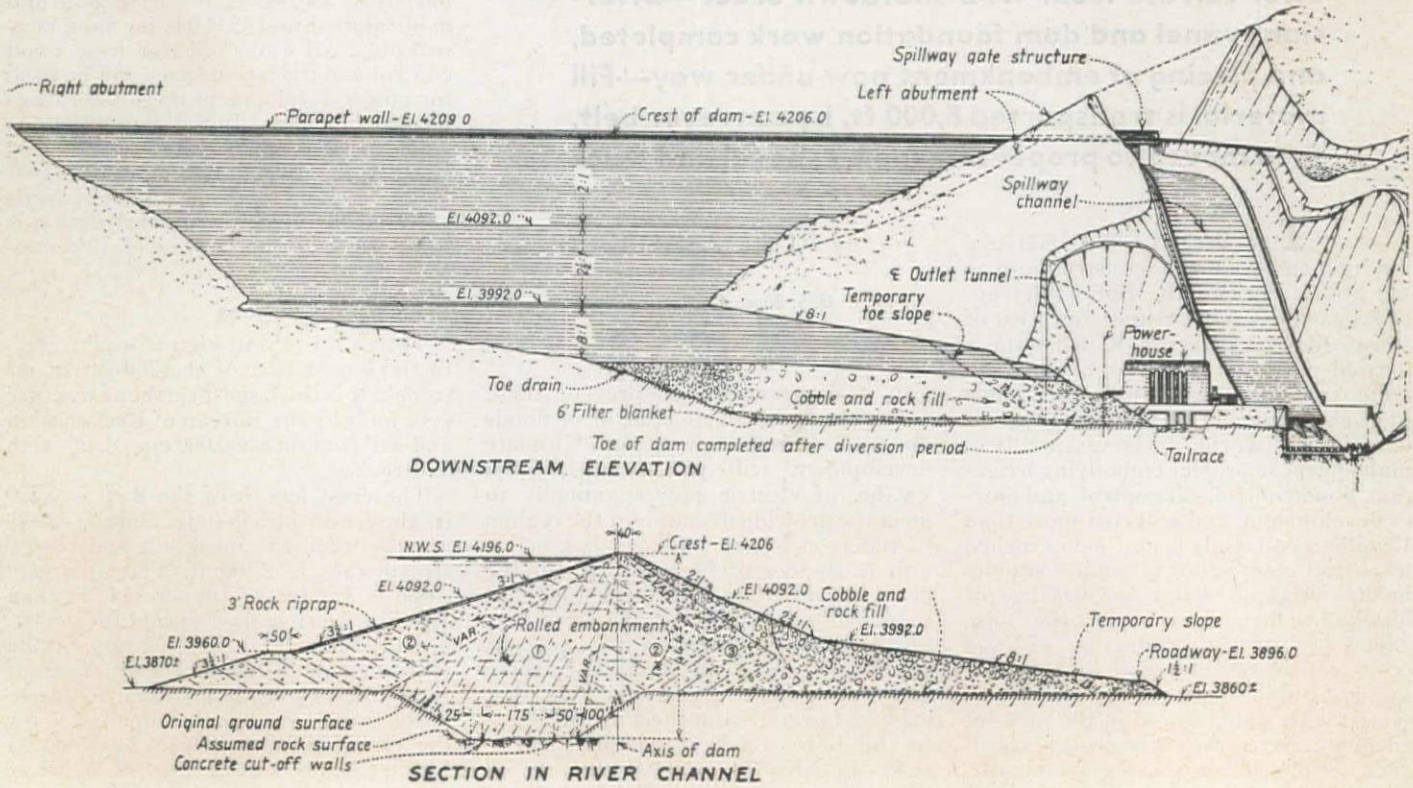
An extensive investigation and testing program was begun at the damsite in 1940. Plans and specifications were prepared for the construction of the dam and power plant, excluding the steel penstocks and the power units, and providing that all materials for permanent inclusion in the structures would be furnished by the Government. Bids were opened July 7, 1941, and the contract awarded to Morrison-Knudsen Co. Inc., J. F. Shea Co. Inc., Ford J. Twaits Co., and Winston Bros. Co., a joint venture, on their bid of $9,986,203, the lowest of three received. Construction was started in August on a program scheduled to complete the dam well in advance of the specification date for completion of the contract, fixed at April 24, 1946.

As the dam is 30 mi. from Mountain Home, the nearest location of housing facilities, it was necessary to provide housing for most of the construction personnel. The contractor built 90 2-room to 7-room residences, seven large bunkhouses, a large messhall, women's dormitory, hospital, laundry, commissary building, theatre and school house, as well as an office building, warehouses, petroleum bulk plant station and shops. Extensive trailer parking accommodations were also provided. A permanent Government camp for later use of the operating personnel was constructed 2½ mi. downstream from the dam and consisted of an office building, eleven 4- to 6-room residences, a dormitory, and a shop and garage building. In addition 26 temporary 3- and 4-room residences were constructed.

Under the contractor's program the work was pushed vigorously and continuously through the fall and winter of 1941 and up to the end of the construction season in 1942 despite material and labor shortages. The diversion tunnel was driven, concrete lined, and on May 18, 1942, the river was diverted. The stripping of the dam abutments had been largely completed. The cut-off trench had been excavated and the cut-off walls and grouting completed in the bottom; placing of embankment in the trench started Sept. 22. At the end of the season the cut-off trench had been back-filled to about one-half depth. Quantities of work completed at the end of 1942 included 3 million cu. yd. of excavation for the dam and appurtenant structures; placing about 800,000 cu. yd. of embankment and 14,000 cu. yd. of concrete; drilling and pressure grouting nearly 4 mi. of grout holes; and numerous smaller items. Camp and access road construction was practically completed. An 8,000-ft. conveyor system, costing one million dollars, had been constructed to transport materials from the main borrow pit to the dam. On the basis of contract earnings the dam was one-third completed.

In Dec., 1942, a stop-work order was issued by the War Production Board. This prohibited further construction except work considered necessary to protect construction already completed. This was done during the summer of 1943. A modified construction program was worked out which reduced strategic materials to a minimum and which provided for 45,000 ac. ft. of storage in 1945, 130,000 in 1946, and full storage in 1947; the power house, spillway

DETAILED ELEVATION and section of 330-ft. rolled earth dam showing the zoning employed to produce an impervious core supported by stable free-draining sections.



control gates, steel penstock and permanent outlet valves were postponed until after the war. This plan received the backing of the War Food Administration as being vital to the War Food program and the stop-work order was modified Oct. 6, 1943.

The change of work program made necessary an adjustment to the original construction contract. The protective work during 1943 was done under negotiated unit prices; the work since Nov. 15, 1943, has been under a fixed-fee construction contract which also included the roads around the reservoir and the reservoir clearing.

Outlet works

Among the first items of work undertaken by the contractor was the stripping and excavation at the tunnel portals to allow the tunnelling to start. The excavated material was placed in the embankment when suitable. Tunnelling was started from the outlet portal, with a full heading under a sub-contract awarded to Blakemore and Nelson Co. A month later the contractor's forces started driving at the inlet portal, excavating only the upper half of the tunnel section in the first advance, then dropping back and excavating the lower half. The 1500-ft. long, 24-ft. diameter tunnel was "holed through" 80 days after starting at the outlet portal, the work being carried forward on a full time, 3-shift basis.

For the full face excavation, a double-deck steel jumbo carrying nine water leyners and a "cherry picker" was used in drilling. Each round advanced 10 to 12 ft., and was drilled with about 50 holes and blasted with 350 lb. of 40 per cent gelatin powder. An average of about 2.6 lb. of powder was used per cubic yard of tunnel rock excavated. The muck was loaded by a ½-cu. yd. Conway mucker into 5-cu. yd. side-dump cars pulled by 80-h.p. electric dinkeys. Ventilation was provided by two 3,800 c.f.m. blower units through a 22-in. metal blower pipe supported on the side of the tunnel. Compressed air at 110-lb. pressure was supplied from the compressor shop through a 4-in. line. At the inlet end a "half-face" jumbo was used, the muck was excavated by a ½-cu. yd. mucker and transported in small dump trucks.

The tunnel was driven through granite rock cut by many thick basic dikes and by innumerable stringers and irregular masses of pegmatite. In places the rock was rather soft and broken. Seventy per cent of the rock required support. Steel supports were used in the pressure section of the tunnel; because of the steel shortage, timber was substituted in the downstream section. Very little seepage was encountered.

The concreting of the lining was planned so that it would be started before excavation was finished. In the downstream half of the tunnel two curb sections about 2 ft. high and part of the finished lining, were placed. These curbs supported the 270-deg. arch section steel form, 40 ft. long. Final cleanup and concreting of the invert was delayed until last. In this way the rail line in the downstream reach was left in place during concreting, enabling excavation and cleanup to continue in the upstream portion of the tunnel. The upstream half was concreted by placing the 60-deg. invert first, then the 300-deg. arch using a 60-ft. steel form. The steel forms were of the two-hinge type, supported and carried forward on special steel jumbos. The arch concrete was placed by pneumatic guns. The invert and curbs were placed from agitators mounted on flat cars, from mine dump cars, and by pumping.

BECAUSE OF THE STEEL shortage, timber supports were placed in the downstream section of the 24-ft. tunnel. This framework supported the excavated tunnel until the reinforced concrete lining was poured. The finished inside diameter is 20 ft.

The unfilled spaces above the concrete at the tunnel arch were filled with a sand-cement grout with a mix of two to three parts sand to one of cement. The grout was placed through holes drilled in the tunnel lining at predetermined locations 10 to 20 ft. apart, using an air pressure-pot with 30-lb. per sq. in. maximum pressure. A total of 16,327 cu. ft. of grout (actual volume) was placed. The rock surrounding the tunnel will be pressure grouted with cement and water at a later date.

The permanent intake was to have been located about 80 ft. directly above the tunnel; an inclined shaft from the intake was to have intersected the tunnel about 170 ft. from the portal. Because of slides which developed on the left abutment and to the left of the tunnel inlet, the permanent intake was shifted 200 ft. to the right and just above the cofferdam. An inclined tunnel on a 0.225 slope from this point will intersect the diversion tunnel 350 ft. from the inlet portal. The intake structure will be laid on a 1½:1 slope up the rock point above the cofferdam. The intake structure excavation has been completed and the excavation of the inclined tunnel has started.

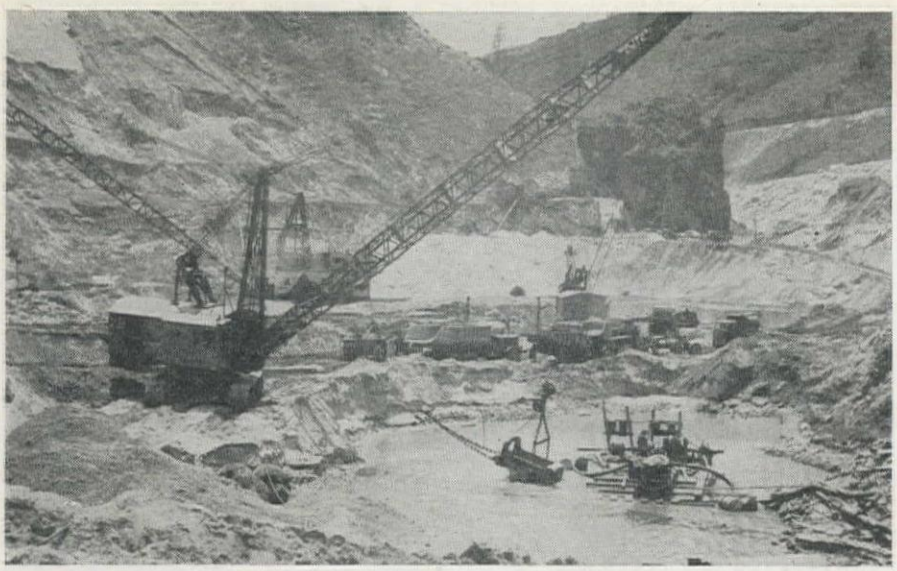
Foundation excavation

On the abutments, top waste material was stripped by being pushed down the abutments by dozers aided by cables and winches. The remaining overburden, which had a maximum depth of 60 ft., was then worked down the slope in benches, using dozers, carryalls, shovels and trucks; the material was placed in stockpiles or in the embankment. The final excavation on the abutments was accomplished by sluicing. The river bottom material consisted of 125 ft. of silt, sand, gravel and boulders with fine sand predominating. The excavation of the cut-off trench, involving 630,000 cu. yd. of material, was begun immediately following river diversion. It was completed to bedrock in 110 days. The principal equipment used in the first 20 or 30 ft. of the excavation consisted of two 4-yd. and one 5-yd. electric shovels, one 6-yd. dragline, one 3-yd. dragline, twenty 10-yd. rear dump trucks, three 23-yd. rear dump trucks, four 12-yd. carryalls, and three dozers.

The rock in the bottom and on the abutments between the cut-off walls and for 25 ft. outside of the walls was cleaned by hand mucking and air jets before placing embankment.

Considerable inflow of water into the deep cut-off trench was expected. The specifications required that the method of unwatering adopted must prevent fines from being washed from the foundation and permit the slopes of the trench to be maintained. The unwatering system adopted by the contractor consisted of two 8x12-ft. vertical shafts in the rock on the left side of the river, one upstream and one downstream from the cut-off trench, with a 4x6-ft. drainage tunnel just below surface rock extending from the shaft across the bottom of the foundation. Holes were then to be drilled upward from the shaft into the foundation material and downward through the river bed materials into the shafts, using well points and perforated pipes to tap seepage water. Pumps were located in the shafts.

The drain-points and pipes were only partly completed due to lack of good



RIVERBED EXCAVATION for the foundation totaled 630,000 cu. yd., and was completed in 110 days. It consisted of 125 ft. of silt, sand, gravel and boulders. Water infiltration, expected to be large, was small because of numerous clay lenses in sand.

drilling equipment and labor, slowness of the drilling attempted, and because much less water was encountered by the excavation than was expected. A maximum of about one sec. ft. was pumped from each shaft. The maximum amount pumped from the two shafts and the trench excavation was only 5½ sec. ft. Clay lenses in the sand and gravel made the material much less pervious than expected. The water in the trench was pumped from a low sump at one end of the excavation; all excavation was done in the dry except when deepening the sump. At the bottom, sumps were constructed in bedrock; water was led to them by covered perforated pipe and gravel drains. Local seepage areas encountered on the slopes were controlled by well points and by gravel and cobble drains. The shafts were filled with sluiced sand and gravel; the sumps and drains were filled with clay grout under pressure. The clay used in the grout averaged 82 per cent passing the 200-mesh screen. Most of the grout was placed with a 1:1 water-clay ratio. A total of 15,300 cu. ft. of clay grout was pumped into the drainage systems.

Foundation grouting

The foundation rock consists of various varieties of intrusive rock, mainly granite, with dikes of pegmatite and basic rock. It is traversed by a complex system of shear planes and joints and the quality of rock changes greatly in short distances. In some belts the rock is extremely jointed and contains many narrow irregular zones of fault gouge which dip and strike in all directions. It is generally tight.

To prevent excessive seepage through the foundation rock and along the rock contacts two cutoffs are being constructed across the bottom of the foundation and up both abutments. These consist of concrete cut-off walls, 5 to 15 ft. high, with footings extending 3 to 10 ft. into rock. Grout curtains up to 150 ft. deep, with holes on 10-ft. or less centers, are being placed under these walls. The surface rock between the walls is being blanket grouted with 20- to 30-ft. holes on about 20-ft. centers.

The cut-off holes are being driven with diamond drills using 1⅜-in. bortz plug bits. The grout is mixed in a paddle type mixer and pumped from an agitator sump by duplex piston pumps. The rock is being stage grouted, using packers where the rock is suitable. Usually a 150-ft. hole is grouted in four stages. The grouting follows a "closing-out" pattern to test results as the work proceeds. After the holes are tested with clear water a 5:1 water-cement ratio by volume grout is started. The grout is thickened according to the rate and amount of take, but generally not to more than 3:1 except in cases of bad leaks. Pressures from 30 lb. for the first stage to 200 lb. for the deepest stages are being used. The attempt is made to control mixes and pressures such as to allow the maximum amount of grout injection, to prevent rock uplift, and to adequately treat all seams.

To date 20,000 cu. ft. of cement has been placed in 22,400 lin. ft. of holes for a unit take of 0.89 cu. ft. per lin. ft. of hole, and 2,000 cu. ft. has been placed grouting seams and drains. Grouting of the right abutment and across the bottom has been completed. The upper 360 ft. of the left abutment and the rock surrounding the tunnel is yet to be grouted.

Embankment construction

Materials for the center impervious section of the dam are being obtained from the Dixie pit located on a high flat 1½ mi. down-stream from the left abutment. It is transported to the dam by an 8,000-ft. conveyor belt. The material obtained is a silty clay, averaging about 90 per cent passing the ¼-in. screen and 33 per cent passing the 200-mesh screen. With standard compaction it has an average wet density of 134.0 lb. per cu. ft. at an optimum moisture content of 12.7 per cent of dry weight. The average percolation rate is 0.048 ft. per year under 1-ft. head. The material in the borrow pit averages about 1 per cent dryer than optimum; some moisture conditioning is necessary.

Materials for the semi-pervious and pervious zones are obtained from the Whipple pit located just upstream from the dam, and from slide-area and spillway excavation on the left abutment. Most of the material from the Whipple pit contains a large number of boulders; it is processed through a trommel screening plant. The material from the slide area and spillway excavation was dumped down the abutment just downstream from the embankment. This provided an excellent method of segregating the material for placement in the different zones of the dam. The bottom coarse rock was placed in the rock fill, the smaller rock and rock fines were placed in the pervi-

BACKFILLING OF CUT-OFF trench in progress about 30 ft. above the bottom of the excavation. Material discharging from the conveyor belt is from Dixie pit, located 1½ mi. downstream and 1,200 ft. above the dam. Concrete cut-off walls are visible.

ous zone, and the upslope portion of the pile was placed in the semi-pervious or impervious zones.

The impervious and semi-pervious materials are placed in 8-inch layers, moisture conditioned when necessary, and rolled twelve times with a 20-ton, sand-ballasted, sheepsfoot roller. The surface of a lift which has become smooth from truck travel or had dried is scarified and moistened, before a new lift is placed. All rocks over 5 in. in maximum dimension are removed before rolling. In the irregular regions in the bottom, along the rough and steep portions of the abutments, and along the cut-off walls, the material is compacted with paving breakers fitted with 4-in. square tamping feet.

The pervious sand and gravel material was placed in 12-in. layers and compacted by sluicing and directing truck travel. The rock fill is being placed dry in horizontal 3-ft. lifts. The borrow areas were sufficiently tested before construction started to enable detailed zoning of the material. Sufficient density tests are taken in the embankment to insure control of moistures and compaction. When tests indicate areas of low density, remedial measures are taken. Record tests and tests from accepted areas show compaction being obtained is generally equal to or greater than maximum laboratory standard compaction.

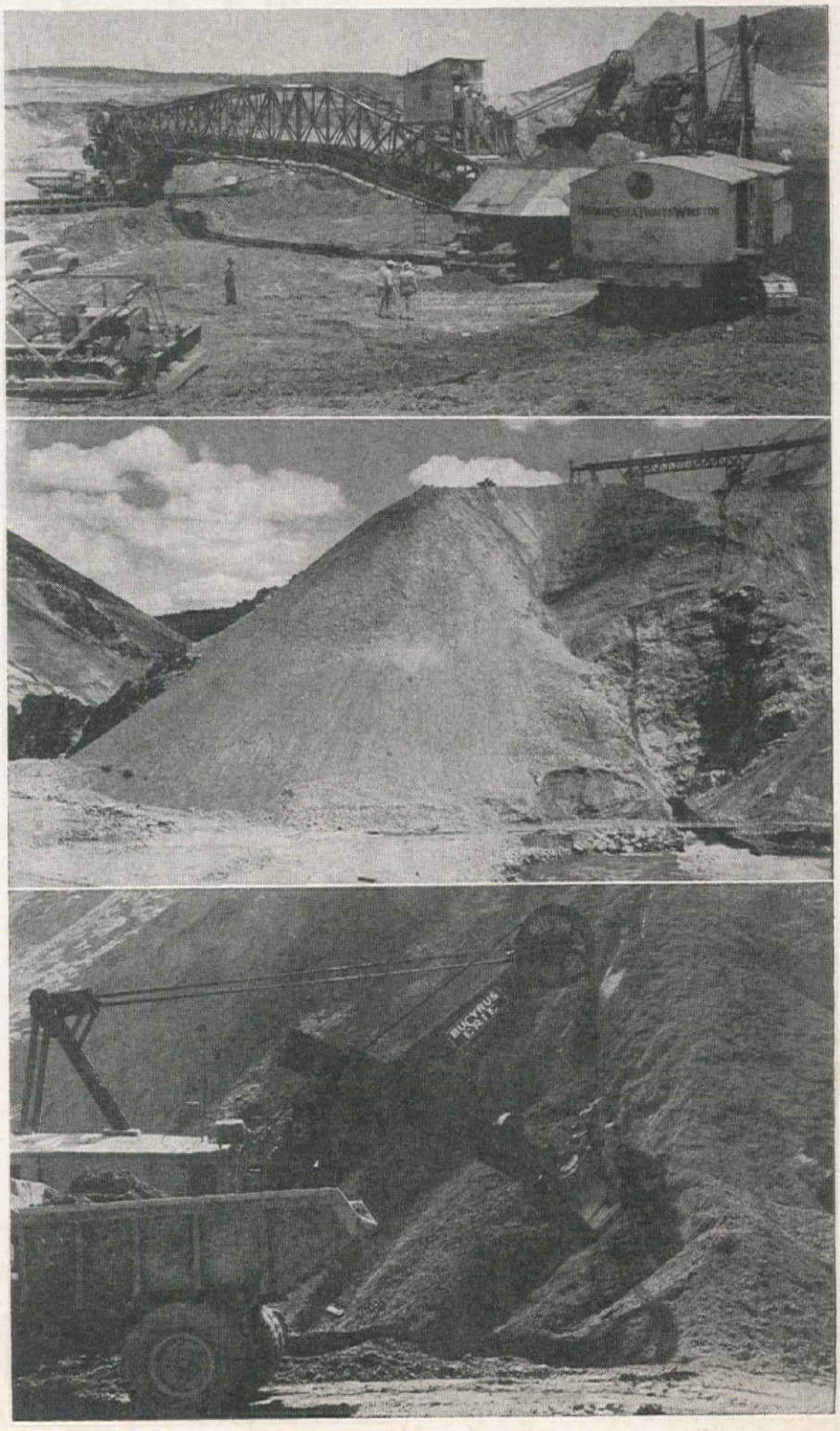
To determine the actual behavior of the embankment materials both during construction and after the dam is completed, testing apparatus are being installed. Settlement apparatus are being installed to measure the settlement of the foundation and the consolidation of the embankment. They consist of telescoping 1½- and 2-in. pipes. Every other section of the 1½-in. pipe is anchored to the embankment with a 3-ft. crossarm. This moves with the embankment and entirely independent of the rest of the system. An installation is made every five feet. Readings are taken by lowering a special engaging device into the system which catches at the bottom of the 1½-in. pipe enabling the distance down from a reading scale to be determined. When reaching the bottom the pawls are locked shut and the device can be withdrawn.

Piezometers are being installed to measure pressure developed within the embankment during construction and the later operation of the reservoir. These consist of ½-in. tubings extending from a tip in the embankment to a terminal well located near the downstream toe. The tubings are filled with liquid; any pressure developed in the dam is transmitted through a porous disk at the tip onto the liquid in the tubes and is read at a gage in the terminal well. Due to the copper shortage, the tubings being installed are of Saran plastic.

Conveyor system

The material located in Dixie Pit is 1,200 ft. above the bottom of the dam. Four and one-half million cubic yards of material will be transported to the dam from the pit by the conveyor belts. The conveyor is motivated by 150 h.p. electric motors which become generators after the belt is in operation; electricity is put back into the line and the generators act as brakes to control the belt speed. The conveyor originally consisted of nine flights of 36-in. belting and a pit belt. The material is excavated in the pit by shovels and dumped into the hopper of the loading pendulums which feed the 42-in. pit belt. The pit belt transfers the material to flight No. 1, which is 1,762 ft. long and drops 103 ft. through two tunnels. The second flight crosses an arroyo on a high trestle and has a net drop of 81 ft. in a distance of 1,527 ft. Flight No. 3, 1,340 ft. long, most of it through a tunnel, drops the clay 166 ft. and transfers it to flight No. 4, which is 758 ft. long with a 100-ft. drop in elevation. Flight No. 5 is 890 ft. long with a 165-ft. drop. Flight No. 6, with a drop of 108 ft. in 620 ft., transports the material on a wooden Pratt truss and 2-cantilever bents for a clear span of 130 ft., across the spillway location and to the top of

SHOVELS DUMP Dixie borrow material into the hopper of the conveyor belt loading pendulum (upper photo), then the conveyor carries it to the 300-ft. high stockpile (middle photo), and shovels load trucks from the base of this pile (lower photo).



the left abutment. To backfill the cut-off trench the material was transferred from here through three flights and a chute zigzagging down the abutment. After the cut-off trench was filled it was found that the clay was sticky enough that it could be dumped down the abutment without segregating. The last four flights were then eliminated and flight No. 6 discharges directly over the edge of the abutment. At the bottom the clay is loaded into trucks by a shovel and transported to its location in the embankment. The belt travels at a speed of 550 ft. per min.; its maximum capacity is 900 cu. yd. per hr.

Many problems have presented themselves in the construction of the conveyor and its operation. The belt is located along steep side hills of decomposed granite which made construction difficult. To allow for settlement along the hillsides the conveyor structure was designed with a substructure supporting an adjustable superstructure on which the belt rides.

The conveyor was originally constructed to provide two surge piles along the line to uniformly load the belt. Because of the tendency of the clay to pack and "ball up" it has been necessary to eliminate all surge piles and reduce all drops at transfers to a minimum. The pendulum used for loading the pit belt has been revised and reconstructed to increase its maneuverability and the hopper has been rebuilt to prevent clogging.

Spillway

The excavation for the spillway was begun soon after the contract for the dam was awarded. Most of the excavation at the top of the abutment was completed during the winter. Early in the spring large cracks appeared in the hillside 350 ft. above the excavation and threatened a major slide. After a series of observations and careful study a plan of flattening the slopes was adopted that involved the removal of 550,000 cu. yd. of material and placing it in the dam embankment. The excavation of this material was completed during the following two winters, the material was dumped down the abutment, downstream from the embankment, into a large stockpile.

It was the original intent that the spillway would be line-drilled and the concrete walls tied to the rock by steel anchor bars. However, because of the rather soft, disintegrated rock encountered in part of the spillway, the original design will be changed somewhat. None of the final excavation for the spillway structure has yet been started.

Concrete plant

The concrete plant is located just downstream from the powerhouse and stilling basin location. The storage bunker originally consisted of six 100-cu. yd. compartments, set below ground level near the plant, into which the aggregate was dumped from trucks. Aggregate heating was provided by steam pipes. The aggregate was elevated to the 8-cu. yd. batching plant bunkers by a

SOIL TECHNICIAN taking a density test in the compacted embankment. Sand of known density is being used to determine the volume of the hole from which a sample has been taken. Sufficient tests are made to insure control of moisture and compaction in the rolled earth embankment.

¾-cu. yd. clamshell. The aggregate is weighed in two 3,000-lb. capacity weighing hoppers and discharged into a mixer-changing hopper of one of two non-tilting mixers set side by side. The cement is added at the charging hopper by hand-dumping. The concrete is discharged from the mixer into agitators in which it is transported to the placements.

In the fall of 1942 side-hill aggregate bins were constructed which provided storage for 10,000 cu. yd. The bins discharge into a reclaiming tunnel onto a conveyor belt which transports the aggregate to the batching plant bunkers. The construction of a bulk cement silo and alterations to the plant so that bulk cement can be used are now under way. The major concreting program will commence this fall when the concreting of the inlet structure is begun and will carry through the next two seasons when the spillway and outlet control structures are built.

To date concrete aggregate has been obtained from a river deposit about 3 mi. upstream from the dam. About 30,000 cu. yd. of aggregate from this deposit is now in stockpile. Another deposit located about 3 mi. downstream will be used to supply an additional 52,500 cu. yd. needed to complete the concreting under the present program.

For the 1½-in. maximum aggregate a 1:2.5:4.0 mix is being used; the 3-in. aggregate mix is 1:2.6:5.9. To date a water-cement ratio of 0.56 by weight has been used. It is planned to place the exposed concrete in the spillway and outlet structures with a 0.50 water-cement ratio. Control of the concrete, both in mixing and placing, has been according to the usual Bureau of Reclamation standards.

Organization

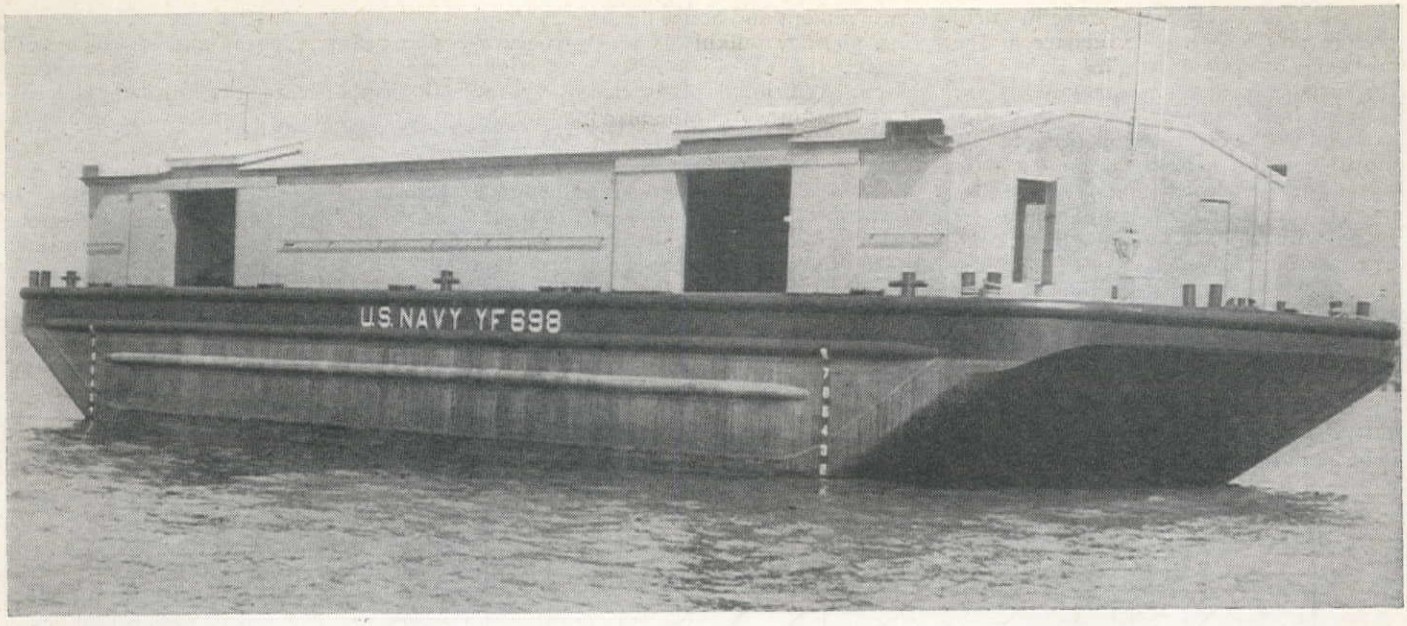
John A. Beemer was in field charge as Construction Engineer of Anderson Ranch Dam until he retired in January, 1944. He was succeeded by H. F. Bahmeier. R. J. Newell is Assistant Regional Director of the Bureau of Reclamation with offices at Boise, Idaho. All design and construction is under the direction of S. O. Harper, Chief Engineer, and the general supervision of H. W. Bashore, Commissioner. J. L. Savage is Chief Designing Engineer.

In charge of construction work for Morrison-Shea-Twaits-Winston is V. A. Roberts, project manager, and Wm. N. Woodall, general superintendent. F. B. Morrison is office manager for the contractors.

The Kaiser Co. and MacDonald & Kahn, Inc., also have small interests in the joint venture contract.

PRINCIPAL ITEMS OF CONSTRUCTION UNDER THE PRESENT WAR FOOD PROGRAM

Item	Quantities Completed by July 1, 1944	Total Quantities Under Present Program
Open cut excavation for dam and appurtenant structures including borrow areas, common	4,340,000 cu. yds.	10,612,000 cu. yds.
Open cut excavation, rock, for dam and appurtenant structures	652,000 "	853,000 "
Excavation, rock, in tunnel	28,000 "	35,000 "
Placing Dam Embankment:		
Earthfill	1,740,000 "	7,720,000 "
Sand and gravel filter	80,000 "	80,000 "
Cobble and rock fill	395,000 "	1,000,000 "
Tunnel supports and liners	187,000 lbs.	200,000 lbs.
Reinforcing bars	465,000 "	3,000,000 "
Concrete in tunnel lining, outlet works, spillway, etc.	21,880 cu. yds.	76,300 cu. yds.
Drilling grout holes	22,400 lin. ft.	40,000 lin. ft.
Pressure grouting of foundation rock	22,000 cu. ft.	40,000 cu. ft.
Excavation for reservoir roads	285,000 cu. yds.	580,000 cu. yds.
Reservoir clearing	450 ac.	4,000 ac.



Navy All-Welded Steel Barge

Bellingham Iron Works, one of the smaller operators, is constructing ten barges—Maximum production is obtained through ingenuity, teamwork between labor and management, and application of shortcuts and practices gained in other trades

By A. E. NIEDERHOFF
Marine Engineer
Bellingham Iron Works, Inc.
Marine Division, Bellingham, Washington

SMALL CONTRACTORS for steel work tend to think that successful shipbuilders can be divided into two classes, one comprising the large established shipyards and the other, those well known and government financed operators who have achieved remarkable goals in production because of the free employment of Federal funds. But there is a third class of shipbuilders who have entered the field during the war, employing private capital, organizing local craftsmen, and building a shipyard and vessels without the benefit of existing facilities or tools and without government financing. An example is the Bellingham Iron Works, Inc., Marine Division, now three years old, employing about 1,200 men and women obtained from the surrounding community and who were normally engaged as tradesmen, mechanics, loggers, farmers and fishermen. This firm builds barges and boats for the U. S. Navy.

This type of shipyard can be found along the west coast and they show an annual profit to the owners not because of superior tools and equipment but largely due to ingenuity, teamwork between labor and management engendering a healthy sense of loyalty, and the application of short cuts and practices gained in other trades. The result is a minimum of strangling, hindering red tape and a maximum of production by a small force of contented workmen.

Production of steel barges for the U. S. Navy in an economical manner without a large capital investment in tools, buildings, and facilities, is exemplified by the pattern of the boatyards at Bellingham, Washington. This can be accomplished as a side line or separate phase of the yard activity. Up to the beginning of 1944, only wood hull boats were constructed in this locality although some of them were fitted with steel deck houses, steel fuel and water tanks, stanchions and gun foundations. Even this metal work was occasionally sub-contracted so that in the yard there were none of the hydraulic presses, shears, bulldozers, furnaces and bending slabs ordinarily associated with steel ship construction. When the contract was awarded to build ten steel barges whose principal dimensions were: overall length 110 ft., molded breadth 34 ft., and molded depth at side 11 ft., 3 in., it became necessary to start construction and acquire vital tools at the same time.

Shipways

Two building ways were allotted to this work, one built for end launching and the other for side launching. The weight of the barges when launched is approximately 125 tons and there were no special problems of strength of the ways to take this relatively light load. At Bellingham the tide fluctuation averages about 6 ft., making it possible to construct the sliding ways in the dry and to launch the barge with plenty of water over the way ends at high tide.

At the peak of employment on these barges only a total of 45 men and women were working in the steel yard and on the ways. The steel yard adjacent to the ways prefabricated the bulkheads, frames, sides and decks. Construction of the bottom and raked ends of the barge was done on the ways. Each of these seagoing, 500-ton lighters had a deck house utilizing steel roof trusses supported on steel stanchions. The roof structure, with the exception of the end frames, was also prefabricated in the steel yard and later lifted onto the deck of the barge.

Facilities for construction were meager and confined to only the bare essentials necessary to produce ten barges. Fabrication was done in the open or under the protection of movable, wood frame, canvas covered tents. A plank flooring over the entire steel prefabrication area served to keep the workers out of the mud during rains. Water, air, and electric power outlets are located at convenient points and toilet facilities are provided for both men and women workers. A small cafeteria within the yard serves hot meals to workers desiring them.

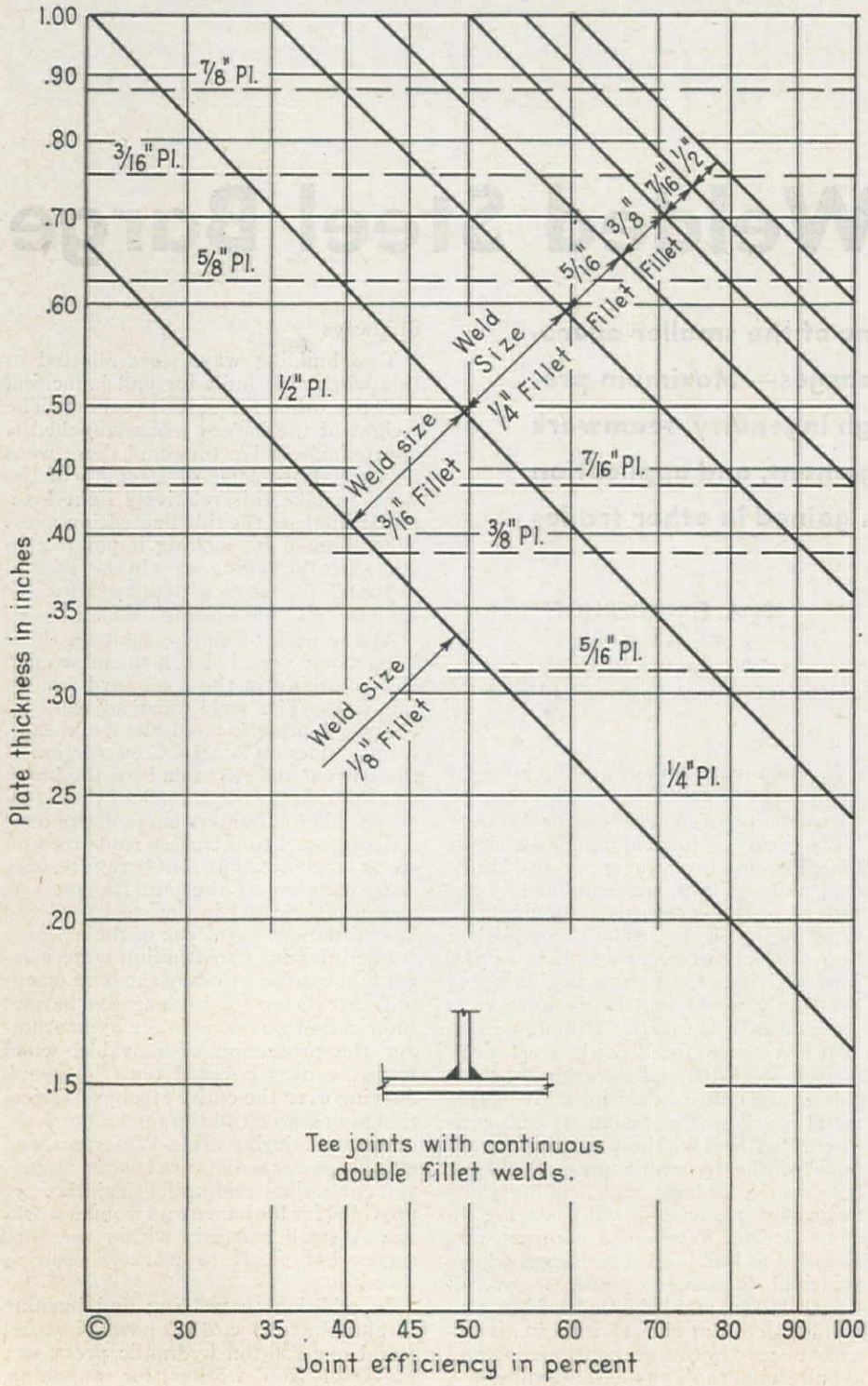
In addition to welding and burning torches the steel yard has now at its command one 250-ton hydraulic press, one universal iron worker for punching,

shearing and clipping, several drill presses and a 6 ft. long furnace at the head end of a small bending slab. Only the furnace is under permanent cover; the remainder of the machines are either exposed to the elements or protected by movable tents. Lifting equipment consists of one truck with a fixed boom having a capacity of 2 tons and one crawler crane with a 40-ft. boom and a rated capacity of 5 tons.

Design and specifications

Under the contract, the Navy furnished three plans showing (1) general arrangement and house details, (2) framing, plating, bulkheads and structural details, and (3) 15 x 23-in. watertight hatch. Additional plans necessary for construction were to be provided by the contractor. Accordingly, six working drawings were prepared after detailed analysis of the local stresses and overall strength of the barge was made. A determination of available materials and tools to accomplish the work was also necessary before plans could be completed. Departure from the plans or substitution of materials had to be approved by the resident assistant supervisor of shipbuilding for the Navy. The working plans thus prepared and approved were drawn in conformity with Navy regulations and became the finished plans submitted to the Navy after delivery of the vessels.

THE CHART indicates the relationship between plate thickness, size of double fillet welds, and the tee joint efficiency that can be obtained through proper welding.



Stresses in the skin plating and deck of these lighters were computed on the basis of a flat, rectangular plate fastened on four edges and carrying a uniform load of 500 lb. per sq. ft. Formulas for flexure developed by Westergaard and substantiated by Bach's experiments on ductile materials indicate a moment coefficient of .06. The resulting stress in the 5/16-in. plates supported and welded to tee sections on 2 ft., 1½-in. centers and transverse frames and bulkheads at 8-ft. centers is 8,400 lb. per sq. in.

The longitudinal tees being continuously welded to the skin plate have a calculated moment of inertia of 23.5 in. assuming 4 in. of skin plate to be effective as flange area of the longitudinal member. The stress under the design load is 10,200 lb. per sq. in. All longitudinals are intercostal with the bulkheads and supported midway by the transverse frame. The use of tee sections eliminates formation of rust pockets where the longitudinals are welded to the hull plating.

Analyzing the rigid transverse frame as a Vierendeel truss with a static load of water on the sides and bottom when submerged 8 ft. and a deck load of 500 lb. per sq. ft. gives a computed extreme fiber stress of only 4,000 lb. per sq. in.

The solid bulkheads are made of ¼-in. steel plate reinforced on one side only by a series of vertical tee shaped stiffeners. These tees are special 4 x 6 in. and are spaced on 2 ft. 1 in. centers. Applicable rules of the American Bureau of Shipping for steel vessels were followed in the design of all parts of the barge.

A few other structural members that should be mentioned are the continuous center line girder supporting the deck and the continuous vertical keel directly under it. The keel supports the bottom plating. Both girders are made up of a ⅜ x 6-in. flange plate and a ⅜-in. web plate 16 in. high for the deck girder and 18 in. high for the keel. The effect of these "backbone" girders is to tie together the transverse members and to distribute local stress to adjacent frames. Three fenders cut from 12-in. extra strong pipe and fitted with a center flat bar for their entire length are welded to the side shell plating of the barge.

The deck house structure consists of a trussed roof made of steel channels resting on channel stanchions. Corrugated plating covers the sides and roof; the latter also has a 1-in. layer of fibre glass insulation on the inside. Four sets of double sliding doors provide access on the sides of the barge for vehicles less than 10 ft. wide. Roof hatches directly over these sliding doors furnish a means of loading the barge by cargo boom from a ship tied alongside.

Welding

The barge is an all-welded structure and as such represents considerable saving in weight, fabrication time and ulti-

mate cost over a riveted barge. Welding conformed to the specifications of the Navy for steel vessels, edition of April, 1940. Under these specifications all shell plating, both butts and seams, had to have a joint efficiency of 100 per cent. The vertical keel butts were also designed for 100 per cent joint efficiency, and longitudinal stiffeners for 75 per cent joint efficiency. Intermittent welding was not allowed, although it is believed that shrinkage stresses arising from welding could have been better distributed if continuous welding had not been specified.

The strength per linear inch of double fillet welds is given in the Navy specifications as follows:

Size of Fillet Welds in Inches	*Strength in Kips per Linear Inch of Double Fillet Weld*
1/4	21
5/16	25
3/8	29
7/16	33
1/2	36

The efficiency of tee joints depending upon the plate thickness and weld size can be obtained from the chart, which appears in the Navy specifications in a slightly different form.

To use this chart for obtaining the size of double fillet weld to fasten the 3/8-in. web of a deck girder to a 3/8 x 6-in. flange, enter the right hand edge of the chart at 0.375. If 65 per cent efficiency is required obtain the point of intersection of the coordinates, and read the size of the fillet weld from the diagonal band in which this point falls. In this case a double 1/4-in. fillet is specified.

Shrinkage strains are produced by the heat of welding and it is vital that all welding be reduced to a minimum that will give a satisfactory connection. Butt welds were made with the very narrowest groove that would give a sound weld. Thus a single V butt joint in 5/16-in. plate had a root of 1/8 in. and a 45-deg. opening of the V groove. Sniping of stiffeners and brackets prevented concentrations of welding extending in several directions, thus relieving the tendency for locked up stresses.

Production figures on machine welding and manual welding were obtained that should prove useful in estimating future work costs. The cost of the Union Melt machine and two Lincoln generators totaled $1,575.00. One helper and one mechanic were used to operate the machine and their combined daily salary was $17.20. In an 8-hr. shift they could do 700 ft. of 1/4-in. fillet or 400 ft. of 3/8-in. fillet. The cost of the materials (excluding power) used in one day averaged $17.10. From the assumption that the machine should be amortized in 3 years at 6 per cent interest, the following daily costs (8 hours) were computed:

	Per Day
Sinking Fund	$ 1.37
Maintenance	.15
Power	.60
Materials (see above)	17.10
Labor (see above)	17.20
	$36.42

This amounts to approximately 37c a pound for weld material in place, or approximately 9c per foot for 3/8-in. fillet weld and 5c per foot for 1/4-in. fillet weld.

Manual welding figured on the same basis yielded the following results:

	Per Day
Sinking Fund	$ .41
Maintenance	.05
Power	.30
Materials	3.10
Labor	9.60
	$13.46

The cost of manual weld material in place amounted to 54c per pound. For a 3/8-in. fillet weld this is about 17c per foot while the 1/4-in. fillet weld costs 13c per foot.

Construction

Construction of the barges falls naturally into two distinct phases. The first is prefabrication on the layout slabs while the second phase is actual construction on the ways.

Bulkheads, transverse frames, side panels, main deck sections and the roof frame for the deckhouse were all prefabricated in advance of their use on the ways. Enough 1/4-in. plate for the 5 solid bulkheads was fitted and welded together on the working slab. Next, the marking

BULKHEADS AND DECK panels are preassembled on the working slab (top photo), bottom plates are welded together on the ways and prefabricated units are set and welded in place (middle photo), and barge is ready for deck panels (bottom photo).

off and prick punching of the steel was done by use of templates allowing less than 1 in. clearance between adjacent edges. Before burning out these shapes the stiffening tee sections were tack welded in place having been previously cut to required length. An automatic welding machine was then used to fillet weld these tees to the bulkhead plate.

After the five bulkheads had been stiffened with tees and fitted with horizontal flat bar stiffeners between the last outboard tee and the edge of the plate, they were burned apart along the scribed outlines. The camber on the deck being straight, the only curved lines on the bulkheads were at the bilges. Extensive use of automatic burners operating on straight tracks materially speeded up the work. Side panels were similarly pre-assembled.

The open transverse frames entailed considerably more work. An inner flange had to be fillet welded to the web of the frame and stiffening brackets and flat bars welded in place. The corners were reinforced to make the frame act as a Vierendeel truss. To allow the longitudinal stringers on the barge bottom, deck, and sides to pass through the frame, notches were burned out along the outside edges at appropriate spacings. The center keel and deck girder are continuous and each open frame was cut at the center-line to be welded later to these barge girders. A total of 60 pieces made up the open transverse frame while only 34 pieces were used in fabricating a solid bulkhead. Fabricating costs could have been very substantially reduced if rolled sections with one flange burned off had been available instead of using two plates.

Construction on the ways followed the usual procedure of fitting sheared plates with one edge joggled, as continuous strakes 125 ft. long, forming the bottom and raked ends of the barge. The joggled edge provided a landing of 2 in. and made fitting of the plates far simpler than would be the case with butt joints. Tack welding held these flat plates in place while the continuous keel and the intercostal longitudinal tees were fitted and tack welded in place. The end longitudinal tees are curved in an arc having a radius of 14 ft. at the lower part where they join the bottom longitudinal members. The straight part of these members were fitted and welded in place except for the curved portion which was left free until the raked ends of the barge were pulled up from a flat position to their final shape.

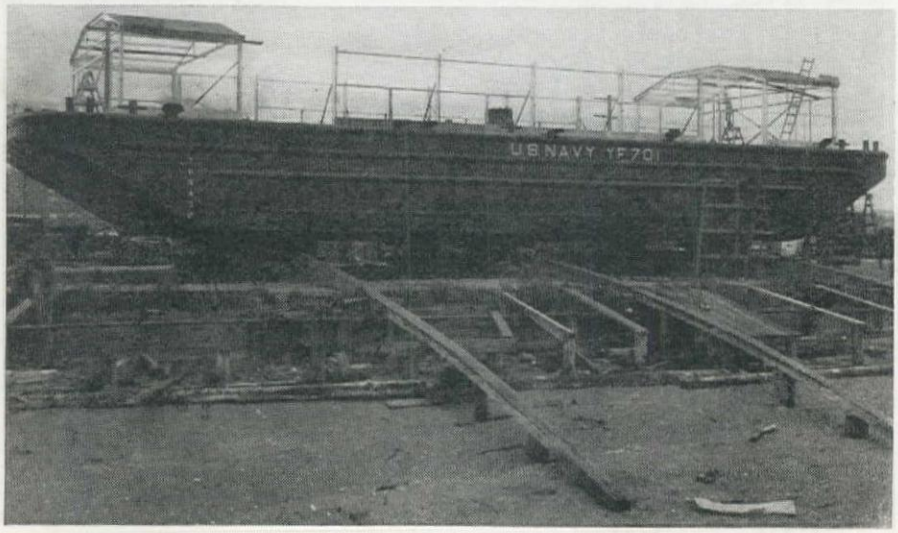
The ends of the barge were bent up by lifting them with a crawler crane while the flat bottom was held down by its own weight. When the proper slope was obtained, the ends of the barge were shored up in place and the solid bulkheads and bottom portion of the open transverse frames were fitted and welded. Following this the sides, in pre-assembled large sections, were fitted and welded in place.

The hull of the barge was completed by connecting panels of the deck in place and finally welding on the curved bilge plates. In all of the work the sub-assemblies were planned to eliminate virtually all overhead and most of the vertical manual welding. The extensive use of the welding machine was the source of economies in time and cost that are reflected in the data given below. On the first barge constructed, all welding was manual while on the third barge the greatest possible use of the automatic machine was achieved.

	1st Barge	*3rd Barge*
Weight of hull, tons	126	126
Total weight of barge, tons	153	153
Man hours of labor	16,800	14,300
Cost of labor	$27,031	$20,300
Material Costs	$10,843	$ 9,997
Other costs	$12,779	$10,280
Days on the way	60	45
Total completion time, days	90	68

It is anticipated that figures for building the tenth barge will show even greater proficiency and lesser cost than the figures quoted above for the third barge.

THE NAVY BARGE is nearly ready for launching. The deck has been welded and the deck-house is under construction. Photo is taken at low tide. At high tide about 5 ft. of water will rise above the ends of the ways, giving ample depth for side launching.



Acknowledgments

The author is deeply indebted to the owner of Bellingham Iron Works, Inc., Mr. A. W. Talbot, for wholehearted cooperation in allowing the assembling of data and taking of pictures within the shipyard. Thanks is also tendered to the Company's Chief Naval Architect, Mr. W. C. Howell, and to the Superintendent of the Steel Yard, Mr. V. E. Valentine. Several other engineers and mechanics have also contributed worthwhile suggestions.

If the majority of steel contractors have recently heard little of this field of construction it is because the more spectacular achievements of larger shipyards have monopolized the press reports. While it is a fact that lifting large tonnages of prefabricated sections onto the deck of a ship or constructing a 10,000-ton vessel in ten days are close to miracles and newsworthy, the majority of smaller operators are anxious to learn of opportunities whereby they can gainfully employ their limited means, equipment and personnel. It is believed to be the function of the technical press to so report these opportunities.

Nebraska Work Resumed Under War Food Program

COMPLETION BY the Bureau of Reclamation of the Mirage Flats project to irrigate 12,000 ac. of land in northwestern Nebraska has been authorized.

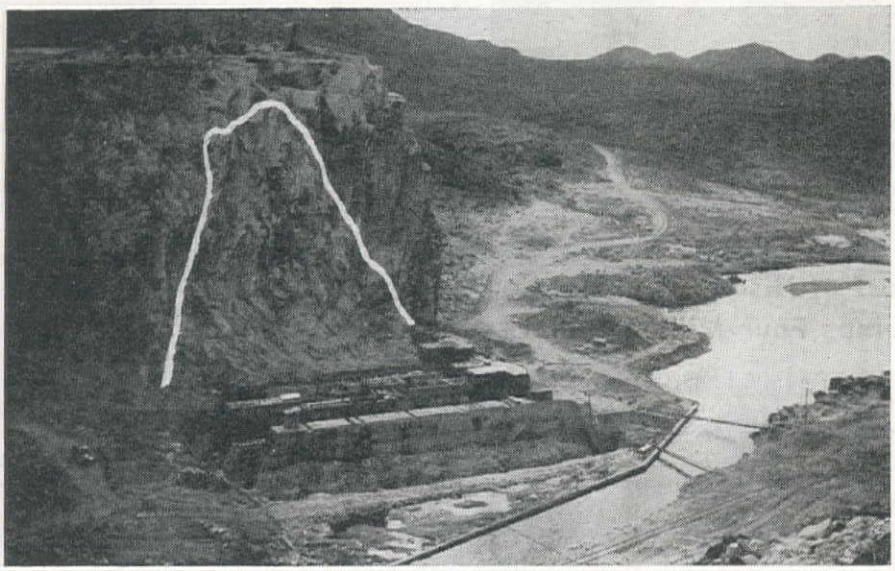
Proposed work on the project lands, located near Hay Springs, Nebr., in Dawes and Sheridan counties, involves completion of the construction on the Niobrara river of a reservoir of approximately 30,000-ac. ft. capacity to provide a full water supply for 12,000 ac. of good land which is now being dry-farmed. An earth and rock-fill dam, which is now about 60 per cent completed, is the principal engineering feature of the project.

Development of the project, including the construction of a storage dam, a diversion dam, and a distribution system, with the preparation of 12,000 ac. of land for irrigation, was approved on April 26, 1940, under the Interior Department Appropriation Act of 1940. Construction was halted, however, by order of the War Production Board on Dec. 12, 1942. Because an adequate water supply for this Nebraska land would increase production of vital food and forage products, the War Food Administrator concurred in a recommendation by the Bureau of Reclamation to the War Production Board that construction be resumed. On Jan. 29, 1944, the WPB approved the project for construction under the war food program.

Advancing costs during the period following the original Presidential approval, delay in shipping and transportation which retarded delivery and added to overhead costs, loss of trained personnel, and other factors contributed toward making it impossible to complete the project without additional funds. The estimated total cost will approach $3,100,000.

Buttress Dam Without Steel

High quality concrete with low heat cement is used by Mexican commission in the construction of a buttress dam 187 ft. high. Because of the steel shortage, no reinforcement will be used. The commission believes that properly placed contraction joints will take care of all deformations



SITE OF Las Virgenes Dam, showing a trace of the buttress height on the right abutment. Four buttresses have been constructed about 30 ft. above foundation. The diversion channel will be used during the major part of the construction period.

By FEDERICO BARONA de la O.
Chief of Testing Laboratories,
Mexican Commission of Irrigation
San Jacinto, D. F., Mexico

A NEW DEVELOPMENT of the Conchos River reclamation project under construction in the state of Chihuahua, the Mexican state lying immediately to the south of Texas, will place under cultivation additional lands of excellent quality to the extent of 53,000 ac. The project is being undertaken by the Mexican Commission of Irrigation.

The main feature of the new development is Los Virgenes Dam, on the San Pedro River, which consists of two rolled earth dikes and a central concrete dam of the round-head buttress type. The structure will form a reservoir with a capacity of 344,551 ac. ft., and spillways will be provided for a maximum discharge of 211,887 cu. ft. per sec. The height of the concrete dam is 162 ft. above bedrock, and it is 620 ft. long.

Foundation rock is an excellent, sound and uniform rhyolite having a compressive strength of 10,000 lbs. per sq. in. and a modulus of elasticity of 5,000,000 lbs. per sq. in. The rock below the river bed being almost completely impervious, no considerable cut-off wall is required, its average depth being only 13 ft. below rock level.

Buttresses and joints

Buttresses are 187 ft. high with a thickness of 10 ft. at the bottom and 5 ft. at the top. They are spaced 29½ ft. center to center, and they are built in vertical blocks 50 ft. long separated by 4½-ft. intervening spaces. These spaces are provided to take care of contraction in the concrete. The contact surfaces in these joints are inclined in a sawtooth fashion in order to follow the direction of the principal stresses and to provide keys for later adequate mechanical bond with the adjacent main blocks.

The filling does not take place until concrete in the adjacent blocks is (a) at least two months old, (b) in a good dry condition, its curing having been discontinued at least three weeks before and no rains having occurred during those three weeks, and (c) its temperature and the outside temperature are not higher than 53 deg. F.

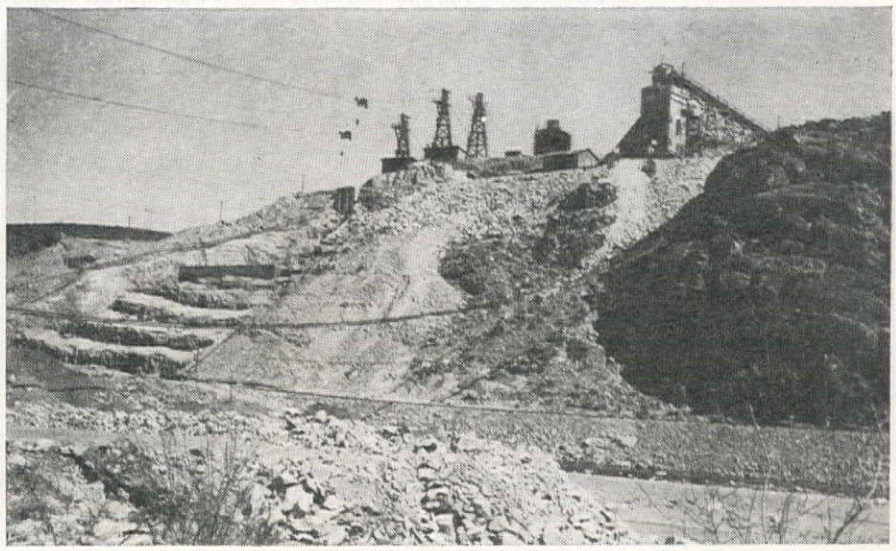
Generally, and for construction reasons, the filling of the intervening spaces between buttresses is made after a height of from 25 to 50 ft. has been reached. This corresponds to from 5 to 10 lifts, since all concrete is poured in the main blocks in 5-ft. lifts.

Construction is carried on in such a way that all the blocks in any one buttress are kept at the same level; that is, no new level is started until all blocks (with the exception of the intervening spaces in the preceding lift), are completed.

Reinforcing steel saved

Because of the scarcity of reinforcing steel during the present emergency, special provisions have been taken to assure that no contraction of importance will occur in the buttresses which are of mass concrete. One of the most important features that has operated to avoid cracking in the buttresses and has resulted in a considerable saving in rein-

FOUNDATION ROCK for the left abutment is a sound and uniform rhyolite having a compressive strength of 10,000 lb./sq. in. Foundation trenches have been dug for the buttresses. The concrete mixing plant and transportation cableways are shown.



forcing steel is the use of a high quality low-heat cement throughout the construction of the dam. It is estimated that about 2,000 tons of reinforcement has been saved by this provision.

This low-heat cement has been found very efficient because its content in total silicates is high—around 76 per cent—and its content in aluminates is unusually low, about 3 per cent of tricalcium and 13 per cent of tetracalcium aluminum ferrite. Alkalis are also low, averaging only 0.53 per cent. These desirable features in the low-heat cement are made possible because of the high silica content of the materials used in its manufacture. This raises the cost somewhat due to the higher degree of hardness encountered in grinding, but it produces a very desirable cement.

The concrete produced with this cement, using 0.99 bbl. per cu. yd., gives an ultimate compressive strength of about 5,700 lbs. per sq. in. All concrete is compacted by vibration with pneumatic vibrators. It is transported from the mixer to the point of placement by cableway.

The cement is manufactured in the Monterrey dry process cement plant of "Cementos Mexicanos, S. A." It is mixed in a concrete plant composed of two 2-cu. yd. mixers, located on the right abutment.

The river was diverted during most of the construction operation through a channel of trapezoidal section which ran between the buttresses. When the buttresses are completed this diversion channel will be closed during a drought season.

The construction is not being done by contract but by the forces of the Commission of Irrigation. All engineering activities of the Commission are under the direction and supervision of its executive commissioner, Adolfo Orive Alba. The author is in charge of all testing of cement and aggregates.

In the September, 1943, issue of *Western Construction News*, Sr. Alba presented a resume of the activities of the Mexican Irrigation Commission.

ADOLFO ORIVE ALBA heads the engineering activities of the Commission of Irrigation. This commission is directing and supervising construction of Las Virgenes dam.

Cost of Nisqually Project Jumps Four Million Dollars

THE ESTIMATED COST of the second Nisqually project now under construction by the city of Tacoma, Wash., has jumped from the original estimate of $19,650,000 to $23,000,000. It may be necessary to float a new $4,000,000 bond issue to complete the project, which includes two dams on the Nisqually River, two powerhouses and a diversion tunnel. The increase in cost is due partly to increased wage rates and material costs since the contracts were awarded in April and June, 1942. Representatives of the Charles T. Main Co., an engineering firm of Boston, Mass., which was called in to supervise construction of the project, were unable when interviewed to account for the discrepancy in any other manner than by saying that the original base cost had been badly underestimated.

Rubber Relief Maps Aid Army Invasion Forces

COLLAPSIBLE RUBBER contour maps of enemy coastlines, made for the Navy by a process developed in laboratories of United States Rubber Company, have assisted in planning recent landing operations and have reduced casualties among our invasion forces. The most recent use of these maps was in the invasion of Northern France.

Rubber models of Salerno, about 5 by 7 ft. in size, indicating gun emplacements and pillboxes as well as natural landmarks, were rushed by plane to North Africa and crossed the Mediterranean with General Mark E. Clark's army of invasion.

The means of instructing the landing forces with accurate, well-displayed knowledge of their coming battleground is claimed to be of incalculable value. The men know what to expect, where the concealment of the enemy is most likely, and where they can fox-hole with most safety. All this knowledge results in more effective assault and the saving of lives.

In the manufacture of the rubber maps, information is gathered from all possible sources and brought up to date by aerial photography. From this data a model is built showing the coastline rising to mountains with all existing buildings and construction as well as natural landmarks.

From the model a plaster negative is cast, with mountains showing as depressions. On this negative model, natural rubber latex is sprayed and dried. After reinforcements to prevent the thin layer of rubber from collapsing in its mountainous areas, the model is cured, stripped from the mold, colored to simulate the actual landscape, and the result is a contour map or model of an invasion coast which may be rolled up and transported by plane or landing boats and studied by invasion forces right up to the time of actual landing.

TWO OF THE buttresses shown during construction. The one on the right is four 5-ft. lifts high. Two of the intervening spaces that permit free concrete contraction are shown. These spaces are filled after the concrete has cured for about two months.

Los Angeles Will Buy Unused Boulder Power

THE LOS ANGELES, Calif., Department of Water and Power in July contracted for the purchase of approximately 268,252,898 kw. hr. of additional unused energy from the Boulder power plants during the current fiscal year, at the firm rate of .00124 per kw. hr. The purchase is a cut-back from the 1,190,000 kw. hr. of energy contracted for by the Defense Plant Corporation, released due to production curtailment at the Basic Magnesium plant in Las Vegas, Nev. The purchase was arranged in consultations between the Department, the Southern California Edison Co., and the Secretary of the Interior. The additional power from Boulder will displace steam plant energy, and will conserve an estimated half million bbls. of fuel oil, an important contribution to the current scarcity.

World's Fastest Wind Tunnel

The new wind tunnel is capable of generating super-hurricanes in the testing of model planes and sections up to 11 ft. in width—Specifications limited construction tolerances to 1/8 in. in the bellmouth and 10 x 8-ft. test sections of the tunnel

AMERICA'S FASTEST large wind tunnel, an aeronautical "test-tube" capable of generating super-hurricanes approaching the speed of sound in which will be born and nurtured many of the planes of the future, was erected recently for the Boeing Aircraft Co., in Seattle, Wash., by the Austin Company, contractors.

Named the Edmund T. Allen Memorial Aeronautical Laboratories in honor of a Boeing test pilot and scientist who lost his life last year in an airplane test accident, the new wind tunnel is a modern research unit with many features which mark it as a distinct step in the progress of aviation.

Fastest of any wind tunnel in the country with test sections more than 2 feet in diameter, the new Boeing experimental laboratory can produce gales in the 700 mi. per hr. range, approximating the speed of sound, through its 12-ft. test section.

The new tunnel is a self-contained research unit, complete with model design and construction facilities and computing laboratories, as well as actual testing quarters. It has numerous experimentation conveniences and refinements never before built into any single tunnel, and is streamlined for efficiency of operation.

Model planes with wingspreads up to 11 ft., or full-scale airplane sections of the same maximum size, can be tested in the new Boeing tunnel. An outstanding feature is that all tunnel controls are centralized in the panel board before the test section, at the same place where model observations are made.

The tunnel's tremendous flow of air is created by a great propeller-like fan 24 ft. in diameter. This fan consists of 16 laminated spruce blades and is mounted on the end of a 37-ft. solid steel driveshaft, 16 in. in diameter, which connects the fan with the motor and clutch.

The tunnel bore is a complete, continuous-return structure which follows an approximately rectangular course 450 ft. in length. When operated at high speed, the air completes the 450-ft. circuit in less than two seconds. Inasmuch as 11 per cent of the air in the wind tunnel is expelled and replaced with fresh air at every "round trip" for cooling purposes, under high speed operation the air in the tunnel is completely replaced with fresh air three times per minute. A pagoda-like structure, known as an interchanger tower, is located atop the tunnel building and is used for the intake and exhaust of this air.

THE CUTAWAY drawing of the wind tunnel shows the power unit, operations room and office quarters and the tunnel itself. Important features include the large fan, the turning vanes and the test section.

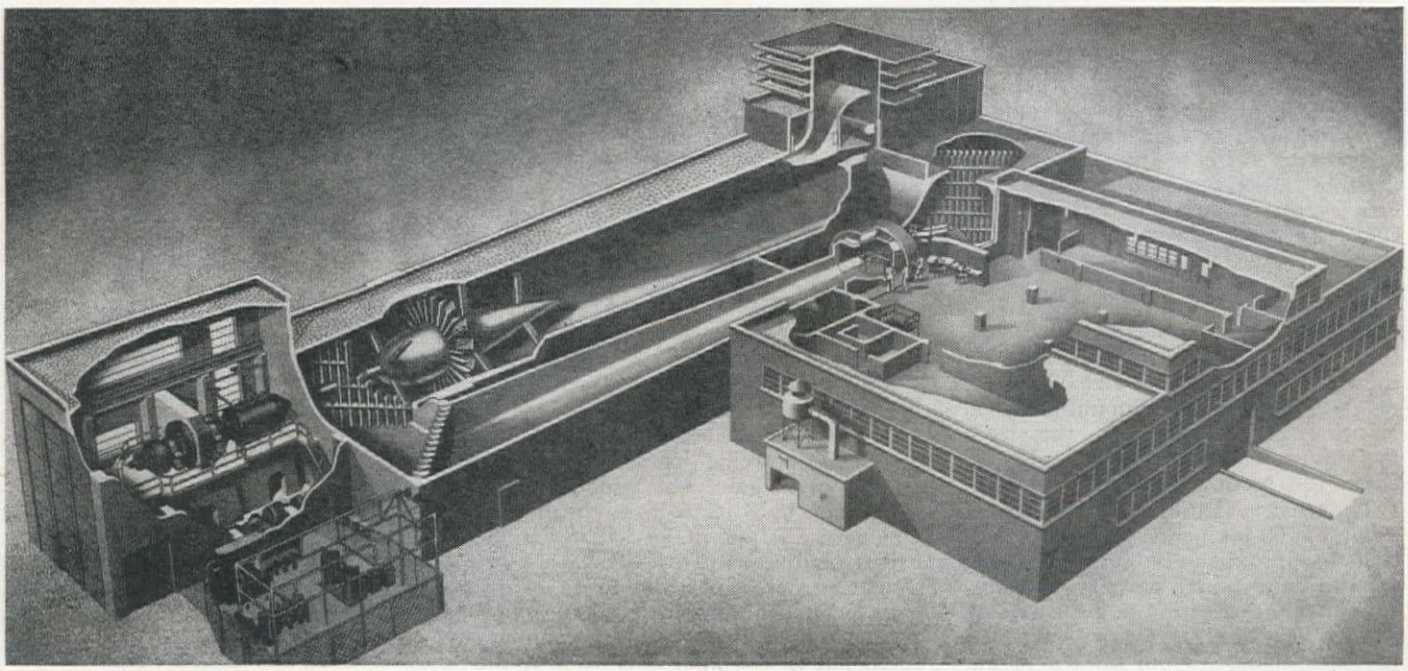
Model shop adjoins

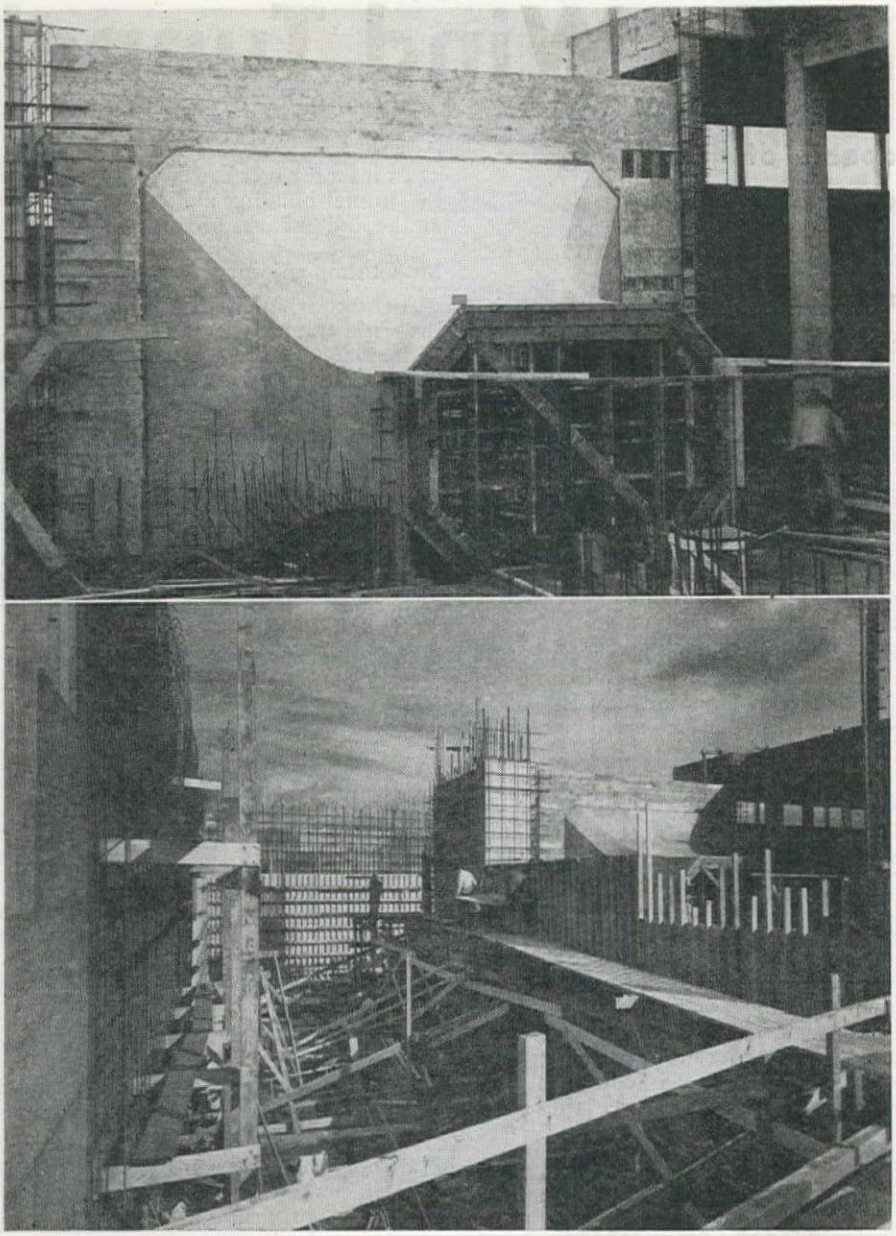
An aerodynamics laboratory adjoins the wind tunnel, with a reception lobby and model building shops on the first floor and engineering offices and tunnel operations room on the second. This arrangement permits Boeing engineers to design, build and test models in the same building.

In construction this adjoining building was absolutely isolated from the wind tunnel itself by an expansion joint that extends through floors, walls and roof. The entire building and wind tunnel was built on piling driven to 40,000 lb. bearing capacity with piling approximately 35 ft. long. The foundation of the test section was again isolated from the supports of the tunnel itself and a group of sixteen piling was driven to support the balancing equipment under the test section and to permit the reading of the delicate instruments there installed that might be subject to vibration by the operation of the tunnel.

At the test section the tunnel is 12x8 ft. with 2-ft. corner fillets. The model is mounted in the test section on a turntable which can be operated so as to place the model in various positions. There is a movable faring constructed of plywood. The upper portion of this faring can be removed in one piece and the two walls are in the form of panels that drop down for access to the model.

In operation, with wind velocities of 700 mi. per hr., a pressure of 1,000 lb. per sq. ft. inward is developed at this section and a steel pressure cap was designed to enclose the test section. The





THE UPPER PHOTO pictures the inner form for the bellmouth of the new tunnel. Specifications limited tolerance to ⅛ in. in this section. The lower photo shows an early stage in the construction of the 450-ft. reinforced concrete tunnel.

skin of the pressure cap is 3/16-in. plate reinforced with tees placed at approximately 18 in. on center. This cap is moved back and forth by a push button control at the main switchboard.

From the test section, the tunnel increases in size to the first corner, where the area is 20x20 ft. At the second corner the tunnel is the same size, but at the nacelle the section changes to a circle 24 ft. in diameter. Approximately 100 ft. from the nacelle the section is increased to 27½ ft. x 27½ ft., and excepting at the air interchanger, the size of the tunnel does not change again until the bellmouth is reached. In 25 ft. the size of the tunnel is again reduced to 12x8 ft. at the test section.

The wind velocities vary from a maximum of 700 mi. per hr. at the test section to approximately 80 mi. per hr. at the third and fourth corners. The pressure at the test section under maximum wind velocity is 1,000 lb. per sq. ft. The pressure changes from inward to outward as the wind velocity changes in travelling through the diffuser section and a maximum pressure of 250 lb. per sq. ft. outward is reached in the nacelle and remains constant from there to the bellmouth.

Air temperature regulated

In order to reduce the temperature of the air, two methods are used. The vanes at the corners are sprayed on the interior with water, which is wasted. Approximately one-fifth of the air is removed at the air interchanger and fresh air is drawn into the wind stream through the air intake. The amount of air removed at the air interchanger is controlled by a large intake gate valve which is 27 ft., 6 in. wide by 3 ft., 6 in. high and the exhaust is 27 ft., 6 in. by 5 ft., 8 in. The exhaust gate is rubber sealed.

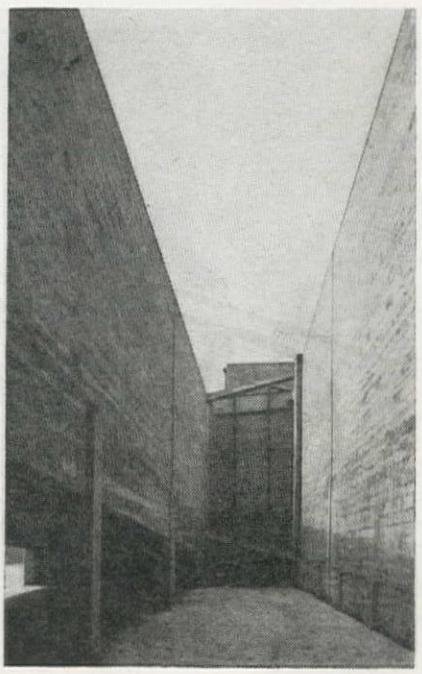
The corner vanes are made of 12-gauge Armco ingot iron. These vanes are made adjustable for preliminary tests, but in the final operation of the tunnel will be welded in place permanently. The water is fed by a centrally located pipe in each vertical series of vanes. Holes are drilled in these pipes to spray the water against the walls of the vane. The air interchanger is in the form of a deflector that removes a portion of the air from the main wind stream. As it may be necessary at some future time to change the contour of the air interchanger the entire construction was made of wood. As there is a possibility of flutter or chatter in this construction at the air interchanger, the beams were installed in steel beam seats to take care of vertical loads both up and down. Due to the possibility of shrinkage in these beams, the seats were made adjustable.

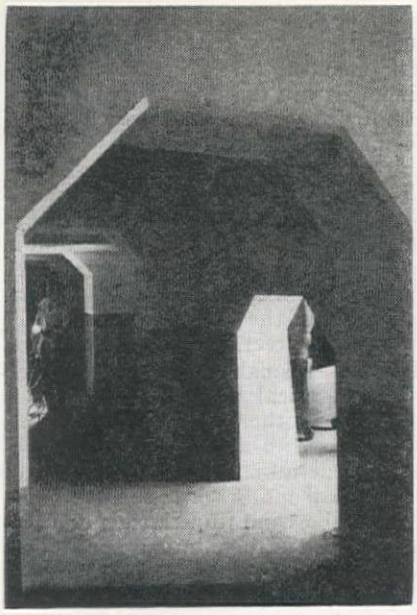
The tunnel is divided into a number of sections to take care of expansion of the concrete due to the 70 deg. variation in temperature. Certain of the joints are designed to take pressure of 150 lb. per sq. ft. inward and 250 lb. per sq. ft. outward. At one time rubber filler or wedging pieces were considered, but due to the fact that it was not possible to get a positive connection between the concrete and the rubber, this idea was abandoned.

Fan mounting

The wind obtains its velocity by a fan located at the nacelle. The fan was installed by the Boeing Aircraft Co. A motor of 18,000 h.p. driving a 14-in. solid steel shaft at 514 r.p.m. is the power unit for the 24-ft. diameter fan. The shaft at the fan is supported to the tunnel walls by thirty pipe struts. As the revolution of the fan had a tendency to produce a rotation of the wind stream in the tunnel, prerotation vanes are attached to each of the thirty struts. These prerotation fans are movable to an angle of 35

THIS CANYON lies between the two longitudinal sections of the tunnel. The columns on the left support the critical diffuser section. The distant cross bracing takes care of the torque strain from the propeller.





MOTOR FOUNDATIONS supporting the 18,000 h.p. electric motor are constructed of reinforced concrete. They rest on 35-ft. piling driven to 40,000 lb. bearing capacity.

deg. In order to reduce the air turbulence, the nacelle is installed about the operating mechanism for the prerotation vanes. Under normal operation no particularly excessive vector movement is developed at the fan, but due to a possibility of the fan's shedding a portion but not all of its blades, the struts and the exterior supporting concrete had to be designed to provide for approximately 250,000 ft. lb. of vector movement.

The forward part of the nacelle is constructed of 12-gauge metal skin fastened to bent angle rings. Access doors are provided into the nacelle, as it is the intention on some tests to have an observer watch the operation of the fan. The rear portion of the nacelle is of wood built up on laminated plywood ribs. The nacelle is supported before and aft of the fan by steel struts which are encased in farings of 12-gauge sheet metal.

In order to move in equipment and for general access, a number of access doors were provided into the tunnel. These doors of necessity had to be flush on the inside of the tunnel without any hardware protruding from the face of the door. Some of the doors had to be designed for inward pressure, others for outward, and still others for both inward and outward. In general these doors were built of wood frames with steel and sealed with rubber gaskets and special locking devices to prevent chatter.

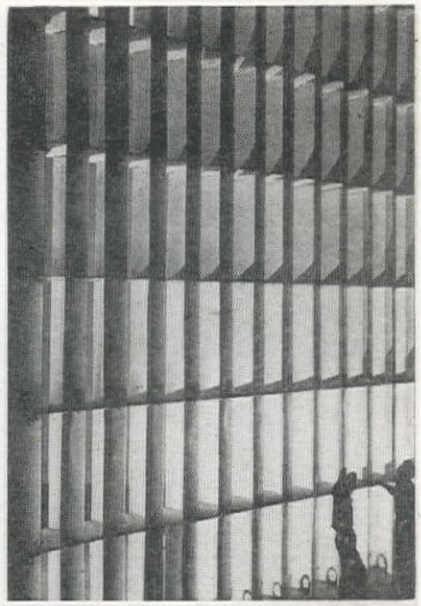
Bellmouth shaping

Perhaps the most interesting piece of construction was in the shaping of the bellmouth. As the tolerances for the construction of the concrete from the bellmouth through the diffuser section were confined to a permissible variation of 1/16 in. either way from the true dimension, considerable study was given to the formwork for the section. At various stages consideration was given to building the bellmouth oversize and putting on a plaster finish to the exact close dimension. At another stage, for forming the bellmouth, wood was considered in several different forms. One of these was bending narrow strips of wood to the desired form and another was to build the form out of heavy laminated wood and then adz the form to the proper shape. It was finally decided to build the inner form in a vertical position out of metal lath and plaster. This form was constructed in one piece, heavily braced, and was tilted from a vertical to a horizontal position. After the reinforcing steel for the walls of the bellmouth was in place, the exterior form was built. The floor of the bellmouth was poured first, together with the side walls up to the floor of the test section, and the balance was poured in a later operation. The fillets in the entrance to the bellmouth, approximately 6 ft. measured along the center line of the tunnel, were built of wood covered with metal lath and plaster fitted against the shoulders of the walls, floor and ceiling.

From the diffuser section through the four corners to the bellmouth, the tolerance permissible in the formwork was 5/16. in. from the required dimension. The great variety of changes in sections and changes in fillets presented a constant problem in building the formwork, particularly fore and aft of the fan, where the sections change from rectangular to full circular and back to rectangular again.

Electrical installations

The new wind tunnel is powered by a 12,000 h.p. constant-speed electric motor which runs at 514 r.p.m. and which was built on Boeing specifications by Westinghouse Electric Co. The motor can develop an overload of 18,000 h.p. for short periods of approximately 20 min.

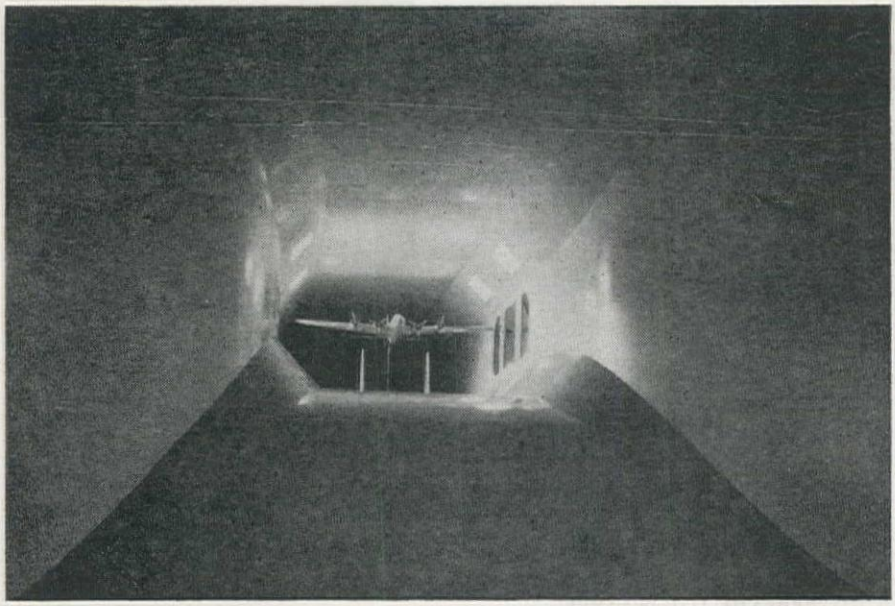


TURNING VANES are located at each of the four corners of the tunnel. They guide the course of the air in such a manner as to eliminate turbulence and result in highest possible wind velocities.

Careful research and planning has resulted in one of the most efficient electrical installations ever made on a wind tunnel. A special transformer station was built to step down the 26,000 volts of the main transmission line to the 6,900 volts required by the main motor. This substation is situated outside the wind tunnel building and gives the tunnel a power source independent of other power lines used in the plant.

The main motor, 11 ft. in diameter and weighing 60 tons, is connected directly to the largest dynamatic clutch ever

THIS GIANT 16-bladed 24-ft. fan has a top speed of 490 revolutions per minute and generates wind velocities approaching the speed of sound. Projecting out from its hub is a conical-shaped fairing which prevents turbulence of the moving air.



TEST SECTION of the Boeing wind tunnel, with a model plane in position for a test. It is at this point of the tunnel that the wind reaches its maximum velocity, about 700 m.p.h. The smooth finish of the walls and fillets practically eliminates friction.

built. The clutch, in turn, operates the 16-blade fan which turns at a maximum speed of 483 r.p.m.

The main motor is of such size that a 400-h.p. starting motor is required to place it in operation. This starting motor turns the main motor until the latter reaches its maximum speed of 514 revolutions per minute, at which time the current is applied to the main motor and the power picks up the turning load.

The dynamatic clutch is electronically controlled and the speed transmitted to the fan blades can be regulated to within a plus or minus one-tenth of one per cent of the speed desired.

The main motor drive shaft rotates a cylinder within the dynamatic clutch at the motor's constant speed—514 revolutions per minute. Inside this cylinder is a rotor which follows the speed of the cylinder in proportion to the amount of power supplied the rotor through a separate exciter motor. When maximum power is supplied the rotor, it revolves at a speed of 483 r.p.m., which is maximum speed of the fan. The rotor drives the fan by a direct shaft connection.

There is a smaller dynamatic clutch in the electrical installation which is driven by another exciter motor. This clutch is used to drive the variable frequency generator which supplies power to the small motors in airplanes being tested in the wind tunnel, thus controlling the speed of the miniature propellers on the models.

A prime consideration throughout the construction of the tunnel was that of convenience to those who were to operate it. For instance, an overhead monorail system is used to transport models from the construction shops through the operations room and into the test section, where the pressure cap is completely removable to permit ease of installation. The tunnel is sound-proofed throughout and even its highest speed operation is scarcely audible in adjoining quarters.

Bridges of the Pan-American Highway

Bridge erection is an important phase of building the road which will one day link all the American republics—Numerous international structures of special importance—U. S. Public Roads Administration and the several Latin-American countries are splitting the cost of the new bridges

By EDWIN W. JAMES
Chief, Inter-American Regional Office
Public Roads Administration
U. S. Federal Works Agency

NEW BRIDGES along the Pan American Highway route through 18 countries are playing an important but little publicized role of tying the Americas together in closer bonds and of accelerating development, production and transport of critical war materials. Of special importance are the international bridges now linking 10 of the American republics. Latest of these to be completed is the 480-ft. Rio Goascoran highway bridge connecting El Salvador and Honduras.

The war, which brought the compelling necessity for improved land communications "south of the border," particularly in Mexico and Central America, is responsible for increased bridge construction as well as road-building on the artery to the Americas. The Corps of Engineers did a great deal of work on pushing a "pioneer" road through gaps on the highway in Central America before they withdrew on Oct. 31, 1943.

The result of the war-expanded bridge and road construction program is that the number of unspanned streams and rivers on the Pan American Highway route, between Laredo, Texas, and Buenos Aires and Rio de Janeiro, has become fewer and fewer. Nevertheless, along the hemisphere highway, bridge construction still remains to be done in southern Mexico, Nicaragua, Costa Rica, and Northern Panama, as well as in South America.

The bridge and highway construction on one of the gaps in southern Mexico—a 145-mi. stretch between Comitan and Tapachula—presents such formidable obstacles to bridge and highway engineers that there is some doubt whether the Mexican Government will be able to finish the Mexican section of this international highway until after the war. Here the highway crosses the towering Sierra Madre range at an altitude of 6,500 ft. However, the work is going ahead, and an army of workers is now pushing construction up the precipitous sides of the inland range from Tapachula, near the Pacific Coast.

The resolution with which Mexico is tackling her part of completing the Pan American Highway system was described recently by President Manuel Avila Camacho. He told the nation that the Administration proposes to continue work on the highway with utmost effort this year. Mexico, he said, considers completion of her section of the highway was "an obligation to the countries of the hemisphere."

Meanwhile, bridges are being constructed along the Inter-American Highway route in Costa Rica by the U. S. Public Roads Administration under the inter-American cooperative road-building program. In South America, bridges still remain to be built in several parts of the Pan American Highway system to provide all-weather, all-year travel.

Bridge building along the Pan American Highway "south of the border" has duplicated in the last two decades much the same trend which the United States experienced earlier. Before 1900, the

principal demand for bridge construction in the Americas was in connection with the building of railroad transportation systems. At the turn of the century the need was for bridges of increased strength and clearance to provide for the increasing size, weight and speed of trains. But the rapid development of automobile traffic in the United States, about 1915, created a new phase of bridge building in the United States which the other Americas did not generally witness until later.

As highway traffic increased in the United States, there was a demand for more and better roads, and later for express highways. This created not only the demand but the economic justification for bridges of unprecedented dimensions over crossings that previously were left unspanned. With the beginning of the Pan American Highway in 1930, came encouragement for the building of both international bridges and others within national boundaries in the other Americas.

Historic structures

The new bridges in Latin America are modern in design, well planned as to strategic location, vital to the economic life of the Republics and important in international communication, both in war and in peace. But there are other structures of historical interest still in use today which furnished the early links in a system the magnitude of which at that time was not even imagined. One such bridge, for instance, is Puente Esclavos (Slaves Bridge) in southern Guatemala, on the Pan American Highway route. This stone arch bridge, built with slave labor around 1592 and rebuilt in the early seventeenth century, is still in use but is wide enough for only one-lane traffic. It is to be hoped that this ancient bridge will be preserved and that a modern bridge will be erected at a favorable location nearby to handle the highway's heavy traffic. In the case of many of the beautiful bridges of Colonial times still in use today, modern roads are often built, even at the cost of additional funds and planning, in such a fashion as to conserve their use and beauty and preserve these rightly famous architectural treasures.

In Mexico there is a bridge furnished with a gateway similar to most of the bridges built in Europe before the eighteenth century. An interesting example is found about 10 mi. from Mexico City on the road leading to Teotihuacan. The long causeway is flanked by old guardhouses. Their use was presumably only military. They probably were built there because the causeway was near the last of the overnight stops in the perilous journey which the Viceroys, sent from Spain to govern Mexico in Colonial times, had to make to the capital after landing at Vera Cruz.

Again, beautiful examples can be found in Mexico of the so-called old Roman "bridge." Many of the old Roman "bridges" were not properly bridges at all, but aqueducts. Mexican examples of these are: the ruins of one in Mexico City itself, that in Morelia, and another magnificently arched structure outside of Queretaro which still carries the water supply across the valley as it did more than 200 years ago. An aqueduct near Guatemala City is another example.

International bridges

Of the new modern highway bridges in the other Americas, the most noteworthy are the international bridges joining 10 of the American republics and the $700,000 Cuscatlan bridge spanning the Lempa river in the interior of El Salvador. Puente Cuscatlan is the longest suspension bridge in Central America.

The international bridges cross the boundaries of the United States and Mexico; Mexico and Guatemala; El Salvador and Honduras; Colombia and Venezuela; Colombia and Ecuador; Brazil and Uruguay, and another such bridge, still under construction, will join the borders of Brazil and Argentina across the Rio Uruguay.

According to Brazilian reports, a second Uruguayan-Brazilian international bridge will be constructed at Quarahy, Brazil, across the Artigas river, connecting with the town of Artigas, Uruguay. Another international bridge that has been proposed is a publicly-owned structure to be built within a few blocks of the present international bridge across the Rio Grande between Laredo, Texas, and Nuevo Laredo, Mexico.

Bridges—both highway and railroad—cross the United States-Mexico border at several points, but the much-traveled highway bridge connecting Laredo and Nuevo Laredo is probably the best known. In times of normal travel thousands of persons drive over this structure each month.

This well known bridge has a total length of 1,400 ft. (427 meters). The two-lane highway is 24 ft. (7.3 meters) wide, flanked by pedestrian walks which are each 8 ft. (2.4 meters) wide. One of the features of the bridge is the removable railings which can be taken down in time of threatening floods.

Mexico-Guatemala

Two international bridges connect Mexico with Guatemala. One is a railroad bridge over the Rio Suchiate providing rail connection between Suchiate, Mexico, and Ayutla. The other is a new highway crossing called El Talisman bridge, located about 25 mi. up the river from Suchiate. On October 1, 1942, the first heavily-laden freight train crossed the railroad bridge, forging a new trade link in inter-American communications.

The bridge, of creosoted timber, trestle-type construction, is 1,140 ft. long and was built in approximately 90 days under the direction of the Mexican engineer, Manuel Buenadad. Construction, greatly accelerated by the use of prefabricated parts from the United States, was at the rate of 37 ft. a day. The cost, $80,000, was financed by the National Railways of Mexico. The speed with which this bridge was erected testifies to the urgency that existed at the time for a more satisfactory way of handling cargo and supplies, both road supplies and civilian goods, between the United States, Mexico and Guatemala.

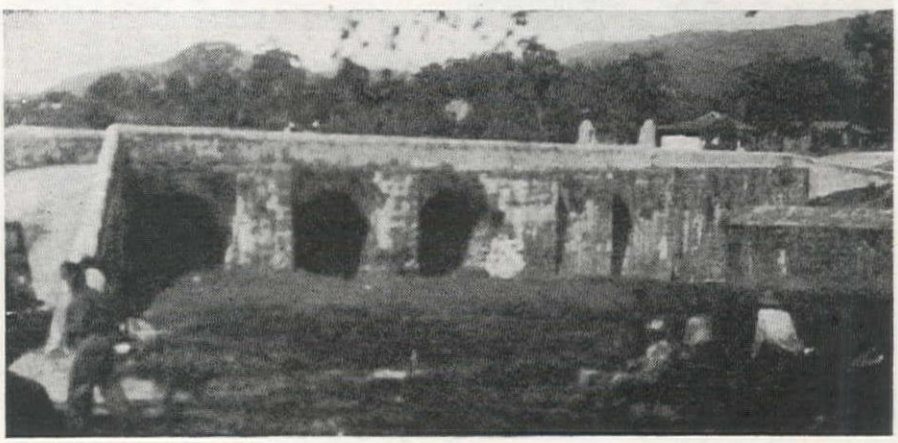
Suchiate is the southern terminus of the standard-gage railway system of the National Railways of Mexico; Ayutla, situated on the southern bank of the Suchiate river, is the northern terminal point of the narrow-gage system of the International Railways of Central America. The tracks on the new bridge are standard-gage. South-bound merchandise crosses the bridge in Mexican cars and is then transferred from one railroad to the other at the 300-ft. covered transfer platform at Ayutla which has narrow-gage track on one side and standard-gage track on the other. Customs procedures take place at the transfer point.

El Salvador-Honduras

El Salvador and Honduras are also linked by a new international bridge. Formal dedication on Dec. 15, 1943, of the 480-ft. steel and concrete structure over the Rio Goascaran marked completion of a new segment of the Inter-American Highway as well as a connection between the town of San Miquel in El Salvador and Nacaome in Honduras.

The bridge consists of a 220-ft. (67-meter) center span and two end spans of 130 ft. (39.6 meters) each. The width of the structure is approximately 28 ft. (8.5 meters), comprising a 24-ft. roadway and 2-ft. sidewalks on either side; it has a maximum elevation above nor-

THE PUENTE ESCLAVOS on Pan American Highway route in southern Guatemala, was first built in 1592. An adjacent modern bridge will be built to handle traffic.



mal water level of about 60 ft. (18.3 meters). Built to safely carry six-wheeled trucks with a load of 27 tons (3 tons on front wheels, 12 tons on center wheels, and 12 tons on rear wheels), the bridge showed its ability in tests to carry loads of 50 tons without distress.

The bridge was built by a United States firm as a cooperative project of Honduras, El Salvador and the U. S. Public Roads Administration. One-third of the construction cost of the bridge was paid by Honduras and El Salvador from loans received from the Export-Import Bank of Washington, and the remaining two-thirds of the cost was provided by the United States. Future maintenance of the structure will be the responsibility of Honduras and El Salvador.

The Public Roads Administration also is constructing two bridges within Honduras. Their cost will be shared by the United States and Honduras, in accordance with the provisions of the Inter-American Highway Act, under which the United States contributes two-thirds and the other contracting country one-third of the cost of cooperative construction on the Inter-American Highway. These bridges are a three-span bridge over the Rio Grande, of which two spans are already up, and a three-span bridge over the Rio-Guacirope, of which the substructures are finished.

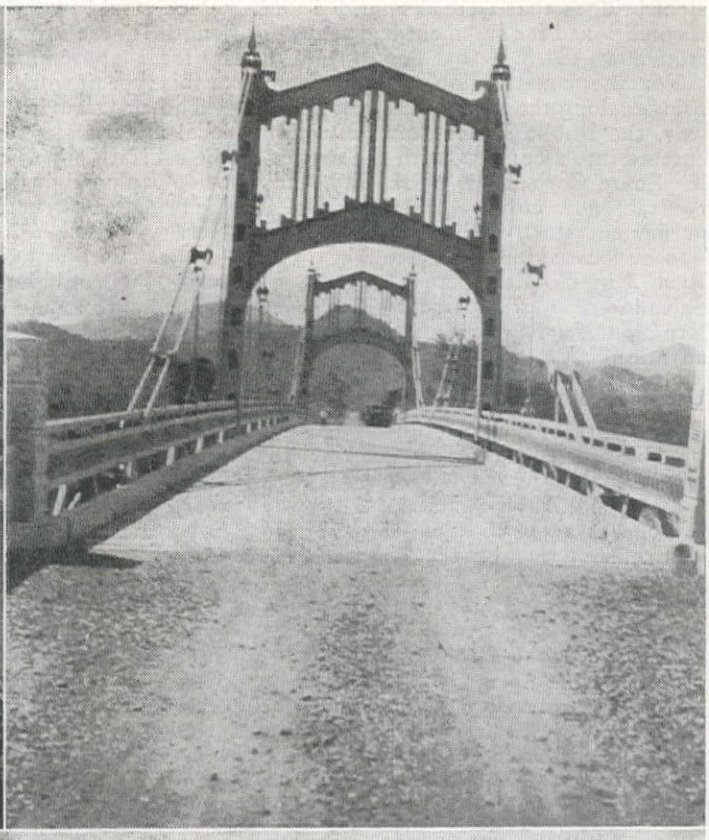
South American bridges

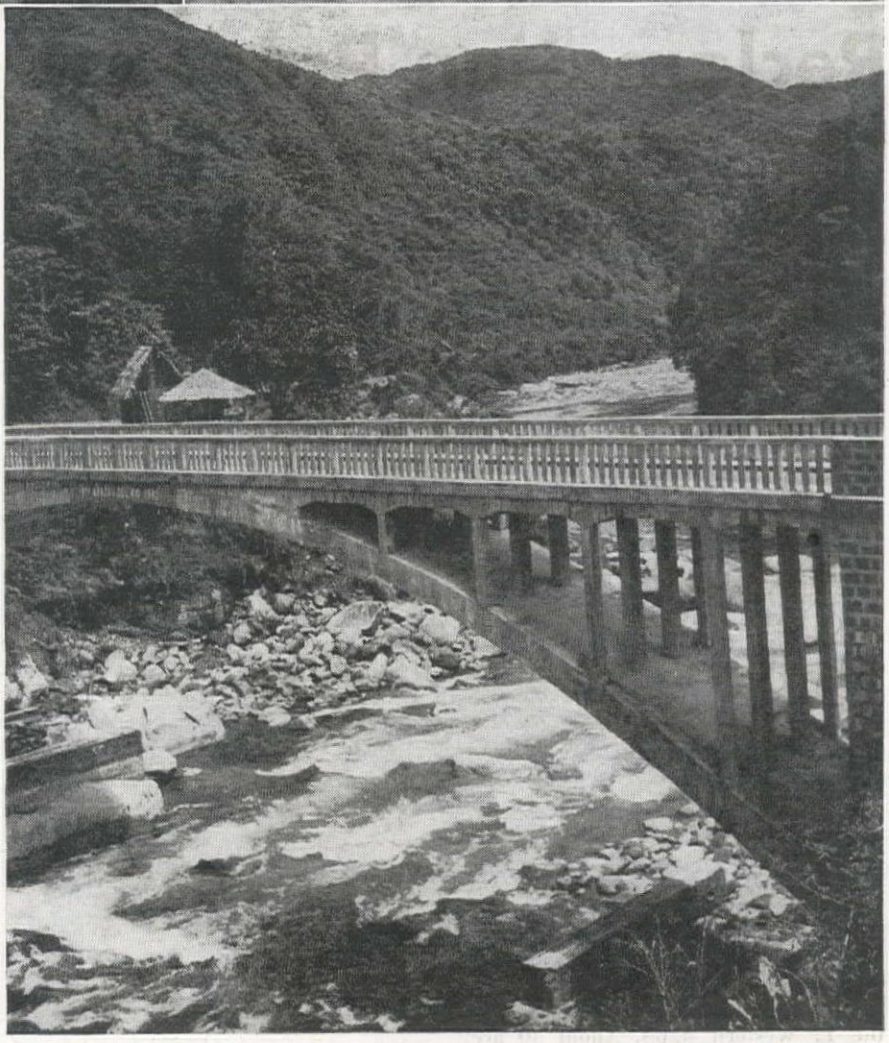
Colombia is joined with Venezuela by the Puente Internacional Simon Bolivar connecting San Antonio del Tachira, Venezuela, and Cucuta, Colombia. It is on the Simon Bolivar Highway—a section of the Pan American Highway system—that connects Quito, Ecuador, and Bogota, Colombia, with Caracas, Venezuela. The bridge was jointly constructed by the Venezuelan and Colombian Governments.

Colombia also is joined by the Puente Nacional Rumichaca with Ecuador. The bridge crosses the border at a gorge a few miles south of the Colombian town of Ipiales, on the Pan American Highway route. The Maua International Bridge, another link in the Pan American Highway, crosses the Rio Yuguaron and joins the town of Rio Branco in Uruguay with the town of Juaguarao in Brazil.

Work has been proceeding since Nov., 1941, on a great international bridge across the Rio Uruguay, between Paso de los Libres, Argentina, and Brazil. The two nations will share equally in the building and financing of the $2,250,000 project. The total length of the bridge, excluding supplementary sections which will span adjacent areas subject to flood, is 4,659 ft. (1,420 meters), divided into

BRIDGES OF many designs are now in use on roads that will become a part of the Inter-American Highway. Pictured from top down are the Maderas bridge in Nicaragua, the Rio Platanar bridge in Panama, the Choluteca suspension bridge in Honduras and the bridge known as the Viaducto Do Cha in the city of Sao Paulo, Brazil.





10 spans, each 466 ft. (142 meters) long. The roadway, which includes a 3.8-ft. (1.15 meter) pedestrian walk, is 19.68 ft. (6 meters) wide; the railroad right-of-way has a width of 12.46 ft. (3.8 meters).

As for the Puente Cuscatlan in interior El Salvador, this longest suspension type bridge in Central America was built by a United States steel-construction company for the Salvadoran Government which paid the entire cost—$700,000—without outside assistance. The bridge, dedicated in June, 1942, spans the Lempa, the largest river flowing into the Pacific Ocean south of the Colorado River in the United States.

The dedicatory tablet hails the bridge in words that bear repeating:

"Puente Cuscatlan—Dream of a Century, Realized by a Governor of Patriotic Faith and an Industrious and Virile People, Who Wished to Pay for This Work Themselves, Which Unites Even More Closely the Salvadoran Family With the Rest of America, With Which It Aspires to Form a Solidary Continental Democracy."

Because of the scarcity of proper materials, fabrication equipment or skilled local labor in certain localities in Central America, a considerable portion of the bridge materials used by the U. S. Army Engineers in building the "pioneer road" came from the United States. In addition to the U. S. prefabricated parts used in the construction of the railroad bridge on the Mexican-Guatemalan border, 93 prefabricated timber bridges and eight abandoned steel bridges were bought in the United States and shipped to Central America by the Army Engineers. The prefabricated timber bridges ranged in length from 50 to 100 ft. and were designed as one-way structures with a 15-ft. clear roadway and H-15 loading. The

THE PUENTE CUSCATLAN (top left) in El Salvador, is the longest suspension bridge in Central America. The Tamasulapa River bridge (top right) is in Guatemala. The Rio Goascaran bridge (bottom) links the countries of El Salvador and Honduras.

steel bridges that were dismantled and reconditioned for shipment had spans of from 80 to 184 ft.

For the construction of permanent bridges along the Inter-American Highway, the Public Roads Administration entered into a contract with the Frederick Snare Corp., New York City. This contract now covers construction of 9 permanent steel or concrete bridges—4 to be located in Nicaragua, 2 in Costa Rica, 2 in Honduras, and 1 on the El Salvador-Honduras border. The construction of most of these bridges is well advanced.

Use of local material

The work of constructing bridges on the "pioneer road" in Central America, whose route was largely identical with the original Inter-American Highway route, was aided by a mission sent to Central America by the U. S. Forest Service. The forestry specialists went into the field and classified the timber that was available near the route. Tests were made by the Forest Products Laboratory of the Forest Service and basic working stresses were recommended for design purposes. Further field investigation enabled the engineers to determine that sound straight trees were available which would furnish logs up to 80 ft. in length. These logs could be hand-hewn by local laborers, who are very skillful at this type of work.

The program calling for the use of local materials as far as possible led to the utilization in Nicaragua of tufa rock of volcanic origin for arch culverts and for bridge substructures, abutments and piers, where deposits were available. It has been used as building stone for centuries, and could be cut with hand tools to the approximate dimensions required by workmen at the quarries. After delivery at the site, stone masons easily trimmed the stone to fit the lines of the structure. Upon weathering, the outside surface becomes harder. Inspection of bridge abutments and piers known to have been in existence more than 25 years showed practically no deterioration from weather or scour. The same stone in old buildings showed no sign of deterioration.

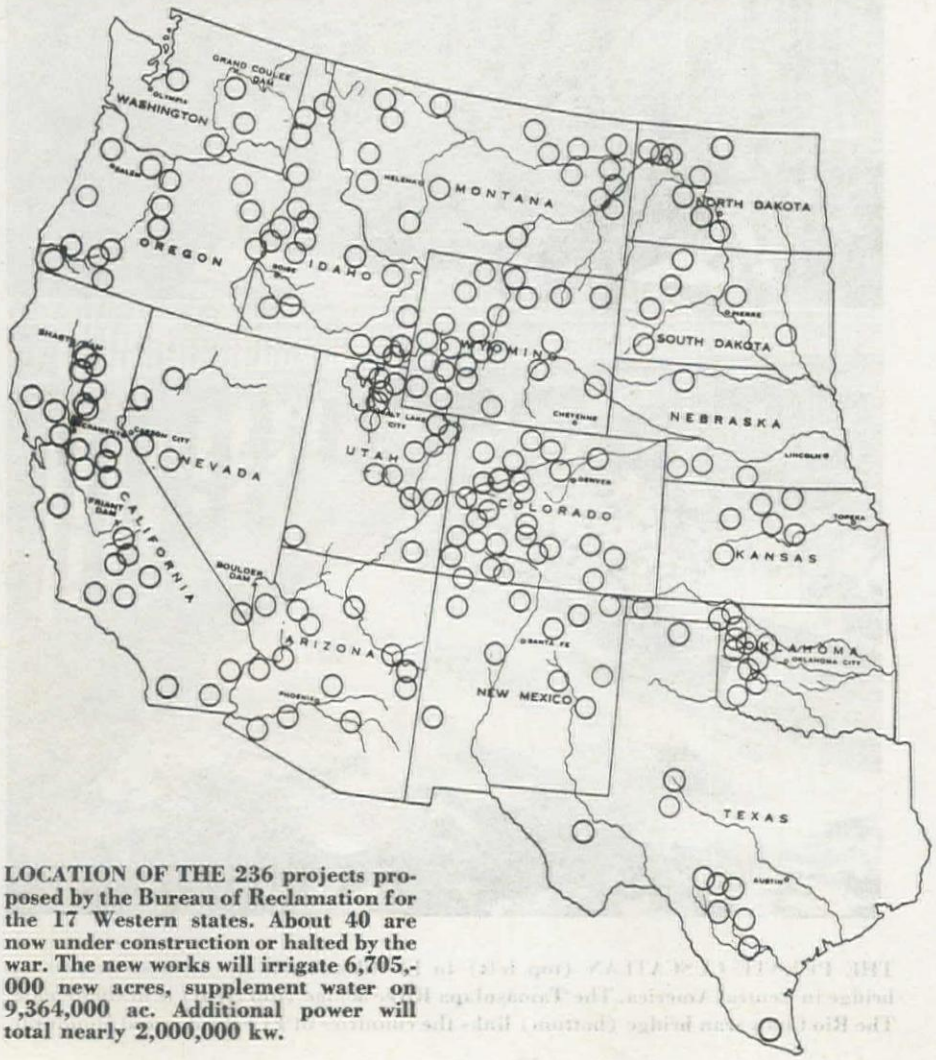
Important aid to the bridge and road construction has also resulted from the inter-American health and sanitation program. This program is combating malaria and other health and sanitation problems along nearly 14,000 mi. of the Pan American Highway. The program, recommended by the Rio de Janeiro Conference of American Foreign Ministers, is being carried out in Mexico, in all of Central America and in every republic in South America with the sole exception of Argentina.

Thus United States health work, materials, engineering skill and financial help have been merged with the materials, labor, technical skill, health work and financial and other resources of the other Americas to bring about the realization of this greatest cooperative project of the Western Hemisphere.

After the war, when automobiles, trucks, buses, tires and gasoline again become available for widespread use, tremendous benefits for the good of all the Americas will undoubtedly result from this great highway's completion. In Central America one of the chief barriers to a better standard of living will have been removed. To almost as great an extent, the highway can perform the same service for South America.

The new highway bridges are vitally essential in making this "dream of a century"—as the Salvadorans put it—come true. It is to be hoped that these bridges will also be bridges to better understanding, a higher standard of living, and greater happiness for all the American peoples.

Reclamation Proposals for Post-War



LOCATION OF THE 236 projects proposed by the Bureau of Reclamation for the 17 Western states. About 40 are now under construction or halted by the war. The new works will irrigate 6,705,000 new acres, supplement water on 9,364,000 ac. Additional power will total nearly 2,000,000 kw.

A complete inventory of the 236 projects proposed by the Bureau of Reclamation for post-war construction shows irrigation, power, and multiple purpose works in every one of the 17 Western states—Entire program will cost $3,000,000,000, employ 1,251,000 man-years of labor

AN INVENTORY OF 236 irrigation and multiple-purpose projects, submitted to Congress by the Bureau of Reclamation for post-war construction, was announced in *Western Construction News* in July. Presented herewith is a detailed tabulation of the projects included. The following remarks are from a memorandum submitted with the inventory by Reclamation Commissioner, Harry W. Bashore:

The major objectives of the inventory are to show how the development of the unused water resources of the western half of the country could be made most effectively into instruments to cushion the transition from war to peace-time economy. Employment on the construction work outlined would lead to permanent settlement on irrigated land for war veterans and demobilized industrial employees who could qualify as irrigation farmers.

Included in the over-all inventory are 236 individual projects and groups of miscellaneous projects listed by states.

Data related to each individual project are tabulated to indicate the location, the irrigation and power potentialities or other purposes, and the construction costs at 1940 levels. The possible construction period on each project is based on the assumption that adequate funds would be provided sufficiently in advance for the completion of the field investigations and the preconstruction work, so that construction could start on most of the projects as presented in the tabulations.

Forty of the projects listed are now authorized for construction under the Reclamation Law or supplemental statutes. Work on specified features of thirty of these is scheduled under the war food or war power programs of the Bureau of Reclamation. The remainder of this group is made up of projects that were halted by the war. Uncompleted work on all of these projects could be accelerated at the close of the war.

Manpower to be released

Assuming that the release of men from the armed forces and the recession of war industrial activities would be gradual, preparations could be made to start construction on a substantial number of the potential projects within a reasonable period. Engineers and other technical men from the services or industry could be enlisted to tackle the postwar job should construction be authorized and funds provided.

A report of the Bureau of Labor Statistics shows that of 14,570,000 persons to be demobilized from the services and war industries throughout the country, 2,929,000 will be in the 17 western states where water conservation for irrigation is essential to the maintenance of agriculture and the support of their increasing population. Hydroelectric power, which is incidental to irrigation developments in multiple-purpose projects listed in the inventory, is the principal source of electrical energy required in this region for industrial, agricultural, and domestic purposes. Flood control, stream regulation, recreation, and wildlife protection are other factors in multiple-purpose projects.

Of immediate importance in these 17 states when hostilities cease will be employment for a substantial number of the 1,771,000 war veterans, and for 1,158,000 emergency industrial workers who may be out of jobs there in the reconversion interval. The construction of the projects outlined in the inventory would give employment not only to workers at the site of construction, but also in the production of materials and equipment in practically every State in the Union.

Employment available

Steel would be required from Pennsylvania, Indiana, and Alabama. Automotive equipment would come from Michigan, Indiana, and Missouri, and electrical machinery from New York, Massachusetts, and Wisconsin. Fabricated cotton products would be obtained from Georgia and other Southern States.

The total employment from the construction of all the projects in the inventory is estimated at 1,251,000 man-years. That is, if it were possible or desirable to execute a program calling for the simultaneous construction of these projects, 1,251,000 workers would be employed for a full 12-month period.

Only 553,000, or 44 percent of the men, would be employed at the construction sites in the 17 western states.

The population of the far western states has increased four times as rapidly as any other section of the country since the turn of the century. From 1920 to 1940 the population gain in the 11 states of the Mountain and Pacific group, which are dependent on irrigation, was 60 per cent, while the increase in irrigated land was less than 10 per cent. The Pacific Coast is the only one of the major regions of the country to show a gain from 1940 to 1943.

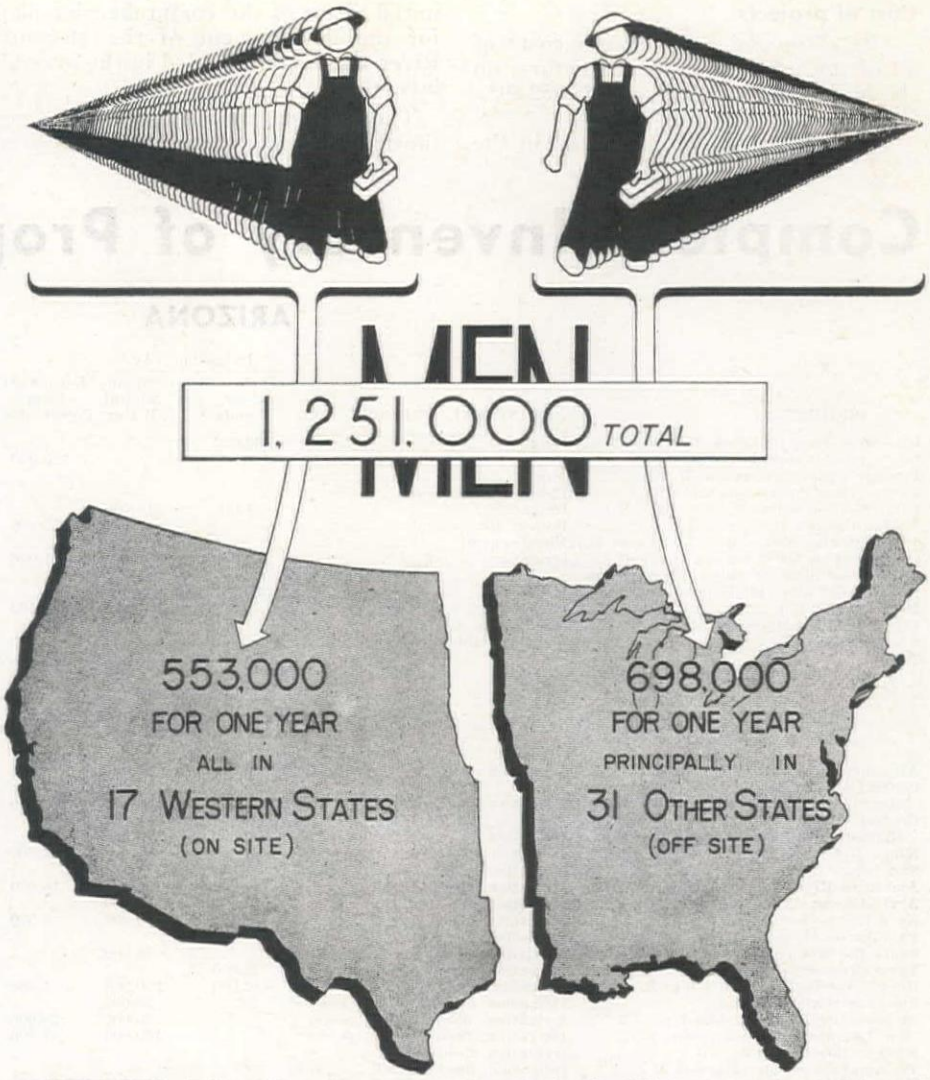
New facilities

The completion of all of the projects in the inventory would create about 135,000 farms and assure security in their present locations for more than 150,000 additional farm families in western areas which are faced with shortages of irrigation water. These developments would come about through the construction of irrigation systems to serve 6,705,000 ac. of new land, and to furnish supplemental water for 9,364,000 ac.

The power capacity in the multiple-purpose projects which are authorized would add 1,765,000 kw. to the existing installations at Bureau of Reclamation projects. The potential firm power in projects under study is estimated at 2,579,000 kw.

The expansion of irrigation that is indicated as possible from the inventory would enlarge the purchasing power of the West and provide an increased home market for the products of industries and farms of the Mid-West, East, and South not produced in irrigated areas. Conservative estimates are that the full development of the irrigation projects listed would add one and one-quarter billion dollars annually to western purchasing power for non-western products.

The multiple-purpose projects in the inventory would assure the double use of water stored in reservoirs to be constructed for irrigation and the production of hydroelectric power to aid in the recovery of western minerals. Low-cost power for industrial use would aid in balancing the economy of the 17 western states. The revenue from power would assist in repaying construction costs of multiple-purpose features.



ALTHOUGH ALL reclamation construction is in the Western states, anticipated employment benefits will be nation-wide, materials and equipment being manufactured off-site.

Cost of projects

The estimated construction costs of all of the projects in the inventory, on the basis of 1940 prices, are $2,952,393,000.

The projects which are listed in the initial phase of the comprehensive plan for the development of the Missouri River Basin are included in the over-all inventory.

The total remaining cost of the authorized projects is currently estimated at $793,000,000. Current schedules call for the expenditure during the war period of about 5 per cent of the total estimated cost. The execution of the war-time work anticipated would leave more than $750,000,000 for postwar.

Complete Inventory of Proposed Projects

ARIZONA

PROJECT	PRINCIPAL PURPOSE	Irrigation (Ac.) New Lands	Irrigation (Ac.) Supplemental Water	Estimated Firm Power—kw.	PRINCIPAL STRUCTURES	Estimated Total Cost 1940 Prices	Time Const. Mos.
Gila-Mesa Unit (Colorado R.)	Irrigation	33,000	----	----	Canals, pumps	$ 3,580,000	17
Davis Dam (Colorado R.)	Power, river regulation	----	----	225,000	Earth dam	41,200,000	40
Boulder Canyon (Colorado R.)	Power	----	----	----	Power installation	----	24
Parker Dam Power (Colorado R.)	Power distribution	----	----	----	Transmission lines	5,010,000	24
Gila, Wellton-Mohawk Unit (Colo. R.)	Irrigation	81,000	16,000	----	Canals, pumps	9,420,000	17
Bridge Canyon (Colorado R.)	Power, silt control	----	----	375,000	Con. dam, power plant	207,432,000	73
Bill Williams-Alamo Res. (Williams R.)	Flood control	----	----	----	Con. dam	3,200,000	24
Colorado Phoenix Diversion (Colo. R.)	Irrigation	300,000	300,000	711,000	Tunnels, aqueduct, canals	333,000,000	122
Chino, Snowflake, Winslow, Hassayampa, Holbrook, etc. (Little Colo. R.)	Irrigation	30,000	12,000	----	Earth dams, canals	16,633,000	24
Buttes (Gila R.)	Power	----	----	7,500	Con. dam, power plant	7,000,000	25
Coconino (Little Colo. R.)	Regulation, silt con.	----	----	----	Con. dam	4,000,000	25
Sentinel (Gila R.)	Flood control	----	----	----	Earth dam	10,000,000	27
Total		444,000	328,000	1,318,500		$640,475,000	

CALIFORNIA

PROJECT	PRINCIPAL PURPOSE	Irrigation (Ac.) New Lands	Irrigation (Ac.) Supplemental Water	Estimated Firm Power—kw.	PRINCIPAL STRUCTURES	Estimated Total Cost 1940 Prices	Time Const. Mos.
All-American Canal (Colorado R.)	Irrigation	400,000	20,000	----	Canals, pumps, drains	$ 31,817,000	49
Central Valley (Delta Cross Channel, Keswick, Shasta Dam) (Sac.&S.J.R.)	Irrigation, power	100,000	24,000	300,000	Con. dams, canals, pumps, power plants, trans. lines	113,367,000	60
Central Valley (Friant Kern, Delta, Mendota, etc.) (San Joaquin R.)	Irrigation	550,000	1,550,000	----	Canals, pump plants	54,510,000	60
Kings River (Kings R.)	Irrigation, flood control, power	----	800,000	146,500	Con. and earth dams, power plant	53,000,000	47
San Diego (Colorado R.)	Municipal water sup., irrigation	----	----	----	Earth dams, aqueduct, pump plants	22,000,000	36
American River-Folsom Dam (Amer. R.)	Irrigation, flood control	100,000	100,000	10,000	Con. dam, power plant	26,000,000	40
Arvin-Edison (Kern R.)	Irrigation	70,000	30,000	----	Canals, drainage	10,000,000	17
Kern River (Kern R.)	Irrigation, flood control	----	270,000	3,500	Earth dam, canals	9,200,000	33
Palo Verde Mesa (Colorado R.)	Irrigation	20,000	----	----	Diversion dam, canals, pumps	1,200,000	13
Santa Barbara (Santa Ynez-Cuyama Rs.)	Municipal, irrigation, flood control	----	70,000	----	Earth dams	13,500,000	34
Farmington Reservoir (Little Johns Ck.)	Irrigation, flood control	8,000	----	----	Earth dam	1,560,000	14
Bear River-Rollins Dam (Bear R.)	Irrigaton, flood & silt control	12,000	200,000	1,500	Earth dam	3,000,000	25
Stockton (Calaveras R.)	Irrigation, flood & salinity control	----	20,000	----	Enlargement of con. dam	1,931,000	12
Jacksonville Reservoir (Tuolumne R.)	Irrigation, flood control, power	----	50,000	20,000	Con. dam, power plant	13,326,000	37
New Melones Res. (Stanislaus R.)	Irrigation, flood control, power	----	100,000	24,000	Con. dam, power plant	22,256,000	37
Success Reservoir (Tule R.)	Irrigation, flood control	----	----	----	Earth dam	3,500,000	30
Terminus Reservoir (Kaweah R.)	Irrigation, flood control	----	----	----	Earth dam	4,600,000	30
Russian River (Russian R.)	Irrigation, flood control	51,000	----	3,500	Con. dam, canal, drains	11,500,000	30
Hollister (Pajaro R.)	Irrigation, flood control	----	----	----	Earth dam	3,000,000	17
Yolo (Cache-Putah Cks.)	Irrigation, flood control	83,000	33,000	----	Earth & con. dams, canals	20,800,000	33
Clickipudi, Willows, Cordua, etc.	Irrigation	25,000	23,000	----	Dams, canals	5,000,000	30
Iron Canyon (Sacramento R.)	Irrigation, flood control	220,000	15,000	1,400	Canals, pumping plant	31,000,000	44
Solano (Sacramento R.)	Irrigation	50,000	----	----	Canals, pumping plant	10,100,000	20
Bidwell Bar Reservoir (Feather R.)	Irrigation, flood control, power	----	100,000	60,000	Con. dam, power plant	52,800,000	50
Bullards Bar Reservoir (Yuba R.)	Irrigation, flood control, power	----	100,000	15,000	Con. dam, power plant	32,000,000	44
Table Mountain (Sacramento R.)	Irrigation, navig., flood control	----	----	150,000	Con. dam, power plant	55,000,000	44
Total		1,689,000	3,505,000	735,400		$605,967,000	

COLORADO

PROJECT	PRINCIPAL PURPOSE	Irrigation (Ac.) New Lands	Irrigation (Ac.) Supplemental Water	Estimated Firm Power—kw.	PRINCIPAL STRUCTURES	Estimated Total Cost 1940 Prices	Time Const. Mos.
Colo-B. Thompson (Colo. & S. Platte Rs.)	Irrigation, power	----	615,000	144,900	Dams, canals, power plants	$ 38,939,000	50
Mancos (San Juan R.)	Irrigation	2,000	8,000	----	Earth dam, canals	1,098,000	20
Paonia-Fire Mt. Div. (Gunnison R.)	Irrigation	2,000	12,800	----	Earth dam, canals	1,373,000	20
San Luis Valley (Rio Grande R.)	Irrigation	----	400,000	----	Con. & earth dams, drains	17,200,000	37
La Plata (San Juan R.)	Irrigation	----	23,800	----	Two earth dams	3,800,000	27
Collbran (Plateau Ck.)	Irrigation	5,500	18,000	----	Earth dam, canals	1,632,000	20
Silt (Rifle Ck.)	Irrigation	1,105	5,300	----	Earth dam, canals	1,245,000	20
West Divide (Colorado R.)	Irrigation	----	8,100	----	Earth dam, canal	941,000	17
Florida (Animas R.)	Irrigation, flood control	8,600	11,400	----	Earth dam, canals	2,500,000	27
Trinidad (Purgatoire R.)	Irrigation, flood control	----	15,210	----	Earth dam	2,781,000	27
Pine River Extension (Pine R.)	Irrigation	15,000	----	----	Canals, drains	1,370,000	14
Blue R.-So. Platte (Blue R.-So. Platte)	Irrigation, municipal power	196,000	363,000	125,000	Earth & con. dams, canals, power plants, tunnel	148,000,000	100
Miscellaneous	Irrigation	5,000	25,000	----	Dams, canals	5,000,000	30
Montrose Power (Uncompahgre R.)	Power, flood control	----	----	9,000	Earth dam, 3 power plants	3,850,000	20
Gunnison-Arkansas (Gunnison R.)	Irrigation, flood control, power	96,000	397,000	25,000	Con. & earth dams, canals, tunnels	84,380,000	70
San Miguel (San Miguel R.)	Irrigation	7,000	7,000	----	Earth dam, canals	1,500,000	20
Upper Dolores (Dolores R.)	Irrigation	40,000	----	----	Earth dam, canals, drains	11,600,000	33
Hunter Mesa (Colorado R.)	Irrigation	9,000	12,000	----	Earth dam, canals	1,500,000	10
Paonia-Minnesota Div. (Gunnison R.)	Irrigation	85	2,740	----	Earth dam	797,000	17
Total		387,290	1,924,350	303,900		$329,506,000	

IDAHO

PROJECT	PRINCIPAL PURPOSE	Irrigation (Ac.) New Lands	Irrigation (Ac.) Supplemental Water	Estimated Firm Power—kw.	PRINCIPAL STRUCTURES	Estimated Total Cost 1940 Prices	Time Const. Mos.
Boise-Anderson Ranch Dam (Boise R.)	Irrigation	----	340,000	30,000	Earth dam, power plant	$ 5,154,000	20
Boise-Payette Division (Payette R.)	Irrigation	27,000	25,000	10,000	Pump plant, canals, dam	3,298,000	13
Rathdrum Pr.-Post Falls Ut. (Spokane R.)	Irrigation	----	3,500	----	Pumping plant, canal	300,000	12
Mann Creek (Mann Cr.)	Irrigation	300	4,000	----	Earth dam	930,000	23
Palisades (Snake R.)	Irrigation, flood control, power	----	1,200,000	30,000	Earth dam, power plant	24,000,000	47
Mountain Home (Snake R.)	Irrigation, power, flood control	220,000	10,000	85,000	Earth dams, pump plant, canals	90,000,000	35
Cambridge Bench (Pine Cr.)	Irrigation	----	2,400	----	Earth dam, canals	360,000	10
Council (Weiser R.)	Irrigation	3,050	3,000	----	Earth dam, canals	500,000	10
Lewiston Orchards (Sweetwater Cr.)	Irrigation	----	4,400	----	Earth dam, canals	1,000,000	17
Mesa (Weiser R.)	Irrigation	600	1,300	----	Earth dam, canals	300,000	10
Cabinet Gorge (Clark Fork)	Power	----	----	50,000	Con. dam, power plant	12,600,000	25
Hornet (Hornet Cr.)	Irrigation	----	2,560	----	Earth dam, canals	300,000	10
Albeni Falls (Pend Oreille R.)	Power and river regulation	----	----	----	Con. dam	5,300,000	12

PROJECT	PRINCIPAL PURPOSE	Irrigation (Ac.) New Lands	Irrigation (Ac.) Supplemental Water	Estimated Firm Power—kw.	PRINCIPAL STRUCTURES	Estimated Total Cost 1940 Prices	Time Const. Mos.
Challis (Salmon R.)	Irrigation	300	2,000	....	Earth dam	500,000	16
Malad Valley (Devil Cr.)	Irrigation	....	4,900	....	Earth dam, canals	670,000	16
Rathdrum Prairie (Spokane R.)	Irrigation	34,300	2,200	....	Pump plants, canals	2,700,000	25
Medicine Lodge & Miscellaneous	Irrigation	5,000	16,000	....	Dams, canals	2,500,000	24
Montpelier (Bear R.)	Irrigation	....	26,000	....	Two earth dams, canals	3,000,000	17
Paris (Sleights Cr.)	Irrigation	....	5,000	....	Earth dam, canal	500,000	17
Oneida (Bear R.)	Irrigation, power	17,000	57,000	15,000	Earth and con. dams, power plant	15,000,000	25
Total		307,550	1,709,260	220,000		$168,912,000	

KANSAS

Kirwin (Solomon R.)	Irrigation, flood control	20,000	....	....	Earth dam, canals	$ 6,000,000	34
Cedar Bluff (Smoky Hill R.)	Irrigation, flood control	13,000	....	....	Earth dam, canals	6,000,000	35
Bostwick (Republican R.)	Irrigation	65,000	....	....	Canals, diversion dam	6,000,000	64
Miscellaneous	Irrigation	5,000	....	....	Earth dams, pumps	1,000,000	18
Total		103,000	....	....		$ 19,000,000	

MONTANA

Bitterroot Val. (Woodside) (Bitterroot R.)	Irrigation	....	18,600	....	Canals	$ 1,070,000	6
Dodson Pumping (Milk R.)	Irrigation	1,655	....	....	Canals, pumps	62,000	6
Fort Peck Power (Missouri R.)	Power transmission	....	....	....	Transmission lines	6,200,000	15
Saco Divide (Milk R.)	Irrigation	9,400	....	....	Pump plants, canals	692,000	13
Intake Pumping (Yellowstone R.)	Irrigation	580	260	....	Pumps, canals	62,000	6
Bitterroot Valley (Bitterroot R.)	Irrigation	1,660	28,960	....	Earth dam, canals, drains	2,814,000	20
Missoula Valley (Bitterroot R.)	Irrigation	900	1,200	....	Canals, pump plants	172,000	10
Buffalo Rapids-3rd Div. (Yellowstone R.)	Irrigation	13,440	....	....	Pump. plant, canals, drains	1,029,000	15
Canyon Ferry (Missouri R.)	Power, irrigation	42,600	5,500	17,500	Con. dam, power plant	11,405,000	40
Savage (Yellowstone R.)	Irrigation	2,390	....	....	Pumps, canals	220,000	9
Glasgow Bench (Missouri R.)	Irrigation	59,400	....	....	Pump. plant, canals, drains	4,788,000	17
Mo. R. Pumping (16 projs.) (Missouri R.)	Irrigation	40,000	....	....	Pumps, canals	2,391,000	20
South Bench (Jefferson R.)	Irrigation	7,600	....	....	Pumps, canals	718,000	9
Miscellaneous	Irrigation	15,000	3,000	....	Canals, pumps	5,000,000	15
Hardin & Yellowtail Res. (B. Horn R.)	Irrigation, flood control, power	45,000	1,800	37,500	Con. dam, canals, power plant	34,014,000	36
Hungry Horse-Kalispell (Flathead R.)	Irrigation, power	100,000	....	40,000	Con. dam, power plant, canals	40,000,000	49
Marias (Marias R.)	Irrigation	120,000	....	....	Earth dam, pump. plant, canals, diversion dam	18,948,000	40
Mo. Souris-Montana Div. (Missouri R.)	Irrigation	96,400	24,600	....	Pump. plants, canals	29,030,000	40
Yellowstone-Hysham Unit (Yel'stone R.)	Irrigation	5,840	1,020	....	Pump. plants, canals	521,000	18
Total		561,865	84,940	95,000		$159,136,000	

NEBRASKA

Mirage Flats (Niobrara R.)	Irrigation	12,000	....	....	Earth dam, canals	$ 557,000	10
North Republican (Republican R.)	Irrigation, flood control	2,080	3,340	....	Earth dam, canals	947,000	14
Frenchman-Cambridge (Republican R.)	Irrigation, flood control	36,130	17,015	....	Earth dam, canals	9,678,000	34
Well Units (5) (Republican R.)	Irrigation	14,200	9,300	....	Wells, pumping plants, canals	1,147,000	10
Bostwick (Republican R.)	Irrigation, flood control	24,170	830	1,000	Earth dam, canals, power plant	24,413,000	64
Miscellaneous	Irrigation	8,000	2,000	....	Earth dams, canals	2,500,000	15
Total		96,580	32,485	1,000		$ 39,242,000	

NEVADA

Humboldt (Humboldt R.)	Irrigation	....	25,000	....	Diversion dam, canals, drains	$ 374,000	10
Fort Mohave (Colorado R.)	Irrigation	1,235	....	....	Pumps, canals	123,000	10
Upper Truckee (Truckee R.)	Irrigation, flood control, power	....	30,000	11,000	Earth dam, power plant, canals	5,535,000	14
Washoe Lake (Lake Tahoe)	Irrigation, flood control, power	20,000	43,000	5,000	Earth dam, tunnels, canals, pow. plt.	5,200,000	20
Miscellaneous (Colorado River, etc.)	Irrigation	4,000	8,000	....	Earth dams, canals	5,000,000	12
Total		25,235	106,000	16,000		$ 16,232,000	

NEW MEXICO

Tucumcari (Canadian R.)	Irrigation, flood control	45,000	....	....	Earth dam, canals	$ 5,525,000	14
Hammond (San Juan R.)	Irrigation	3,670	....	....	Diversion dam, canals	725,000	10
Fort Sumner (Pecos R.)	Irrigation	1,100	5,080	....	Diversion dam, canals	615,000	10
Middle Rio Grande Valley (Rio Grande R.)	Flood, silt control, irrigation	....	118,000	....	3 earth dams, drains	16,000,000	34
Springer (Canadian R.)	Irrigation	....	7,500	....	Canals	800,000	10
Alamogordo (Pecos R.)	Irrigation, flood control	....	....	....	Enlargement of dam	1,270,000	14
Miscellaneous	Irrigation	1,000	1,000	....	Earth dams, canals	1,000,000	12
San Juan-Chama Diversion (San Juan R.)	Irrigation, power	....	70,000	11,000	Earth dam, power plants, canals	15,968,000	18
Mora (Mora R.)	Irrigation	....	11,000	....	Earth dam, canals	2,500,000	20
Cliff Reservoir (Gila R.)	Irrigation, flood control	....	30,000	5,000	Conc. dam, power plant	9,500,000	36
Total		50,770	242,580	16,000		$ 53,903,000	

NORTH DAKOTA

Bismarck (Missouri R.)	Irrigation	4,875	....	....	Pump. plant, canals, drains	$ 310,000	10
Missouri Pump (5 Units) (Missouri R.)	Irrigation	32,000	....	....	Pump. plants, canals, drains	2,230,000	50
Heart River (Heart R.)	Irrigation	16,000	....	....	Pump. plants, canals, drains	2,900,000	20
Knife River (Knife R.)	Irrigation	15,380	....	....	Earth dam, canals	3,385,000	24
Miscellaneous	Irrigation	35,000	....	....	Pumps, canals, dams	5,000,000	18
Mo. Souris, N. Dak. Div. (Missouri R.)	Irrigation	300,000	....	....	Earth dam, canals	44,970,000	50
Total		403,255	....	....		$ 58,795,000	

OKLAHOMA

Lugert-Altus (Red R.)	Irrigation, municipal, flood control	80,000	....	....	Masonry and earth dams, canals	$ 8,956,000	34
Fort Supply (No. Canadian R.)	Irrigation	3,500	....	....	Canals	234,000	10
Canton (No. Canadian R.)	Irrigation	27,000	....	....	Canals	1,700,000	12
Fort Cobb (Washita R.)	Irrigation	7,000	....	....	Earth dam, canals	2,400,000	27
Barnitz (Washita R.)	Irrigation, flood control	3,000	....	....	Earth dam, canals	2,500,000	27
Foss, (Washita R.)	Irrigation, flood control	30,000	....	....	Earth dam, canals	6,500,000	40
Rainey Mtn. Res. (Washita R.)	Stream flow regul., flood control	....	....	....	Earth dam	2,400,000	27
Englewood (Cimarron R.)	Irrigation, flood control	14,500	4,500	....	Earth dam, canals	5,900,000	34
Miscellaneous	Irrigation	5,000	1,000	....	Earth dams, canals	1,000,000	18
Kenton (Cimarron R.)	Irrigation, flood control	11,500	600	....	Earth dam, canals	3,900,000	30
Total		181,500	6,100	....		$ 35,490,000	

OREGON

PROJECT	PRINCIPAL PURPOSE	Irrigation (Ac.) New Lands	Irrigation (Ac.) Supplemental Water	Estimated Firm Power—kw.	PRINCIPAL STRUCTURES	Estimated Total Cost 1940 Prices	Time Const. Mos.
Klamath-Modoc Unit (Tule Lake)	Irrigation	12,500	....	....	Dikes, pump. plant	$ 410,000	20
Deschutes (Deschutes R.)	Irrigation	50,000	8,000	....	Earth dam, canals	5,320,000	17
Bully Creek Reservoir (Malheur R.)	Irrigation, flood control	5,000	....	....	Earth dam, canals	1,217,000	13
Canby (Molalla R.)	Irrigation	1,554	....	....	Canals, pumping plant	290,000	12
Grande Ronde (Grande Ronde R.)	Irrigation, flood control	47,430	16,030	....	3 earth dams, canals, drains	13,115,000	40
Crooked River (Ochoco) (Crooked R.)	Irrigation, flood control	8,410	10,140	....	Earth dam, canals, pumps	1,680,000	14
Merlin (Rogue R.)	Irrigation	9,210	500	....	Earth dams, canals	2,904,000	17
Talent (Bear Cr.)	Irrigation, flood control	3,580	11,500	....	Earth dam, canals	2,342,000	17
Wapinitia, Paulina, & Miscellaneous	Irrigation	10,000	3,000	....	Earth dams, canals	2,500,000	18
Baker (Powder R.)	Irrigation, flood control	22,000	25,000	1,500	Earth dam, canals, pumps	3,663,000	17
Yamhill (Yamhill R.)	Irrigation, flood control	54,300	....	....	Earth dam, canals	7,200,000	27
Illinois Valley (Illinois R.)	Irrigation	11,200	5,400	....	Earth dams, canals	5,300,000	24
Debenger Gap (Rogue R.)	Irrigation, flood control, power	31,150	13,200	7,000	Earth dam, canals, power plant	13,740,000	40
Total		266,334	92,770	8,500		$ 59,681,000	

SOUTH DAKOTA

Rapid Valley (Rapid Cr.)	Irrigation, municipal	6,000	12,000	....	Earth dam, canals	$ 1,650,000	17
Angostura (Cheyenne R.)	Irrigation, flood control	16,180	....	....	Con. dam, canals	5,160,000	24
Grand River (Grand R.)	Irrigation	28,500	....	....	Earth dams, canals, pumps	3,886,000	20
Moreau (Moreau R.)	Irrigation	27,150	....	600	Earth dam, pumps, canals	4,639,000	20
Miscellaneous	Irrigation	6,000	2,000	....	Earth dams, canals, pumps	1,000,000	12
Oahe (Missouri R.)	Irrigation	200,000	....	....	Canals, pumping plant	25,000,000	48
Total		283,830	14,000	600		$ 41,335,000	

TEXAS

Valley Grav. Canal & Stg. (R. Grande R.)	Irrigation	165,000	550,000	18,000	Earth dam, canals	$ 62,500,000	80
Balmorhea (Pecos R.)	Irrigation	2,460	7,140	....	Earth dam, canals	1,597,000	14
Robert Lee (Colorado R.)	Irrigation, flood control	58,000	....	....	Earth dam, canals	11,815,000	34
La Pryor (Nueces R.)	Irrigation, flood control	18,500	10,000	....	Earth dam, canals	7,600,000	30
Cotulla (Nueces R.)	Irrigation, flood control	19,100	2,400	....	Earth dam	5,000,000	16
San Angelo (Concho R.)	Irrigation, flood control	10,000	....	....	Earth dam, canals	10,100,000	34
Miscellaneous	Irrigation, flood control	7,000	14,000	....	Earth dams, canals	2,500,000	18
Palo Duro (N. Canadian R.)	Irrigation, flood control	2,000	1,200	....	Earth dam, canals	1,000,000	14
Sabinal (Sabinal R.)	Irrigation	7,000	....	....	Earth dam, canals	1,725,000	14
Concan (Frio R.)	Irrigation, flood control	12,000	....	....	Earth dam	5,600,000	27
Fowlerton (Frio R.)	Irrigation, flood control	7,650	350	....	Earth dam, canals	2,100,000	15
Hondo (Hondo R.)	Irrigation, flood control	4,000	....	....	Earth dam, canals	1,720,000	15
Total		312,710	585,090	18,000		$113,257,000	

UTAH

Provo River (Provo R.)	Irrigation, municipal	....	97,500	8,600	Earth dike, canals, pumps	$ 9,975,000	25
Gooseberry (Price R.)	Irrigation	....	20,000	....	Earth dam, tunnel, canals	1,400,000	14
Ogden River Extension (Ogden R.)	Irrigation, municipal	2,000	4,000	....	Earth dam, canals, pumps	3,000,000	20
Weber Delta (Weber R.)	Irrigation	6,000	....	....	Pump. plant, wells, canals	927,000	14
Santa Clara (Santa Clara Cr.)	Irrigation	2,000	1,700	....	Earth dam, canals	1,500,000	16
Emery County (Cottonwood Cr.)	Irrigation	....	34,000	....	Earth dam, canals	3,715,000	24
Hurricane (Virgin R.)	Irrigation	16,000	6,500	700	Earth dam, tunnel, canals	8,400,000	34
Vernal (Ashley Cr.)	Irrigation	....	24,200	....	Earth dam, canals	1,600,000	20
Ouray Valley, etc.	Irrigation	4,000	7,000	....	Earth dams, canals	5,000,000	24
Uintah-Echo Park Unit (Green R.)	Power	....	....	33,000	Con. dam, power plant	46,000,000	36
Provo River Extension (Provo R.)	Irrigation	6,000	5,000	....	Earth dam, tunnel, canals	10,000,000	35
Manila (Henrys Fork)	Irrigation	21,000	9,000	....	Earth dikes, canals	1,462,000	14
Farmington (Weber R.)	Irrigation	5,000	5,000	....	Con. dam, tunnels, canals	2,200,000	17
Cutler (Bear R.)	Irrigation	3,000	30,000	....	Con. dam, pumps, canals	5,000,000	24
Dewey Reservoir (Colorado R.)	Power, flood control	....	....	75,000	Earth dam, power plant	41,000,000	100
Moon Lake Extension (Duchesne R.)	Irrigation, municipal	13,500	....	....	Earth dam, canals	4,500,000	20
Woodruff (Bear R.)	Irrigation	12,000	25,000	....	Earth dam, canals	3,000,000	17
Bluff (San Juan R.)	Power, flood control	....	....	....	Con. dam	16,000,000	35
Total		90,500	268,900	117,300		$164,679,000	

WASHINGTON

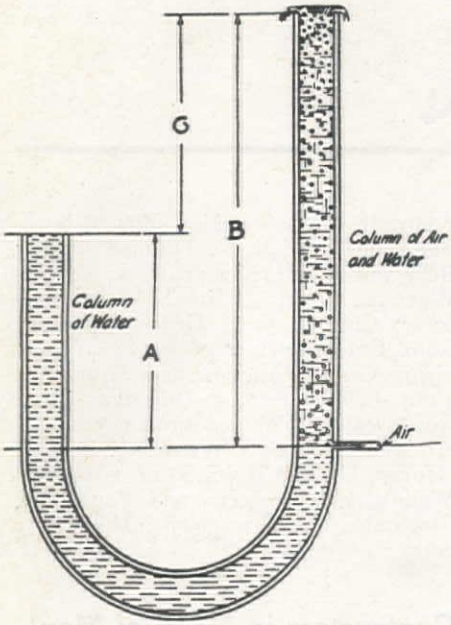
Columbia Basin (Columbia R.)	Irrigation, power	1,000,000	....	832,000	Con. and earth dams, power plant, pumps, canals	$270,000,000	98
Yakima (Yakima R.)	Irrigation, flood control, power	102,310	4,000	20,000	Earth dam, power plant, pumps, canals	15,400,000	36
Burbank & Miscellaneous (Columbia R.)	Irrigation	13,500	2,000	....	Earth dams, canals	2,450,000	11
Foster Creek (Columbia R.)	Power	....	....	622,000	Con. dam, power plant	79,500,000	36
Green Puyallup-Auburn Unit (Green R.)	Irrigation	15,300	....	....	Canals, pumps, drains	2,550,000	17
Total		1,131,110	6,000	1,474,000		$369,900,000	

WYOMING

Eden (Sandy Cr.)	Irrigation	11,000	9,000	....	Earth dam, canals	$ 1,817,000	20
Shoshone, Heart Mt. Div. (Shoshone R.)	Irrigation	41,000	....	....	Canals	1,902,000	12
Riverton (Wind R.)	Irrigation	68,000	....	....	Canals	4,115,000	15
Kendrick (No. Platte R.)	Irrigation	35,000	....	....	Canals	1,584,000	12
Paintrock (Big Horn R.)	Irrigation	1,290	6,020	....	Earth dam, canals	370,000	14
Owl Creek (Big Horn R.)	Irrigation	4,700	9,700	....	Earth dam, canals, pumps	1,140,000	20
Lyman (Smiths Fork)	Irrigation	....	21,000	....	Earth dam, canals	2,363,000	27
Kortes (No. Platte R.)	Power	....	....	15,000	Con. dam, power plant	7,045,000	25
Big Horn-Boysen Dam (Big Horn R.)	Irrigation, flood control	....	44,000	5,000	Con. dam, canals, power plant, railroad relocation	11,000,000	25
Little Snake River (Little Snake R.)	Irrigation	....	15,700	....	Earth dam	310,000	12
Big Horn Pumping (Big Horn R.)	Irrigation	20,000	....	....	Pumping plants, canals	1,955,000	12
Stump Creek (Stump Cr.)	Irrigation	....	20,000	....	Earth dam	550,000	17
Belle Fourche, Keyhole Reservoir (Belle Fourche R.)	Irrigation	11,300	33,700	....	Earth dam	750,000	20
Pinedale, Kendall Reservoir (Green R.)	Irrigation	41,500	8,500	....	Earth dam, canals	10,081,000	30
Powder River (Powder R.)	Irrigation	84,100	46,200	....	Earth dam, canals	18,858,000	24
Seedskadie (Green R.)	Irrigation	40,830	....	....	Diversion dam, canals	4,543,000	14
La Barge, Fontenelle, Shell Ck., Misc.	Irrigation	12,000	20,000	....	Earth dams, canals	2,500,000	18
Evanston (Bear R.)	Irrigation	....	25,000	....	Earth dam, canals	2,000,000	24
Glendo Reservoir (No. Platte R.)	Irrigation, power, flood control	....	200,000	....	Earth dam	4,000,000	34
Total		370,720	458,820	20,000		$ 76,883,000	

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK



Air-lift Pumps Are Simple to Operate

THE U-TUBE shown in the above diagram, illustrates the action of an air-lift pump. If air is introduced near the bottom of the right-hand column, being lighter than water, it will rise and displace an equal volume of water during the ascension. This will decrease the density of the aerated water and it will rise until its total weight equals the weight of the normal water in the other column. A steady flow of compressed air into the discharge pipe will create a continuous pumping action. The amount of flow will depend upon the amount of compressed air that is introduced.

There are many advantages in the use of the air-lift pump. Its capacity is limited only by the source of supply. There are no moving parts inside the well. The only mechanical equipment required is an air compressor. Compressed air may be piped from a conveniently located central station and used to operate a number of wells simultaneously.

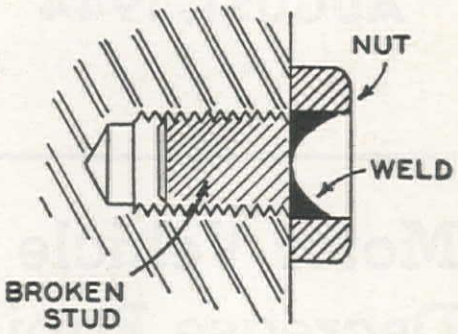
The pump can handle gritty liquids and acid without damage to the efficiency of the pump. If used for drinking purposes, the quality of the water is improved by the constant aeration. The simplicity as well as the efficiency of the air-lift pump lends itself to an ever increasing list of applications.

Removal of Sawdust From Sawmill Ponds

WHEN THE ARTIFICIAL ponds for floating logs to a mill get overloaded with sawdust a suitable pump can be used to pump out the semi-solid water. Sawmill practice in this country seems to dictate that an artificial pond be made next to the sawmill head where the logs are dragged into the head saw, since floating is the most economical and simplest means of handling the logs. This pond is made just deep enough to float the largest of the logs.

The butts must be cut from some of these logs and a great many must be cut in two to make them suitable for the slicing machine in the making of plywood. Sawdust from these operations fills the pond so that the water becomes semi-solid and not satisfactory for the rapid movement of the logs.

A diaphragm pump mounted on a float has been found satisfactory in sucking the sawdust from the bottom of the pond and discharging it in some suitable place on the bank. The suction hose can be moved from place to place and large quantities of the sawdust can be sucked out with the water. This suggestion was sent to *Western Construction News* by the Columbia Equipment Co. of Portland, Ore.



Remove Broken Stud —Weld It to a Nut

A CONTRACTOR'S mechanic, learning from experience, has discovered a novel and simple method to use in extracting a broken stud. His plan is to take a nut that is a size larger than the stud and to weld through the hole to the broken part of the stud, gradually building up the bead on the inside of the nut. After the nut has been firmly welded to the broken stud, he lets it cool and then unscrews the unit with a wrench.

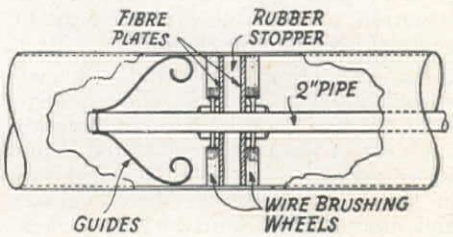
This suggestion was printed in the *Stabilizer*, a booklet published periodically by Lincoln Electric Co. and edited by A. F. Davis.

Disc Wire Brush Wheels Used as Part Of Gas Line Shut-off Emergency Plug

DISC-CENTER SECTION wire brushing wheels have been incorporated in a shut-off plug for cast iron pipe gas lines for emergency use in case of fire or other hazard. Unlike steel pipelines, which can be shut off by hydraulic jacks in emergencies, cast iron pipe will not withstand this excessive pressure without fracturing with a resulting release of gas, which may become ignited.

The plug, the size of which depends upon the diameter of the cast iron pipe in which it will be used, consists of a rubber stopper, flanged by fibre plates with a wire brushing wheel on each side. The plug is screwed on a 20-ft. section of 2-in. pipe, which serves as a handle for inserting the plug into a broken pipeline without endangering the safety of the service operator. The wire brushes seem to add greatly to the efficiency of the rubber stopper by absorbing and dissipating the heat from the flames.

The Southern Counties Gas Company of Los Angeles, Calif., which invented this unique installation, provides 2 plugs each in the 4, 6, 8, 10, and 12-in. sizes for each of its service trucks. These are the emergency trucks which report to the danger areas in the event of gas line breaks.



NEWS OF WESTERN CONSTRUCTION

AUGUST, 1944

Motor Vehicle Registrations Decrease Rapidly Since 1942

NEARLY 4,000,000 motor vehicles went out of use in 1942 and 1943 and have not been replaced, according to registration statistics compiled by the Public Roads Administration from reports of State authorities. Private and commercial vehicle registrations in 1943 totaled 30,499,608, a decrease of 2,082,636 or 6.4 per cent from 1942. The decline from the all-time high of 34,461,018 in 1941 is 11.5 per cent.

Automobiles showed the greatest decrease from 1942, both in number and percentage, the 25,912,730 registrations in 1943 being 1,956,016, or 7 per cent, lower than in 1942. Truck registrations decreased 127,910 to 4,480,176, a decline of only 2.8 per cent from 1942, and buses increased 1,301 to 106,702, an increase of 1.2 per cent.

Registrations of publicly-owned vehicles in 1943 (excluding those of the War and Navy Departments) were 388,526. Of these, 330,334, practically the same number as in 1942, were owned by state, county, and city governments. The decrease from 81,819 vehicles owned by the civilian branches of the Federal Government in 1942 to the 58,192 in 1943 was largely accounted for by the transfer of civilian conservation corps vehicles to the War Department.

Largest decreases in registration were in the Eastern States. The District of Columbia, New York, and New Hampshire, showed decreases of 14.8, 12.7, and 10.9 per cent, respectively.

The Public Roads Administration pointed out that gasoline rationing in the Eastern States began six months earlier than in the remainder of the country, and that the rationing and driving restrictions have been much more severe in the East, probably contributing to the sale of many automobiles for shipment into States farther west.

Registration in Western states follows:

STATE	Vehicles Registered: Private and Commercial	Decrease in Registration from 1942* Per Cent
Arizona	136,543	3.2
California	2,749,720	5.4
Colorado	343,442	4.6
Idaho	148,846	5.3
Montana	160,809	8.2
Nevada	50,398	0.0
New Mexico	108,845	6.1
Oregon	408,412	2.2
Texas	1,559,870	3.5
Utah	158,338	*2.7
Washington	596,585	2.2
Wyoming	82,741	4.7

*The figure for Utah is an increase.

Reclamation Office Is Moved to Salt Lake City

REGION FOUR OFFICES of the Bureau of Reclamation have been moved from Provo, Utah, to Salt Lake City, to facilitate operations of the various construction projects now under way or contemplated in the region.

Regional Director E. O. Larson, although moving with his offices to Salt Lake City, will continue as construction engineer of the partly completed Provo River project. L. R. Dunkley will stay in Provo as project resident engineer and director of work on the Kamas canal and Salt Lake aqueduct phases of the job.

Larson explained that the new regional headquarters, occupying 20 rooms on the fifth floor of the old Salt Lake Chamber of Commerce Building, will handle planning, fiscal and administrative management, design and construction and power utilization work for the region.

Chief of the branch of fiscal and administrative management is F. J. Farrell, while Reid Jerman is project planning chief, and N. T. Olson is operation and maintenance division chief. Larson has yet to select heads of the other branches.

Suboffices and the field engineers who report to the new region four reclamation office are: E. K. Thomas, Ogden, Bear and Malad river projects; Francis Warnick, Vernal, Uintah basin projects; Clifford Jex, Grand Junction, Colo., Colorado river projects near Gunnison, Grand Junction and Montrose; John J. Hedderman, Durango, Colo., southwestern Colorado and northwestern New Mexico; J. Wayne Cahoon, St. George, Utah, Virgin, Santa Clara and Muddy river projects, and Paul Berg, Cheyenne, Wyo., Green river basin projects.

Contractors in Need of Men On Construction of Ross Dam

AN URGENT REQUEST for more manpower at Ross Dam, being built by Seattle City Light on the Skagit River, has been issued by E. R. Hoffman, superintendent of the department. The second step of the power project is now under construction by General-Shea-Morrison on a contract awarded to them last year for approximately $10,000,000. Concreting is expected to start late in the summer, and according to Hoffman, at least double the present crew will be required if that work is to be successfully carried out. Hoffman and Congressman Warren Magnuson have wired federal officials asking for higher manpower priority on the project because of the threatening northwest power shortage.

Tunnelling May Be Used In Ripple Rock Removal

REMOVAL OF Ripple Rock by tunnelling from either shore of Seymour Narrows, B. C., is now believed feasible, after this method had previously been considered too dangerous to the lives of the working crews involved, a Canadian public works official states.

Bad weather conditions which commence in the area in October or November will soon make it not worthwhile to recommence the project this year by the drill barge methods heretofore employed, he said. Tunnelling, however, could be carried on at any time of the year.

At the same time this official expressed the opinion that a further government grant of $500,000 would probably complete the project, instead of the $1,250,000 which is now being asked from Ottawa.

G. G. McGeer, MP (Vancouver Burrard) has recently been urging Ottawa to complete the Ripple Rock project, and visited Washington to gain support for the move. The pinnacle is a constant menace to Alaska-bound shipping.

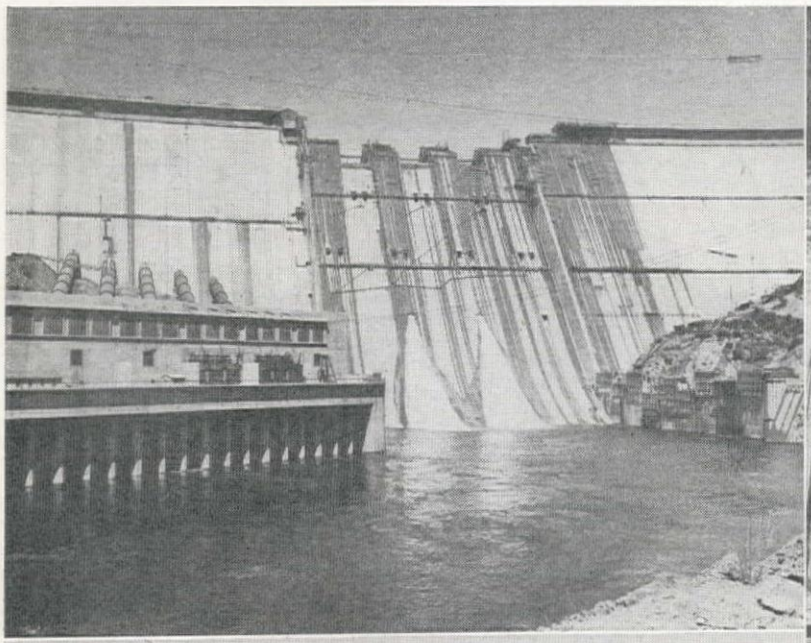
It was originally believed that faults in the formation near the rock might result in fissures opening up if tunnelling was employed. This might let the sea into the tunnels, but more recent geological studies have led to the belief that no such faults exist, although further investigations would have to be carried out.

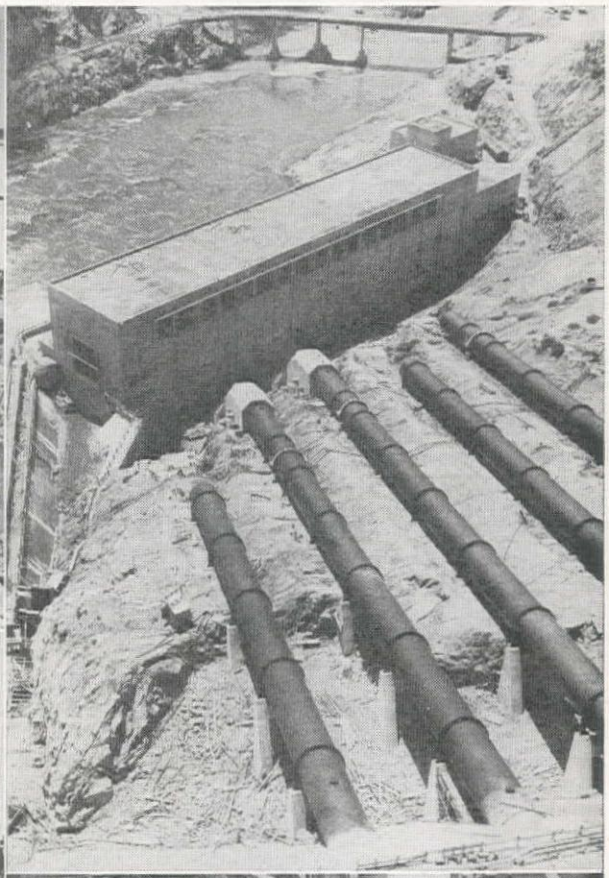
Before any tunnel was dug to the rock, a 2,500-ft. diamond drill test hole would be made to learn the formation. Further tests would also be made 400 or 500 ft. ahead of the tunnellers.

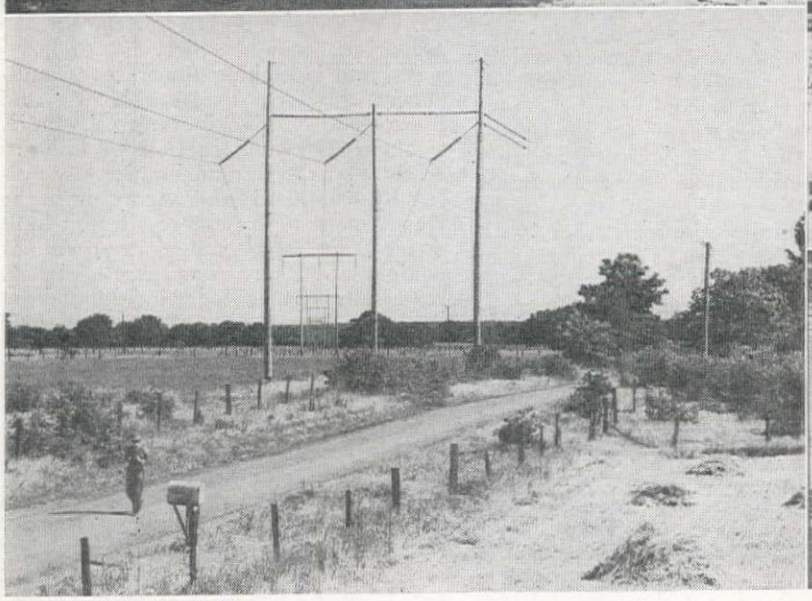
The drill barge method by which removal of the navigation obstruction was first undertaken, was described in *Western Construction News* for October, 1943.

Airport Assured Nevada Town

DEFINITE STEPS are being taken for construction in the postwar period of a municipal airport at Wells, Nev. Engineers of the Civil Aeronautics Administration recently made an inspection trip of the area and have agreed to include the project in the billion dollars proposed for such work by the Randolph Bill, now under consideration in Congress. The city is proceeding to secure the necessary property and will make all necessary surveys. A site about 3½ miles from the city has been selected.







SHASTA POWERHOUSE BEGINS PRODUCTION OF ELECTRICAL ENERGY

WHEN TWO generators of the Shasta powerhouse, built by the Bureau of Reclamation as a part of California's Central Valley project, were placed in operation on July 14, 150,000 kw. of electrical energy were added to the war production activities of the state. In the upper photos, upstream and downstream views of the powerhouse are shown. The five penstocks passing through the dam are each 15 ft. in diameter. Lower right is an interior view of the powerhouse, showing the two units now installed, with openings left for the three others which will be added. At present, two of the units have been loaned to Grand Coulee dam, and are in operation there. The fifth is being built. Lower left is the Shasta-Oroville transmission line, which connects the powerhouse with the distribution lines of Pacific Gas & Electric Co., who purchase power. Shasta dam will cost over $87,000,000, and will contain 6,500,000 cu. yd. of concrete.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—For publication, the program is for Congress to come back here by installments in August. Also, for publication, it is permitted to seep out that Congress will merely go through the motions of keeping the flame of life glimmering until after Labor Day. For publication, the impression has been spread that Congress will get down to work again in September. But it is elemental common sense that few members of the Congress wish to do anything decisive or definitive until after the election. The chances are that only where the pressure is irresistible will things happen legislatively.

We think the most irresistible pressure upon legislation vital to the West Slope will be exerted upon the highway bill. All but 3 States will convene their legislatures in 1945, and the legislatures will want to know what the Federal aid policy will be, and how much money the Federal Government will make available to enable the States to undertake desperately needed road building. The most recent survey reveals that the collective needs of the 48 State Highway Departments total $4,600,000,000 in work that would have been done had not the war intervened, and now is urgently necessary. Bear in mind, this is not a program or a specific schedule proposed by any group. It is the gross total reliably and responsibly gathered by a neutral agency. The figure is broken down by an item of $3,323,000,000 for rural roads, and $1,277,000,000 for urban routes.

To engineers and contractors the most startling figures should be these: it is revealed that those projects sufficiently advanced to make a start on construction total only $216,460,000; those in the next stage, completion for final preparation, total $214,533,000; those which are in the process of designing, and no further than arrested designing, total $932,535,000; and those in process of survey, or on the brink of survey, total $1,069,415,000. Apparently, the country needs $4,600,000,000 worth of roads, and work of some kind has been done by the State Highway Departments on projects totalling a potential of $2,167,057,000, but actually it would be possible immediately to set to work only on projects totalling a cost of $216,460,000. The striking fact is the enormous amount of work necessary before the rest of the $4,200,000,000 highway construction could be started.

Road planning is slow

Here in the Capital they are not very optimistic about the speed with which the necessary preliminaries could be accomplished. The professional and technical personnel either are in the armed forces or other war work. State Highway Departments, like the Federal agencies not immediately tied into the war, have been depleted of help. There are practically no sources to which they can turn. Those who are competent to judge, here, have the opinion that it will take a year, or something approximating a year, after the technicians are released from war services, to get a substantial volume of the preliminary road planning work done. The hope is that the State Highway Departments, especially those in some of the States on the Western slope, will study the problem of closing the gap. The pressure to get started on highway work immediately after the war is definitely over comes from all industrial and social forces which realize the urgent need for more transportation facilities as quickly as they may be available in the postwar period; and from those who realize highway building will be the most obvious method of legitimately providing public work for the masses who will be unemployed in the earliest postwar period.

Congress apparently has the same idea. The House Committee on Roads, in recommending $1,500,000,000 be spent by the Federal Government over a period of three years, emphasized the tremendous transportation facilities necessary in the immediate postwar period, stressed the paralysis in construction since Pearl Harbor, and urged the sovereignty of the States be acknowledged by preservation of the existing formula of Federal Aid matched by State funds under Administration of the Public Roads Administration together with State administration. The report also urged preservation of the system of competitive bidding on new and reconstruction projects.

The final recommendation is that all postwar highway legislation should be embraced in a single omnibus bill. The Congressional report points out that H. R. 4915 is the first effort to give specific recognition to the need of Federal Aid for urban roads. The hullabaloo raised by some Eastern states for "flexibility," which is another way of asking for the legal affirmation of the principle that population is the fundamental reason for the volume of Federal aid, is met in the report by the assertion that each state has sufficient leeway to use the Federal aid funds where they will do most good. The Eastern states are continuing to fight for "flexibility" and have sent out word in some of the Eastern "newsletters" that population would form the basis of allocation of funds. It is indicated that the Western states with rural roads should combine with other states with rural roads to underline the needs of rural transportation. The fight will come to a head before long, and the breaks will go to those States, or groups of States, which make the most vigorous fight.

Additional road data

WPB reports approximately 50,000 mi. of highway in the U. S. requires rebuilding. In many areas the situation is so critical that Public Roads Administration has urged State highway agencies to make up pools of equipment and to place the equipment at the service of adjacent counties. Lieut. Gen. Brehon B. Somervell, head of the Army Service Forces, has issued orders directing loan or sale of equipment to highway departments in an emergency. The Transportation Corps will support requests by highway officials for equipment addressed to WPB. In addition to the prospective appropriation of $1,500,000,000 to finance the three-year postwar program, there is also a total of $300,000,000 Federal Aid funds authorizations which were not supported by appropriations after the war began. These funds will undoubtedly be appropriated as soon as the conversion period is in sight. Public Roads Administration and WPB are responsible for the statement that $1,000,000,000 spent on road construction will furnish annual employment for 200,000 men on the site of the project, and additional employment for 450,000 men engaged in making equipment and supplying road-building materials.

The Fifth Pan-American Highway Congress has now been set at Lima, Peru, for October 12 to 22. It starts on Columbus Day, and will cover a hemisphere-wide over-all highway program. . . . Ecuador is reported by OIAA to be preparing to build a network of highways, and is looking for tractors, bulldozers, graders, trucks, bridges and hydroelectric machinery. . . . India, awakened by construction of military roads, plans to extend its highway system by 400,000 mi., and, according to the Department of Commerce, wants bulldozers, ditchers, graders, and similar equipment. There was practically no road building machinery in India before the war. Our equipment is now their standard.

Reclamation news

Shortly before leaving Washington for his recent Western trip, Commissioner Bashore nursed through the State Department the formalities which permitted the Imperial Irrigation District to loan to the farmers in Mexicali valley in Lower California the 4,000 cu. ft. per sec. to save their 170,000 ac. of cotton, alfalfa and other crop land from the effect of this summer's great drought. The water was diverted through the All-American Canal and released via the wasteways to the Alamo canal for Lower California. The desilting works on the canal were put in operation with labor recruited for the emergency. Shortly before going westward, Bashore also reported that farmers on 4,055,000 ac. of irrigated land under the Bureau of Reclamation during the past year had produced $388,000,000 worth of crops, 140 percent increase since the season imme-

diately before Pearl Harbor. The power incidental in the 30 projects soared to an all time high of 11,900,000,000 k.w. hr., an increase of 275 per cent since Pearl Harbor.

The Washington Post, seldom interested in irrigation or Western problems, spent several columns on July 16 in discussing hopefully the postwar irrigation plan for the far West. It declared 265,000 farm boys in the West want Western lands, and that many more service men from the East and South wish to buy irrigated Western land. It also listed thousands of war workers as potentially eager farmers on Western lands. It sees the 22,000,000 acres to be brought into bearing in the West as the great future farm hope of the country. The article stated: "Non-irrigated lands throughout the West have lost population and become permanently depressed, while irrigated lands have prospered and gained in population. This is strikingly illustrated in North Dakota where 15,000 irrigated acres of prosperous farm land flourish in sharp contrast to the surrounding dry-farming country, desolate and depopulated by the droughts of the 30's." The article lists as the greatest farm aids to the West, first, Boulder dam; second, Columbia River Basin development; and, third, the great Central Valley project in California. It marks that there is a "good deal of opposition in Congress to certain of the policies adopted in connection with Federal river control. This opposition may curtail the scope and effectiveness of postwar reclamation work or may postpone construction indefinitely.

"Some power companies are opposing the Government's policy of giving electric power priorities to public agencies and are trying to introduce legal restrictions which would give private companies the exclusive right to lease power generated on Federal projects. . . . Because of success of the methods used in the Tennessee Valley, there is growing sentiment for unified development of resources on a broad regional basis, with power of coordination and responsibility for long-range planning vested in a single supervising agency. At the same time Congress has shown a tendency to authorize scattered local river control projects, which may prove out of harmony with larger regional interests. . . . The fight on these issues will become intensified in the next year, as postwar plans take definite shape. Decisions finally reached will prove of major importance to the development of the whole Western economy."

Manpower

Ten thousand more Mexicans will be brought into the United States to work on railroads. This will raise the total to 50,000 assigned to 29 railroads. They may work only on railroads by terms of the contract with the Mexican Government. Each worker has a contract for six months with the Federal Government of the U. S. The contract may be renewed. Recruitment is conducted by the Railroad Retirement Board under supervision of the WMC. Ten per cent of the wages is deposited to their accounts with the National Bank of Mexico, and 3¼ per cent is deducted as required by the Railroad Retirement Act.

Recruiting of workers for war work outside of the region where they are located will be conducted under the supervision of the National Manpower Priorities Committee. The Committee consists of Maj. Gen. Lewis B. Hershey, Selective Service System; John N. Ohly, War Department; Capt. Paul H. Rice, Navy Department; Dan Ring, U. S. Maritime Commission; T. P. Wright, Aircraft Resources Control Office; J. H. Weiss, U. S. Civil Service Commission; Clinton S. Golden, WPB; and Charles M. Hay, deputy chairman and executive director of WMC.

Overtime wage, payroll taxes, and insurance, may now be added to the service charges by contractors who pay operators and crews overtime wages for overtime operation of construction equipment which is rented on a bare rental. The authority is provided in Amendment 15, MPR 134.

Miscellaneous

Irrigation and flood control techniques will be professionally taught to Chinese experts who will arrive from Asia late in August and in September. The training will undoubtedly be conducted under direction of the Bureau of Reclamation in the areas of the Pacific slope, as well as elsewhere in the United States by personnel of the Chief of Engineers of the War Department. The Chinese will be under general supervision of the China Institute, 119 W. 57th St., New York City. The expenses will be defrayed by the United Nations Relief and Rehabilitation Administration. To get in touch with those in charge it is suggested by the UNRRA that letters be addressed to the China Institute at New York City, and copies of the communications be mailed to Michail Menshikov, Deputy Director General, UNRRA, Walker-Johnson Building, Washington, D. C.

We are told here that cities of 10,000 population or over plan collectively to spend over $4,000,000,000 on public works during the first five years after the war ends. Chile, according to the Department of Commerce, plans to build 5,000 houses, schools, theaters, sports stadia, markets, and a canal, at a cost of approximately $10,000,000. At the suggestion of the House Postwar Planning Committee, the Bureau of the Budget and the Federal Works Administration are making a survey of postwar public works plans of State and local government agencies. WPB reports private construction during the first six months of this year shows an increase of 3 per cent, the first break in the long series of decreases since 1942. Construction as a whole, however, for the same period, fell off 58 per cent from the total of the same period in 1943.

Much of the West had more than normal rainfall, according to the Water Resources Review of the Geological Survey, but drought conditions prevail in the upper Gila River basin in Arizona, and in the Columbia River basin. Utah, Idaho, Montana, Northern Nevada, and Oregon had especially heavy rains.

Personalities

Frank E. Marsh, manager of the Washington Office of the San Francisco Chamber of Commerce, will be at the San Francisco office of the Chamber of Commerce during August... Dr. O.S. Adams, Chief Mathematician, Coast and Geodetic Survey, well known on the Pacific Coast, retired in July after 34 years service. . . . Brig. Gen. Clarence L. Sturdevant, Chief, Troops Division, Office of Chief of Engineers, was decorated with the medal of the Legion of Merit for planning, organizing supply, and generally supervising the construction of Alaska Highway from Dawson Creek to Fairbanks. . . . Preston L. Wright, former president Seattle Real Estate Board, has been appointed as head of the regional office of the National Housing Agency in San Francisco. Utah has been added to Region 10, Mr. Wright's area; and Wyoming has been added to Region 9, which heads up in Seattle. Colorado has been added to Region 8 with headquarters in Dallas. Region 7 which had headquarters in Kansas City has been abolished. . . . John C. Hoyt, well known in the West, retired as consulting engineer to the Water Resources Branch of the U. S. Geological Survey, in July, after 42 years service. During his long service he held the office of chief hydrographer and as chief of the division. The present importance of water gaging activities of the division is attributed chiefly to Mr. Hoyt. As a representative of the Government he has travelled in all parts of the world. . . . Charles Baird, deputy regional administrator of OPA at San Francisco, and Kenneth Hampton, district director, OPA, at Fresno, were in Washington during July. . . . H. H. Bennett, Chief U. S. Soil Conservation Service, on invitation of the Government of the Union of South Africa, left during July for two months' visit to Africa. Both WFA and WPB sponsored Mr. Bennett's trip. . . . Lyle F. Watts, Chief, Forest Service, will make a survey of Alaska forests during August and September. . . . Senor Constantino Lacayo Fiallo, Engineer of the Nicaraguan Department of Roads, in charge of construction of the Pan American Highway in Nicaragua, is making a three months' visit in the United States as the guest of the Department of State. He was formerly Director General of Public Works of Nicaragua. He may visit the West Coast, especially if there are indications that he will be welcome. . . . Lt. Comdr. W. Creighton Peet, Jr., has been appointed Acting Pacific Coast Director of the U. S. Maritime Commission, succeeding the late E. C. Mausshardt of San Francisco, who died while in office. Lt. Comdr. Peet is a New Yorker who went to the Coast in 1943 as director of War Shipping Administration. . . . Col. Alvin G. Viney, of Pasadena, Corps of Engineers, received the Legion of Merit, for conspicuous services in Florida and in Brazil.

Land Acquisition Committee Begins Research on Highway Rights-of-Way

A NEW COMMITTEE has been created in the Highway Research Board, Public Roads Administration, to be known as the Committee on Acquisition and Legal Control of Right-of-way, Adjacent Areas, and Parking Facilities. The functions of the committee include the initiation and execution of original research, the synthesis of efficient technique and existing practice, and the dissemination of information among the States, urban areas, and other local units of government, in the fields of highway right-of-way, access and roadside control, and parking facilities.

Land acquisition policy, according to the committee, should implement the modernization of street and highway systems, rather than impede it as has been the case so often in the past, by facilitating land assembly at the minimum total cost, rapidly and adequately. To the end that large numbers of vehicles may travel safely with a minimum of obstruction and with a maximum of speed, highway authorities are beginning to think in terms of controlling highway access and effectively controlling the adjacent roadside development that often detracts from the efficiency of the road system. Off-street parking facilities, particularly in the central areas of cities, should be recognized as completing the provision for over-all service from origin to destination, necessary for a full realization of the speed, economy and convenience of efficient highway transport. The legal, economic and policy aspects of these problems will be investigated by this group.

Western members of the committee, under the chairmanship of David R. Levin, Public Roads Administration, are:

Frank C. Balfour, Chief Right-of-way Agent, California Division of Highways; J. L. Dickson, Road Design Engineer, Texas State Highway Department; H. S. Fairbank, Deputy Commissioner, Department of Research, Public Roads Administration; H. E. Hilts, Deputy Commissioner, Department of Design, Public Roads Administration.

Stress Relief Studies Improve Redwood Lumber

RESEARCH SPONSORED by the California Redwood lumber industry for means of controlling seasoning defects has borne fruit in form of uniform schedules for relieving casehardening stresses in kiln-dried Redwood lumber.

The investigation was inaugurated early this year through the setting up of a research group, the Redwood Seasoning Committee, composed of kiln operators at lumber mills.

A progress report just made by the committee indicates that in the reconditioning of 1-in. kiln-dried Redwood lumber, a temperature of 170 deg., with relatively high humidities, will entirely relieve casehardening stresses within 24 hr.

Casehardening was the first major problem considered by the committee. Because outer portions of the wood become drier than the core, kiln-dried lumber that is to be resawn, is reconditioned to equalize the moisture content throughout its thickness, in order that all surfaces of the resawn lumber be of uniform moisture content. In the course of the investigation, kiln schedules at the various mills were studied and test runs were made with varying degrees of heat and percentages of humidity.

The report also stated that an investigation was under way into the use of chemical solutions to facilitate the seasoning of thick stock. Several actual tests have already been made.

Another important phase in seasoning Redwood lumber, now under consideration by the committee, is the proper segregation of stock at the green chain, according to its green moisture content. It is pointed out that such a procedure has a favorable effect on the time in the kiln.

Vancouver Housing Authority Reports Operational Profit

A PROFIT of $1,020,802 has been returned to the federal government by the Vancouver, Wash., Housing Authority, representing the results of a 12-months' operation period ending July 1, 1944. The average occupancy of war housing units under control of the Authority was 75 per cent with a peak of 89 per cent being reached in the months of December and January. This brings the operating profits of the Authority to a total of $1,237,774 since the projects were opened for use by war workers. D. Elwood Caples is chairman of the board of commissioners of the Housing Authority.

Suspend Nevada Builder For Violating WPB Rule

VIOLATION OF WAR Production Board construction orders was the basis for the issuance of a six-months' suspension order against the Home Builders' Corporation of Las Vegas, Nev., it was announced recently by the WPB Regional Compliance Division in San Francisco.

The suspension order penalty, prohibiting the Nevada contractors from receiving any priority assistance or delivery of critical building materials for the period between June 28 and Dec. 31, 1944, was based upon double violations of WPB wartime regulations as follows:

1. Violating its agreement with WPB requiring priority on occupancy be given to war workers or persons engaged in National Defense Activities, the Las Vegas firm sold five of the 85 housing units it had built to persons outside of required war activities.

2. Violating its prior agreement with WPB under wartime regulations to establish a selling price not in excess of $4,500, the Nevada builders sold 27 of its houses for amounts exceeding $5,000.

Hearings were held before the WPB Compliance Commissioner following investigations of the violations by the WPB compliance representative, and recommendations for the suspension were approved by Washington.

Yellowstone Basin States Continue Negotiations on Water Use Compact

H. D. COMSTOCK, Regional Director of the Bureau of Reclamation's work in the Missouri river basin, has been appointed to represent the United States on the Yellowstone River Compact Commission which will meet soon. His headquarters are at Billings, Mont.

Water for irrigation is the desperate need which will bring representatives of Montana, Wyoming, and North Dakota together to agree on the allotment of waters from the Tongue and Powder rivers arising in Wyoming and Montana, which are tributaries of the Yellowstone River.

After consent to the negotiations had been given to the three states by the Congress in 1937, and extended in 1940, state legislatures of Wyoming and Montana failed to ratify a draft of compact agreed to by the states' representatives. Again, under Act of Congress of March 16, 1944, consent was given to the negotiation and the making of a compact or agreement for the division of the water of the Yellowstone River. The compact, when ratified by the states, must be submitted to the Congress for its approval.

The Federal Government is represented in the formulation of the compact because of the constitutional requirement with respect to interstate agreements. The Department of the Interior is interested also because the Bureau of Reclamation has constructed the Lower Yellowstone project in Montana and North Dakota. It has proposed other irrigation and multiple-purpose projects in its Missouri River Basin Report.

Federal agencies represented in the Yellowstone preliminary negotiations include: Bureau of Reclamation, National Park Service, Office of Indian Affairs, and Geological Survey; Forest Service; the Federal Power Commission; and the Chief of Engineers.

The Editor's Mail...

13 June, 1944

Dear Sirs:

I received the May issue of *Western Construction News* today and noticed that the A.P.O. number in the address on the wrapper is incorrect. I'd appreciate your correcting this now as that would expedite delivery of your excellent magazine.

Although my job in the Army has nothing at all in common with construction or construction equipment, the magazine will serve to keep us up to date on what is going on in the construction world. This war won't last forever, and I won't always be a soldier.

It does a G. I. Joe, like myself, good to read articles like "Wanted: 3,000,000 Jobs" by Rex L. Nicholson. It's good to know that there are men who are trying now to get projects started for the returning G. I. Joes to work on. It is my sincere hope that "Builders of the West" reaches their objective and has the situation well in hand when we get home.

Sincerely yours,
MARK L. CHERNE

NEW BOOKS...

RESULTS OF PUBLICLY-OWNED ELECTRIC SYSTEMS, 1944—Published by the Burns & McDonnell Engineering Company, Kansas City, Missouri. 450 pages, 9 x 6. Price $10.00.

The new eighth edition of the electric rate book lists the operating records, earnings, output, rates, net revenue, valuation, and other information dealing with the use and cost of electricity in 767 publicly-owned systems. The volume has interesting graphs and tables which picture and compare these rates and revenues. The edition attempts to compare the rates of both private and municipal plants in every city of over 5,000 population. More than one-half of the publicly-owned systems in the country have lowered their rates since 1941. A majority of these systems report no bonded indebtedness. A description is given of the type of plant, whether steam, diesel or hydroelectric, and its form of management. Every complete record received from publicly-owned systems has been recorded. Therefore the publishers believe that the records of these 767 systems present a fair, unbiased cross-section of the results that are being obtained by publicly-owned systems in the producing and selling of electricity.

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FUNDAMENTALS OF INDETERMINATE STRUCTURES—By Fred L. Plummer. Published by The Pitman Publishing Corporation, New York. 232 pages, 9x6. Price $4.00.

This book, written by a research engineer, is based on notes assembled by the author over a period of years while teaching courses in structural analysis and design and while acting as consultant on problems arising during the design of many important structures. The volume covers the solution of those analysis problems which are created by the "continuity" of structures, or the interaction of adjacent or supplementary parts connected so as to act as one unit rather than a group of independent statically determinate units. Structural designers must frequently check designs prepared by others who may use unfamiliar analysis methods. They sometimes join a different design group or face a new type of design problem, either of which may require the use of a specified analysis procedure. It has therefore seemed desirable to present in one book all of the principal basic and special analysis methods now in general use in our chief design offices. The author has attempted to do this, presenting each method as briefly and simply as possible, avoiding as much as possible the use of long formulas or theoretical derivations. The use of each method is clearly illustrated by a number of practical examples.

Kaiser Enters Gypsum Products Building Field

HENRY KAISER has entered a new field. He has formed a partnership with Sam A. Perkins, president of Standard Gypsum Co., for the production of gypsum products used in housing construction. The Standard Co. controls numerous gypsum deposits all the way from the Gulf of California to Alaska.

The Kaiser management will establish and manage production, handling and manufacturing facilities on a mass production basis and will produce plaster wallboard, agricultural gypsum and other substances. Kaiser forecasts an unprecedented era of building construction after the war but disclaims any personal ambitions to enter the building field in any other capacity than that of a supplier of materials. Along with interior wallboard, the new Kaiser industry will produce prefabricated sections of steel-framed houses and plastic cement similar to stucco for the exterior.

Among the gypsum properties to be operated by the new coalition are San Marcos Island in the Gulf of California, quarries in Nevada and Washington, and manufacturing plants at Long Beach, Calif., and Seattle, Wash. Plans include the establishment at a very early date of a manufacturing plant in the San Francisco Bay area, to produce cement and prefabricated sections.

ENGINEERING STUDIES of the undeveloped power resources of Owens Gorge, in Inyo County, Calif., will be continued during the current fiscal year as a result of action by the Board of Water and Power Commissioners of the city of Los Angeles in July. Expenditure of $75,000 was authorized for the purpose. The work will include studies of most efficient locations for power plants, penstocks and surge chambers. Complete development of gorge power has been under discussion for some years.

OBITUARIES...

Peter Bradley, San Francisco, Calif., plastering contractor, died at his home in Burlingame, Calif., July 9, after a long illness. Bradley, a member of the San Francisco Builders' Exchange, established the firm of Bradley and O'Reilly, carrying on the business under his own name after O'Reilly retired. The Southern Pacific building in San Francisco and the Union Depot in Los Angeles are two of the structures for which he contracted.

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A. W. Quist, Seattle, Wash., contractor and Finnish Consul in that city for many years, died July 15 of a heart attack. As founder and president of the A. W. Quist Co., he was responsible for many large Seattle buildings, among them the Medical - Dental and the old Times buildings. Quist was a specialist in underwater cement construction, having built the piers at Pearl Harbor in 1934 and 1935. He was a member of the Associated General Contractors of America.

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Frank John Safley, engineer with the U. S. Government service since 1918, died February 29 in San Gabriel, Calif. He was 71 years old. Safley, who specialized in hydraulics and irrigation, was in private work in Denver, Colo., for many years and was associated with George Teal, mining engineer, in Boulder, Colo.

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Thomas David Hunt, job engineer, and **L. C. Bustrack** and **Gunnar Halberson,** timekeepers for Macco-Case Construction Co., Oakland, Calif., were killed in the disastrous explosion at Port Chicago, Calif., naval ammunition depot on July 17. The company was building additional facilities at the depot at the time.

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W. Frank Rantsma, city engineer of Fresno, Calif., died May 12 following a heart attack. He entered the city service as a deputy engineer in 1917 and had been deputy public works commissioner since 1921. Rantsma was also a member of the City Planning Commission of Fresno.

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Col. George A. Hunt, Army reservist and well known engineer, died in Oakland, Calif., at the age of 56. Since his graduation from the University of California in 1911, Hunt had been associated with the Pacific Gas and Electric Company, San Francisco.

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William Estes Hacker, retired president of the Warren Construction Company of San Francisco, Calif., died June 29 at the age of 76.

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Fred A. Henninger, 79-year-old architect of Omaha, Nebr., and Pasadena, Calif., died in Pasadena, June 28.

PERSONALLY SPEAKING

Maurice A. Buckley, formerly associated with the engineering department of J. H. Pomeroy Co., San Francisco, has been made managing editor of *Western Construction News.* He has had a wide field experience in construction, having been associated in different positions with Pacific Bridge Co., Barrett & Hilp, General Engineering Co., Bechtel-McCone-Parsons, and other contractors. He taught mathematics and engineering at Bakersfield, Calif., Junior College for 18 years.

Prof. Charles Gilman Hyde, professor of sanitary engineering at the University of California since 1905, has retired from active teaching and been appointed professor emeritus. He has been active in affairs of the American Society of Civil Engineers, being past president of the San Francisco section, and a past director of the Society nationally. He has acted as consultant on many of the largest projects in the sanitary field throughout the West. He will continue in consulting practice.

A. Middleton was elected president of the Victoria Contractors' Assoc. at Victoria, B. C. Other officers include: **A. Whiteman** as vice-president, **P. M. Townsend** as secretary-treasurer, and **H. M. Cowper, W. S. Bartlett, H. Rupert Brown, A. V. Wilkinson, W. J. Drysdale, A. E. Evans** and **H. A. Bradley** as directors.

Daniel Hayes of the Security Plumbing Supply Co., San Francisco, Calif., has been elected national president of the Heating, Piping and Air Conditioning Contractors Assoc. The election of a westerner shatters a 55-year precedent.

Brig.-Gen. DONALD P. BOOTH, whose promotion was recently confirmed by the Senate. He was executive officer of the Seattle, Wash., District Engineer's office for 2½ years, with the rank of Lt. Colonel. He left there in Oct. 1942 to go to a special assignment in the Middle East.

D. D. Smalley, general superintendent of the San Joaquin Power division of the Pacific Gas and Electric Co., has been appointed as area superintendent of the central area with headquarters in San Francisco. He will take over the work of the San Francisco and East Bay divisions' general superintendents and will direct the construction, operation and maintenance of all physical properties of the coast valleys, San Jose and Stockton divisions.

Appointment of **Guy M. MacVicar** as district director for Builders of the West, Inc. in the nine San Francisco bay area counties, is announced by **Rex L. Nicholson,** managing director. A Harvard graduate, with years of experience as a trained executive, MacVicar will assist municipalities and counties, as well as private business and industry, in the San Francisco bay area to develop and blueprint vital postwar building and development projects.

A. M. Rawn, chief engineer and general manager of Los Angeles County Sanitation Districts, is acting as consultant for the sewage disposal problem of the city of Portland, Ore. A $12,000,000 bond issue was recently voted by that city for construction of an interceptor system. **J. C. Cunningham, Ray E. Koon,** and their staffs are currently engaged in the design.

Wilmot D. Cloos has resigned from the War Production Board to return to private industry as assistant to the president of the Pacific Portland Cement Co. at San Francisco, Calif. He has been serving in the New York regional office as chief of the materials redistribution section which is responsible for the utilization of idle and excess inventories. **Edward F. Wilson** has been appointed to succeed Cloos.

Franklin P. Ulrich, chief of the seismological field survey of the Coast and Geodetic Survey, in San Francisco, Calif., has returned from a 5-month trip through Latin America studying seismological conditions in the southern countries, and will cooperate in the establishment of a cooperative program for the American republics, having headquarters in Mexico City.

Prof. Charles Derleth, Jr., is on sabbatical leave from his civil engineering classes at the University of California until Oct. 2, following which he will become professor emeritus. **Prof. S. T. Harding,** of the Irrigation division of the University, has been named chairman of the Division of Civil Engineering.

Major-General John Peter MacKenzie, former manager of Hamilton Bridge Limited, Vancouver, B. C., has been appointed associate controller of construction in the Canadian government. He retired recently as inspector-general of western Canada.

Eugene D. Eaton, land use specialist, has been transferred from Washington to the Bureau of Reclamation office at Denver, Colo. He will aid in the development of the fullest beneficial use of both land and available water in the West.

Fitz Turner has returned to his former position as division engineer at Sacramento for the Southern Pacific Railroad Co. For the past fifteen months, he has been a captain in the Army Transportation Corps organizing a railroad battalion for overseas duty.

J. L. Monteith has severed his connections with Armstrong & Monteith Construction Co., Vancouver, B. C., contractors.

Delbert D. Smith, formerly in the city water department of Santa Barbara, Calif., has been appointed superintendent of the Montecito water district. **Eugene B. Brown,** past city engineer of the city, will succeed Smith as city water superintendent.

E. L. Filby has returned to his position as principal assistant engineer with Black & Veatch, consulting engineers in Kansas City, Mo. For the past year he has been field director for the Committee on Water and Sewage Works Development.

Lee J. Noftzger, formerly technical editor for the Technical Reports Service of Sacramento, Calif., is now an engineer for the United States Bureau of Reclamation at Hay Springs, Nebraska. He is employed on the Mirage Flats Project where an irrigation system is being located and constructed.

A. E. Glover, regional engineer with the U. S. Forest Service, is in charge of crews engaged in the selecting of areas to be used for a 7½-billion bd. ft. pulp timber unit. The unit is being laid out in southeast Alaska.

A. F. HEWITT, assistant highway engineer of the Colorado Highway Dept., inspects a pedestrian overpass being built by Lowdermilk Bros. at Denver. He is president of the Colorado Engineering Society.

SUPERVISING THE JOBS

J. T. Lay has been appointed county engineer in Jefferson County, Ore. He succeeds **William A. Bugge** who has taken a position with the Asphalt Institute in Portland. Lay has been the county engineer of Clallam County.

* * *

W. Allen Grubb, past district engineer for the Portland Cement Assoc., will become associated in a civil and hydraulic engineering capacity with the American Pipe & Construction Co. in Los Angeles, Calif.

* * *

L. R. Douglass is now the engineering assistant to the Commissioner of the Bureau of Reclamation at Washington, D. C. Formerly he was in the office of the Chief Engineer of the Bureau at Denver, Colo.

* * *

Howard Drake, Coeur d'Alene, Ida., national forest logging engineer, is now in charge of the headquarters at Missoula, Mont., for the inspection of timber sales for compliance with federal regulations.

* * *

Col. Alvin G. Viney, former Pasadena, Calif., engineer, was awarded the Army's Legion of Merit for distinguished service. He has been with the Army Engineers since 1929 and was recently sent overseas.

* * *

Coleman H. Cook has been appointed chief designing engineer of the bridge division of the Texas State highway department. He has been associated with the department for the past 15 years.

* * *

Fred Langhorst, architect, has been elected as executive director of the San Francisco Planning and Housing Assoc. He expects to continue his private practice.

* * *

Joseph T. James has been reappointed commissioner of public works at Alhambra, Calif. He will represent the city commission on the local planning commission.

* * *

Oliver Bandelman, past resident engineer during the construction of the Lewiston airport by the Northwestern Engineering Co., will supervise the construction of an airport at Malad, Ida.

* * *

Fred W. Crocker is now with Kaiser Industries of Oakland, Calif. He is the designing engineer on shell plants for the Fontana and Denver units.

* * *

Carl R. Rankin has returned to his home in Altadena, Calif., after a prolonged stay in Mexico, where he acted as consultant on an important irrigation tunnel.

* * *

Lloyd Y. White is now associated with Morriss and Van Wormer, Engineers, of San Francisco, Calif.

* * *

Roy A. Welsh has again become Centralia, Wash., city engineer. For the past year he has been city engineer at Ephrata, Wash.

* * *

Glen Rogers, formerly with the Bureau of Reclamation, now has a position with the Navy department in San Francisco.

C. J. (Jack) Haglund is the general superintendent on the Macco-McKittrick-Morrison contract for the Naval Ordnance Station at Inyokern, Calif. **F. W. Case** is project manager, **H. B. Olson** is assistant superintendent, **I. L. (Les) Croft** and **Olly Stoffel** are master mechanics, **Bennett Murray** is superintendent of heavy construction, **Adolph Brandt** is superintendent of buildings, **Ray Perry** is rigger foreman, **C. F. Strohacker** is concrete foreman, **C. McGinniss** is in charge of the concrete mixing plant, **Nick Carter** is superintendent of the asphalt plant, **V. Frandsen** is the lumber yard foreman, **R. Barnes** is the excavation foreman, **Ray Masey** is the grading foreman, **Harry Bambauer** is superintendent of the rock plant and **George Harris** is the general plant superintendent. **J. T. Stafford** is project manager for the Stafford, Davis & Goherty engineers on this job. **D. S. Reynolds** is the mechanical engineer, **C. Y. Berry** is the site-planning engineer, **W. G. Balch** is designing coordinator, **Jean E. McAllister** is assistant to Reynolds, **Fred Pearson** is the electrical engineer, **Al Pierce** is the civil engineer, **Jack Bliss** is the supervising field engineer, **Clyde Stoughton** writes the specifications, and **Charles Stickney** is the structural engineer.

* * *

Dolph Lowe is superintending a $573,000 contract for the Pacific Pipe Line Construction Co. of Los Angeles, Calif. The contract calls for the digging of a trench, placing, and backfilling for 55 mi. of 18-in. welded steel pipe from Ventura to a regulator station in North Hollywood. The project manager on the job is **G. W. Abernathy** and the project engineer is **Henry Schumacher.** On another section of the same project, **Louie Robertson** is in charge as superintendent of a $519,000 contract. This work involves the digging of a trench, placing and backfilling for 36 mi. of 16-in. steel between Goleta and Ventura, Calif. **Don W. Metcalf** is the office manager.

* * *

Ed. Campbell is the general superintendent for the Morrison-Knudsen Co. and Ford J. Twaits Co. on a construction job at the Klamath Falls Naval Air Station, Klamath Falls, Ore. The project manager is **J. N. Wells,** the equipment supervisor is **Harold G. Piper** and among the many foremen are **Bud Snowball, Jess Leamaster, Ralph Colby, J. M. Bonner,** and **Clarence Sylvia. Jack Ogden** is the building superintendent, **W. N. Drew** is construction superintendent, **E. C. Elliott** is office manager, and **Frank Barr** is the purchasing agent.

* * *

George N. Rantanen is the general superintendent of construction for the Pacific Naval Airbases Contractors on a contract calling for some construction changes at the Naval Air Base at Port Hueneme, Calif. **Dan W. Barnard** is the assistant general manager, **Al. Pierson** is the carpenter superintendent, **Howard Burfeind** is the concrete superintendent, **E. R. Quam** is in charge of the drafting room, **M. D. O'Donnell** is the plumbing superintendent, **Harry Roberts** is the chief engineer and **Comdr. Daley** represents the Navy. Another key man on the job is **L. B. (Connie) Conrad** who is the superintendent of excavation and the quarry.

* * *

Jack H. Hurley, assisted by **Lee Jefford,** grading foreman, and **"Hap" Farris,** pipe foreman, is general superintendent on Fredrickson & Watson Construction Co.'s contract for grading and paving at Camp Shoemaker, Calif. This job is an addition to the present camp, including additional barracks, mess halls, auditorium and swimming pools. **K. C. Danstrom** is Chief of Naval Inspection at Shoemaker, coming there from the Naval Air Station, Tillamook, Ore., several months ago.

* * *

W. W. Christopherson is the superintendent on a job calling for the replacement of the southeast trestle approach to the New Westminster bridge in British Columbia, Canada. He is representing the Campbell Contracting Co., Ltd., Vancouver, B. C., on this $90,000 contract. **R. G. Campbell** is the managing director and **Colin Campbell** is the general superintendent.

* * *

E. H. (Bud) Smith is in charge of the shop of the Shepard Tractor & Equipment Co. at their new location at 205th and So. Normandie Sts., Los Angeles, Calif. He is assisted by **Vic Dearinger,** who has just returned from the South Pacific where he was serving with the Seabees. The Shepard Tractor & Equipment Co., a Caterpillar distributor, is at present engaged in repairing earth-moving equipment for the U. S. Army.

* * *

C. R. Hazen is general superintendent for Winston Bros. Company, Los Angeles, Calif., on the job recently awarded this contractor by the Atchison, Topeka & Santa Fe Railway, amounting to $67,802. Job site is at Canadian, Hemphill county, Texas, and consists of railroad alignment involving 200,000 cu. yd. of excavation. **S. A. Almlie** is office manager and **Otto Ahlers,** general foreman.

* * *

R. E. (Bob) Ellis is general superintendent for Porter W. Yett, Portland, Ore., of a $376,687 contract. The work includes the grading and paving of 8.8 mi. of the Halsey-Harrisburg section of the Pacific Highway east. **George W. Cressler** is the job superintendent, **Joe M. Lady** is plant superintendent, **Paul Cochran** and **Jimmy Hugh** are grade foremen, **Glen Juilus** is concrete foreman, **E. I. Smith** is timekeeper, and **Bernice Christensen** is the paymaster.

* * *

Vern Jeffries, master mechanic; **Ralph Shafstall,** welding foreman; **W. C. Runnels,** tractor foreman, with **Charles Rich-**

ardson, in charge of engineering, are all working at the recently expanded yard of the contracting firm of Vinnell Company (formerly A. S. Vinnell Co.) in Alhambra, Calif. In addition to their various construction activities, this firm is largely engaged in building and repairing equipment for the Army. **L. D. Webster** is general manager of the company.

* * *

Harry L. Arnold is general superintendent for Bohannon & Chamberlain on their large housing contract at San Lorenzo, Calif. Assisting him as superintendents are: foundations, **Fay Morser**; framing, **Earl Evans**; finishing, **Richard De Luchi**; streets and sidewalks, **Tony Skubi**; lumber and pre-cutting, **Robert Smiley. Edwin Smith** is resident engineer and **Irving Randall, Jr.** is office manager.

* * *

Jack Sommers is foreman in charge of the construction of siphons for Teichert & Sons, Inc., on the Madera Canal. Other Teichert personnel was listed in the May issue. **G. E. Embree** is the job superintendent for the contractor Earl Parker, who is building the canal and reservoir. **Irving Poston** is the grade foreman, **J. H. Shaver** is the master mechanic and **W. E. Newman** is carpenter superintendent.

* * *

Charles S. Lenoir is superintendent for the I. C. Little Construction Co., Dallas, Texas. He is in charge of a job calling for the laying of 140 mi. of 12-in. pipe from southern Mont. to Casper, Wyo., to serve the Elk Basin oil pool in Mont. The field manager is **Harvey C. Galloway** and the assistant superintendents are **K. K. Kelley** and **William B. Williams.**

* * *

Bill Terry is superintendent in charge of the construction of a 4-mi. road, 18 ft. wide, with a 12-in. gravelled surface. The $40,000 job is being done by the North Pass Paving Co., Ltd., a subsidiary firm of the Vancouver Construction Co., Ltd., of Vancouver, B. C. The work consists of the construction of a logging road near Sechelt, for the Lamb Lumber Co. of Vancouver.

* * *

Harry P. Benner is the general superintendent and **P. E. Lancaster** is the assistant superintendent for Bechtel, McCone and Parsons Corp. of refinery installations for the Associated Oil Co. at Ventura, Calif. **Cecil Cain** is welding superintendent, **Lester Fleming** is in charge of the pipefitters. **C. E. Barnbeck** is office manager and **B. Taff** is chief of party.

* * *

A. L. Johnson is the superintendent on a $2,013,000 job involving a considerable amount of fill that is required to extend a runway at the San Francisco Municipal Airport, San Francisco Co., Calif. The work is being done by Morrison-Knudsen Co., Inc., and the Macco Construction Co. of Oakland, Calif. **O. H. Tucker** is the project manager.

* * *

Britt Pugh is the general superintendent for the Phoenix Construction Co. on the construction of parking aprons and the placing of pavement at the Marine Base, Mojave, Calif. **W. T. (Bill) Perry** is general foreman, **Norman Weldon** is grade foreman, **R. E. Needham** is job engineer, and **J. E. Keithly** is the purchasing agent.

CARL W. ERICKSON

C. W. Erickson of the Erickson Paving Corp., Seattle, Wash., is superintending a $158,357 grading and paving contract at Moon Island Airport near Hoquiam. **Algot Nelson** is in charge of the grading and the Washington Asphalt Co. of Seattle is doing the paving.

* * *

H. H. Tomlinson is superintendent in charge of a $486,229 contract awarded to the Union Construction Co., Great Falls, Mont. The contract calls for the grading, surfacing, and construction of drainage structures on 10.3 mi. of highway on Lookout Pass between Superior and the St. Regis-Tarkio Road, Mineral Co., Mont. **N. D. Robinson** is assistant superintendent, **Ray Hollern** is grading foreman, **S. E. Kessler** is gravel foreman and **Fey Ramsey** is master mechanic.

* * *

H. W. Calder and **Charles Burke** are the foremen in charge of the work on a $248,271 contract awarded to Miller & Stoutenberg of Oakland, Calif. The contract calls for the improving of water, steam and fire protection facilities on the receiving ship at Yerba Buena Island, Calif. **David Love** is project manager and **O. L. Lewis** is the purchasing agent and office manager.

* * *

W. D. Ferguson is the superintendent in charge of the construction of 200 reinforced concrete and clay tile dwelling units at Harlingen, Texas. The $439,866 contract was awarded to H. H. Moeller of San Antonio and includes the installation of a sanitary sewer distribution system. **F. D. Cromack** is engineer on the job and **Travis Wallace** is the carpenter foreman.

* * *

Neal Folger is superintendent for Macco Construction Co. at Oakland, Calif., in charge of the work on a $119,640 contract for the preparation of a site for the Postal Concentration Center at the Oakland Army Base. Other key men are **Johnny Rawhauser** as office engineer, **Trace Baker** as night foreman, and **Bob Poss** as paymaster.

* * *

W. O. Ward is the superintendent of a $342,945 contract awarded to Hull-Smale-Robinson, Inc., Wilmington, Calif. The work involves the construction of loading facilities for the transportation of aircraft from the Naval Air Station at San Diego, Calif. **R. C. Frisbie** is general foreman on the job.

* * *

Paul Moore is the general superintendent on a contract awarded to Ruddy & Son for the construction of highway at Merced, Calif. The job superintendent is **E. A. Bray,** the hot plant foreman is **Joe Hanson,** the paving foreman is **Bill Fogle,** the master mechanic is **Bert Crouch,** and the office manager is **H. A. Moore.**

* * *

Howard Spence is superintending the construction of a 16-room frame school bldg. with solid masonry exterior walls to be built in the Pasco area, Wash. The $115,-500 contract was awarded to Paul N. Odegard of Everett. **Bob Denamur** is the assistant superintendent of the work.

* * *

Paul W. Hillseth is superintending a $82,-070 contract awarded to the Firguson Door Co. of Los Angeles, Calif. The contract calls for the construction of doors for the shop, and operations and check hangars in the Marine Corps hangar, El Toro, Calif. **Joe Laughlin** is the assistant superintendent.

* * *

Ray Everetts is superintending a $127,946 contract for the W. H. Noel Co. of Jamestown, N. Dak. The contract calls for a stabilized base and bituminous surface on 6 mi. of highway on the S. Dak. line northwesterly and 10.8 mi. from Bucyrus northwesterly on U. S. 12 in Adams Co., N. Dak.

* * *

Harold E. Paul is the superintendent in charge of a $399,434 job for the Harris Construction Co., Fresno, Calif. The contract calls for the construction of buildings, the installation of services and the laying of paving at the Auxiliary Air Station at Santa Rosa, Calif. **T. A. Bales** is the assistant superintendent.

* * *

Ferris Erickson is superintending construction of 84 dwelling units in Kensington Gardens, Salt Lake City, Utah. This is a $411,600 contract recently awarded to Edward Eckman Construction Co., Murray, Utah. Acting as office manager for the contractor on the job is **T. E. Harris.**

* * *

R. F. (Bob) Fleming is in charge of the construction of buildings at the Marine Base at Mojave, Calif. He is general superintendent for the Del E. Webb Construction Co., Phoenix, Ariz. **Frank Brundage** and **D. H. (Buck) Buchanan** are area superintendents, **Bob Ours** is engineer and **Bert Collins** is the office manager.

* * *

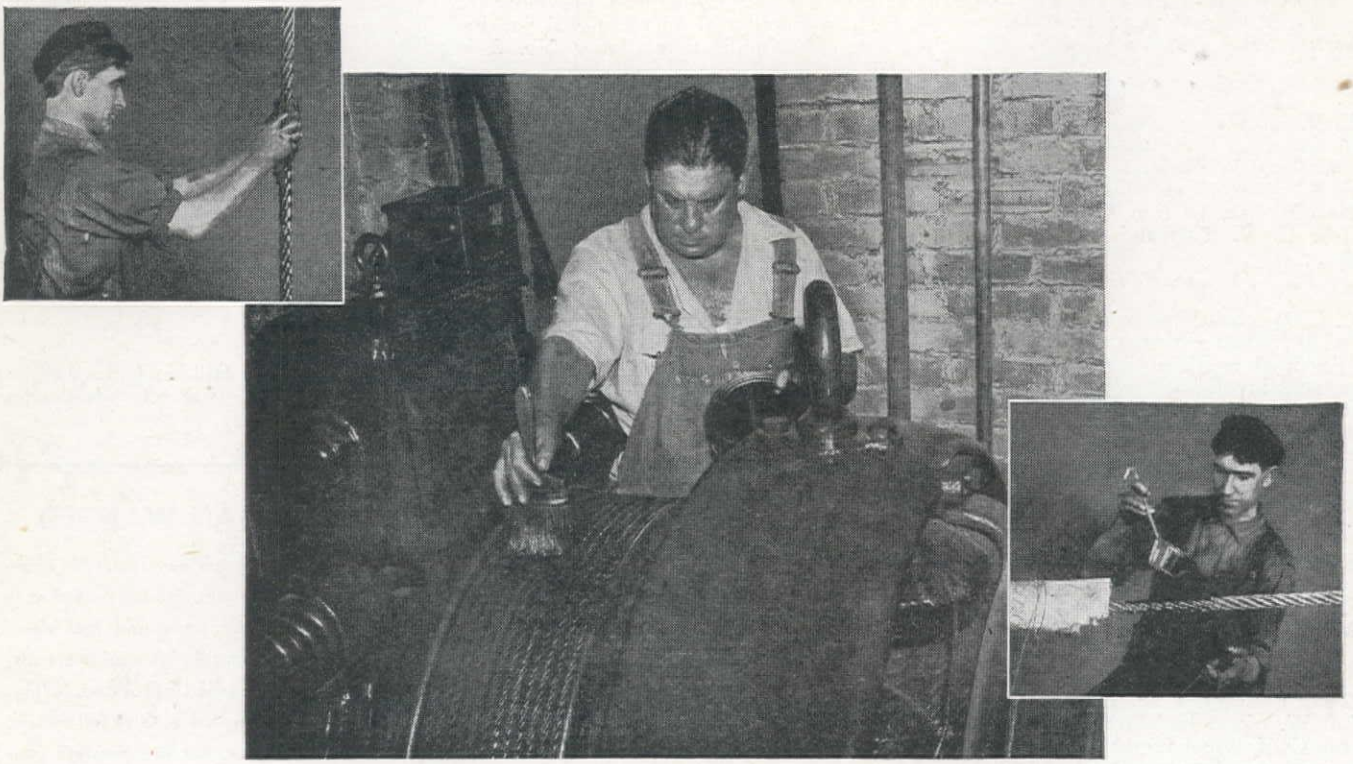
Al Osborn is the superintendent for the Diesel Oil Sales Co. of Seattle, Wash., on a $72,043 contract. The work calls for the oiling of 57.3 mi. of roads in Spokane Co., Wash., **J. H. (Ham) Boyce** is serving as foreman and **W. K. (Bill) Kellogg** is the timekeeper.

* * *

Ernest L. Barry is in charge of the construction of an addition to the Kearney Junior High School in San Diego, Calif. He is the superintendent of this $335,000 contract that was awarded to Herbert Mayson of Los Angeles. **C. W. Davis** is the purchasing agent.

Longer Life through

PROPER LUBRICATION



WIRE ROPE is continually fighting a battle-royal with corrosion, friction and wear. Because of the hazards involved, it is neither safe nor economical to use a rope whose original strength has been reduced (by either corrosion or wear) to a point where it no longer affords an adequate factor of safety.

But the safe life span of a wire rope can be greatly extended by keeping it correctly lubricated at all times. The lubricant applied during manufacture will not last indefinitely.

The greatest harm resulting from incorrect or insufficient lubrication is the rust and decay that takes place within the rope. For the most part corrosion is an "undercover" worker as its action is not always visible until too late.

Friction and wear fight hand in hand. Their attack is within *and* without. Every time a wire rope bends there is a sliding movement of both wires and strands where they contact one another. There is also friction where the rope comes in contact with the sheaves and drum.

Proper lubrication will help wire rope win its battle for Longer Life as it lessens friction, promotes flexibility, reduces wear and retards corrosion. The right kind of lubricant to use and the frequency with which it should be applied, depend upon the conditions under which the rope is operating. We shall be glad to give further details on this important subject.

Important: **An idle wire rope is more vulnerable to corrosion than one in use. So be sure to give your ropes the protection of a good lubricant when they are not in service.**

A. LESCHEN & SONS ROPE CO.

WIRE ROPE MAKERS — ESTABLISHED 1857

5909 KENNERLY AVENUE — ST. LOUIS, MISSOURI, U. S. A.

NEW YORK . . . 90 West Street
CHICAGO . . 810 W. Washington Blvd.
DENVER . . . 1554 Wazee Street

HERCULES (RED STRAND) WIRE ROPE

SAN FRANCISCO . . 520 Fourth Street
PORTLAND . . 914 N. W. 14th Avenue
SEATTLE . . 3410 First Avenue South

M. Lummus was superintending work calling for the extension of the empty car storage yard at the Naval Magazine, Port Chicago, Calif. This contract was let to A. D. Schader of San Francisco, Calif., at a bid of $79,900. **L. Roller** was the head foreman and **V. Barker** was the purchasing agent.

* * *

O. J. Spengel is in charge of the construction of 5 barracks bldgs. at the Naval Air Station, Ward Island, Corpus Christi, Tex. He is superintendent for Lawless & Alford of Corpus Christi on this $364,364 contract. **Milburn Exsum Jr.** is the office manager and purchasing agent.

* * *

E. V. Shields is superintending the construction of a heat treating plant at the Naval Torpedo Station at Keyport, Wash. This $77,500 contract was awarded to the Gaasland Construction Co., Bellingham, Wash. **G. V. Turner** is the purchasing agent.

* * *

C. C. Mitchell is general superintendent of a $1,750,000 contract awarded to the L. S. Whaley Co. of Long Beach, Calif. The work involves the construction of 346 frame-stucco dwellings in Long Beach, Los Angeles Co. **J. L. Talbert** is the project manager.

* * *

George Bacus is in charge as superintendent of a $313,045 job calling for the placing of pavement at the Oakland airport, Alameda Co., Calif. He is representing Piazza & Huntley of San Jose, Calif. **Roy Copley** is assistant superintendent.

* * *

Cecil Rafferty is shop foreman at the Clyde W. Wood, Inc. yard in North Hollywood, Calif. Other important personnel at the yard are **Stanley B. Wood,** general manager; **Ed. Koehler,** chief engineer, and **G. C. Gough,** office manager.

* * *

A. P. Jensen, superintendent of the Gaasland Construction Co. of Bellingham, Wash., is in charge of the construction of additional hospital facilities at the Navy Hospital at Seattle. **E. V. Lade** is the purchasing agent for the $54,250 contract.

* * *

J. V. Huddleston is superintending the construction of a mock-up ramp and dock at San Diego, Calif., for the Case Construction Co. of San Pedro, Calif. The assistant superintendent for the $94,163 contract is **Norman Baldwin.**

* * *

A. G. Gardner, superintendent for Dolph Construction Co. of Dallas, Tex., is in charge of the work on a $203,271 contract at Temple. The contract calls for the construction of a war-housing project to serve the McCloskey Hospital.

* * *

Bravis E. Smartt is the superintendent for L. H. Leonardi, San Rafael, Calif., on a $109,000 contract, which calls for the installation of a night lighting system at Hamilton Field. **James Stone** is the general manager.

* * *

L. Figone is superintending the construction of a seaplane ramp for the Naval Auxiliary Air Field at South San Francisco, Calif. A. Soda & Son of Oakland, Calif., was awarded the $184,148 contract. **A. W. Clayton** is the assistant superintendent.

* * *

W. D. Merrigan is the superintendent for the O. J. Scherer Co. of Angels Camp, Calif., of the work on a $218,637 contract for the construction of buildings, shops and other structures at the Navy Ammunition Depot at Hawthorne, Nev.

* * *

T. E. Moore is superintendent for the P.D.O.C. General Constractors, Phoenix, Ariz., on a $225,939 contract providing for the construction of an additional parking apron at Modification Center No. 2 in Tucson.

* * *

Lew Wallace is the superintendent for Ramey & Mathis, Amarillo, Tex., on a $115,000 housing contract. The work involves the construction of 50 family units at Dalhart. **J. R. Richardson** is the timekeeper and clerk.

* * *

Larry Saar, superintendent for the Brizard Co. of Arcata, Calif., is in charge of the installation of heating facilities at the Navy Air Depot at Hawthorne, Nev. **Robert W. Matthews** is manager of the work under the $198,562 contract.

* * *

Fred McNabb is the superintendent in charge of the removal, re-erection and landscaping of 12 buildings from Wickenburg to a new site at Avondale, Ariz. He is representing E. W. Duhame of Phoenix, Ariz.

* * *

Walter Geiser is superintendent for the Owl Truck & Construction Co. of Compton, Calif., on a $53,919 contract, for the improvement of section "D" of pier "A" in the east Long Beach harbor.

* * *

Earl L. Ryan is superintendent for Carson Frazzini of Tonopah, Nev., of the work on a $61,078 contract. He will be in charge of building a 15.4-mi. access road from the junction of U. S. Route 91 to the Blue Diamond Mine and Mill in Clark Co., Nev.

* * *

George F. Lewis is superintending the construction of 5 additional barracks bldgs. for enlisted men at the Naval Air Station at Corpus Christi, Texas. Thomas Bate & Son were awarded the $159,393 contract.

* * *

W. B. Moss is in charge of the laying of a vitrified clay sewer on Long Beach Blvd. in Los Angeles, Calif. He is the superintendent of the $93,782 contract for the M. F. Kemper Construction Co. of Los Angeles.

* * *

Louis R. Mushaney, formerly with Griffith Co. at Bakersfield, Calif., is a first class boilermaker in the ship repair unit of the United States Navy.

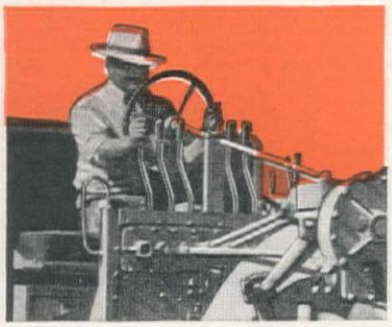
* * *

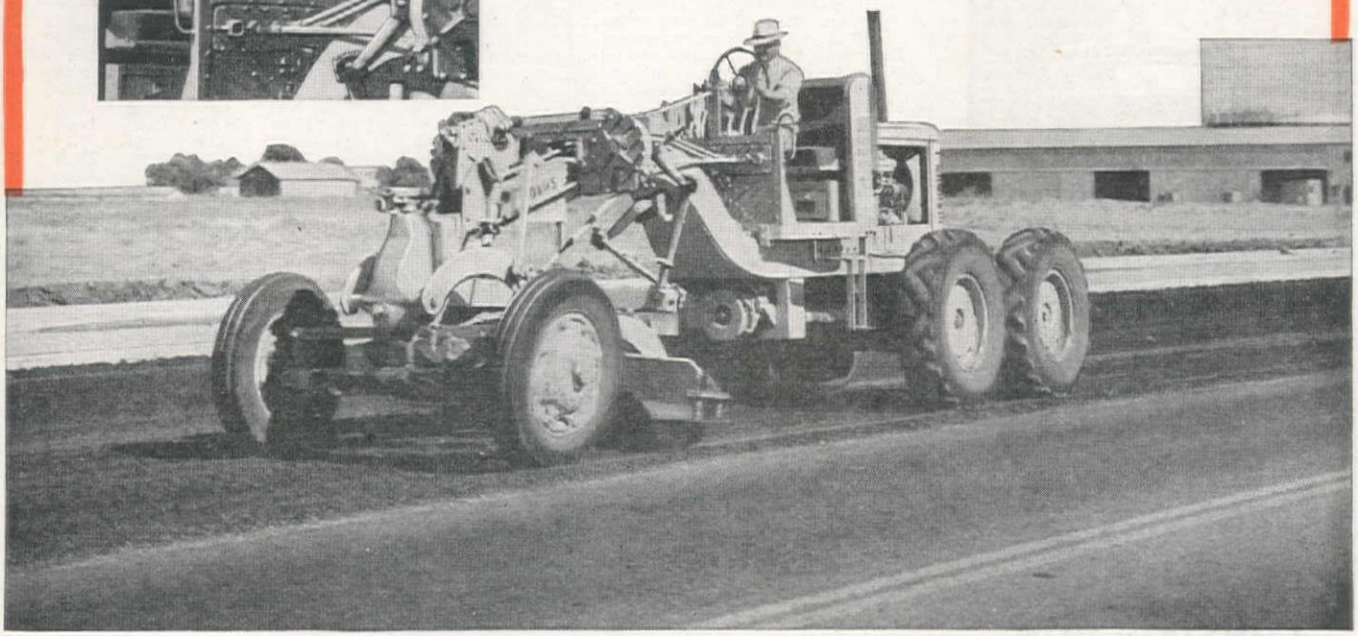
Joe O. Ivy is night superintendent for the Utah Construction Co. He is in charge of the night work driving a railroad tunnel for the Utah Copper Co. in Bingham Canyon, Utah.

* * *

Miss Louise G. Hill has entered the construction field. She is secretary in the heavy duty repair shop at Inyokern, Calif.

YOU GET *Speedy and Positive Controls* ON ADAMS MOTOR GRADERS





One of a series of ads on Adams motor grader features

***EXPERIENCED grader operators—particularly those on construction work where frequent blade adjustments are necessary—want positive, dependable controls. When they operate their control levers they want to know what's going to happen and how fast . . . When you lower the blade on an Adams, it goes down at a constant, set speed and when you raise the blade it comes up at the same constant speed. The same positive action applies to the scarifier and leaning of the front wheels. And, with Adams mechanical controls you can operate two or more controls at the same time without affecting the set speed of any of them . . .

Positive acting controls are essential on fine work, such as the blading of black top on the contract job pictured above, but they are advantageous also on all types of grading and road maintenance. You want them and should have them whether you are contractor or highway official, so be sure of getting them by buying Adams . . . Not only are Adams controls positive and dependable in their action but they are speedy and easy to operate.

J. D. ADAMS COMPANY · INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.

Let These Distributors Service Your Equipment

ALASKA—Glenn Carrington & Co., Fairbanks
ARIZONA—O. S. Stapley Company, Phoenix
CALIFORNIA—J. D. Adams Co., San Francisco, Los Angeles
Sutton Tractor & Equip. Co., Sacramento
J. G. Bastain, Redding
COLORADO—McKelvy Machinery Co., Denver
IDAHO—Intermountain Equipment Co., Boise, Pocatello
MONTANA—Industrial Equipment Company, Billings
NEVADA—Allied Equipment, Inc., Reno
NEW MEXICO—Hardin & Coggins, Albuquerque
OREGON—Howard-Cooper Corp., Portland, Eugene
UTAH—The Lang Company, Salt Lake City
WASHINGTON—Howard-Cooper Corp.,
Seattle, Spokane, Walla Walla
WYOMING—Industrial Equip. Co., Billings, Mont.
The Lang Company, Salt Lake City, Utah

ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT

UNIT BID SUMMARY

Highway and Street...

California—Contra Costa Co.—State—Surf.

W. E. Hall Co., Alhambra, bidding $77,871, submitted the low proposal to the California Division of Highways for construction work on Trabuco road between Route 2 and the El Toro marine base, and on Central Ave. between Route 2 and Trabuco road. A total of about 4 mi. is to be graded and surfaced with plantmix surfacing on untreated rock base and in some cases plantmix surfacing to be placed on existing surface. Unit bids were submitted as follows:

(1) W. E. Hall Co. $77,871
(2) Arthur A. Johnson 82,652
(3) Griffith Co. 82,821
(4) Lewis Construction Co. 84,584
(5) Sully Miller Contracting Co. $86,088
(6) J. E. Haddock, Ltd. 89,041
(7) M. W. Stanfield Co. 89,816

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
10 cu. yd. removing concrete	12.00	5.00	5.50	5.00	4.50	5.50	12.00
210 sta. clearing and grubbing	6.00	5.00	5.00	20.00	12.00	3.50	10.00
6,500 cu. yd. roadway excavation	.78	.70	.80	.50	1.08	.85	.77
580 cu. yd. structure excavation	1.70	2.00	2.00	3.00	4.00	1.50	1.00
Lump sum, devel. wtr. sply. and furn. wtg. equip.	200.00	300.00	$1,000	500.00	$1,400	$2,900	$1,000
550 M. gal. applying water	1.25	2.25	1.50	2.00	1.20	2.10	2.00
210 sta. finishing roadway	4.00	5.00	5.00	10.00	8.50	6.50	6.00
11,000 T. untreated rock base	1.70	1.60	1.50	1.50	1.69	1.76	1.60
250 T. liq. asph., MC-2 or 3 (B.S.T.)	14.00	15.50	15.00	14.00	15.50	14.00	15.20
20,000 sq. yd. prep'g, mix'g & shpg. surf. (B.S.T.)	.12	.15	.11	.14	.11	.10	.12
20 T. liq. asph., MC-2 (pr. ct.)	20.00	20.00	24.00	28.00	30.00	20.00	25.00
17 T. asphaltic paint binder	32.00	45.00	52.00	30.00	35.00	40.00	35.00
10,300 T. P.M.S.	3.50	3.55	4.05	3.78	3.50	4.10	4.50
145 cu. yd. Cl. "A" P.C.C. (structures)	28.00	50.00	33.00	30.00	36.00	39.00	30.00
90 lin. ft. 18-in. R.C.P. (std. str.)	3.00	4.50	3.00	4.00	4.10	3.25	3.60
120 lin. ft. 24-in. R.C.P. (std. str.)	3.80	5.00	4.00	6.00	5.25	4.75	5.00
20 lin. ft. 12-in. plain C.P.	.95	3.00	1.20	3.00	1.50	2.00	2.00
220 lin. ft. salvaging pipe culverts	1.00	3.00	.75	2.00	1.05	.70	1.25
220 lin. ft. relaying salvaged C.M.P.	1.00	1.50	.75	2.00	.75	.55	1.25
13,500 lb. bar reinforcing steel	.08	.09	.066	.10	.09	.09	.075
3 ea. F.A.P. markers	5.00	10.00	4.00	40.00	6.00	6.25	10.00
Lump sum, removing existing bridge	774.00	500.00	160.00	$1,000	550.00	200.00	500.00

Montana—Prairie Co.—State—Surf.

Stanley H. Arkwright, Inc., Billings, Mont., was low at $108,408 to the State Highway Commission on gravel surfacing and bituminous surface treatment on 2.2 mi. of highway on Terry-Glendive highway. The contract was awarded to the low bidder. All bids submitted were lower than the engineer's estimate. The grading and surfacing work is to be completed Oct. 31, 1944, and all work by June 30, 1945. The following unit bids were submitted:

(1) Stanley H. Arkwright, Inc. $108,408
(2) Inland Construction Co. 113,803
(3) Union Construction Co., Inc. 114,288
(4) Big Horn Construction Co. 116,873
(5) Northwestern Engineering Co. $120,244
(6) McLaughlin, Inc. 121,452
(7) O'Neill Construction Co. 122,698
(8) Engineer's estimate 133,426

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
224,729 cu. yd. uncl. exc. and borrow	.818	.165	.20	.19	.20	.23	.18	.21
15,103 cu. yd. select. borrow	.222	.523	.30	.33	.50	.45	.35	.55
433 cu. yd. culv. exc.	1.00	1.25	1.00	1.00	1.25	1.00	1.00	1.50
1,102,920 sta. yd. overhaul	.333	.004	.01	.01	.01	.005	.005	.01
17,391 T. base course cr. grav. surf.	.77	.685	.70	.75	.90	.80	.90	1.10
6,062 T. Gr. "A" top crse. cr. gr. surf.	.88	1.06	1.00	1.00	1.20	1.30	1.25	1.25
368 T. stone chips in pl.	4.44	4.75	5.00	4.00	3.50	10.00	9.00	3.00
983 cu. yd. binder	.01	.12	.10	.01	.25	.10	.10	.30
1,966 yd. mi. overhaul on binder	.01	.12	.10	.01	.12	.05	.10	.15
14,353 gal. prime coat oiling, MC-2	.11	.107	.10	.15	.12	.12	.12	.11
10,053 gal. seal coat oiling, 150-200	.11	.114	.15	.15	.12	.12	.12	.11
4,090 M. gal. watering	1.50	1.76	1.00	1.50	1.50	1.00	1.25	1.50
264 lin. ft. R.C.P. culv. 15-in.	1.77	1.92	2.00	2.75	2.10	2.00	2.10	2.25
220 lin. ft. R.C.P. culv. 24-in.	3.33	3.83	4.00	4.50	4.50	3.25	4.00	4.50
60 lin. ft. R.C.P. culv. 48-in.	12.12	14.40	14.00	13.50	16.00	11.50	12.00	12.00
124 lin. ft. R.C.P. culv. 60-in.	17.17	23.20	20.00	18.50	25.00	16.00	17.00	16.50
28 lin. ft. relaying pipe culv.	2.00	2.70	2.00	2.00	1.25	1.50	1.75	1.00
146 lin. ft. corr. met. syph. pipe 24-in.	4.44	6.72	7.00	6.00	4.75	3.50	3.00	4.00
73 cu. yd. Class "A" conc.	33.00	39.96	35.00	23.00	45.00	40.00	40.00	35.00
0.85 cu. yd. Class "B" conc.	33.00	39.96	50.00	100.00	45.00	40.00	40.00	35.00
7,800 lb. reinf. steel	.11	.12	.10	.15	.12	.10	.11	.10
15 cu. yd. hand laid riprap	4.44	8.00	5.00	10.00	6.00	4.00	5.00	10.00
3,800 cu. yd. random riprap	3.33	2.30	2.00	2.78	1.80	2.00	5.00	3.00
5,376 lin. ft. lam. wd. guard rail	1.80	2.60	1.60	1.39	.81	1.50	1.50	1.60
2 ea. conc. proj. marker	25.00	14.80	20.00	15.00	10.00	15.00	10.00	15.00
30 ea. conc. r/w mon.	3.33	2.80	3.00	3.00	3.50	3.00	3.00	3.50
11 ea. conc. sta. markers	4.44	5.00	5.00	3.00	3.00	4.00	5.00	3.50
300 T. stockpile grav.	.88	.95	1.00	1.00	1.20	.80	.90	1.25

Oregon—Linn Co.—State—Pave.

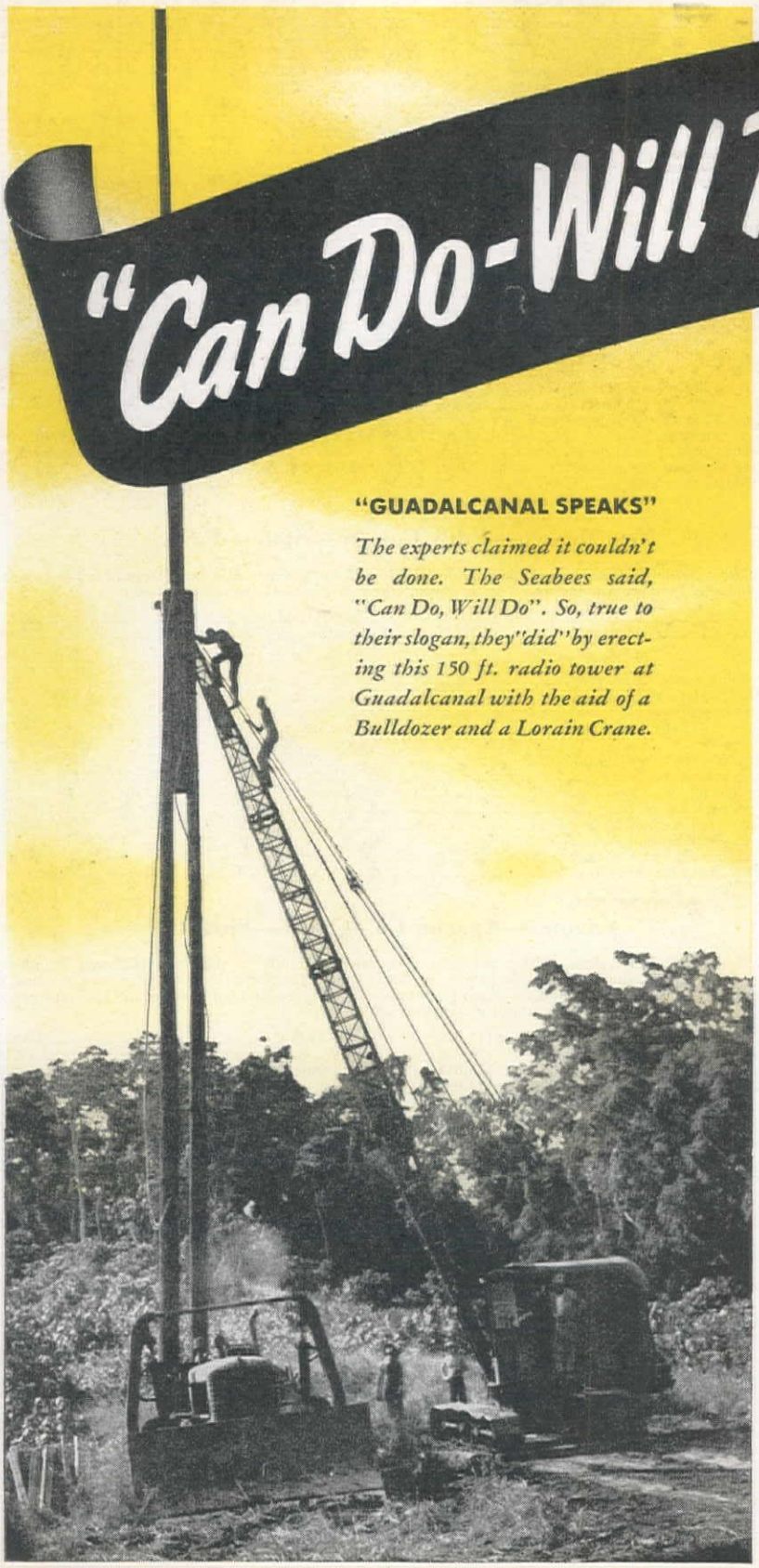
Porter W. Yett, whose proposal of $376,687 was low to the Oregon State Highway Department, has received the contract to grade and pave the Pacific Highway East between Halsey and Harrisburg, partly with Portland cement concrete pavement and partly with Class B asphaltic concrete. The following unit bids were submitted:

(A) Porter W. Yett $376,687
(B) Warren Northwest, Inc. 413,854
(C) Peter Kiewit Sons Co. 451,997
(D) Northwestern Engineering Co. 452,903
(E) Oscar Butler & Son 456,866
(F) McNutt Bros. $516,739
(G) E. C. Hall Co. and J. C. Compton 519,409
(H) Axman & Miller 521,170
(I) Babler & Conley 559,772

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1) Lump sum, clearing and grubbing	12,000	1,500	3,000	1,800	1,000	3,000	3,000	6,800	10,000
(2) 4,500 sq. yd. removal of pavement	.70	.50	.35	1.20	.48	.80	.75	.30	1.00
(3) 50 sq. yd. removal of walks	.50	1.00	.50	1.00	1.00	1.00	1.00	.50	1.00
(4) Lump sum, remov. of conc. box culv.	100.00	250.00	100.00	900.00	300.00	300.00	250.00	180.00	300.00
(5) 1,000 cu. yd. trench excav., uncl.	2.00	1.75	2.50	1.00	1.50	2.00	2.00	1.85	2.00
(6) 76,000 cu. yd. gen. excav., uncl.	.35	.33	.36	.33	.50	.60	.35	.50	.50
(7) 148,000 yd. stas. short overhaul	.02	.01	.02	.01	.02	.03	.03	.02	.05
(8) 7,900 cu. yd. stas. long overhaul	.30	.50	.35	.01	.60	.40	.45	.24	.35
(9) 8.80 mi. finish'g r'dbed & slopes	275.00	600.00	500.00	540.00	450.00	800.00	500.00	806.00	800.00
(10) 1,300 lin. ft. 12-in. sewer pipe	.95	1.25	1.50	1.00	1.10	1.40	1.25	1.86	1.25

(Continued on next page)

"Can Do-Will Do-DID"



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The experts claimed it couldn't be done. The Seabees said, "Can Do, Will Do". So, true to their slogan, they "did" by erecting this 150 ft. radio tower at Guadalcanal with the aid of a Bulldozer and a Lorain Crane.

DAILY, the list grows longer, the record more amazing, of the jobs being performed by the famed Seabees in the drive to Tokyo and Berlin.

And, closely related to the records being run up by these famed construction battalions, are almost unbelievable exploits of the tractors, bulldozers, shovels, and cranes that travel with them. We know, too, that among them are many noteworthy achievements of Lorains performing material handling jobs no one ever dreamed they would ever be asked to do, proving again their versatility, ruggedness, extra power and speed under the toughest imaginable conditions.

But, there are still bigger jobs coming up in the postwar period . . . when efficient and dependable equipment will be equally vital. And, because of Lorains' war-proven developments and performance you can figure on being in a better competitive position to *get* and *work* those big peacetime jobs—at a profit—with Lorains.

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(11)	1,200	lin. ft. 12-in. concrete pipe	1.00	1.30	1.50	1.05	1.10	1.20	1.50	1.86	1.25
(12)	600	lin. ft. 18-in. concrete pipe	2.10	2.75	3.00	2.00	2.50	2.40	2.50	3.72	2.50
(13)	400	lin. ft. 24-in. concrete pipe	3.25	3.75	4.50	3.00	3.25	3.25	3.50	4.35	3.00
(14)	200	lin. ft. 30-in. concrete pipe	4.80	6.50	6.00	4.50	6.50	4.75	5.00	7.44	5.00
(15)	36	lin. ft. salvaging culvert pipe	.75	1.00	2.00	1.25	5.00	2.00	1.00	4.95	2.00
(16)	6	ea. concrete catch basins	45.00	40.00	100.00	88.00	50.00	80.00	35.00	125.00	60.00
(17)	20	cu. yd. Class "A" concrete	30.00	35.00	30.00	35.00	33.00	70.00	40.00	62.00	40.00
(18)	2,300	lb. metal reinforcement	.0664	.10	.08	.09	.07	.12	.10	.06	.065
(19)	80	cu. yd. concrete curbs	20.00	24.00	60.00	41.00	22.00	50.00	40.00	37.20	30.00
(20)	120	sq. yd. concrete walks	1.80	2.50	2.00	3.30	3.50	2.25	3.00	2.50	2.50
(21)	53,500	cu. yd. 3-in. - 0 matr'l in base	.70	1.30	1.20	1.00	1.30	1.60	2.00	1.55	2.00
(22)	8,600	cu. yd. ¾-in. - 0 material in leveling crse. and shldrs	1.60	2.75	2.85	2.35	2.75	3.50	3.00	4.45	3.00
(23)	1,500	cu. yd. ½-in. - 0 material in cushion course	1.60	3.00	3.00	2.15	2.75	4.00	3.00	4.45	3.00
(24)	Lump sum,	salv'g detour surfacing	$1,925	$1,925	$2,750	$3,300	$2,585	$3,300	$2,750	$2,750	$2,750
(25)	1,100	M. gal. sprinkling	1.75	1.75	2.50	3.00	2.35	3.00	2.50	2.50	2.50
(26)	15,600	sq. yds. Portland cement conc. pave.	2.30	2.50	2.20	3.30	2.75	2.90	3.10	3.50	2.75
(27)	120	lin. ft. expansion jts. in pave.	.11	.15	.20	.30	.20	.50	.20	.25	.50
(28)	9,300	lin. ft. contraction joints	.015	.03	.04	.15	.04	.15	.05	.20	.25
(29)	120	ea. dowel bars	.40	.50	.20	.60	.60	.40	.60	.30	.75
(30)	5,100	lb. tie bars and reinf.	.0482	.07	.06	.08	.07	.08	.07	.08	.10
(31)	36,000	sq. yd. Port. cem. conc. base	1.60	1.90	1.93	2.90	2.10	2.30	2.50	2.50	3.05
(32)	27,000	T. Cl. "B" asph. conc.	5.70	5.10	6.00	5.50	5.75	5.80	6.00	5.43	6.00
(33)	100	T. furn. and placing emuls. asph. in seal coat	20.00	28.00	34.00	28.00	35.00	45.00	40.00	50.00	35.00
(34)	450	T. furn. and pl. fine aggre. in seal coat	3.00	3.50	32.00	4.00	4.00	5.00	5.00	4.00	4.50
(35)	1,700	cu. yd. furn. and pl. aggre.	3.50	3.25	4.00	3.00	4.00	5.00	4.00	4.80	4.50
(36)	140	T. furn. and pl. 150-200 asph.	22.00	27.60	32.00	28.00	32.00	45.00	30.00	30.00	35.00
(37)	168	T. furn and pl. RT-8 Tar	....	23.00	....	....	....	37.50	....	25.00	....

New Mexico—Eddy County—State—Pave.

Brown Bros., Albuquerque, was the low bidder at $36,302 to the State Highway Dept., for the paving of 5.4 mi. of highway between Loving and Potash mines. The following bids were submitted:

(1) Brown Bros. $36,302
(2) Armstrong and Armstrong 37,285
(3) G. I. Martin $38,379
(4) Henry Thygesen & Co. 38,858

		(1)	(2)	(3)	(4)
84	hr. rolling—steel tired roller	6.00	6.00	10.00	5.00
616	M. gal. watering	3.00	3.00	2.00	3.00
7,052	lin. ft. galvanized barb wire fence	.08	.12	.15	.15
6	ea. gates (Texas Type)	5.00	10.00	10.00	10.00
24	ea. bracing	2.00	3.00	5.00	3.00
2,173	lin. ft. removing and rebuilding fence	.10	.07	.10	.10
6,317	T. top course surfacing	1.00	1.30	1.50	1.65
421	cu. yd. sand	5.00	6.00	6.00	4.00
5.246	mi. preparation of base	300.00	150.00	200.00	350.00
366	bbl. cutback asphalt Type MC-1	5.00	4.75	4.25	4.20
2,933	bbl. cutback asphalt Type MC-3	5.00	4.70	4.75	4.20
5.391	mi. mixing asphalt and aggregate	600.00	600.00	500.00	700.00
130	ea. new posts for rebuilding fence	.50	1.00	1.00	.60

Arizona—Apache Co.—State—Surf.

W. J. Henson, Prescott, Ariz., with a bid of $111,910 was low bidder to the State Highway Commission for constructing 11.7 mi. of the Holbrook-Lupton highway from Houck to the New Mexico state line, the work to consist of plantmix bituminous surfacing, salvage oil mix shoulders and seal coat. The contract was awarded to the low bidder. Unit bids submitted were as follows:

(1) W. J. Henson $111,910
(2) Phoenix-Tempe Stone Co. 121,796
(3) W. E. Orr 122,615
(4) N. G. Hill & Co. 124,092
(5) P.D.O.C. $126,706
(6) W. R. Skousen Construction Co. 142,567
(7) Tanner Construction Co. 143,819

		(1)	(2)	(3)	(4)	(5)	(6)	(7)
7.994	mi. reshaping road surface	500.00	140.00	400.00	200.00	300.00	550.00	$1,000
756	M. gal. sprinkling	2.25	2.50	3.00	2.50	3.00	3.00	2.50
815	hr. rolling	5.00	5.00	4.00	4.50	5.00	5.50	4.50
440	ea. guide posts	3.50	4.50	4.00	4.00	4.00	5.00	5.00
14,370	T. plantmix (including haul)	1.80	1.90	1.75	2.00	2.25	3.05	2.60
1,180	T. cutback asph. (MC-5)	22.25	26.00	29.00	28.00	25.00	23.00	23.00
8.005	mi. placing plantmix	400.00	500.00	400.00	200.00	300.00	450.00	$1,000
3,231	T. screenings	5.00	5.50	5.00	5.00	5.50	4.50	4.00
480	T. emuls. asph. (Class "A") (for seal coat)	26.50	32.50	30.00	29.00	26.00	27.00	30.00
10,860	T. mixing and relaying salv'g'd oil mix	1.51	1.60	1.75	2.00	2.00	2.50	2.60

California—Alameda County—State—Grade, Pave & Surf.

Heafey-Moore Co., Oakland, submitted the low bid at $59,476 to the State Division of Highways for the grading, paving and surfacing 0.9 mi. of Sequoyah Road, Oakland, between Oak Knoll Blvd. and the San Leandro Naval Hospital. The bids were:

(1) Heafey-Moore Co. $59,476
(2) Independent Const. Co. 62,429
(3) Fredrickson Bros. 63,065
(4) MacDonald & Kahn $65,245
(5) Lee J. Immel 68,994

		(1)	(2)	(3)	(4)	(5)
5	cu. yd. removing concrete	6.00	5.00	8.00	10.00	13.00
120	ea. removing trees, size 1	10.00	8.00	10.00	10.00	25.00
80	ea. removing trees, size 2	30.00	35.00	12.00	40.00	38.00
20	ea. removing trees, size 3	60.00	60.00	15.00	70.00	90.00
9,000	cu. yd. roadway excavation	.70	.90	.80	1.00	1.25
850	cu. yd. structure excavation	3.75	4.00	3.40	3.00	3.00
6,250	sq. yd. preparing subgrade	.12	.10	.15	.10	.18
Lump sum,	developing water supply and furn. wtg. equip.	400.00	450.00	$1,000	800.00	250.00
220	M. gals. applying water	2.50	3.00	2.50	2.00	2.50
50	stas. finishing roadway	12.00	15.00	6.70	15.00	12.00
3,300	T. crushed rock (waterbound macadam base)	3.75	4.00	3.80	4.00	3.40
13	T. liquid asphalt, MC-1 (pr. ct. and pen. tr.)	25.00	30.00	40.00	20.00	31.00
2	T. liquid asphalt, MC-2 (pen. tr.)	50.00	60.00	47.00	25.00	38.00
25	T. screenings (pen. tr.)	4.50	4.00	5.00	7.00	5.00
1,200	T. mineral aggregate (P.M.S.)	4.00	3.90	6.50	5.00	5.00
66	T. paving asphalt (P.M.S.)	15.00	18.00	25.00	25.00	18.00
3	T. asphaltic emulsion (seal)	30.00	35.00	45.00	30.00	30.00
1,320	cu. yd. Class "B" P.C.C. (pavement)	14.80	14.50	16.00	16.00	17.00
5	cu. yd. Class "B" P.C.C. (curbs and driveways)	30.00	30.00	40.00	25.00	31.00
4	ea. guide posts	5.00	5.00	4.00	10.00	3.00

(Continued on next page)

TO HELP YOU BUILD 'EM, HEAT 'EM, LIGHT 'EM

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Then team 'em up with rugged, easy-handling, air-saving Blue Brute Air Tools . . . like the breakers shown above. You'll have a power team, sturdy and trouble-free for years to come!

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Shell-blasted mountain highways in Italy have been repaired with Blue Brute** assistance. In hundreds of war plants here at home . . . Navy Yards, air bases . . . Blue Brutes are at work. Your nearest distributor is listed on page 106.

*Reg. U. S. Pat. Off. **Blue Brute Compressors and Air Tools are painted olive drab for the Army.

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Worthington Pump and Machinery Corporation Construction Equipment Division
Holyoke, Massachusetts

730 lin. ft. 12-in. unr. C.P.	3.00	3.00	2.00	1.00	1.70
120 lin. ft. 18-in. reinf. C.P. (std. str.)	4.00	3.50	3.00	3.00	2.70
2 ea. brick manholes with inlet top	150.00	175.00	150.00	150.00	110.00
9 ea. storm-water inlets	110.00	120.00	100.00	70.00	100.00
3 ea. lamp holes	50.00	40.00	90.00	20.00	40.00
380 ea. pavement dowels	.50	.40	.27	1.00	.50
600 lb. bar reinforcing steel (pavement)	.10	.09	.10	.10	.10

California—Monterey County—State—Repair & Armor Coat

Granite Construction Co., Watsonville, bid low at $182,435 to the California Division of Highways, Sacramento, for repairing 8.5 mi. of highway between San Ardo and King City. Work includes removing existing bituminous surface and placing it on shoulders, furnishing and placing imported borrow and crusher run base, and applying armor coat. The following bids were submitted:

(1) Granite Construction Co. $182,435
(2) M. J. Ruddy & Son 192,205
(3) Fredrickson Bros. $228,549
(4) Arthur A. Johnson 233,961

	(1)	(2)	(3)	(4)
8.5 mi. removing existing surf.	200.00	500.00	920.00	500.00
72,000 cu. yd. imported borrow	.93	1.10	1.48	1.45
Lump sum, develop water, furn. equip	$1,000	750.00	$1,200	$1,000
4,000 M. gals. applying water	2.00	1.40	2.40	2.25
447 sta. finishing roadway	5.00	5.00	6.00	8.00
24,700 T. crusher run base	2.70	2.60	2.66	2.55
150 T. liq. asph. MC-2 (prime coat)	19.00	16.50	21.00	25.00
350 T. paving asph. (armor coat)	20.00	19.50	21.50	45.00
6,500 T. screenings (armor coat)	4.00	4.10	3.74	4.50

Tunnel . . .

California—San Mateo County—City—Replace Shaft & Adits

T. E. Connolly, San Francisco, submitted the low bid of $113,780 to the Public Utilities Commission, San Francisco, for replacement of Bald Hill outlet shaft and adits. The following bids were taken under advisement:

(1) T. E. Connolly $113,780
(2) R. G. Clifford & P. Sorenson $125,996
(3) Utah Const. Co. $142,490
(4) Piombo Bros. $143,265
(5) Guy F. Atkinson $167,125
(6) Mittry Bros. $187,405

	(1)	(2)	(3)	(4)	(5)	(6)
40,000 cu. yd. open cut excavation	.70	1.40	1.20	1.00	1.50	1.90
800 cu. yd. shaft excavation	20.00	14.00	20.00	25.00	30.00	28.00
550 cu. yd. tunnel excavation	14.00	15.00	17.00	25.00	20.00	30.00
450 cu. yd. concrete for shafts	27.00	17.65	34.00	35.00	40.00	40.00
90 cu. yd. conc. floors of tunnel	12.00	19.10	24.00	30.00	25.00	35.00
290 cu. yd. conc., sides and arches of tunnel	24.00	27.00	40.00	35.00	40.00	35.00
270 cu. yd. conc. structs.	30.00	30.00	40.00	45.00	50.00	45.00
50 bbls. extra cement	2.00	3.00	3.00	3.00	2.50	2.60
46,000 lbs. reinf. steel	.07	.075	.10	.04	.065	.08
110 ea. furn. and install grout pipes	2.00	3.00	4.00	4.50	3.50	2.00
800 cu. ft. pressure grouting	2.00	2.00	2.50	1.85	1.50	4.00
11,000 lbs. furn. and install steel castings	.40	.25	.25	.40	.45	.30
5,500 lbs. furn. and install misc. metalwork	.50	.25	.32	.40	.55	.25
30,000 lbs. install gate valves	.02	.04	.05	.05	.05	.05
Lump sum, const. timber roof for shaft	400.00	600.00	500.00	300.00	300.00	$1,300
41,000 lbs. furn. and install intake screens	.50	.30	.38	.40	.30	.35

Sewerage . . .

California—Los Angeles County—F.W.A.—Sewer

Burch & Bebek, Los Angeles, submitted low bid of $126,030 to the Federal Works Agency, Los Angeles, for the construction of the Lennox-Lawndale-Gardena sanitary sewer from Crenshaw Blvd. to Gardena pumping station. The bids were:

(1) Burch & Bebek $126,030
(2) Bebek & Brkich 128,029
(3) George Miller 138,598
(4) V.C.K. Construction Co. 150,007
(5) Steve P. Rados $160,260
(6) Tom L. Gogo 163,118
(7) Artukovich Bros. 164,703
(8) R. A. Wattson Co. 165,311
(9) Martin Construction Co. 170,256

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Lump sum, field office	600.00	500.00	750.00	$1,000	$1,000	500.00	750.00	400.00	500.00
11,635 lin. ft. 24-in. extra str., VCP	7.00	6.75	7.00	8.10	9.80	9.50	9.25	9.40	9.00
478 lin. ft. 21-in. extra str., VCP	5.50	5.75	5.50	7.50	9.25	6.70	8.50	7.00	16.00
2,461 lin. ft. 12-in. extra str., VCP	3.25	4.00	4.00	4.50	2.75	5.20	4.75	5.50	5.00
2,664 lin. ft. 10-in. extra str., VCP	3.00	3.50	3.50	2.98	2.25	3.30	4.50	4.00	4.40
47 ea. brick manholes	250.00	225.00	300.00	300.00	275.00	230.00	230.00	250.00	300.00
550 cu. yd. conc. bed	12.00	15.00	15.00	14.00	12.00	15.00	14.00	15.00	10.00
1,410 sq. ft. rem. and repl. conc. pave	.50	1.00	1.00	1.00	.75	.80	.75	.60	.50
40,000 sq. ft. premix repaving	.14	.15	.25	.20	.17	.15	.20	.15	.30

California—San Bernardino County—U.S.E.D.—Sewer

W. J. & C. O. Brand, Riverside, entered the low bid of $148,940 to the U. S. Dist. Engr. Office, Los Angeles, for the construction of a water and sewer system for the shell plant at Fontana. The following bids were submitted:

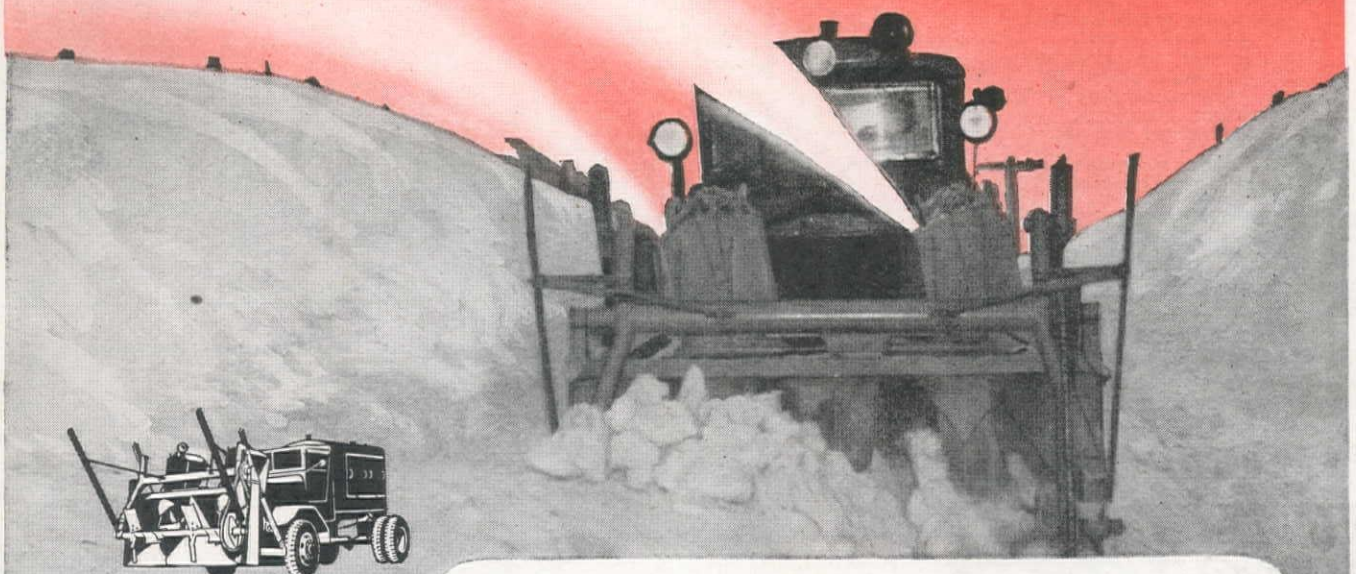
(1) W. J. & C. O. Brand $148,940
(2) Midland Construction Co. 155,546
(3) Macco-Robertson 188,946
(4) Contracting Engineers Co. $196,326
(5) Edward Green 201,649
(6) P. & J. Artukovich 220,794

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, 1,000,000 gal. reservoir	$40,845	$48,604	$44,700	$55,000	$49,000	$36,245
Lump sum, pump house	$10,460	$24,244	$33,800	$37,000	$22,000	$34,452
3,345 lin. ft. 22-in. welded steel pipe	1.90	1.30	2.30	2.00	4.00	4.65
400 lin. ft. 20-in. welded steel pipe	1.85	1.25	2.30	1.90	4.00	4.60
160 lin. ft. 18-in. welded steel pipe	1.75	1.25	2.20	3.00	4.00	4.33
11,775 lin. ft. 16-in. welded steel pipe	1.50	.95	1.99	1.30	3.50	3.92
80 lin. ft. 14-in. welded steel pipe	1.50	.95	1.94	2.25	3.50	3.86

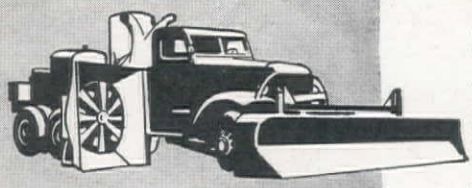
(Continued on next page)

BROS *Sno-Flyr* PLOWS

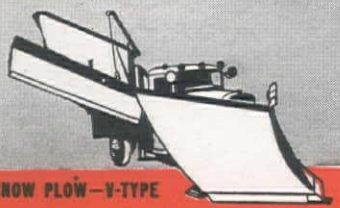
A TYPE AND SIZE FOR EVERY JOB REQUIREMENT



SNOW PLOW—ROTARY



SNOW PLOW—WIDENER



SNOW PLOW—V-TYPE

BROS designs and manufactures a complete line of "Sno-Flyr" plows. Big giant Rotaries for the toughest kinds of snow jobs—the sensational Bros Rotary-Widener for airport clearance and for widening roads by removal of snow banks from road shoulders—and the popular line of Bros V type and mouldboard plows.

Complete information promptly furnished. Write today for detailed literature.

BROS *Snow* PLOWS

HEATERS | CIRCULATORS | BULLDOZERS AND TRAILBUILDERS | V PLOWS | ROTARY PLOWS | TAMPING ROLLERS | WOBBLE WHEEL ROLLERS

140 lin. ft. 10-in. welded steel pipe	1.35	.90	1.80	2.00	3.00	3.20
120 lin. ft. 8-in. welded steel pipe	1.25	.80	1.76	1.80	3.00	2.99
200 lin. ft. 14-in. cast iron pipe	6.50	6.00	5.18	6.00	6.00	6.70
1,000 lin. ft. 12-in. cast iron pipe	5.15	3.90	4.45	5.00	4.25	5.87
40 lin. ft. 10-in. cast iron pipe	4.50	3.50	3.80	4.00	5.00	4.36
3,200 lin. ft. 8-in. cast iron pipe	3.30	2.60	2.86	3.00	3.00	2.40
850 lin. ft. 6-in. cast iron pipe	2.65	2.00	2.42	2.00	3.50	2.27
285 lin. ft. 4-in. cast iron pipe	2.30	1.80	1.65	2.00	1.50	1.97
250 lin. ft. 2-in. cast iron pipe	1.80	1.30	1.20	1.80	1.30	1.73
150 lin. ft. 8-in. cement asbestos pipe	3.05	2.60	2.68	3.80	3.00	3.08
1,725 lin. ft. 6-in. cement asbestos pipe	2.50	1.80	2.10	2.20	2.00	2.10
2,280 lin. ft. 4-in. cement asbestos pipe	1.95	1.50	1.59	1.70	1.60	1.82
150 lin. ft. 3-in. cement asbestos pipe	1.80	1.40	1.30	1.50	1.50	1.64
210 lin. ft. 24-in. conc. pipe	6.55	9.00	5.55	10.00	9.50	9.50
380 lin. ft. 18-in. conc. pipe	5.20	6.50	4.72	6.00	7.70	7.70
950 lin. ft. 1-in. steel pipe	1.00	1.20	.80	.50	1.00	1.05
3 ea. 12-in. gate valve and box	175.00	160.00	178.00	200.00	160.00	139.00
4 ea. 10-in. gate valve and box	160.00	130.00	138.00	167.00	135.00	107.00
17 ea. 8-in. gate valve and box	110.00	85.00	72.50	107.00	80.00	75.00
33 ea. 6-in. gate valve and box	75.00	55.00	55.00	80.00	50.00	49.00
12 ea. 4-in. gate valve and box	50.00	40.00	33.50	54.00	40.00	35.00
2 ea. 18-in. gate valve & box (AWWA lgt. std.)	610.00	425.00	460.00	487.00	380.00	355.00
7 ea. 16-in. gate valve & box (AWWA lgt. std.)	450.00	300.00	367.00	390.00	300.00	273.00
3 ea. 14-in. gate valve & box (AWWA lgt. std.)	330.00	225.00	264.00	280.00	220.00	224.00
1 ea. 16-in. geared valve (AWWA std.)	500.00	450.00	442.00	515.00	330.00	325.00
1 ea. 2-in. air release valve and box	35.00	85.00	35.00	47.00	50.00	52.00
17 ea. std. fire hydrant	140.00	130.00	125.00	230.00	150.00	120.00
Lump sum, install surge tanks	$2,860	$4,415	$2,975	$6,000	$4,200	$3,520
Lump sum, const. wellhouse	$2,200	$4,390	$3,700	$8,600	$4,500	$3,495
Lump sum, altitude valve and valve box	425.00	150.00	$1,550	910.00	$1,800	764.00
Lump sum, const. rock-well	75.00	180.00	140.00	200.00	100.00	800.00
Lump sum, sewage pump station	$3,300	$5,120	$13,500	$6,000	$4,400	$17,094
2,250 lin. ft. 8-in. vitr. clay pipe sewer	2.50	2.20	2.80	2.00	2.50	3.25
1,000 lin. ft. 6-in. vitr. clay pipe sewer	2.25	1.80	2.75	1.93	2.50	2.50
2,015 lin. ft. 6-in. CIP sewer pressure main	2.65	2.10	2.51	2.00	2.60	2.75
6 ea. std. manhole base	25.00	30.00	30.00	16.00	23.00	25.00
1 ea. drop manhole base	35.00	30.00	35.00	27.00	23.00	30.00
1 ea. special manhole base	15.00	14.00	20.00	6.70	25.00	20.00
45 lin. ft. std. manhole shaft	18.00	15.00	21.00	10.00	25.00	22.00
6 lin. ft. drop manhole shaft	25.00	18.00	37.50	48.00	25.00	30.00
8 ea. manhole frame and cover set	200.00	40.00	350.00	30.00	50.00	35.00

Airport . . .

California—Kern County—U.S.E.D.—Hangars & Bldgs.

R. J. Daum, Inglewood, submitted the low bid of $923,803 to the U. S. District Engineer Office, Los Angeles, for the construction of hangars, buildings, and facilities at Muroc Army Airfield. The bids were as follows:

	Sch. "A"	Sch. "B"	Sch. "C"	Total
(1) R. J. Daum	$733,513	$1,559	$188,731	$ 923,803
(2) Robert E. McKee	$797,036	$1,500	$170,849	$ 969,386
(3) Peter Kiewit Sons' Co.	$913,522	$ 675	$140,352	$1,054,549
(4) James I. Barnes Construction Co.	$878,740	$4,000	$212,960	$1,095,700
(5) Del E. Webb	$894,674	$4,400	$215,249	$1,113,323

SCHEDULE "A"	(1)	(2)	(3)	(4)	(5)
2 ea. depot supply hangar	$307,256	$330,000	$381,376	$365,000	$370,000
Lump sum, boiler house	$37,270	$38,000	$43,811	$48,000	$49,650
2,700 cu. yd. selected borrow fill for bldgs.	1.55	2.00	2.10	2.50	2.56
460 gal. membrane curing solution	1.00	.95	1.95	1.00	1.00
20,200 bbl. Portland cement	2.20	2.45	2.93	2.50	2.57
Lump sum, elec. distribution system	$8,690	$10,900	$12,848	$11,000	$12,163
970 lin. ft. 12-in. cast iron water pipe	4.85	5.00	5.75	5.00	5.06
38 lin. ft. 10-in. cast iron water pipe	4.10	4.40	5.00	4.50	4.53
343 lin. ft. 6-in. cast iron water pipe	2.35	2.45	3.00	4.00	4.02
50 lin. ft. 3-in. cast iron water pipe	1.75	1.80	2.00	2.50	2.60
610 lin. ft. 2-in. cast iron water pipe	1.36	1.45	1.90	1.75	1.78
50 lin. ft. 1½-in. steel water pipe	1.25	1.25	1.50	1.50	1.56
60 lin. ft. 1¼-in. steel water pipe	1.15	1.20	1.50	1.50	1.49
76 lin. ft. 1-in. steel water pipe	1.08	1.10	1.30	1.25	1.33
5 ea. 6-in. gate valve and Type 2 box	62.00	66.00	60.00	70.00	70.00
2 ea. 3-in. gate valve and Type 2 box	37.50	40.00	45.00	40.00	43.00
4 ea. 2-in. gate valve and Type 2 box	25.00	30.00	37.00	30.00	31.00
1 ea. 1½-in. curb stop and service box	13.00	15.00	20.00	20.00	23.00
1 ea. 1¼-in. curb stop and service box	10.00	12.00	14.00	15.00	17.30
3 ea. 1-in. curb stop and service box	7.50	8.00	12.00	12.00	12.75
3 ea. std. fire hydrants (without drain)	135.00	150.00	150.00	150.00	157.00
Lump sum, sterilize water lines	75.00	65.00	200.00	100.00	110.00
1,339 lin. ft. 8-in. vitr. clay pipe sewer	2.02	2.25	2.35	2.50	2.63
710 lin. ft. 6-in. vitr. clay pipe sewer	1.80	2.00	2.20	2.25	2.31
2 ea. surf. clean-out box	16.00	17.00	24.00	20.00	20.60
4 ea. manhole base	45.00	45.00	60.00	50.00	56.00
29 lin. ft. brick manhole shaft	20.00	20.00	24.00	22.00	24.80
4 ea. manhole frame and cover	17.50	20.00	40.00	25.00	25.90
120 sq. yd. remove ex. 6-in. conc. pave.	2.00	1.10	2.60	2.50	2.78
335 sq. yd. remove ex. 3-in. fieldmix pave.	1.50	.60	.13	2.00	2.14
500 cu. yd. excav. and grade (general pave.)	2.65	.55	1.00	1.80	1.98
5,490 sq. yd. prepare subgrade	.16	.30	.13	.20	.23
127 cu. yd. decomp. granite or grav. base crse. for conc. driveway	1.85	5.00	2.65	3.00	3.19
1,220 sq. yd. decomp. granite, compacted earth shrdlrs.	.31	1.20	.26	.40	.47
30 T. liq. asph., MC-1, applied	30.00	40.00	39.00	6.00	6.12
30 T. liq. asph., MC-3, fieldmix surf.	29.00	35.00	33.00	5.00	5.19
110 cu. yd. pit-run aggreg. fieldmix surf.	2.90	5.50	2.60	3.00	3.12
220 cu. yd. sel. earth borrow, fieldmix surf.	2.75	4.50	2.60	3.00	3.12
3,105 sq. yd. 3-in. fieldmix surf.	.26	1.25	.26	1.50	1.58
3 cu. yd. liq. asph., RC-2, seal coat	52.00	50.00	26.00	8.00	8.60
20 cu. yd. pit-run cover aggreg. sealcoat	9.00	6.50	8.00	4.00	4.28
120 sq. yd. replace 6-in. conc. pave.	2.40	2.25	3.25	5.00	5.12
335 sq. yd. replace 3-in. fieldmix surf.	.90	2.00	.65	1.50	1.52
Lump sum, move and rehabilitate one bldg.	$2,992	$6,000	$5,864	$6,000	$6,300
970 lin. ft. 12-in. cem-asb. pipe water line (Alt. Item No. 7)	4.35	4.50	5.55	5.00	5.11
38 lin. ft. 10-in. same (Alt. Item No. 8)	3.75	4.00	5.00	4.00	5.15
343 lin. ft. 6-in. same (Alt. Item No. 9)	2.20	2.25	2.50	3.00	3.09
50 lin. ft. 3-in. same (Alt. Item No. 10)	1.55	1.60	1.60	2.00	2.18
610 lin. ft. 2-in. same (Alt. Item No. 11)	1.35	1.40	1.30	1.80	1.86

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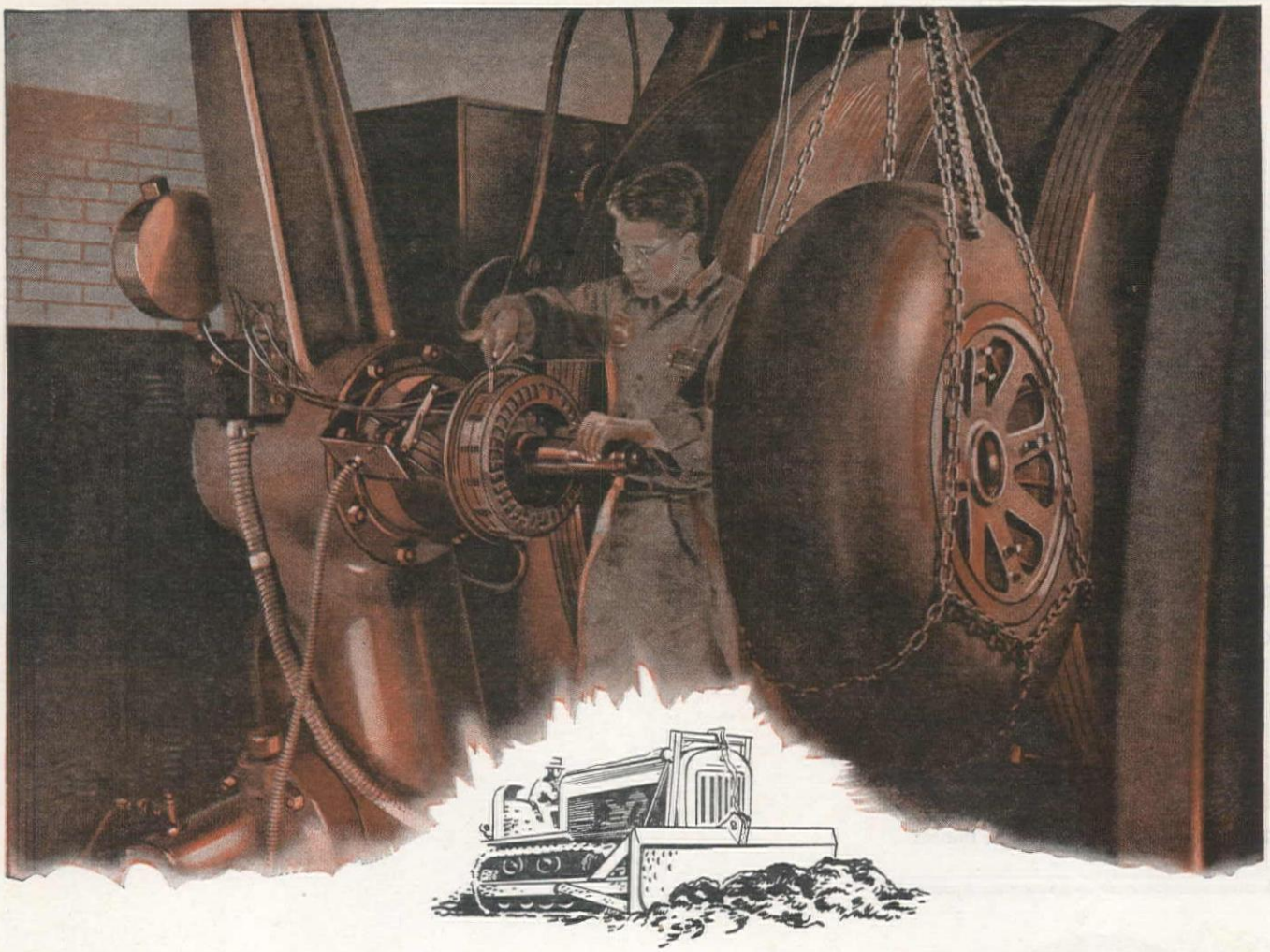

Back of every Velvetouch·Installation . . .

Behind each Velvetouch clutch facing and brake lining are years of leadership in developing powdered metal friction materials . . . plus the facilities of a well equipped laboratory devoted exclusively to the study of pairs of *rubbing surfaces.* Modern science and engineering skill can produce no finer friction materials than Velvetouch for brake and clutch replacements in tractors, power shovels and other earth-moving equipment.

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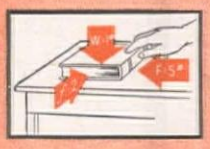
Interesting facts about *Friction*

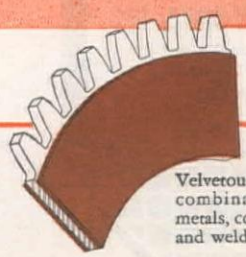


The coefficient of friction (f) of a book sliding across a table top is easily determined by dividing the weight of the book (W) by the amount of force required to slide the book (F).

Because many factors affect the coefficient of friction, i. e. speed, pressure, temperature, etc., it is impossible for any material to have a uniform coefficient of friction under all operating conditions.

The powdered metals in Velvetouch are combined in a wide variety of "mixes" to give the best possible coefficients of friction for each installation.

For Brake and Clutch . . . Use Velvetouch



Velvetouch is *all metal* — a combination of powdered metals, compressed, sintered and welded to a solid steel backing.

SCHEDULE "B"

Lump sum, high tower shotgun range	$1,559	$1,500	675.00	$4,000	$4,400

SCHEDULE "C"

2 ea. celestial navigation trainer bldgs.	$16,413	$15,300	$14,550	$19,000	$20,740
Lump sum. boiler house	$21,601	$8,900	$5,372	$12,000	$13,120
Lump sum, trainer bldgs.	$81,614	$80,600	$61,576	$98,000	$99,630
Lump sum, post engineer's warehouse	$10,827	$11,700	$7,414	$16,000	$18,490
Lump sum, crash station	$31,897	$27,300	$18,242	$35,000	$37,620
Lump sum, move and rehabilitate 3 bldgs.	$2,831	$4,500	$9,773	$1,500	$16,007
222 gal. membrane curing solution	1.00	.95	1.95	1.00	1.00
760 sq. yd. 6-in. conc. driveway pave.	2.80	2.25	3.25	5.00	5.04
2,175 bbl. Portland cement	2.20	2.45	2.93	2.50	2.57

California—Los Angeles County—U.S.E.D.—Hangar & Bldgs.

Weymouth Crowell Co., Los Angeles, bid low at $389,048 to the U. S. District Engineer Office, Los Angeles, for construction of a hangar, misc. buildings, paving, and utilities at Metropolitan Airport, Van Nuys. The bids were:

	Sch. "A"	Sch. "B"	Sch. "C"	Total
(1) Weymouth Crowell Co.	$352,901	$24,047	$12,100	$389,048
(2) Jackson Bros.	$399,308	$23,550	$13,000	$435,858
(3) R. J. Daum	$401,928	$19,969	$9,742	$431,639
(4) W. C. Smith, Inc.	$405,266	$25,591	$13,745	$444,602
(5) Baruch Corp.	$416,371	$19,302	$10,073	$445,746
(6) Harvey A. Nichols Co.	$438,118	$23,870	$14,730	$476,718

SCHEDULE "A"

	(1)	(2)	(3)	(4)	(5)	(6)
1 ea. prefab. Butler hangar	$37,725	$30,150	$29,053	$33,861	$34,125	$36,220
1 ea. engr. shop	$20,686	$12,930	$13,985	$15,995	$20,041	$18,480
1 ea. subdepot office	$4,200	$3,880	$5,680	$4,974	$4,076	$4,000
1 ea. Air Corps warehouse	$35,000	$32,600	$28,600	$34,896	$34,386	$37,960
1 ea. parachute bldg.	$6,600	$5,640	$7,500	$6,478	$6,118	$8,100
1 ea. paint, oil and dope bldg.	$3,300	$2,841	$3,730	$3,687	$3,491	$3,430
1 ea. quartermaster office	$5,200	$5,270	$4,904	$5,995	$4,640	$5,000
1 ea. qtm. whse. with prefab refrigerators	$13,000	$12,890	$9,670	$14,669	$12,336	$14,850
1 ea. quartermaster warehouse	$13,000	$12,610	$9,860	$14,234	$13,520	$14,350
100 cu. yd. addtl. native soil ex. and fill for bldgs.	1.50	1.06	2.00	1.50	1.77	3.00
2,500 gal. membrane curing solution	1.00	.95	.80	1.07	.71	1.10
25 cu. yd. addtl. conc. foundations	40.00	27.00	20.00	30.00	23.67	40.00
44,500 sq. yd. 9, 6, 9-in. PCC pave.	2.00	1.55	1.70	2.10	2.25	2.25
825 sq. yd. 6-in. PCC pave.	2.00	1.60	1.90	2.00	2.12	2.20
325 ea. tie-down anchor	1.00	.60	1.00	1.65	1.18	2.20
50 cu. yd. conc. in cut-off walls and drain. structs.	40.00	12.00	50.00	28.50	23.67	50.00
15,700 bbl. Portland cement	2.00	1.95	2.00	2.15	2.00	2.10
5 ea. water and elect. service stand	2.50	435.00	75.00	295.00	405.00	200.00
1,350 lin. ft. 8-in. vitr. clay sewer pipe	2.00	1.80	1.80	1.85	3.07	2.80
1,650 lin. ft. 6-in. vitr. clay sewer pipe	1.50	1.64	1.65	1.65	2.25	2.10
3 ea. surf. cleanout box	31.00	19.08	20.00	20.00	23.67	22.00
3 ea. surf. cleanout box	31.00	12.72	14.00	14.00	13.00	13.00
5 ea. manhole base	21.00	37.10	37.00	38.00	23.67	22.00
30 lin. ft. manhole shaft	15.00	14.84	15.00	15.50	21.30	20.00
1 ea. manhole frame and cover	31.00	19.08	20.00	20.00	40.23	38.00
4 ea. manhole frame and cover	37.00	12.72	13.00	13.00	37.87	35.00
2 ea. reconst. manhole	22.00	37.10	37.00	38.00	23.67	22.00
2,350 lin. ft. 8-in. CI pipe water line	2.50	2.44	2.40	2.45	3.43	3.10
1,650 lin. ft. 6-in. CI pipe water line	2.25	2.07	2.05	2.10	2.66	2.50
225 lin. ft. 3-in. CI pipe water line	1.50	1.32	1.35	1.35	1.50	1.40
300 lin. ft. 2-in. CI pipe water line	1.20	1.00	1.00	1.05	1.30	1.20
430 lin. ft. 1½-in. black stl. water pipe	1.05	.95	.95	1.00	1.06	1.00
200 lin. ft. 1¼-in. black stl. water pipe	1.05	.92	.95	.95	1.00	.95
700 lin ft. 1-in. black stl. water pipe	1.05	.74	.75	.75	.89	.85
Lump sum, connect. ex. distrib. lines	10.00	159.00	160.00	160.00	89.00	100.00
1 ea. 8-in. gate valve and box	80.00	68.90	70.00	70.00	72.00	67.00
4 ea. 6-in. gate valve and box	65.00	47.70	50.00	50.00	50.00	46.00
1 ea. 4-in. gate valve and box	36.00	29.68	31.00	30.00	33.00	31.00
1 ea. 3-in. gate valve and box	27.00	23.32	25.00	23.50	27.00	25.00
2 ea. 2-in. gate valve and box	20.00	21.20	22.00	22.50	18.00	17.00
1 ea. 1½-in. curb stop and box	15.00	19.28	20.00	20.00	14.00	13.00
1 ea. 1-in. curb stop and box	10.00	12.72	14.00	14.00	12.00	11.00
Lump sum, new water service connection	55.00	42.40	43.00	55.00	412.00	$1,000
9 ea. std. fire hydrant	130.00	121.90	122.00	125.00	124.00	125.00
Lump sum, sterilize water line	160.00	265.00	265.00	275.00	130.00	120.00
Lump sum, elec. distrib. system	6,100	$5,300	$5,250	$5,400	$5,920	$5,500
2 ea. 1500-gal. precast conc. oil storage tank	700.00	525.00	525.00	530.00	517.00	475.00
950 lin. ft. 33-in. reinf. conc. pipe drain	10.75	11.00	12.00	12.00	13.00	12.00
8 lin. ft. 24-in. reinf. conc. pipe drain, plugged	8.25	8.06	20.00	9.00	7.00	8.00
2 ea. catch basin	375.00	347.00	200.00	385.00	426.00	400.00
Lump sum, 12-in. OMP culvert	170.00	174.00	$1,000	175.00	177.00	175.00
80 cu. yd. rubble surface	21.00	7.68	22.50	8.00	12.00	15.00
2,500 sq. yd. rem. exist. pave.	.27	.27	2.80	.28	.30	1.20
30,000 cu. yd. excav. and grade	.45	.445	.70	.50	.50	.60
4,400 cu. yd. grade, level and compact fill	.65	.65	.92	.70	.72	.50
500 sq. yd. surface compaction	.30	.29	.38	.35	.32	.75
4 T. bailed grain straw	18.00	18.00	....	25.00	20.00	10.00
2 ac. disking and mulching	50.00	47.70	200.00	55.00	48.00	100.00
1 ac. flowing fire breaks	60.00	63.60	69.00	70.00	71.00	50.00
89,550 sq. yd. prepare subgrade for gravel base crses.	.075	.0715	.065	.09	.08	.16
4,000 sqare load test. earth subgrade	.25	.25	.43	.30	.27	.20
14,800 cu. yd. gravel base and surf. courses	2.60	2.55	4.35	2.65	2.85	2.70
4,000 square load test, earth subgrade	.25	.25	.43	.30	.27	.20
60 T. liq. asph.	27.00	27.00	19.00	28.00	30.00	17.00
93 T. 200-300 pen. pave. asph.	25.00	23.85	22.00	24.50	26.72	15.00
95 T. coarse aggr.	4.25	4.24	6.40	4.30	4.73	5.00
46 T. fine aggr.	5.00	4.67	7.40	4.85	5.32	6.00
270 T. 85-100 pen. pave. asph.	15.50	15.74	16.00	16.20	17.60	18.00
3,630 T. C.P.H. bitum. mixture	3.50	3.50	3.95	3.55	3.90	3.50
7 T. liq. asph.	30.00	30.50	43.00	31.00	34.00	25.00
5,050 sq. yd. 2-in. plmx. bitum. lining in ditches	.75	.75	.93	.80	.84	1.26
75 sq. yd. 2-in. plmx. bitum. surf sidewalk	1.00	1.03	1.00	1.10	1.20	1.28
1,000 lin. ft. parking area bumpers	1.10	.88	.50	.80	3.84	1.00
3 ea. 1½-in. curb stop box	15.00	19.08	20.00	20.00	17.70	17.00

SCHEDULE "B"

1 ea. dispatchers house	500.00	422.00	420.00	539.00	514.00	540.00
1 ea. oil storage house	$1,500	495.00	737.00	$1,034	985.00	$1,120
2 ea. grease rack	$1,350	$1,455	$1,356	$1,893	735.00	$1,600
1 ea. motor repair shop	$7,000	$7,550	$5,700	$7,253	$5,771	$7,090
1 ea. motor repair shop, with toilet room	$8,500	$8,890	$6,700	$8,683	$7,220	$8,620
1 ea. wash rack (10 car)	$3,350	$3,780	$3,700	$4,296	$3,342	$3,300

SCHEDULE "C"

1 ea. traffic control tower	$13,000	$12,100	$9,742	$13,745	$10,073	$14,730

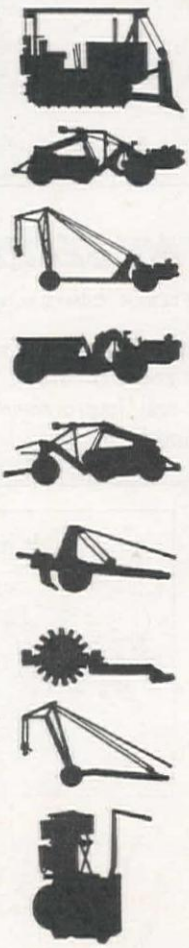
New LE TOURNEAU HEADQUARTERS FOR NORTHERN CALIFORNIA

Soulé Equipment Company is proud to announce its appointment as Northern California Distributor and Service Agent for R. G. LeTourneau, Inc. More than two decades ago LeTourneau's inventive genius revolutionized earth moving equipment and through the intervening years his organization's capacity to improve and produce has created an entirely new era in this phase of construction.

Many an allied war front has been pushed rapidly forward from LeTourneau graded airstrips, over LeTourneau filled roads, through LeTourneau cleared jungles. Today LeTourneau equipment is with our troops closing in on Berlin and Tokyo. Later it will push out new roads for commerce both at home and abroad.

VICTORY IN WAR... OPPORTUNITY IN PEACE

For Faster Earth Moving... Rubber Tired Power Tournapulls



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SUPER C and MODEL D TOURNAPULL

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SOULÉ EQUIPMENT COMPANY

1750 EAST 12th STREET, OAKLAND • 701 12th STREET, SACRAMENTO

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information on many of these projects is often available, and will gladly be furnished upon your request to the Editor, WESTERN CONSTRUCTION NEWS, 503 Market Street, San Francisco.

CONTRACTS AWARDED

Large Western Projects...

Basich Bros., Torrance, Calif., was awarded a contract for $1,325,000 to construct additional roads at the Navajo Ordnance Depot, at Bellemont, Ariz., by U. S. Engineer Office, Los Angeles, Calif.

J. A. Terteling & Sons, Boise, Ida., at $297,728, received a contract for grading and paving 3.8 mi. of the Astoria-Naval Hospital section of the Nehalem highway in Oregon, by the State Highway Commission.

P.D.O.C., Phoenix, Ariz., has been awarded a contract for $225,939 to construct an additional parking apron at a modification center near Tucson, Ariz., by U. S. Engineer Office, Los Angeles, Calif.

Contracting Engineers Co., Los Angeles, Calif., has received a $396,838 contract for additional aviation facilities at the Navy auxiliary air station, Los Alamitos, Calif., by Bureau of Yards and Docks, Washington, D. C.

Western Contracting Corp., Sioux City, Iowa, was awarded a contract at $323,207 for concrete taxiways and a turning pad at the Army airfield in Clovis, N. Mex., by U. S. Engineer Office, Albuquerque, N. Mex.

N. Fiorito, Inc., Seattle, Wash., at $1,644,658, has the contract to grade, pave, and install various facilities at the Boeing airfield in Seattle, awarded by U. S. Engineer Office, Seattle.

Peter Kiewit Sons Co., Omaha, Nebr., has been awarded a contract for $458,930 for airport improvements at Sheridan, Wyo., by the Civil Aeronautics Administration, Kansas City, Mo.

Dudley Anderson Co., Great Falls, Mont., has a $158,131 contract to erect a 4,745,000-gal. prestressed concrete water tank at Great Falls, by the City Council of that city.

Dalton & Cullum, Dallas, Tex., have a $454,212 contract for a water supply main and a well collecting system at Big Spring, Tex., awarded by the City of Big Spring.

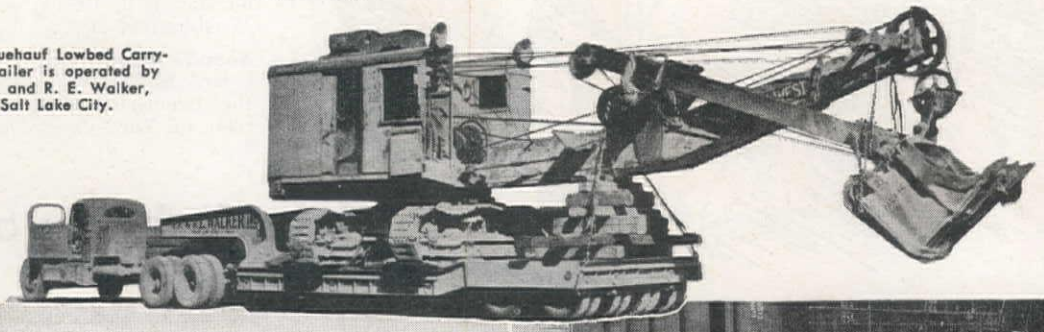
American Pipe & Construction Co., Los Angeles, Calif., at $279,816, was awarded a contract to furnish and install 12,290 ft. of 52-in. steel cylinder concrete pipe in the Green River supply line of the City of Tacoma, Wash., gravity line, by the City of Tacoma.

Shannahan Bros., Inc., Huntington Park, Calif., received a $900,480 award for a boat landing at San Diego, Calif., by Bureau of Yards and Docks, Washington, D. C.

R. J. Daum, Inglewood, Calif., $923,803 for hangars, miscellaneous buildings, and facilities at the Muroc army airfield, by U. S. Engineer Office, Los Angeles.

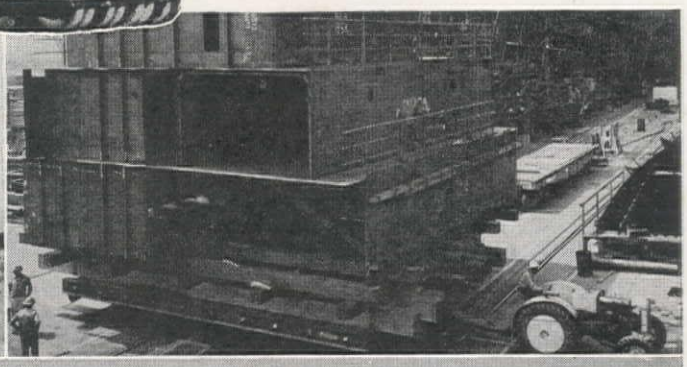
American Builders, Inc., and **Times Building Co.,** Long Beach, Calif., a contract for $1,750,000 for 346 frame-stucco dwellings in Long Beach, for themselves.

How to make *light* hauling of HEAVY machinery



This Fruehauf Lowbed Carryall Trailer is operated by J. B. and R. E. Walker, Salt Lake City.

This special Fruehauf Carryall Trailer owned by E. C. Hall Co., Eugene, Ore., is shown in operation at Klamath Falls, Oregon, Airport.



The Fruehauf Tilt-bed Trailer enables one man to load a tractor in less than a minute. Available in 5 to 25 tons.

You can hardly see the Trailer under this huge 66-ton superstructure assembly at Consolidated's Wilmington Shipyard. Yet the load is only a "light haul" for this Fruehauf Trailer, which was built to carry an emergency load of 125 tons.

FOR HAULING ALL KINDS OF MACHINERY it's hard to beat a Fruehauf Carryall Trailer. It's designed for your particular job... whether your need is for 10 or 100-ton... four or twenty-four wheels... any width, any length.

Fruehauf has led the way in the engineering of Carryalls with such features as the strong, clean-cut, electrically-welded construction, the 360° slack adjusters which permit on-the-road brake adjustments and the generously oversized heavy duty bearings.

For "Engineered Transportation" carry all your "Carryall" problems to your nearest Fruehauf Branch.

World's Largest Builder of Truck Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant • Los Angeles

ENGINEERED TRANSPORTATION

Reg. U.S. Pat. Off.

FRUEHAUF TRAILERS

Sales and Service Branches:

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

Ford J. Twaits Co., Los Angeles, Calif., $1,185,000 for a 19-bldg. plant for the Willamette Valley Wood Distillation Co., at Springfield, Oregon, by Defense Plant Corp., Washington, D. C.

Western Construction Co., Seattle, Wash., was awarded a contract valued at $1,723,000 for 6 additional warehouses and other facilities at the Naval Supply Depot, Spokane, Wash., by Bureau of Yards and Docks, Washington, D. C.

Ford J. Twaits Co., Los Angeles, Calif., a contract for $1,261,865 for additional personnel facilities at Alameda, Calif., naval air station, by Bureau of Yards and Docks, Washington, D. C.

Sound-Kiewit Co., Seattle, Wash., an award $2,424,346 for the third section of the Bremerton-Shelton railroad, by Bureau of Yards and Docks, Washington, D. C.

Highway and Street...

Arizona

COCONINO CO.—**Basich Brothers,** 20530 So. Normandie Ave., Torrance, Calif.—$1,325,000 in supplemental contracts for additional roads at the Navajo Ordnance Depot, Bellemont—by U. S. Engineer Ofc., Los Angeles, Calif. 7-5

MARICOPA CO.—**Arizona Sand & Rock Co.,** Box 1522, Phoenix—$58,000 for const. of conc. apron, taxiway, & compass rose at Aux. Air Facility, Litchfield Park, Phoenix—Bur. of Yds. & Docks, Washington, D. C. 7-18

California

ALAMEDA CO.—**Heafey-Moore Co.,** 344 High St., Oakland—$59,476 for 0.9 mi. grading, Port. conc. cement paving & plantmix surf. on water-bound macadam base, on Sequoyah Road betw. Oak Knoll Blvd. & San Leandro Naval Hospital in city of Oakland—by Calif. Div. of Hwys., Sacramento. 7-21

BUTTE CO.—**Piazza & Huntley,** Box 708, San Jose—$36,875 for repair of 4.6 mi. of hwy. betw. Biggs Rd. and Oroville "Y" with plantmix surf.—by Calif. Div. of Hwy., Sacramento. 7-18

CONTRA COSTA & ALAMEDA COS.—**A. J. Raisch,** 46 Kearny St., San Francisco—$58,311 for repairing portions of 8.2 mi. net length with plantmix surf. betw. Willow Pass & Dublin—by Calif. Div. of Hwys., Sacramento. 7-10

LOS ANGELES CO.—**Griffith Co.,** 1060 So. Broadway, Los Angeles—$20,420 for asphalt paving of roadways, shed floors & wharf decks at Los Angeles Harbor—by Los Angeles Harbor Dept., San Pedro. 6-30

LOS ANGELES CO.—**C. O. Sparks** & **Mundo Engineering Co.,** 1601 So. Soto St., Los Angeles—$126,000 for paving & repaving at N. A. S., Terminal Island—by Bur. of Yards & Docks, Washington, D. C. 7-6

LOS ANGELES CO.—**Sully-Miller Contracting Co.,** 1500 W. 7th St., Long Beach—$37,084 for asphalt conc. paving at Berths 32, 33 & 34, Pier "D," Long Beach Harbor—by Port Manager, Long Beach. 7-7

LOS ANGELES CO.—**Ford J. Twaits Co.,** 451 So. Boylston St., Los Angeles—$37,444 for asphalt & conc. paving & conc.

curbs & walks at Lockheed plant in Burbank—by Lockheed Aircraft Corp., Burbank. 7-11

LOS ANGELES & ORANGE COS.—**Sully-Miller Contracting Co.,** 1500 W. 7th St., Long Beach—$44,657 for repairing 9.6 mi. net length with plantmix surf. on Parson St. betw. Rte. 168 & Orange Co. line (L. A. Co.), & on Garden Grove Ave. betw. Rte. 170 & Santa Ana (Orange Co.)—by Calif. Div. of Hwys., Sacramento. 7-10

MONTEREY CO.—**Granite Construction Co.,** Box 900, Watsonville—$182,435 to remove exist. bitum, surf. & place on shoulders; & to furn. & place imp. borrow & crusher run base, & apply armor coat on portions only of 8.5 mi. (net length) hwy. betw. San Ardo & King City—by Calif. Div. of Hwys., Sacramento. 7-5

SACRAMENTO, PLACER & YOLO COS.—**McGillivray Construction Co.,** Box 873, Sacramento—$27,388 to repair 8 mi. net length with plantmix surf. between Sylvan School & Roseville, Hood & Sacramento, & Kiesel & Sacramento—by Calif. Div. of Hwys., Sacramento. 7-5

SAN BERNARDINO CO.—**R. R. Hensler,** 816 Allen Ave., Glendale—$57,175 for repair of 63.8 mi. with seal coat over existing surf., betw. Cajon Summit & Victorville & betw. Daggett & Needles—by Calif. Div. of Hwys., Sacramento. 7-10

SAN DIEGO CO.—**R. E. Hazard,** 2548 Kettner Blvd., San Diego—$12,036 to repair approx. 1.5 mi. with plantmix surf. & asphaltic emuls. seal betw. San Ysidro & Chula Vista—by Calif. Div. of Hwys., Sacramento. 7-11

VENTURA CO.—**Schroeder & Co.,** Box 308, Roscoe—$16,955 to repair 2.9 mi. with plantmix surf. betw. Fillmore & Piru Creek—by Calif. Div. of Hwys., Sacramento. 7-21

Colorado

PUEBLO CO.—**Peter Kiewit Sons Co.,** 1024 Omaha National Bank Bldg., Omaha, Nebr.—$135,724 for conc. paving, roadway excavating, reinf. conc. pipe, bitum. surfacing, etc., at Pueblo Ordnance Depot, Pueblo—by U. S. Engineer Ofc., Denver. 6-30

Kansas

ELLIS CO.—**D. G. Hansen,** Logan—$15,529 for 17.9 mi. sing. asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

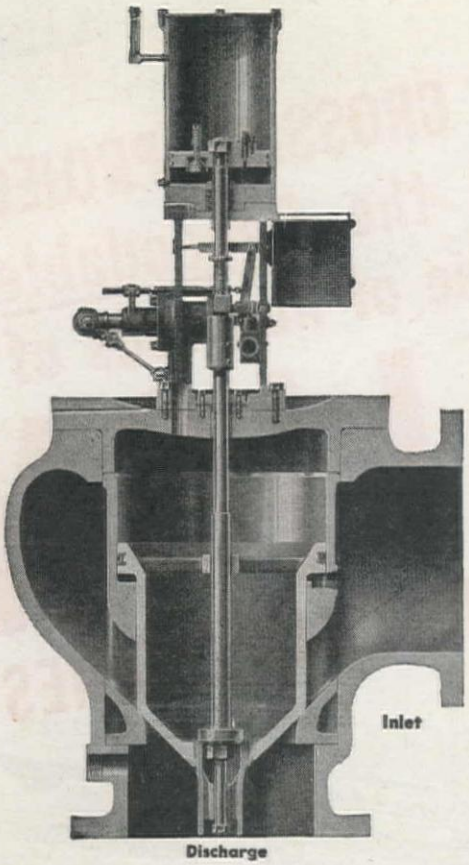
FORD CO.—**San-Ore Construction Co.,** McPherson—$19,440 for 27.2 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

HASKELL CO.—**Broce Construction Co.,** 1207 W. Main, Oklahoma City, Okla.—$20,470 for 25 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

KIOWA CO.—**M. W. Watson,** 1004 National Bank of Topeka Bldg., Topeka—$16,914 for 21.9 mi. for single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

NESS CO.—**Dan Scherrer Construction Co.,** 903 No. 3rd St., Kansas City, Kan.—$18,396 for 25.9 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

NESS CO.—**Dan Scherrer Construction Co.,** 903 No. 3rd St., Kansas City, Kan.—$14,804 for 20.2 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7



Greater SURGE Impacts *Follow Increased Flow*

Protect Your Water Pumping Lines with the PELTON SURGE SUPPRESSOR

SUDDEN POWER FAILURE to the motor driving the water pump causes back surges. When you increase the flow through pump discharge lines, surge danger increases. These sudden pressure rises may exceed many times the pumping head and be sufficient to burst the line.

The Pelton Surge Suppressor, located near the pump, opens automatically before the surge arrives, releases the water, protects your line and then *slowly* closes. It also opens automatically when other excess pressures develop.

Here's low-cost insurance against surge impacts which do break water-pumping lines—the Pelton Surge Suppressor. It saves your lines from rupture.

The Pelton Surge Suppressor is manufactured to protect water-pumping lines regardless of how large they may be.

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THE BALDWIN GROUP

PELTON

Subsidiary of THE BALDWIN LOCOMOTIVE WORKS

ROOKS CO.—**D. G. Hansen,** Logan—$18,149 for 33.7 mi. resurfacing material—by State Hwy. Comm., Topeka. 7-7

STEVENS CO.—**Broce Construction Co.,** 1207 W. Main, Oklahoma City, Okla.—$16,765 for 20.3 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

TREGO CO.—**M. W. Watson,** 1004 National Bank of Topeka Bldg., Topeka—$21,175 for 24.7 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka. 7-7

WALLACE CO.—**D. G. Hansen,** Logan—$20,605 for 27.3 mi. single asphalt surf. treatment—by State Hwy. Comm., Topeka 7-7

Montana

CARBON & BIG HORN COS.—**Charles Shannon,** 502 S. Washington St., Butte—$27,215 for 12.1 mi. sealcoat oiling & stone chip cover coat on Bridger-Wyoming St. Line Rd.; & 21.3 mi. sealcoat oiling & crushed gravel cover coat on Billings-Hardin Rd.—by State Hwy. Comm., Helena. 7-18

HILL, LIBERTY, TOOLE, & PONDERA COS.—**J. L. McLaughlin,** 431 Ford Bldg., Great Falls—$22,840 for 31.6 mi. sealcoat oiling and crushed gravel cover coat on Havre-Chester Rd.; and 25.3 mi. sealcoat oiling and stone chip cover coat on Shelby-Conrad Rd.—by State Hwy. Comm., Helena. 7-18

TOOLE & PONDERA COS.—**Nilson Smith Construction Co.,** Box 1147, Great Falls—$20,400 for 25.3 mi. stone chip cover coat & sealcoat oiling on Shelby-Conrad Hwy.—by State Hwy. Comm., Helena. 7-19

Nevada

CLARK CO.—**Carson Frazzini,** Box 73, Tonopah—$61,078 for 15.4 mi. access road from junction of U. S. Rte. 91 to the Blue Diamond Mine & Mill—by Nev. State Hwy. Dept., Carson City. 7-10

HUMBOLDT CO.—**Hunt & Frandsen,** Box 808, Elko—$82,406 for conc. bridge, grading, various structures & placing select matl. base & gravel course from junc. with U. S. 40 to point approx. 4.8 mi. northeasterly, near Golconda—by Nev. State Hwy. Dept., Carson City. 7-12

WASHOE CO.—**Isbell Construction Co.,** 1300 E. 4th St., Reno

GRUENDLER CRAFTSMANSHIP

Serving Industry over 50 Years

Peak Production!

150-200 TONS OF CRUSHED ROCK PER HOUR

Steam Shovel sizes to 5" to 6" minus in one-operation

These heavy plate and cast steel constructed roller bearing JAW CRUSHERS have tremendous crushing power. Built to take it for continuous operation with minimum maintenance. Built in all sizes, stationary or portable.

Complete weight of 25 x 42 JAW CRUSHER is 54,200 lbs.

Mfgrs. of Double Roll Crushers and Hammer Crushers for Secondary Crushing requirements.

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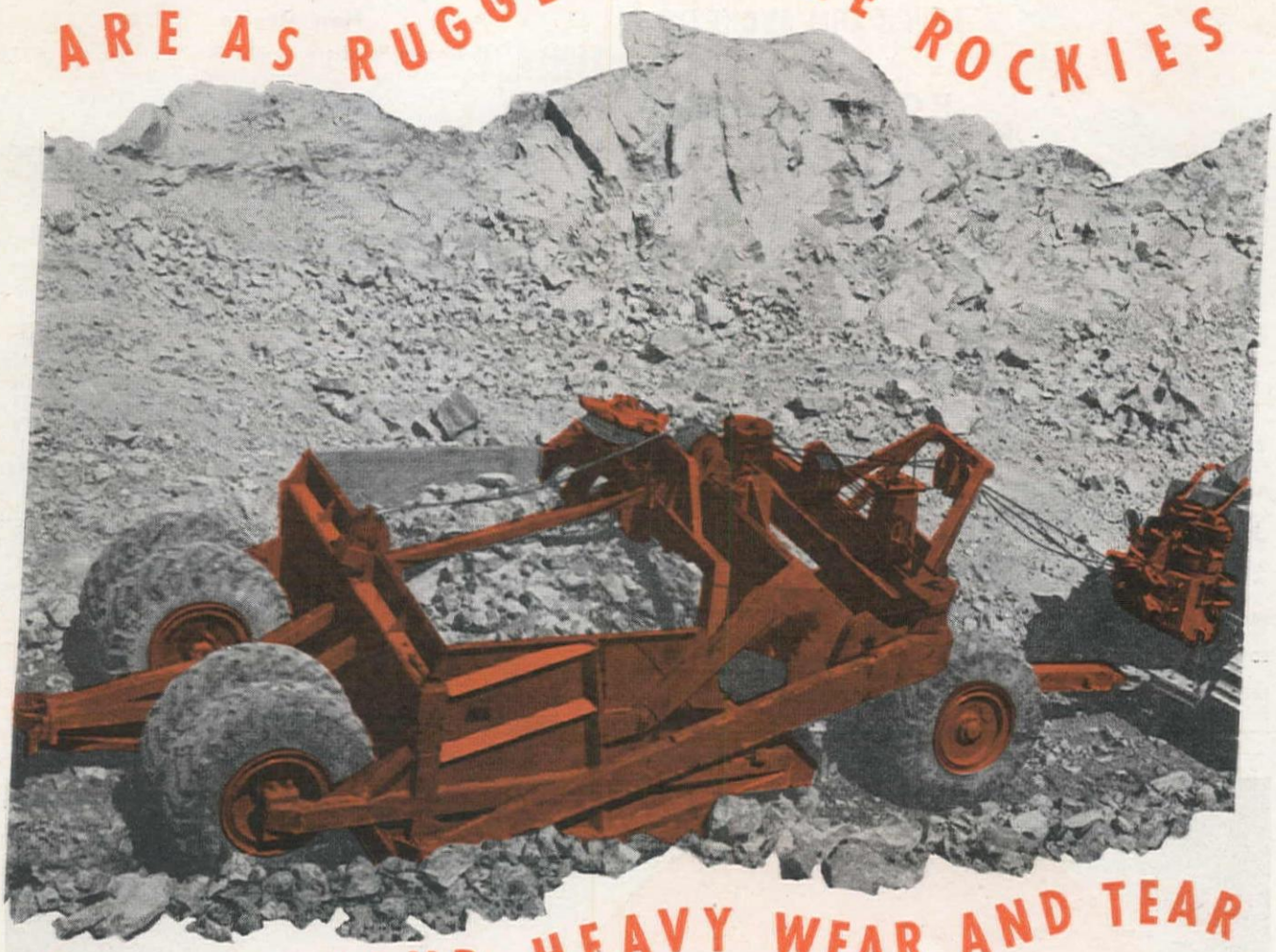
CRUSHER *and* PULVERIZER CO.

2915-17 North Market St., ST. LOUIS (6), MO.

WOOLDRIDGE SCRAPERS

ARE AS RUGGED AS THE ROCKIES



TO WITHSTAND HEAVY WEAR AND TEAR

Wooldridge Scrapers are built from the ground up to insure longest trouble-free performance and lowest yardage costs. In their rugged construction they utilize a high carbon steel digging blade to withstand tougher and rougher usage. Dual steel plate apron is doubly reinforced by criss-cross welded structural steel diaphragms. Welded channels reinforce the one-piece dual steel box plate bottom of ejector-bowl against wear and tear while loading, traveling or dumping on rough or rocky ground. Fewer sheaves, less cable and no reverse bends cut down cable wear and "down-time" for repair to a minimum. Wooldridge Scrapers are built first—to last longer.

—WHERE THE GOING'S TOUGH AND THEY'RE TREATED ROUGH

WOOLDRIDGE

MANUFACTURING COMPANY • SUNNYVALE, CALIFORNIA

SCRAPERS • POWER UNITS • BULLDOZERS • RIPPERS • TRAIL BUILDERS

BOILING BOWL TERRA CLIPPER PRINCIPLE SCRAPERS

—$46,834 to furn. & roll 15,135 tons plantmix surf. & 832 tons asph. cement on present roadway surf. from Reno southerly to Washoe Summit on U. S. Hwy. 395—by State Hwy. Dept. Carson City. 7-20

WASHOE CO.—**Isbell Construction Co.,** 1300 E. 4th St., Reno —$47,781 to grade roadbed & place gravel base courses & plant-mix bitum. surf. on portions of Wells Ave., Reno—by City Clerk, Reno. 7-17

New Mexico

EDDY CO.—**Brown Brothers,** Box 1479, Albuquerque—$33,002 for top course surfacing of 5.4 mi., oil processing & misc. const. on State Hwy. Rte. 31 betw. Loving & Potash Mines—by State Hwy. Dept., Santa Fe. 7-5

GUADALUPE & QUAY COS.—**M. M. Sundt Construction Co.,** 440 So. Park Ave., Tucson, Ariz.—$29,890 for 59.1 mi. sealing oil mat betw. Santa Rosa & New Mexico-Texas state line on U. S. Hwy. Rte. 66—by State Hwy. Dept., Santa Fe. 7-5

QUAY CO.—**M. M. Sundt Construction Co.,** 440 So. Park Ave., Tucson, Ariz.—$18,390 for approx. 47.7 mi. sealing oil mat on U. S. Hwy. Rtes. 54 & 66 east of Tucumcari—by State Hwy. Dept., Santa Fe. 7-5

SANTA FE, SAN MIGUEL & TORRANCE COS.—**M. M. Sundt Construction Co.,** 440 So. Park Ave., Tucson, Ariz.—$36,331 for crushing, screening & stockpiling cover material adjac. to U. S. Hwy. Rte. 285, betw. junct. with U. S. Hwy. Rte. 85 & Encino; adjac. to U. S. Hwy. Rte. 66, E. & W. of Clines Corner; & adjac. to State Rd. 41 betw. junct. with U. S. Hwy. 285 So. of Lamy & Stanley—by State Hwy. Dept., Santa Fe. 7-5

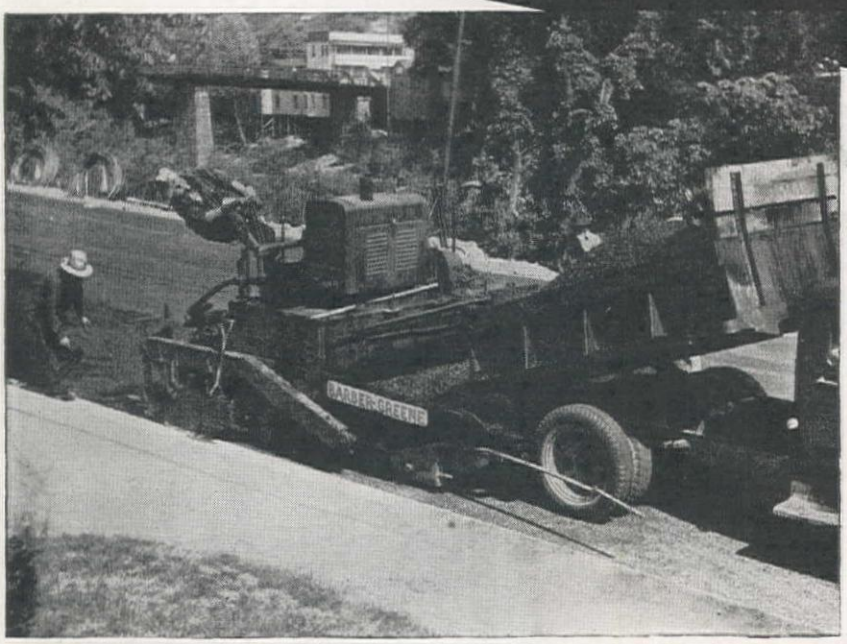
SANTA FE & TORRANCE COS.—**M. M. Sundt Construction Co.,** 440 So. Park Ave., Tucson, Ariz.—$19,992 for 9,800 cu. yds. crushing chats for stockpile adjacent to U. S. Hwy. Rte. 60, U. S. Hwy. Rte. 66, & State Road 14—by State Hwy. Dept., Santa Fe. 7-5

Oklahoma

CARTER CO.—**Harry Newton,** Graham, Tex.—$46,636 for access roads to bombing range at Army Airfield, Ardmore—by U. S. Engineer Ofc., Denison, Tex. 7-14

already finished

"Wot's the use?" growls Gloomy Gus. "All day I tramp up and down and I don't get a chance to complain. No high spots; no low spots; no nuthin'; just flat pavement." That's why they call him Gloomy. Gus' job is to find the bad spots —the spots that are not level; that have to be patched up. Gus is not the final judge, though. The guy that drives across the stretch ten years after you leave is the real critic. He knows even better than Gus how good a job you did. Most jobs look good when you first put them down. How do they look ten years later?

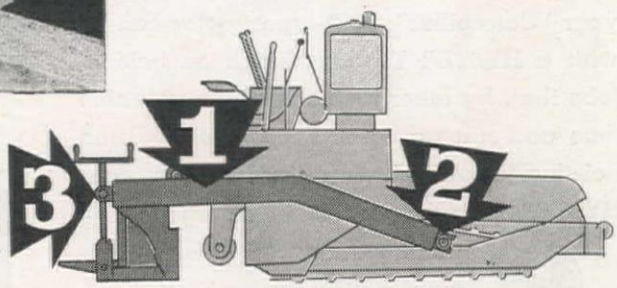


Left: B-G Asphalt Finisher laying top course even with top edge of gutter.

The Leveling principle on the Barber-Greene Finisher is one of the many features that assures a smooth riding road. The Tamping action assures a long life for that smoothness. Unevenness and abrupt changes in the sub-base and base become a smooth flowing of the pavement. The mat smoothly rises and falls to meet the general contour of the roadway.

44-10

The profile view at right, with sideplate removed at spreader screws, shows the Leveling Arm principle. This arm (1) is attached to the screed unit at the rear of Finisher, much like a rake handle is attached to the raking teeth. The extreme end of the rake handle, or Arm, is attached to the tractor unit (2). A rise or fall of several inches of the crawlers is therefore reflected only slightly on the screed plate. Try this action yourself with a rake. To make changes in mat thickness, the rear of the screed plates are screwed up or down by the control (3) at the opposite end of the Arm. The screed then gradually rides up to increase or cuts down to decrease the mat thickness. Catalog 879 clearly illustrates this operation.



BARBER GREENE

ARMY E NAVY

AURORA, ILL., U. S. A.

Brown-Bevis Equip. Co., Los Angeles, Phoenix; Columbia Equip. Co., Portland, Spokane, Seattle, Boise; Contractors Equip. & Supply Co., Albuquerque; Jennison Machinery Co., San Francisco; Lund Machinery Co., Salt Lake City; Western Construction Equip. Co., Billings; Ray Corson Machinery Co., Denver.

North Dakota

McKENZIE CO.—**Archie· Campbell,** Warwick—$234,594 for 3.5 mi. grading, stab. base and bitum. surf. on U. S. Hwy. 85, south of Watford City—by State Hwy. Dept., Bismarck. 6-30

Oregon

CLATSOP CO.—**J. A. Terteling & Sons,** Box 1406, Boise, Idaho—$297,728 for grading & paving 3.8 mi. of Astoria-Naval Hospital section of Nehalem Secondary Hwy.—by State. Hwy. Comm., Portland. 7-17

COOS CO.—**Kern & Kibbe,** 42 S. E. Salmon St., Portland—$16,718 for resurfacing roads at A.A.S., North Bend—by Bur. of Yards & Docks, Washington, D. C. 7-6

MARION CO.—**Warren Northwest Inc.,** N. E. 102nd Ave. & Warren Road, Portland—$22,400 for 3,000 tons of asph. conc. paving on various streets & alleys in Salem—by City Clerk, Salem. 7-3

Texas

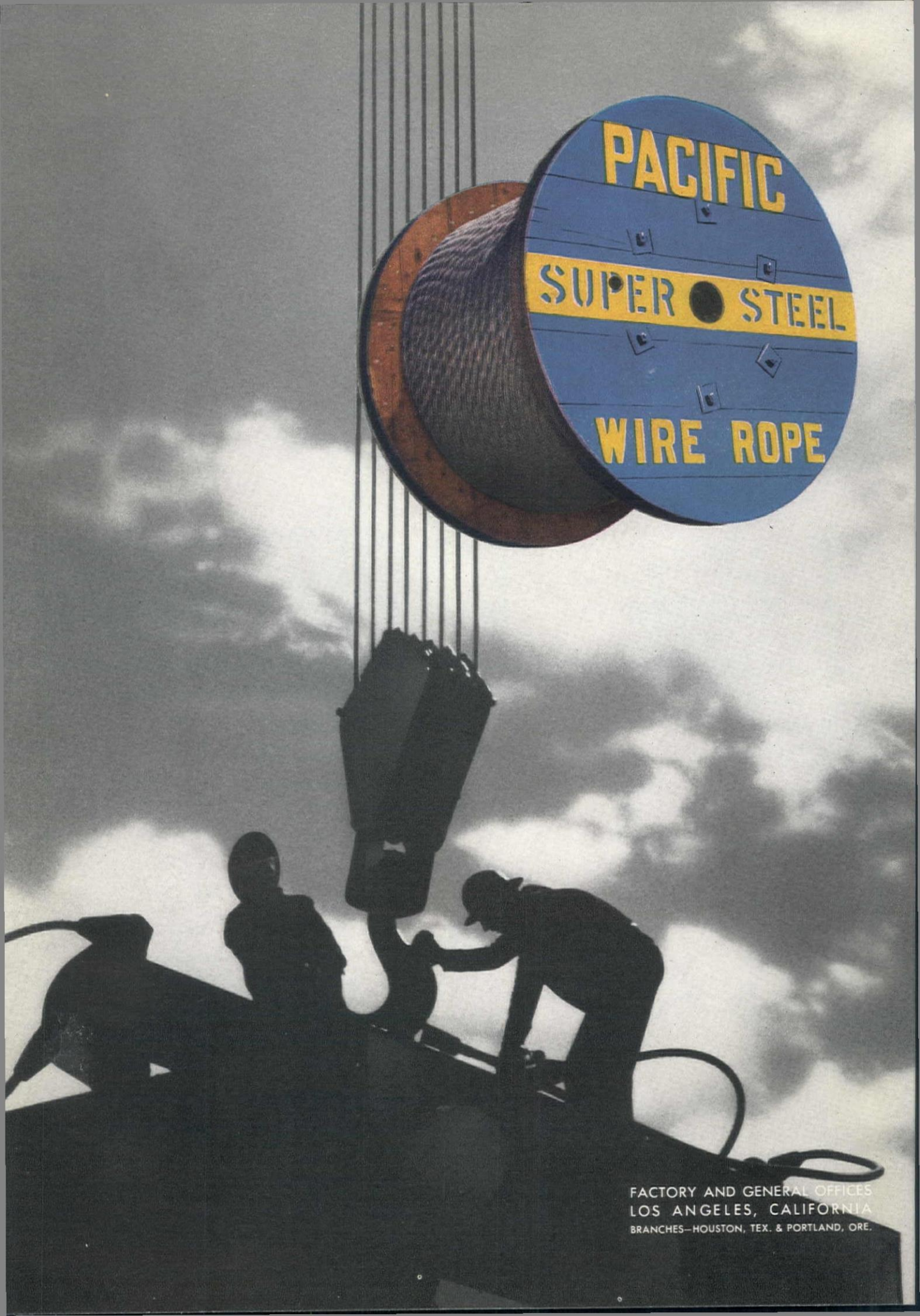
BEXAR CO.—**Colglazier & Hoff,** 326 Seguin Road, San Antonio—$35,913 for 1.4 mi. road repair in vicinity of San Antonio—by Texas Hwy. Dept., Austin. 7-10

BEXAR & GUADALUPE COS.—**Holland Page,** Box 1181, Austin—$98,769 for 17.2 mi. road work on Farm Hwy. 78, junction Farm Hwy. 25 to Bexar county line, etc.—by Tex. Hwy. Dept., Austin. 7-10

DALLAM CO.—**Standard Paving Co.,** 2119 E. 11th St., Tulsa, Okla.—$219,002 for paving reinforcement & additional taxiway at Army Airfield, Dalhart—by U. S. Engineer Ofc., Tulsa, Okla. 7-10

DALLAS CO.—**Glade Construction Co.,** Century Bldg., Fort Worth—$108,222 for roads, parking areas, walks, drainage, culverts, etc., at Dallas and Grand Prairie—by Texas Hwy. Dept., Austin. 7-13

DALLAS CO.—**Texas Bitulithic Co.,** 111 Commerce St., Dallas—$70,860 for leveling & surfacing with hot asphaltic conc. portions of Swiss & Gaston Aves. & Hall & Elm Sts. in Dallas—by city of Dallas. 7-11



FACTORY AND GENERAL OFFICES
LOS ANGELES, CALIFORNIA
BRANCHES—HOUSTON, TEX. & PORTLAND, ORE.

DALLAS CO. — **Texas Bitulithic Co.,** 111 Commerce St., Dallas—$23,338 for leveling & asphalt conc. surfacing on portions of Jackson St., Ervay St. and Turtle Creek Blvd., & for 2 course asphalt penetration surf. treatment on portion Douglas St., Dallas—by city of Dallas. 7-11

GRAYSON CO.—**Spencer Construction Co.,** Box 487, Carrollton—$23,710 for 0.4 mi. grading, structures, flexible base & double asphalt surf. treatment on Hwy. Spur 151, North of Denison—by Texas Hwy. Dept., Austin. 7-10

NOLAN CO.—**Holland Page,** Box 1181, Austin—$33,521 for 15.6 mi. level-up course on St. Hwy. 70, betw. Sweetwater & 20 mi. south—by Texas Hwy. Dept., Austin. 7-10

Utah

BOX ELDER CO.—**Ora Bundy,** Kiesel Bldg., Ogden—$121,200 for constr. concrete paved road on U. S. Hwy. 30 betw. Brigham & Corinne—by State Road Comm., Salt Lake City. 6-28

WEBER CO.—**Reynolds-Ely Construction Co.,** Springville—$40,944 for roads and parking area at the Ogden Air Depot—by U. S. Engineer Ofc., Salt Lake City. 7-18

Washington

COWLITZ & LEWIS COS.—**Diesel Oil Sales,** 2155 Northlake, Seattle—$21,231 for 26 mi. of nonskid seal on Sec. St. Hwy. 1-R, Coal Bank Bridge to Hoffstadt Creek; Sec. St. Hwy. 5-K, from Morton westerly; & Sec. St. Hwy. 12-E, Napavine to Winlock—by Director of Hwys., Olympia. 7-19

JEFFERSON CO.—**Diesel Oil Sales Co.,** 2155 Northlake, Seattle—$20,898 for resurfacing 6.6 mi. of city streets, Port Townsend, & 19.6 mi. of county roads—by Board of Jefferson County Commissioners.

JEFFERSON, GRAYS HARBOR, KITSAP & THURSTON, PIERCE & MASON COS.—**J. F. Forbes,** 211 E. Bay Drive, Olympia—$49,393 for 5.8 mi. light bitum. surf. treatment & 55.4 mi. nonskid sealcoat on portions of Prim. St. Hwys. No. 9 & No. 21, and Secondary State Hwys. No. 1-M, No. 1-N, No. 5-I, and No. 14-B—by Director of Hwys., Olympia. 7-19

KING CO.—**L. Coluccio,** 521-21st Ave., So., Seattle—$26,971 for non-skid single seal treat. on 10.2 mi. Prim. St. Hwy. 2, Isaquah to North Bend—by Director of Hwys., Olympia. 6-28

KING CO.—**Northwest Construction Co.,** 3950 - 6th Ave., N.W., Seattle 7— $105,641 to pave 1 mi. with cement conc. on crushed stone leveling course over exist. conc. pavement & to constr. & place light bitum. surf. treatment & nonskid sealcoat on shoulders, Prim. St. Hwy. No. 1, Duwamish River southerly —by Director of Hwys., Olympia. 7-19

KING CO.—**Washington Asphalt Co.,** 309 W. 39th St., Seattle —$65,617 for asphalt paving at Naval supply depot, Seattle—by Bur. of Yards & Docks, Washington, D. C. 6-27

PIERCE CO.—**Axel Osberg,** 502 No. 62nd St., Seattle—$84,000 for rough grading at the advanced naval base site, Tacoma—by Bur. of Yards & Docks, Washington, D. C. 7-8

PIERCE CO.—**Woodworth & Co.,** 1200 East "D" St., Tacoma —$92,630 for road improvements in Tacoma — by Fed. Pub. Housing Auth., Tacoma. 7-21

SPOKANE CO.—**Diesel Oil Sales Co.,** 2155 Northlake, Seattle —$72,043 for oiling 57.3 mi. of county roads—by Spokane county commissioners, Spokane. 7-11

SPOKANE CO.—**Inland Asphalt Co.,** 10th & Havana St., Spokane—$18,755 for 1.15 mi. asphaltic conc. on Prim. St. Hwy. 2, from Opportunity east—by Director of Hwys., Olympia. 7-7

SPOKANE CO.—**Chas. A. Powers,** East 27-28th Ave., Spokane —$29,755 to widen & surface a portion of Sunset Hwy., Spokane —by City Clerk, Spokane. 7-11

STEVENS, PEND O'REILLE & LINCOLN COS.—**Joslin & McAllister,** Box 1174, Spokane—$38,925 for manuf. & stockpiling crushed stone surf. & mineral aggreg. on Sec. 1, Prim. St. Hwy. 3, Colville to Kettle Falls; Sec. 2, Prim. St. Hwy. 6, Ione to Metaline Falls; Sec. 3, Prim. St. Hwy. 22, Cedonia to Marcus: Sec. 4, Second. St. Hwy. 4-B, Odessa north—by Director of Hwys., Olympia. 7-7

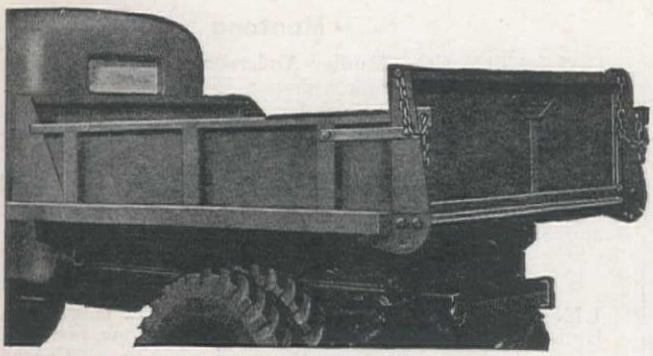
WHATCOM CO.—**Quigg Brothers,** Hoquiam — $24,989 for manufacturing & stockpiling crush-stone surf. & mineral aggregates on Prim. St. Hwy. No. 1, Deming to Shuksan—by Director of Hwys., Olympia. 7-7

WHITMAN CO.—**Roy L. Bair,** 1220 Ide Ave., Spokane—$53,321 for 8 mi. light bitum. surf. treatment & stockpiling on Prim. St. Hwy. 18, Ewan to St. John—by Director of Hwys., Olympia. 7-19

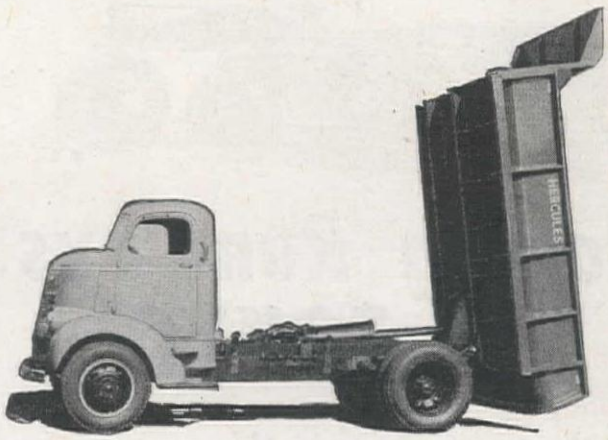
HERCULES

HYDRAULIC HOISTS and DUMP BODIES

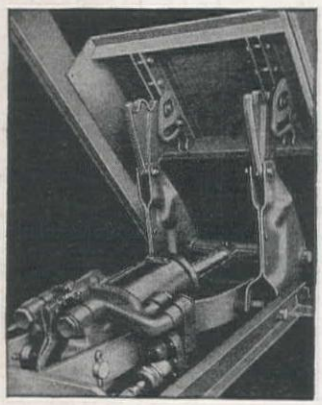
GIVE DEPENDABLE SERVICE ON ALL KINDS OF JOBS



Hercules Removable Side Rub Rail Body with hinged rear corner posts. Available in many sizes.



Hercules High Dumper—Power up, power down with 78° dumping angle. Equipped with 12 ton capacity hoist.



HERCULES HYDRAULIC BOOSTER HOIST

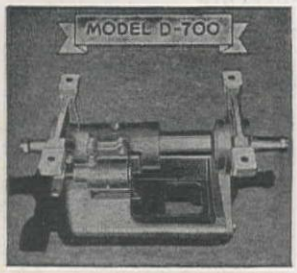
Makes any truck a Dump Truck

Install HERCULES DOUBLE-ARM HYDRAULIC HOISTS under your platform, stake, express or special bodies, which are now idle. Unload the easy way!

This is the Model KXE Hoist, with 6" cylinder, for bodies up to 12 feet long. Body reinforcing plate and steel sills included. Control valve is operated from driver's seat.

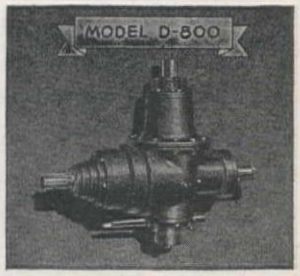
USE THE HERCULES SPLIT-SHAFT POWER TAKE-OFF

To operate any truck-mounted equipment



Direct (D-700 Series), Side (D-800 Series) and Dual Drive (B) models are available for operation of almost every possible type of truck-mounted equipment, either singly or in combination.

Recommendations and complete specifications upon request.



HERCULES STEEL PRODUCTS CO.

GALION, OHIO

UTILITY TRAILER SALES, Seattle, Wash.; NEWELL TRUCK EQUIPMENT CO., Portland, Ore.; A. PASTERIS CO., Oakland, Calif.; STANDARD CARRIAGE WKS., INC., Los Angeles, Calif.; STANDARD IRON WORKS, San Diego, Calif.; SAWTOOTH CO., Boise, Idaho; WESTERN CONSTRUCTION CO., Billings, Mont.; WYOMING AUTOMOTIVE SUPPLY CO., Casper, Cheyenne, Rock Springs, Sheridan, Wyoming; McKELVY MACHINERY CO., Denver, Colo.; MORROW & CO., Albuquerque, New Mexico.

WHITMAN CO.—**Carl Nyberg,** Box 7, Yardley—$23,555 for manufacturing & stockpiling crushed stone surf. & mineral aggreg. on Prim. St. Hwy. No. 3, Sec. 1, Colfax to Snake River Bridge & Sec. 2, Palouse north to Garfield—by Director of Hwys., Olympia. 7-7

Wyoming

SWEETWATER CO. — **Woodward Construction Co.,** Box 1046, Rock Springs—$53,500 for pavement, curb, sidewalks and gutter project for 76-house addition to Colony Coal Co., Rock Springs—by Colony Coal Co., Rock Springs. 7-3

Bridge & Grade Separation...

California

HUMBOLDT CO.—**Kiss Crane Co.,** 2700 San Pablo Ave., San Pablo—$17,710 for reinf. conc. box culvert & timber bridge across Willow Creek & east branch of Willow Creek betw. 32 & 36 mi. east of Arcata—by Calif. Div. of Hwys., Sacramento. 6-27

Montana

GALLATIN CO.—**Dudley-Anderson Co.,** 3021-2nd Ave., N., Great Falls—$66,229 for a 3-span 154-ft. conc. & steel viaduct over Northern Pacif. R. R. Co.'s tracks & 3 mi. grade, surf. & roadmix oil treatment of road approaches near Bozeman on Yellowstone Trail—by State Hwy. Comm, Helena. 7-18

RICHLAND CO.—**L. V. Lockwood,** Box 227, Glasgow—$52,980 for pile and timber breakwater on E. bank of Yellowstone River above Sidney Bridge—by State Hwy. Comm., Helena. 7-18

Oregon

LINN CO.—**Lindstrom Brothers,** 7923 N. E. Halsey St., Portland—$14,676 for a timber truss bridge on conc. piers & timber approaches over Santiam River, in vicinity of Cascadia—by State Hwy. Comm., Portland. 7-17

Washington

KING CO.—**MacRae Brothers,** 2733-4th Ave., Seattle—$33,718 for a reinforced conc. & pile bridge on W. Spokane St., Seattle —by Board of Public Works, Seattle. 7-11

OKANOGAN CO.—**Henry Hagman,** Cashmere—$34,410 for 200-ft. steel span & timber pile trestle approaches across Methow River & for 0.5 mi. grading & surf. with selected roadway borrow on Prim. St. Hwy. 16 near Mazama—by Director of Hwys., Olympia. 7-14

OKANOGAN CO.—**Rumsey & Co.,** 3821 Airport Way, Seattle —$29,933 for 2 reinf. conc. bridges, 3 reinf. conc. culverts & other work on Prim. St. Hwy. 10, Davis Canyon & Chiliwist Creek, Omak to Disautel, Little Nespelem River & Lucy Red Thunder Creek—by Director of Hwys., Olympia. 7-19

Airport . . .

Arizona

PIMA CO.—**P. D. O. C. General Contractors,** Box 3977, Phoenix —$225,939 for an additional parking apron at Modification Center No. 2, Tucson—by U. S. Engineer Ofc., Los Angeles, Calif. 6-27

California

ALAMEDA CO.—**Clements & Co.,** Box 277, Hayward—$34,933 for resurfacing landing mat at N. A. S., Livermore—by Bur. of Yards & Docks, Washington, D. C. 7-6

IMPERIAL CO.—**Macco Construction Co.,** 815 Paramount Blvd., Clearwater—$61,320 for a cement conc. plane parking area at Holtville—by Bur. of Yards & Docks, Washington, D. C. 6-29

ORANGE CO.—**The Contracting Engineers Co.,** 2310½ W. Vernon Ave., Los Angeles—$396,838 for additional aviation facils. at the Navy auxiliary air station, Los Alamitos—by Bur. of Yards & Docks, Washington, D. C. 7-19

ORANGE CO.—**Nathan A. Moore,** 2455 Sherwood Rd., San Marino—$27,029 for a parking apron at Orange County Army Airfield, Santa Ana—by U. S. Engineer Ofc., Los Angeles. 6-28

ORANGE CO.—**United Concrete Pipe Corp.,** Box 1, Sta. "H," Los Angeles—$596,000 for runways, taxiways & parking areas at air station, Los Alamitos—by Bur. of Yards & Docks, Washington, D. C. 7-6

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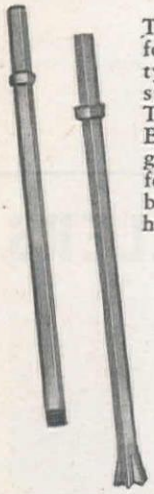
GENUINE *Thor* ACCESSORIES

BECAUSE THEY ARE MADE TO FIT THE JOB BY PNEUMATIC TOOL MEN WHO KNOW MINING NEEDS!

To *save you time,* Thor Air Tool Accessories are designed to *fit* the job . . . and do it *right* by Thor Pneumatic tool engineers who *know mining needs!* To *save you money,* Thor Accessories are durably built to help you get the *most* from your air tools. Two good reasons why – whatever your needs – it *pays to specify* "Genuine Thor Accessories."

Thor

DETACHABLE BITS & ROCK DRILL STEELS



Thor makes available for rock drilling in all types of formations sturdy, fast-cutting Timken Detachable Bits. All standard gauges from 1⅜" to 2⅝" in four-point, six-point or chisel bit styles with center or side holes.

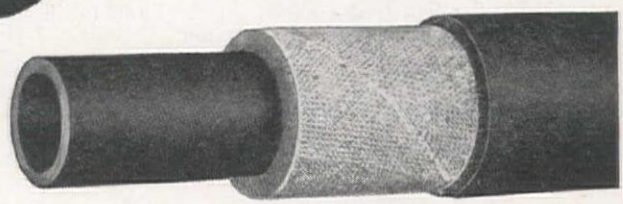
ROSE BIT

CROSS BIT

CHISEL BIT

- Seven sizes of Thor Hollow Steels for these detachable bits used with hand-held drills, and seven sizes for drifter drills, all specially heat-treated for durability in toughest formations.
- Five Thor Hollow Drill Steels with four- or six-point bits in two size ranges – with ⅞" Hexagon steel and 3¼" collared shank, and 1" Hexagon steel with 4¼" collared shank.

AIR & WATER HOSE



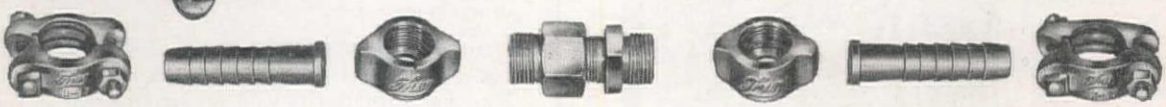
OIL RESISTANT

DURABLE

You get protection against both inner and exterior wear with Thor Wrapped Air and Water Hose. Multiple plies of light, yet tough rubber compounds combine with this protection important advantages of flexibility and durability. The inner tube is protected against flaking and decomposition from oil in the air stream by a special oil-resistant compound. Cover consists of a tough, abrasion-resistant rubber compound that withstands roughest usage.

Thor **HOSE FITTINGS**

Thor Hose Fittings for use with all types of Air and Water Hose are specially designed to withstand severest conditions in mines, quarries and on construction jobs. Solidly constructed of high quality steel, heat treated for durability. Each coupling consists of stem, nut packing, washer, clamp and spud, which is furnished with either male or female thread for connection to the pipe or machine.



HOSE CLAMP · HOSE STEM · HOSE UNION NUT · HOSE SPUDS · HOSE UNION NUT · HOSE STEM · HOSE CLAMP

Thor *Portable Pneumatic and Electric Tools*

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54 E. FOURTH, S., SALT LAKE CITY, UTAH

SAN DIEGO CO.—**Ralph O. Dixson,** 2801 W. Mission Road, Alhambra—$236,800 for additional plane parking areas at the auxiliary air station, Brown Field, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-17

SAN DIEGO CO.—**Griffith Co.,** 1060 So. Broadway, Los Angeles—$182,700 for additional plane parking areas at Ream Field, San Diego—by Bur. of Yards & Docks, Washington, D. C. 6-27

SONOMA CO.—**William D. Rapp,** 705 Bennett Ave., Santa Rosa—$230,733 for paving, bldg. & constr. at Santa Rosa Army Air Base—by U. S. Engineer Ofc., San Francisco. 6-30

Colorado

PUEBLO CO.—**R. E. Wear & Son,** Montrose—$25,586 for trainer bldgs., electrical distrib., etc., at Army Air Base, Pueblo—by U. S. Engineer Ofc., Denver. 7-3

New Mexico

CHAVES CO.—**The Austin Road Co.,** 1813 Clarence St., Dallas, Tex.—$276,480 for additional installations at Roswell Air Base, Roswell—by U. S. Engineer Ofc., Albuquerque. 7-13

CURRY CO.—**Western Contracting Corp.,** 2100 E. 4th St., Sioux City, Iowa—$323,207 for conc. taxiways & turning pad at Army Airfield, Clovis—by U. S. Engineer Ofc., Albuquerque. 7-3

Texas

BEXAR CO.—**Collins-Bland Construction Co.,** Box 1192, Austin—$29,172 for repairing runways, taxiways & aprons, at Army auxiliary airfield, Clear Springs—by U. S. Engineer Ofc., Fort Sam Houston. 6-29

BEXAR CO.—**J. C. Worcester,** 1634 W. Craig Place, San Antonio—$34,503 for parachute escape facils. at Randolph Field—by U. S. Engineer Ofc., Fort Sam Houston. 7-11

DALLAS CO.—**Texas Bitulithic Co.,** 111 Commerce St., Dallas—$216,063 for additional aircraft parking area at Love Field, Dallas—by U. S. Engineer Ofc., Denison. 7-14

SAN PATRICIO CO.—**W. S. Dellows Construction Co.,** Bankers Mortgage Bldg., Houston—$26,927 for improvements to airport, Aransas Pass—by U. S. Engineer Ofc., Corpus Christi. 6-29

Washington

GRAYS HARBOR CO.—**Erickson Paving Corp.,** 1550 No. 34th St., Seattle—$158,357 for grading, paving & other work at Moon Island Airport, near Hoquiam—by Civil Aeronautic Admin., Seattle. 7-3

KING CO.—**N. Fiorito, Inc.,** 844 W. 48th St., Seattle—$1,644,658 for improvements at Boeing Airfield, Seattle, to include grading, paving, water system, drainage facils. & other work—by U. S. Engineer Ofc., Seattle. 7-3

Wyoming

NATRONA CO.—**Rognstad-Olsen Construction Co.,** 1233 East "C" St., Casper—$28,779 for trainer bldgs., electrical distrib., walks, etc., at Army Airfield, Casper—by U. S. Engineer Ofc., Denver, Colo. 7-3

SHERIDAN CO.—**Peter Kiewit Sons Co.,** 1024 Omaha National Bank Bldg., Omaha, Nebr.—$458,930 for airport improvements in Sheridan—by Civil Aeronautics Admin., Kansas City, Mo. 7-27

Water Supply . . .

Arizona

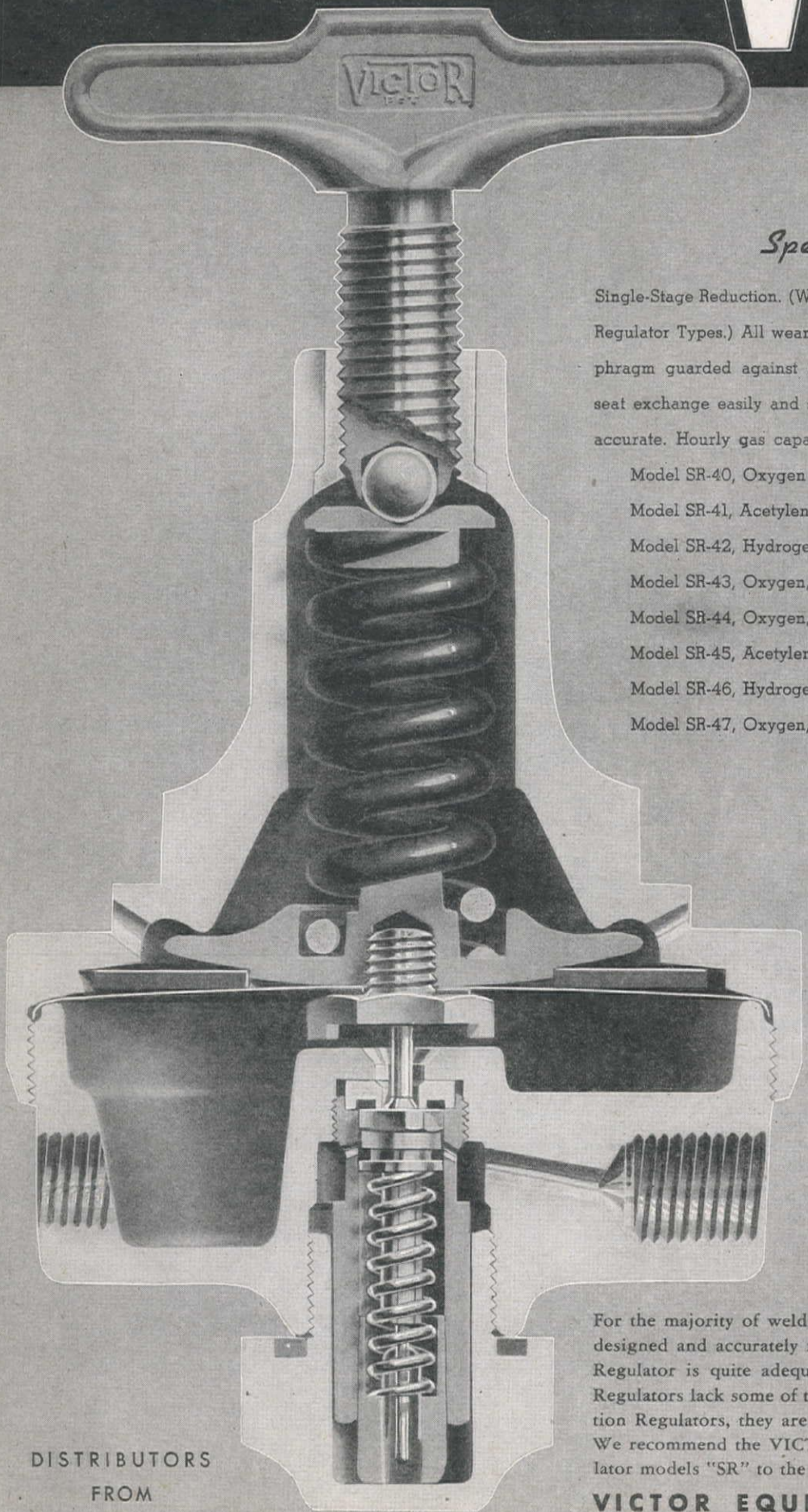
MOHAVE CO.—**Macco-Robertson Co.,** 815 Paramount Blvd., Clearwater, Calif.—$28,050 supplemental award for extensions to water supply system at Kingman—by U. S. Engineer Ofc., Los Angeles, Calif. 7-6

California

KERN CO.—**Edward R. Siple Co.,** 2545 San Fernando Road, Los Angeles—$32,029 for additional water supply system at Army airfield, Muroc—by U. S. Engineer Ofc., Los Angeles. 7-5

REGULATOR BY VICTOR

ARMY E NAVY



Specifications

Single-Stage Reduction. (We also produce Two-Stage Reduction Regulator Types.) All wearing parts adequately protected. Diaphragm guarded against shearing and buckling. Occasional seat exchange easily and swiftly accomplished. Very pressure accurate. Hourly gas capacity 1,840 cu. ft. p. hr. at 100 Psi.

Model SR-40, Oxygen

Model SR-41, Acetylene or Liq. Pet. Gases

Model SR-42, Hydrogen

Model SR-43, Oxygen, cutting

Model SR-44, Oxygen, manifold

Model SR-45, Acetylene, manifold

Model SR-46, Hydrogen, manifold

Model SR-47, Oxygen, heavy duty

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For the majority of welding and cutting operations, a well-designed and accurately functioning Single-Stage Reduction Regulator is quite adequate. While Single-Stage Reduction Regulators lack some of the advantages of Two-Stage Reduction Regulators, they are more easily maintained in service. We recommend the VICTOR Single-Stage Reduction Regulator models "SR" to the most discriminating buyer.

VICTOR EQUIPMENT COMPANY
844 FOLSOM STREET · SAN FRANCISCO 7

LOS ANGELES CO.—**N. P. Van Valkenburgh Co.,** 8609 San Vincente Ave., South Gate—$79,900 for furn. & laying cast iron pipe & fittings in 119th St. and others, Inglewood—by City Council, Inglewood. 7-6

SAN BERNARDINO CO.—**Chicago Bridge & Iron Co.,** 416 Rialto Bldg., San Francisco—$100,851 for design & constr. of elevated water tanks at Army airfield, San Bernardino—by U. S. Engineer Ofc., Los Angeles. 7-5

SAN BERNARDINO CO.—**Contracting Engineers Co.,** 2310½ W. Vernon Ave., Los Angeles—$34,267 for water supply system at Army airfield, San Bernardino—by U. S. Engineer Ofc., Los Angeles. 7-5

SAN BERNARDINO CO.—**W. J. & C. O. Brand,** 3960 Market St., Riverside—$148,940 for water & sewer systems at Shell Plant in Fontana—by U. S. Engineer Ofc., Los Angeles. 7-5

SOLANO CO. — **Monterey County Plumbing Co.,** 8275 San Leandro Blvd., Oakland—$50,300 for additions & alterations to water distrib. system at Naval Ammunition Depot, Mare Island—by Bur. of Yards & Docks, Washington, D. C. 7-5

Montana

CASCADE CO. — **Blakeslee Construction Co.,** Great Falls — $74,920 for installing water mains & related work for new reservoir at Great Falls—by City Clerk, Great Falls. 7-25

CASCADE CO.—**Dudley Anderson Co.,** 3021 2nd Ave., N., Great Falls—$158,131 for a 4,745,000-gallon prestressed conc. water tank at Great Falls—by City Council of Great Falls. 7-25

Texas

HOWARD CO.—**Dalton & Cullum,** Great National Bank Bldg., Dallas—$454,212 for water supply main & well collecting system, Big Spring—by city of Big Spring. 6-29

HOWARD CO.—**George L. Taylor,** Plainview—$32,887 for 8 water wells at Big Spring—by city of Big Spring. 6-29

Washington

COWLITZ CO.—**Oscar Butler & Son,** 4910-42nd Ave., N.E., Portland, Ore.—$110,906 for a filter plant at Longview—by City Clerk, Longview. 7-19

PIERCE & KING COS.—**American Pipe and Construction Co.,** Box 3428, Terminal Annex, Los Angeles, Calif.—$279,816 for furnishing and installing 12,290 ft. 52-in. lock-joint steel cylinder conc. pipe in Green River supply line, replacing wood-stave pipe on Tacoma gravity line — by Board of Contracts and Awards, Tacoma. 7-12

SNOHOMISH CO. — **Paine, Gallucci, & Gallagher,** 1521 S. Grant St., Tacoma—$28,192 for installation of water system at Pinehurst—by Pinehurst Water Dist., Pinehurst. 7-18

Sewerage . . .

California

ALAMEDA CO.—**Oakland Sewer Construction Co.,** Box 282, Walnut Creek—$14,891 for 7 storm sewers in Oro Lomo Sanitary District, adjoining Benton St. in Hayward—by Oro Lomo Sanitary Dist., Hayward. 7-21

LOS ANGELES CO.—**Burch & Bebek,** 8003 So. Broadway, Los Angeles—$125,430 for a sanitary sewer in Lennox-Lawndale-Gardena area, Los Angeles—by Fed. Works Agency, Los Angeles. 7-6

LOS ANGELES CO.—**M. F. Kemper Construction Co.,** 3701 Overland Ave., Los Angeles—$93,782 for a vitrified clay sewer in Pauline St. & other streets, Los Angeles—by Board of Supervisors, Los Angeles. 7-12

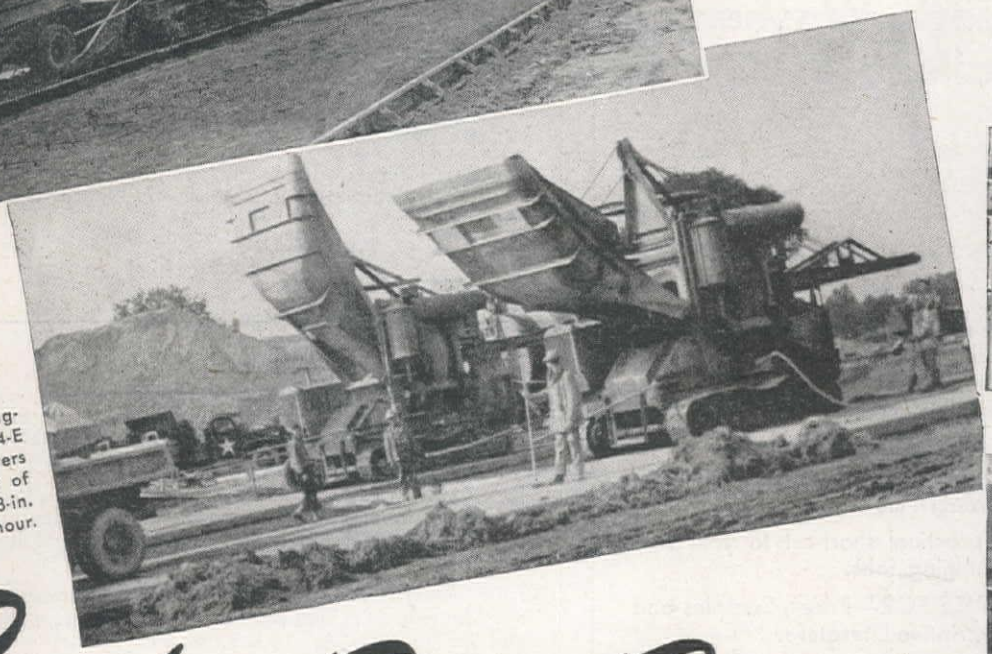
LOS ANGELES CO.—**George Miller,** 2147 W. Silver Lake Drive, Los Angeles—$106,320 for vitrified sewer in the Centinela-Mitchell Ave. Sewer Dist., Los Angeles—by Board of Public Works, Los Angeles. 7-25

LOS ANGELES CO.—**Mike Miller Co.,** 877 No. Bunker Hill Ave., Los Angeles—$93,203 for a vitrified clay pipe sewer near the Douglas Aircraft Plant, Santa Monica—by City Council, Santa Monica. 7-13

SAN DIEGO CO.—**J. S. Barrett,** 455 Spreckels Bldg., San Diego—$126,877 for a sanitary sewer betw. La Mesa & San Diego in Solas Valley—by City Clerk, La Mesa. 7-12

SAN DIEGO CO.—**B. G. Carroll,** 4396 Maryland St., San Diego—$55,940 for Powder House Canyon Trunk Sewer—by City Council, San Diego. 7-10

A pair of 34-E Multi Foote Pavers working in tandem speed up completion of airport runways in America.



Somewhere in England a pair of 34-E Multi Foote Pavers pave 210 feet of 25-ft. runway 8-in. thick every hour.

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DOUBLE CONE DRUM with its end-to-end scouring action insures a complete and thorough mix of every batch.

TROUBLE-FREE WATER SYSTEM is simple, accurate and independent of water pressure.

HIGH OPERATING PLATFORM assures greater visibility and faster, more accurate work.

ROTARY DISCHARGE takes only a quarter turn to kick concrete into the big bucket ready to speed out the long boom to be discharged.

BIG, WIDE, SOLID SKIP prevents spilling and assures fast, positive charging.

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Multi Foote Pavers are leading the field all over the world. Machines that can win the battle of putting down runways and roads in war theatres everywhere are a sure thing to make money for you on peacetime road contracts. Write direct or ask your Foote dealer for all the details.

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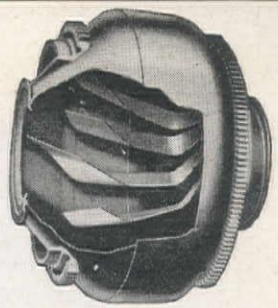
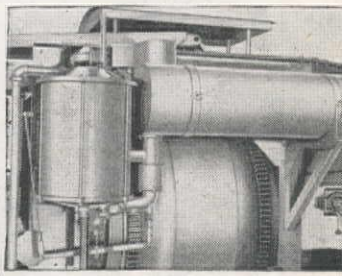
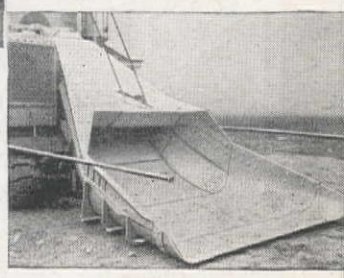


DOUBLE CONE DRUM

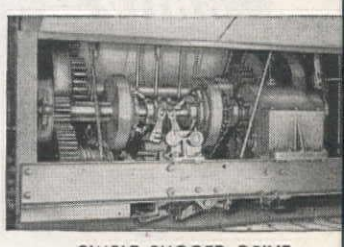


TROUBLE-FREE WATER SYSTEM

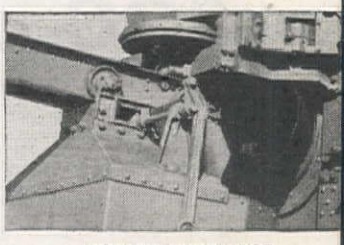


BIG WIDE SOLID SKIP

HIGH OPERATING PLATFORM



SIMPLE RUGGED DRIVE



ROTARY DISCHARGE

ARMY E NAVY

Texas

DALLAS CO.—**Williams & Whittle,** 5422 Mockingbird Lane, Dallas—$39,144 for storm sewers in Dallas—by city of Dallas. 7-7

Utah

BEAVER CO.—**Young & Smith Construction Co.,** 1678 Browning Ave., Salt Lake City—$10,476 for a septic tank project at Milford—by Fed. Works Agency, Salt Lake City. 7-13

Washington

KING CO.—**Valley Construction Co.,** 8423-48th Ave., So., Seattle—$206,560 for sewer system in View Ridge Dist., near Sand Point Naval air station, Seattle—by Board of Public Works, Seattle. 7-16

Waterway . . .

California

ALAMEDA CO.—**Clinton Construction Co.,** 923 Folsom St., San Francisco—$301,500 for piers & craneway track foundations at the Hurley Marine Works, Oakland—by Bur. of Yards & Docks, Washington, D. C. 7-17

LOS ANGELES CO.—**Case Construction Co.,** Box 6, San Pedro—$48,878 for dredging & mooring dolphins for install. of small dry dock at Harbor Boat Bldg. Co., Terminal Island—by Bur. of Yards & Docks, Washington, D. C. 7-3

LOS ANGELES CO.—**Owl Truck and Construction Co.,** 420 So. Alameda St., Compton—$159,067 for improving Sections "D" and "E" of Pier "A," East Long Beach Harbor—by Port Manager, Long Beach. 7-7

MARIN CO.—**Macco Construction Co.,** Freight & Ferry Sts., Oakland—$95,982 to repair & reconstruct existing docks, involving earthwork, piling, conc. constr., timberwork, paving, etc., at Net Pier, Ship Dock & Barge Dock, Naval Net Depot, Tiburon—by Bur. of Yards & Docks, Washington, D. C. 7-10

SAN DIEGO CO.—**Case Construction Co.,** Box 6, San Pedro—$94,163 for a mock-up ramp & dock at San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-6

SAN DIEGO CO.—**Shannahan Bros., Inc.,** 6193 Maywood Ave., Huntington Park—$900,480 for a boat landing for Naval personnel at San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-10

SAN FRANCISCO CO.—**J. D. Proctor, Inc.,** Box 247, Pt. Richmond Sta., Richmond—$39,640 to build wharves Nos. 58 & 60 on Channel St., betw. 6th & 7th Sts., San Francisco—by Board of State Harbor Comm., San Francisco. 6-28

Washington

KING CO.—**Puget Sound Bridge & Dredging Co.,** 2929-16th Ave., S. W., Seattle—$7,200 for dredging at Pier "E," port of embarkation, Seattle—by U. S. Engineer Ofc., Seattle. 7-3

KITSAP CO.—**N. C. Jannsen Drilling Co.,** Box 3185, Seattle—$28,800 for drilling & development at naval ammunition storage & trans-shipment depot, Puget Sound area—by Bur. of Yards & Docks, Washington, D. C. 7-3

KITSAP CO.—**Manson Construction and Engineering Co.,** 821 Alaskan Way, Seattle 4—$604,200 for a marginal wharf near Bangor—by Bur. of Yards & Docks, Washington, D. C. 6-30

Irrigation . . .

Oregon

DESCHUTES CO.—**McLaughlin Construction Co.,** Pocatello, Idaho—$58,881 for earthwork, 2 railway siphons & 2 conc. hwy. bridges on the north unit of main canal, Deschutes project near Redmond & Terrebonne—by Bur. of Reclamation, Bend. 7-10

Tunnel . . .

California

SAN MATEO CO.—**T. E. Connolly,** 461 Market St., San Francisco—$113,700 to replace Bald Hill outlet shaft and adits—by Pub. Utilities Comm., San Francisco. 7-18

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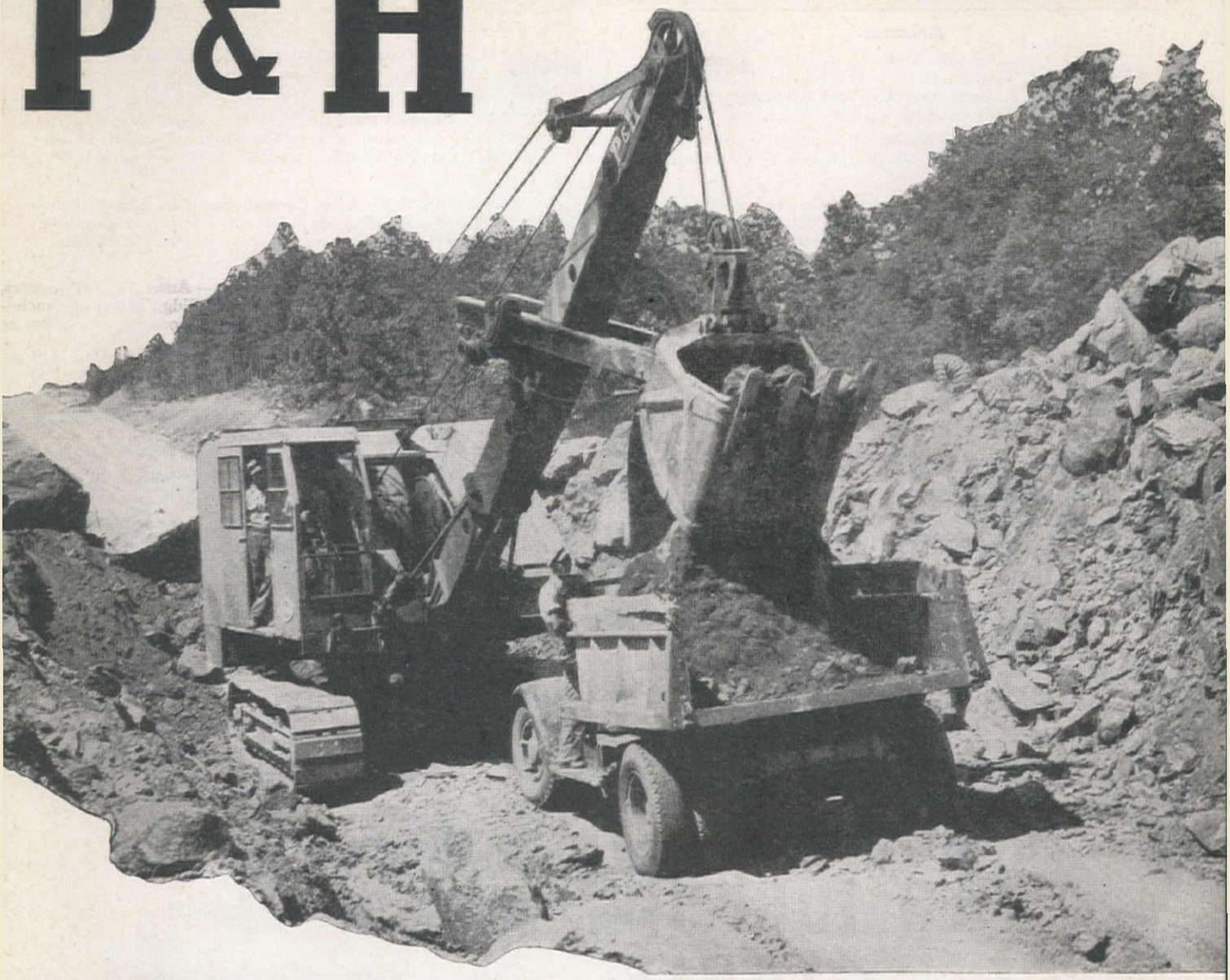

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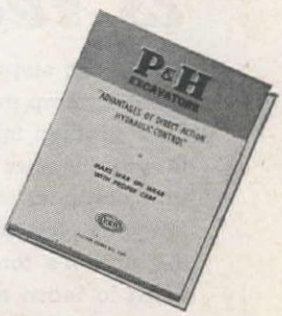

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Building . . .

Arizona

MARICOPA CO. — **E. W. Duhame,** 3717 No. Central Ave., Phoenix—$80,700 for removal & re-erection of 12 bldgs. from Wickenburg to new site at Avondale, incl. landscaping & all site work—by Fed. Pub. Housing Auth., San Francisco, Calif. 7-7

MARICOPA CO.—**Del E. Webb,** 302 So. 23rd Ave., Phoenix—$85,000 for a prisoner-of-war camp near Mesa—by U. S. Engineer Ofc., Los Angeles. 7-5

PIMA CO.—**M. M. Sundt Construction Co.,** Box 2592, Tucson—$88,500 for structural changes & remodeling former Desert Sanitarium bldg., Tucson—by Tucson Medical Center, Tucson. 7-7

California

ALAMEDA CO.—**A. J. Hopper,** 243 Langton St., San Francisco—$184,780 for a welfare & recreation bldg. at the Naval Supply Depot, Oakland—by Bur. of Yards & Docks, Washington, D. C. 7-6

ALAMEDA CO.—**Leibert & Calleti,** 28 Francisco Blvd., San Rafael—$97,211 for erecting prefabricated grammar school bldg. in Albany—by Fed. Works Agency, Berkeley. 7-13

ALAMEDA CO.—**MacDonald & Kahn, Inc.,** Financial Center Bldg., San Francisco—$698,700 for additional hospital facils. at U. S. Naval Hospital, Oak Knoll, Oakland—by Bur. of Yards & Docks, Washington, D. C. 6-30

ALAMEDA CO.—**Moore & Roberts,** 693 Mission St., San Francisco — $390,351 for WAVES quarters, Oakland — by Bur. of Yards & Docks, Washington, D. C. 7-10

CONTRA COSTA CO. — **Northwest Fabricators,** Box 478, Albany, Ore.—$232,300 for 200 prefabricated family dwelling units at Port Chicago—by Pub. Housing Auth., San Francisco. 7-10

CONTRA COSTA CO. — **Northwest Fabricators,** Box 478, Albany, Ore.—$174,750 for fabrication & erection of 150 portable shelter units at Pittsburg—by Fed. Pub. Housing Auth., San Francisco. 7-15

HUMBOLDT CO.—**Fred J. Mauer & Son,** 3031 "E" St., Eureka—$456,500 for barracks, storehouse, trainer bldgs., paving & parking apron at Arcata—by Bur. of Yards & Docks, Washington, D. C. 6-30

KERN CO.—**R. J. Daum,** 6803 West Blvd., Inglewood—$923,803 for hangars, misc. bldgs. & facils. at Muroc Army Airfield, Muroc—by U. S. Engineer Ofc., Los Angeles. 7-5

KERN CO.—**Truscon Steel Co.,** 5480 E. Slauson Ave., Los Angeles—$166,000 for const. & installing hangar doors for 2 depot supply hangars at Army Airfield, Muroc—by U. S. Engineer Ofc., Los Angeles. 7-6

LOS ANGELES CO.—**Alco Construction Co.,** 5423 Flemish Village Lane, Los Angeles—$141,700 for a transportation bldg. at Naval Dry Docks, Terminal Island—by Bur. of Yards & Docks, Washington, D. C. 7-20

LOS ANGELES CO. — **American Builders, Inc.,** and **Times Building Co.,** 410 Times Bldg., Long Beach—$1,750,000 for 346 frame-stucco dwellings in Long Beach—by selves. 6-29

LOS ANGELES CO.—**James I. Barnes Construction Co.,** 1119 Montana Ave., Santa Monica—$850,000, supplemental award 1500-man expansion at Roosevelt Base, Terminal Island. Work includes swimming pool, barracks & other bldgs.—by Bur. of Yards & Docks, Washington, D. C. 7-11

LOS ANGELES CO.—**Biltmore Homes,** 2111 E. Willow St., Long Beach—$1,500,000 for first of a group of 344 family dwellings in Wardlow Heights, Long Beach—by self. 7-18

LOS ANGELES CO.—**Weymouth Crowell Co.,** 2104 E. 14th St., Los Angeles—$389,048 for a hangar, misc. bldgs., & paving at Metropolitan Airport, Van Nuys—by U. S. Engineer Ofc., Los Angeles. 7-5

LOS ANGELES CO.—**Wm. C. Crowell Co.,** 170 E. Calif. St., Pasadena—$194,350 for basement and 2-story add'tn to St. Luke's Hospital, Pasadena—by St. Luke's Hospital. 7-18

LOS ANGELES CO.—**Wm. C. Crowell Co.,** 170 E. Calif. St., Pasadena—$28,550 for 50 family portable shelters at Long Beach—by Fed. Pub. Housing Auth., San Francisco. 7-18

LOS ANGELES CO.—**Sam Duff,** 733 W. 14th St., Long Beach

—$58,300 for addition of a 5th floor to Seaside Memorial Hospital, Long Beach—by the Hospital. 7-3

LOS ANGELES CO.—**Escherich Bros.,** 234 W. 37th Place, Los Angeles—$28,530 for community bldgs. at Long Beach—by Fed. Pub. Housing Auth., Los Angeles. 7-18

LOS ANGELES CO.—**Structon,** 8442 Santa Monica Blvd., Los Angeles—$66,318 for four 30-unit nursery school bldgs. at Long Beach—by Fed. Works Agency, Los Angeles. 7-18

LOS ANGELES CO.—**Structon,** 8442 Santa Monica Blvd., Los Angeles—$27,240 for 2 nursery units at Inglewood—by Fed. Works Agency, Los Angeles. 7-6

LOS ANGELES CO.—**J. K. Thomas and Beyer Construction Co.,** 700 Kress Bldg., Long Beach—$50,000 for addition to main toll bldg. at 5th & Elm Sts., Long Beach—by So. Calif. Telephone Co., Los Angeles. 7-3

LOS ANGELES CO.—**P. A. Weeger,** 4565 Santa Monica Blvd., Los Angeles—$35,797 for 8-room addition to Woodrow Wilson school in Bellflower—by Fed. Works Agency, Los Angeles. 7-13

LOS ANGELES CO.—**P. A. Weeger,** 4565 Santa Monica Blvd., Los Angeles—$66,895 to move bldgs. from San Fernando to the metropolitan airport, Van Nuys, and rehabilitate them—by U. S. Engineer Ofc., Los Angeles. 7-6

LOS ANGELES CO.—**Zoss Construction Co.,** Box 1167, Hollywood—$569,265 for additional storage space & utils. at Army Airforce supply depot, Maywood—by U. S. Engineer Ofc., Los Angeles. 7-5

MONTEREY CO.—**Fratessa-Harder Co.,** 787 Munras Ave., Monterey—$25,983 for a warehouse at Fort Ord—by U. S. Engineer Ofc., San Francisco. 7-15

ORANGE CO.—**Howard Dunn,** 12026 Riverside Drive, North Hollywood—$49,190 for a 6-classroom addition to the Seal Beach Elementary School, Seal Beach—by Seal Beach School District, Seal Beach. 7-7

ORANGE CO.—**Wm. P. Neil,** 4814 Loma Vista Ave., Los Angeles—$1,299,424 for ammunition overhaul depot, embracing 12 reinf. conc. bldgs., R.R. tracks, grading, water & sewer systems, etc., at Naval magazine & net depot, Seal Beach—by Bur. of Yards & Docks, Washington, D. C. 7-6

PLACER CO.—**McCoy & Butler,** 1128 "F" St., Marysville—$25,247 for a theater bldg. at DeWitt General Hospital, Auburn—by U. S. Engineer Ofc., Sacramento. 6-30

RIVERSIDE CO.—**Davies & Keusder,** 118½ No. Larchmont Blvd., Los Angeles—$59,550 for a chapel bldg. at U. S. Naval Hospital, Corona—by Bur. of Yards & Docks, Washington, D. C. 7-27

RIVERSIDE CO.—**Weymouth Crowell,** 2104 E. 14th St., Los Angeles—$65,279, supplemental award for additional bldgs. at March Field—by U. S. Engineer Ofc., Los Angeles. 7-5

SACRAMENTO CO.—**Campbell Construction Co.,** 800 "R" St., Sacramento—$48,600 for motor repair shop at McClellan Field, Sacramento—by U. S. Engineer Ofc., Sacramento. 6-28

SACRAMENTO CO.—**Lawrence Construction Co.,** 3020 "V" St., Sacramento—$42,094 for a cafeteria & time clock bldg. at McClellan Field, Sacramento—by U. S. Engineer Ofc., Sacramento. 6-30

SAN BERNARDINO CO.—**Mead & O'Donnell,** 7769 Melrose Ave., Los Angeles—$52,730 for misc. bldgs. at Shell Plant, Fontana—by U. S. Engineer Ofc., Los Angeles. 7-7

SAN DIEGO CO.—**Bethlehem Steel Co.,** 20th & Illinois, San Francisco—$174,135 to furn., fabricate & erect structural steel for engine overhaul bldg. at naval air station, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-13

SAN DIEGO CO.—**Harvey & Rose,** 211 W. Orange Grove Ave., Arcadia—$39,769 for civilian employees dispensary at the Naval Air Station, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-17

SAN DIEGO CO.—**Kemp Brothers,** 2900 Hyde Park Blvd., Los Angeles—$133,190 for 6 bachelor officers' quarters at Camp Kearney—by Bur. of Yards & Docks, Washington, D. C. 6-27

SAN DIEGO CO.—**Herbert Mayson,** 9315 Hooper Ave., Los Angeles—$335,000 for addition to Kearney Junior High School, San Diego—by Fed. Works Agency, Washington, D. C. 7-7

SAN DIEGO CO.—**E. S. McKittrick,** 7839 Santa Fe Ave., Huntington Park—$31,890 for conc. foundations for engine overhaul bldg. at the Naval Air Station, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-17

SAN DIEGO CO.—**Secrest Construction Co.,** 1943 West See Drive, Whittier—$41,064 for equipment housing facils. at Naval training school, Point Loma, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-6

SAN DIEGO CO.—**Secrest Construction Co.,** 1943 West See Drive, Whittier—$69,703 for a chapel at Navy Hospital, San Diego—by Bur. of Yards & Docks, Washington, D. C. 6-30

SAN DIEGO CO.—**Edward R. Siple,** 2545 San Fernando Road, Los Angeles—$26,228 for alterations and additions to fire station bldg. in Oceanside—by city of Oceanside. 7-17

SAN DIEGO CO.—**Stanton-Reed Co.,** 816 W. 5th St., Los Angeles—$223,379 for WAVES quarters at Imperial Beach Radio Station, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-25

SAN DIEGO CO.—**Walter Trepte,** 631-9th Ave., San Diego—$311,286 for facils. for WAVES at Naval repair base, San Diego—by Bur. of Yards & Docks, Washington, D. C. 7-5

SAN FRANCISCO CO.—**Empire Construction Co.,** 344 Harriet St., San Francisco—$105,000 for class "A" bldg. at 15th & DeHaro Sts., San Francisco—by China Aircraft, San Francisco. 7-3

SAN FRANCISCO CO.—**Irving Litchfield,** 221 Union St., San Rafael—$38,802 for officers' recreation bldg. at Treasure Island—by Bur. of Yards & Docks, Washington, D. C. 7-13

SAN FRANCISCO CO.—**Martinelli Construction Co.,** 44 Mary St., San Francisco—$34,300 for longshoremen's temporary shelters in San Francisco—by Bur. of Yards & Docks, Washington, D. C. 7-6

SAN FRANCISCO CO.—**C. L. Wold Construction Co.,** 4412 Fulton St., San Francisco—$28,900 for alterations to the Dalziel Bldg., San Francisco—by Bur. of Yards & Docks, Washington, D. C. 7-26

SAN FRANCISCO CO.—**Erbentraut & Summers,** 446-6th St., San Francisco—$54,000 for generator bldg. and another bldg. on Farralone Islands—by U. S. Coast Guard, San Francisco. 7-12

SAN FRANCISCO CO.—**H. H. Larsen Co.,** 64 So. Park St., San Francisco—$42,923 for emergency power plant at Presidio, San Francisco—by U. S. Engineer Ofc., San Francisco. 7-3

SAN FRANCISCO CO.—**Standard Building Co.,** 1500 Judah St., San Francisco—$119,842 for a school bldg. on Treasure Island—by Bur. of Yards & Docks, Washington, D. C. 6-30

SAN MATEO CO.—**Dinwiddie Construction Co.,** 210 Crocker Bldg., San Francisco—$111,000 for a transmitter bldg. at U. S. Coast Guard Station, San Bruno—by U. S. Coast Guard, San Francisco. 7-12

SANTA BARBARA CO.—**W. J. Hunter,** 660 Heliotrope Drive, Los Angeles—$88,000 for housing for WAC at Army Airfield, Santa Maria—by U. S. Engineer Ofc., Los Angeles. 7-5

SOLANO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$187,000 for wood frame recreational facils. bldg. & other work at north barracks, Mare Island Navy Yard—by Bur. of Yards & Docks, Washington, D. C. 7-6

SOLANO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$125,000 to rehabilitate machine shop at Mare Island Navy Yard—by Bur. of Yards & Docks, Washington, D. C. 7-6

SOLANO CO.—**J. A. Bryant,** 2170 - 28th Ave., San Francisco—$133,829 for 60 temporary dwelling units at Vacaville—by Housing Auth., Vacaville. 7-5

SOLANO CO.—**H. H. Larsen,** 64 South Park St., San Francisco—$422,849 for warehouses at Benicia Arsenal, Benicia—by U. S. Engineer Ofc., San Francisco. 7-3

SOLANO CO.—**Willis F. Lynn,** 3848 Grand Ave., Oakland—$93,400 for an optical repair shop, etc., at Benicia Arsenal—by U. S. Engineer Ofc., San Francisco. 6-29

VENTURA CO.—**Oxnard Construction Co.,** 620 La Brea Ave., Inglewood—$300,000 for 80 frame and stucco dwellings in Oxnard. Work has started—by self. 7-18

Colorado

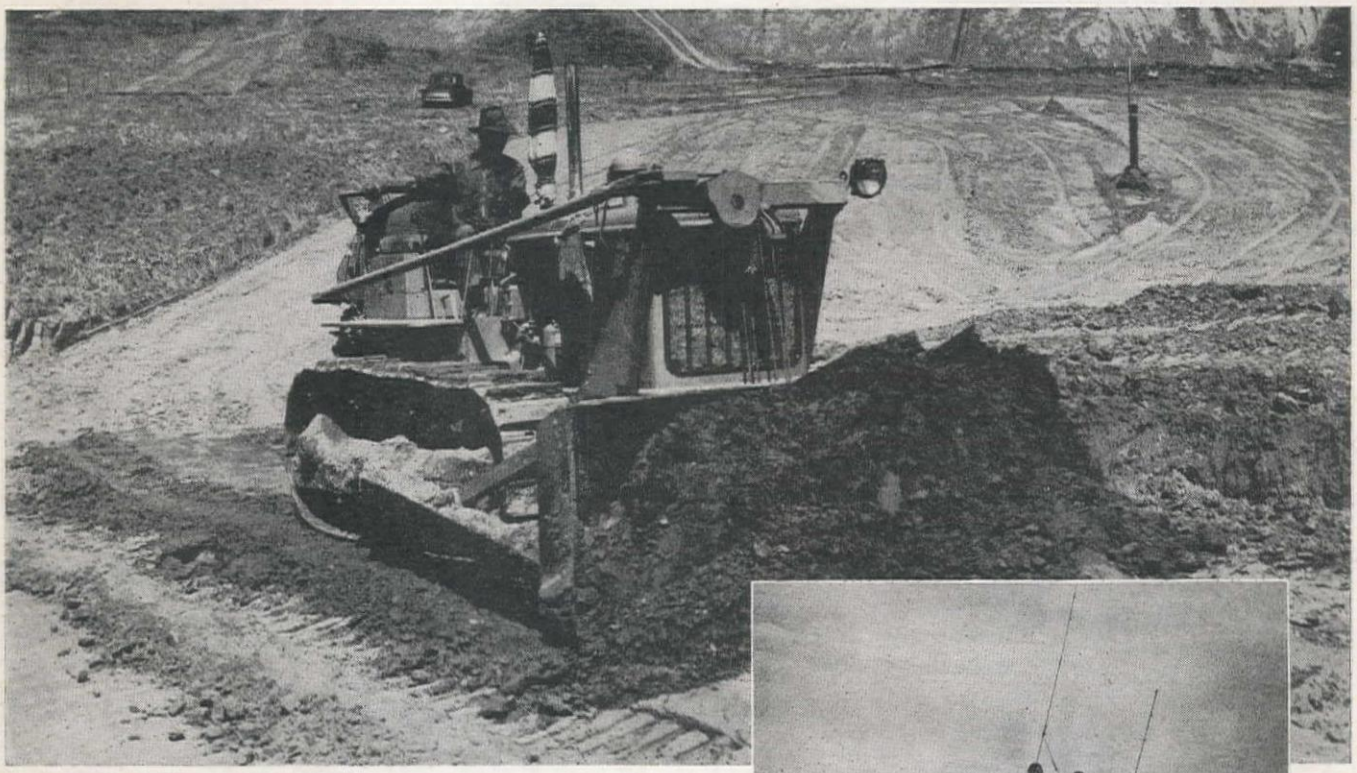
DENVER CO.—**Mead and Mount Construction Co.,** Denver National Bldg., Denver—$32,900 for one 2-unit film storage bldg. for A.A.F. specialized depot, Denver—by U. S. Engineer Ofc., Denver. 6-30

Idaho

TWIN FALLS CO.—**Northrup King &**

RUGGED!

K-B 'DOZERS SET THE PACE FOR LOW COST YARDAGE AND FAST DIRT MOVING!



(Official U.S. Navy Photograph)

New highways – new roads – new airports – whatever the job – the K-B stout welded box type frame construction provides the greatest strength with the least amount of weight. The blade mounted close to the front end of the tractor, insures better balance, yet permits ample clearance with maximum lift and drop for handling any type of dirt. The same careful workmanship that has made K-B 'Dozers the overwhelming preference of Navy contractors and engineers throughout the world is applied to the construction of the turret "superstructure" of the "water buffalo" – the Navy's new amphibious tank known as the LVT (A) -1.

KAY-BRUNNER Steel Products, Inc.

Equipment Division

2721 ELM STREET • LOS ANGELES 41, CALIFORNIA

Co., Twin Falls—$70,000 for seed warehouse on Wall St., Twin Falls. Work has started—by self. 7-7

Nevada

MINERAL CO.—**O. J. Scherer Co.**, Box 178, Angels Camp, Calif. — $218,637 for shops & misc. constr. at Navy Depot, Hawthorne—by Bur. of Yards & Docks, Washington, D. C. 6-30

New Mexico

OTERO CO.—**A. J. Rife Construction Co.**, 2808 Inwood Road, Dallas, Tex.—$31,169 for a celestial navigation trainer bldg. at airfield, Alamogordo—by U. S. Engineer Ofc., Albuquerque. 7-11

Oregon

KLAMATH CO. — **Brennan & Cahoon**, Klamath Falls—$67,749 for officers' quarters at Marine Barracks, Klamath Falls—by Bur. of Yards & Docks, Washington, D. C. 7-20

LANE CO.—**Ford J. Twaits Co.**, 451 So. Boylston St., Los Angeles, Calif.—$1,185,000 for a plant consisting of 19 bldgs. for the Willamette Valley Wood Distillation Co., to be located at Springfield—by Defense Plant Corp., Washington, D. C. 7-20

LINN CO.—**Halvorsen Construction Co.**, 603 First National Bank Bldg., Salem—$29,520 for school bldg. at Crawfordsville—by Linn County School Board, Albany. 7-22

LINN CO.—**Junius Johnson**, Portland—$39,170 for school bldg. at Crowfoot—by Linn County School Board, Albany. 7-22

LINN CO.—**Howard Ross,** Portland—$50,738 for school bldg. at Lebanon—by Linn County School Board, Albany. 7-22

MULTNOMAH CO.—**Gerardo Greco,** 2810 S. E. Lincoln, Portland—$51,250 for constr. of rock masonry walls at the Rocky Butte jail, Portland—by County Commissioners, Portland. 7-20

MULTNOMAH CO.—**Lorenz Brothers Co.,** Title & Trust Bldg., Portland—$48,500 for two additional units at the Lincoln Memorial Park mausoleum, Portland. Work is under way—by Lincoln Memorial Park Mausoleum. 7-24

SPOKANE CO.—**Western Construction Co.,** 417 Arctic Bldg., Seattle 4, Wash.—$1,723,000 for 6 additional warehouses and related facils. at Naval Supply Depot, Spokane—by Bur. of Yards & Docks, Washington, D. C. 7-22

Texas

BELL CO.—**Dolph Construction Co.,** Thomas Bldg., Dallas—$203,281 for war housing project, serving McCloskey Hospital, Temple—by Fed. Public Housing Auth., Fort Worth. 7-6

BEXAR CO.—**Lee Christy,** 503 American Hospital & Life Bldg., San Antonio—$92,734 for a cold storage plant at Fort Sam Houston—by U. S. Engineer Ofc., Fort Sam Houston. 7-7

CAMERON CO.—**H. H. Moeller,** Box 35, Grayson St. Station, San Antonio—$439,866 for 200 clay tile & reinf. conc. dwelling units, sanitary sewer distrib. system, etc., at Harlingen—by Fed. Public Housing Auth., Fort Worth. 7-7

DALLAM CO.—**Industrial Construction Co.,** Tulsa, Okla.—for completion of maintenance bldg., 2 navigation trainer bldgs., extension to boiler house, and a steam distribution system—by U. S. Engineer Ofc., Tulsa, Okla. 7-13

DALLAM CO.—**Ramey & Matthis,** Paramount Bldg., Amarillo—$115,000 for 50 family units at Dalhart—by Fed. Public Housing Auth., Fort Worth. 6-29

DALLAS CO.—**Cedrick Burgher Construction Co.,** 3027 Main St., Dallas—$200,000 for expansion to cold storage plant at Broom and Yate Sts., Dallas—by Merchants Cold Storage Co., Dallas. 7-13

EL PASO CO.—**J. E. Morgan & Sons,** 210 No. Campbell St., El Paso—$179,360 for hangar & additional facils. at Biggs Field, El Paso—by U. S. Engineer Ofc., Albuquerque, N. M. 7-6

HIDALGO CO.—**H. B. Swedlund & Sons,** Harlingen—$135,000 for brick & conc. citrus packing plant, 220x190 ft., at Mission—by Mission Citrus Growers Union, Mission. 7-19

HIDALGO CO.—**H. B. Swedlund & Sons,** Harlingen—$75,000 for a 130x120 ft. addition to packing plant at McAllen—by McAllen Citrus Assoc., McAllen. 7-19

MOORE CO.—**Robb-Musick Co.,** Amarillo—$55,611 for auxiliary bldg. addition and alterations at ordnance plant, Etter—by U. S. Engineer Ofc., Denison. 7-14

NUECES CO.—**Lawless & Alford,** Box 1248, Corpus Christi—$364,364 for 5 barracks bldgs. at the Naval Air Station, Ward Island, Corpus Christi—by Bur. of Yards & Docks, Washington, D. C. 7-13

NUECES CO.—**Thomas Bate & Son,** 1107 Girard St., Houston 1—$159,393 for 5 additional barracks bldgs. at the Naval Air Station, Corpus Christi—by Bur. of Yards & Docks, Washington, D. C. 7-5

WEBB CO.—**Lee Christy,** American Hospital and Life Bldg., San Antonio—$37,880 for a school and research facils. at Army Airfield, Laredo—by U. S. Engineer Ofc., Fort Sam Houston. 7-3

Utah

DAVIS CO.—**The Perkins Construction Co.,** 626 Dooly Bldg., Salt Lake City—$176,200 for a dispensary addition, laundry expansion & firehouse at Naval Supply Depot, Clearfield — by Bur. of Yards & Docks, Washington, D. C. 7-5

SALT LAKE CO.—**Enoch Chytraus Co.,** 436 So. 4th W., Salt Lake City 4—$81,600 for 17 brick residences on Redondo Ave., Salt Lake City—by The Home Builders, Inc., Salt Lake City. 7-6

Washington

BENTON CO.—**Strand & Sons,** 3939 University Way, Seattle—$80,175 for 200 trailers at Kennewick—by Fed. Public Housing Auth., Kennewick.

CLARK CO. — **Northwest Construction Co.,** 3950 6th Ave., N. W., Seattle—$113,400 for addition to Shumway Junior High School, Vancouver—by School Board, Vancouver. 7-13

FRANKLIN CO.—**Halvorson Construction Co.,** First National Bank Bldg., Salem, Ore.—$84,750 for a trailer camp in the Pasco area—by Fed. Public Housing Auth., Seattle. 7-17

FRANKLIN CO.—**Paul N. Odegard,** 2417 Hewitt, Everett — $115,500 for 16-room frame school bldg. with solid masonry outside walls, in the Pasco area—by Supt. of Schools, Kennewick. 7-5

ISLAND CO.—**Western Construction Co.,** Arctic Bldg., Seattle—$59,920 for 2 celestial trainer buildings at the Naval Air Station, Whidby Island—by Bur. of Yards & Docks, Washington, D. C. 7-7

KING CO.—**Bergesen, Wick & Dahlgren,** 2016-30th St., So., Seattle—$57,623 for building two net sheds & other jobs at Salmon Bay Terminal, Seattle—by Port Commission, Seattle. 7-17

KING CO. — **J. C. Boespflug Construction Co.,** 807 Securities Bldg., Seattle—$280,460 for WAVES barracks, gunnery training bldg. & officers' quarters, Seattle—by Bur. of Yards & Docks, Washington, D. C. 7-10

KING CO.—**Gaasland Construction Co.,** 2828-34th St., Seattle — $54,250 for additional hospital facils. at Navy Hospital, Seattle—by Bur. of Yards & Docks, Washington, D. C. 6-30

KITSAP CO.—**Gaasland Construction Co.,** 1161 Ellis St., Bellingham—$77,500 for a heat treating plant at the Naval torpedo station, Keyport — by Bur. of Yards & Docks, Washington, D. C. 7-11

KITSAP CO.—**Strand & Sons,** 3939 University Way, Seattle—$41,955 for an infirmary bldg. at Port Orchard—by Fed. Public Housing Auth., Port Orchard. 7-21

SPOKANE CO. — **B. H. Sheldon Construction Co.,** W. 1403 First Ave., Spokane —$29,872 for a recreation bldg. at Fort Wright, Spokane—by U. S. Engineer Ofc., Seattle. 6-30

Foreign

BRITISH COLUMBIA, CANADA — **Coast Construction Co., Ltd.,** 510 W. Hastings St., Vancouver — $40,000 for warehouse and office bldg. in Vancouver—by B. C. Seeds, Ltd., Vancouver.

Miscellaneous...

Arizona

MOHAVE CO.—**Allied Contractors, Inc.,** 9700 W. Pico Blvd., Los Angeles, Calif.—$182,000 for poorman-type target range at Army airfield, Kingman—by U. S. Engineer Ofc., Los Angeles, Calif. 7-5

PIMA CO.—**J. S. Sundt,** 440 So. Park Ave., Tucson—$46,600 for a poorman target range at Davis-Monthan Field, Tucson—by U. S. Engineer Ofc., Los Angeles, Calif. 7-6

YUMA CO.—**H. B. Nicholson,** 572 Chamber of Commerce Bldg., Los Angeles, Calif.—$113,000 for poorman-type target range at Army Airfield, Yuma—by U. S. Engineer Ofc., Los Angeles, Calif. 7-5

YUMA CO.—**Shannahan Bros., Inc.,** 6193 Maywood Ave., Huntington Park, Calif.—$30,863 to remove railroad trackage from railheads at Yuma & Hyder—by U. S. Engineer Ofc., Los Angeles, Calif. 6-28

California

ALAMEDA CO.—**Ford J. Twaits Co.,** Russ Bldg., San Francisco—$1,261,865 for additional personnel facilities at the Naval Air Station, Alameda—by Bur. of Yards & Docks, Washington, D. C. 7-10

ALAMEDA CO.—**Whalin Brothers,** 2942 23rd Ave., Oakland—$50,426 for an engineer yard at Oakland Army Base, Oakland—by U. S. Engineer Ofc., San Francisco. 7-15

CONTRA COSTA CO.—**A. D. Schader,** 144 Spear St., San Francisco—$79,900 to extend empty car storage yard at Naval magazine, Port Chicago—by Bur. of Yards & Docks, Washington, D. C. 7-6

CONTRA COSTA CO.—**Stolte Inc.,** 8451 San Leandro Blvd., Oakland—$87,586 for site work at Pittsburg—by Contra Costa Co. Housing Auth., Martinez. 6-30

IMPERIAL CO.—**Shannahan Bros., Inc.,** 6193 Maywood Ave., Huntington Park—$30,863 to remove railroad trackage from railheads at Goffs, Glamis & Ogilby—by U. S. Engineer Ofc., Los Angeles. 6-28

KERN CO.—**R. J. Daum,** 6803 West Blvd., Inglewood—$43,300 for a poorman target range at Muroc Army Airfield, Muroc—by U. S. Engineer Ofc., Los Angeles. 7-6

LOS ANGELES CO.—**Macco-Robertson Co.,** 815 Paramount Blvd., Clearwater—$200,000 to install 57,000 lin. ft. of 22-in. pipeline from Haskell Station to Hollywood Holder Station—by Southern California Gas Co., Los Angeles. 7-25

LOS ANGELES CO.—**O'Neal & Hedberg,** 852 So. Robertson Blvd., Los Angeles—$131,250 supplemental award for underground facils. & roads at Army Air Force supply depot, Maywood—by U. S. Engineer Ofc., Los Angeles. 7-5

MARIN CO.—**L. H. Leonardi,** Box 89, San Rafael—$109,000 for a night lighting system at Hamilton Field—by U. S. Engineer Ofc., San Francisco. 7-3

MARIN CO.—**Peter Sorensen,** 927 Arguello St., Redwood City—$64,717 to install 5 gasoline storage tanks at Hamilton Field—by U. S. Engineer Ofc., San Francisco. 6-29

MONTEREY CO.—**H. H. Larsen,** 64 So. Park St., San Francisco—$108,648 for a swimming pool at Fort Ord—by U. S. Engineer Ofc., San Francisco. 6-30

ORANGE CO.—**Ferguson Door Co.,** 814 E. 29th St., Los Angeles—$82,070 for constr. of doors for a shop, operations & check hangars at Marine Corps air hangar, El Toro—by Bur. of Yards & Docks, Washington, D. C. 6-30

ORANGE CO.—**Shumaker & Evans,** 832 W. 5th St., Los Angeles—$204,976 for site improvements for 500 portable dwellings at Oxnard—by Fed. Pub. Housing Auth., San Francisco. 7-18

RIVERSIDE CO.—**Scherer & Prichard,** 208½ Orange St., Redlands—$46,600 for poorman target range at March Field—by U. S. Engineer Ofc., Los Angeles. 7-6

SACRAMENTO CO.—**M. R. Carpenter,** 907 Front St., Sacramento—$53,217 for a filtered air system in a bldg. at McClellan Field—by U. S. Engineer Ofc., Sacramento. 7-6

SAN BENITO, SANTA CRUZ & MONTEREY COS.—**Haas Construction Co. & Peter Kiewit Sons Co.,** 1104 Merchants Exchange Bldg., San Francisco—$774,418 for paving, bldgs. & services at A.A.S., Hollister, Watsonville & Monterey—by Bur. of Yards & Docks, Washington, D. C. 7-6

SAN BERNARDINO CO.—**Hickman & Ritter,** 2411 Charnwood Ave., Los Angeles—$51,170 for steam & oil systems at Shell Plant in Fontana—by U. S. Engineer Ofc., Los Angeles. 7-26

SAN BERNARDINO CO.—**Morrison-Knudsen Co.,** 810 Title Guarantee Bldg., Los Angeles—$30,000 for grading & draining railroad yards at Barstow—by Santa Fe Railway Co., Los Angeles. 7-3

SAN BERNARDINO CO.—**Shannahan Bros., Inc.,** 6193 Maywood Ave., Huntington Park—$266,095 for an explosive hold yard, Rialto—by U. S. Engineer Ofc., Los Angeles. 6-29

SAN DIEGO CO.—**Concrete Ship Constructors,** Box "D," National City—$1,800,000 for two 265-ft. Army repair barges—by War Department, Washington, D. C. 7-25

SAN DIEGO CO.—**Haddock-Engineers, Ltd.,** Box 569, Oceanside—$27,000 for extension to railroad siding at Fallbrook—by Bur. of Yards & Docks, Washington, D. C. 7-6

SAN DIEGO CO.—**Gunnar Johnson,** 2515 33rd St., San Diego—$87,989 for various repairs, alterations & improvements at the county hospital, San Diego—by Board of Supervisors, San Diego. 7-6

SAN FRANCISCO CO.—**Miller & Stoutenburg,** Central Bank Bldg., Oakland—$248,271 to improve water, steam & fire protection, Receiving Ship, Yerba Buena Island—by Bur. of Yards & Docks, Washington, D. C. 7-10

SAN FRANCISCO CO.—**Herman Lawson Co.,** 465 Tehama St., San Francisco—$138,847 to replace hot and cold water piping for main groups of bldgs. at San Francisco Hospital—by Dept. of Public Works, San Francisco. 7-19

SAN MATEO CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$287,314 for drum storage at Naval overseas freight terminal at port of Redwood City—by Bur. of Yards & Docks, Washington, D. C. 6-30

SOLANO CO.—**E. A. Forde,** 640 Sir Francis Drake Blvd., San Anselmo—$65,487 for const. open storage space No. of Bldg. No. 629 in Mare Island Navy Yard—by Bur. of Yards & Docks, Washington, D. C. 7-6

SOLANO CO.—**Monterey County Plumbing Co.,** 635 Cass St., Monterey—$50,300 for additions & alterations to steam distribution system at Mare Island—by Bur. of Yards & Docks, Washington, D. C. 6-30

SOLANO CO.—**Geo. M. Robinson Co.,** 451 Folsom St., San Francisco—$298,276 for installing automatic sprinkler system at Benicia Arsenal, Benicia—by U. S. Engineer Ofc., San Francisco. 7-5

SONOMA CO.—**Harris Construction Co.,** Box 109, Fresno—$399,434 for bldgs., services & paving at A.A.S., Santa Rosa—by Bur. of Yards & Docks, Washington, D. C. 7-6

STANISLAUS & SAN JOAQUIN COS.—**Johnson, Drake & Piper,** Latham Square Bldg., Oakland—$889,400 for bldgs., paving & services at A.A.S., Vernalis and Crows Landing—by Bur. of Yards & Docks, Washington, D. C. 7-6

Colorado

DENVER CO.—**Schmidt & Hawkins,** Kremmling—$87,700 for grading & additional railroad trackage betw. Denver and Orsted—by Denver & Salt Lake Railway Co., Denver. 7-19

Nevada

CLARK CO.—**General Construction Co.** and **J. Walter Johnson,** 5205 Hollywood Blvd., Los Angeles, Calif.—$248,900 for poorman-type target range at Army airfield, Las Vegas—by U. S. Engineer Ofc., Los Angeles, Calif. 7-5

MINERAL CO.—**A. Brizard, Inc.,** Arcata, Calif.—$198,562 for misc. heating facils. at N.A.D., Hawthorne—by Bur. of Yards & Docks, Washington, D. C. 7-6

Texas

CAMERON CO.—**Dodds and Wedegartner,** 382 North Bowie St., San Benito—$85,548 for poorman target ranges at Harlingen Airfield, Harlingen—by U. S. Engineer Ofc., Galveston. 7-12

DALLAM CO.—**G. Fred Anderson, Harry M. House** and **Patterson Steel Co.,** Tulsa, Okla.—$245,458 for additional facils. at Army Airfield, Dalhart—by U. S. Engineer Ofc., Tulsa, Okla. 7-17

WEBB CO.—**Cunningham & Dinn,** 2024 N. St. Mary's St., San Antonio—$86,035 for poorman target ranges at Laredo—by U. S. Engineer Ofc., Fort Sam Houston. 7-19

Washington

KING CO.—**A. W. Johnson Co.,** Seattle—$40,204 for recreation facils. at port of embarkation, Seattle—by U. S. Engineer Ofc., Seattle. 7-3

KITSAP CO.—**C. C. Moore & Co.,** 450 Mission St., San Francisco, Calif.—$147,777 to furnish & install boiler for new power plant at Puget Sound Navy Yard, Bremerton—by Bur. of Yards & Docks, Washington, D. C. 7-26

KITSAP CO.—**Sound-Kiewit,** 1012 Northern Life Tower, Seattle—$2,424,346 for constr. of third portion of Bremerton-Shelton railroad from Bangor magazine area entrance to the marginal wharf, & also constr. of a naval storage & trans-shipment depot near Bangor on the Hood Canal—by Bur. of Yards & Docks, Washington, D. C. 7-7

SNOHOMISH CO.—**Sound Construction & Engineering Co.,** & **Peter Kiewit Sons Co.,** 1012 Northern Life Tower, Seattle—

$336,000 for railroad, guard road & appurtenances in Snohomish Co.—by U. S. Engineer Ofc., Seattle. 7-6

PROPOSED PROJECTS

Airport . . .

California

ORANGE CO.—The Navy has approved the const. of a $820,000 project at the Santa Ana Naval Air Base, to include runways, taxiways, and parking areas. 7-18

Sewerage . . .

Texas

TARRANT CO.—The city of Fort Worth plans constr. of an addition to sewage treatment plant, to cost $703,600. 7-13

Washington

YAKIMA CO.—Plans and specifications have been completed for a sewage disposal plant, sewer laterals, sewage pumping plant and related work at Sunnyside. Estimated cost, $174,750—by city of Sunnyside. 7-7

Waterway . . .

Washington

WHATCOM CO. — Bellingham Port Comm. has approved prelim. plans for a $900,000 harbor and port development. A 500 ft. channel 4,000 ft. long will be dredged. 7-18

Tunnel . . .

New Mexico

QUAY CO.—Bid will be called in the near future for construction of another tunnel, extensive earthwork and processing of aggregates for further work on the Tucumcari Project. 7-25

Building . . .

Arizona

MARICOPA CO.—The Goodyear Aircraft Corp. plans a $375,000 addition to a steel hangar building at their Litchfield Park division, near Phoenix. 7-3

California

KERN CO.—Plans are being prepared for the const. of a $350,000 wood-frame guayule plant at Bakersfield for the U. S. Dept. of Agric. 7-18

LOS ANGELES CO.—A $264,000 construction and building enlargement program for the juvenile hall, Los Angeles, is being considered by the Board of Supervisors, Los Angeles County.

LOS ANGELES CO. — Priorities have been granted and plans are being checked by FHA for const. of 84 duplex dwellings at Compton Blvd. and Barron St., Compton, for the Gage Corp., at a cost of $525,000. 7-18

LOS ANGELES CO.—Working drawings are being prepared for a 100-bed hospital to be constr. on a 14-acre site at Lynwood, and to cost $600,000—by the Sisters of St. Francis of Penance and Christian Charity, Lynwood. 7-27

SAN DIEGO CO. — The Navy has approved constr. of barracks for 700 WAVES, a boiler plant & accessory facils. at the Air Station, North Island, to cost $1,700,000—by Bur. of Yards & Docks, Washington, D. C. 7-3

STANISLAUS CO.—Shell Chemical Co., 100 Bush St., San Francisco (6), is planning to build an agricultural laboratory on 142 acres at Salida. Estimated cost, $500,000—by Shell Oil Company. 7-26

Colorado

DENVER CO.—Working drawings will be completed soon for a 4-story reinf. conc. manufacturing plant, 175x185 ft., on So. Broadway, Denver.

Idaho

BUTTE CO.—The Navy has approved a $516,000 program of storage expansion at the proving grounds, Arco. 7-14

Montana

CASCADE CO. — The Great Northern Railway Co., Minneapolis, Minn., is contemplating constr. of a $200,000 roundhouse to service Diesel locomotives at Great Falls.

Texas

BEXAR CO.—The Presbyterian Churches, San Antonio, plan constr. of two church buildings in San Antonio, one to cost $75,000, the other $125,000.

BEXAR CO.—Plans have been completed for a municipal airport administration building of steel, concrete and glass brick, to be built at San Antonio at a cost of $424,000. 6-30

CAMERON CO. — Richard Gill Co., Gunter Bldg., San Antonio, plans constr. of a $450,000 tourist court on San Benito-Brownsville Hwy.

Utah

IRON CO.—WPB has granted priorities for constr. of $300,000 steam generating plant near the old Cedar City plant at mouth of Coal Creek Canyon for the Southern Utah Power Co. 7-18

Washington

KING CO.—Plans have been completed for 106 five-room homes to cost $600,000 and to be located along 28th S.W. & 29th S.W. betw. W. Myrtle & W. Holden Sts., in Seattle—by Sunrise Homes, Inc., Seattle. 6-28

Miscellaneous . . .

California

ORANGE CO. — The Navy Department has approved a $5,430,000 project at Seal Beach Naval Ordnance Depot, to include an ammunition classification & segregation yard, railroad siding, barracks, extensions, etc.—by Bur. of Yards & Docks, Washington, D. C. 7-10

SAN FRANCISCO CO.—The Navy has approved $626,933 for various projects to be carried out at Hunters Point Naval Dry Docks, San Francisco. They include submarine training school, anti-aircraft trainer bldg., fleet personnel facils., etc.—by Bur. of Yards & Docks, Washington, D. C. 7-6

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

The chief administrative offices of the Pomona Pump division of the JOSHUA HENDY IRON WORKS have been moved to Sunnyvale, Calif., to be consolidated with the general administration of the company. These changes will affect the sales, engineering, purchasing and accounting departments. Among a number of men moving their offices north are **Arnold Brown**, sales manager; **A. W. Moore**, advertising manager; and **Ralph Linderman**, export manager. All manufacturing activities will be carried on in the Southern California plants at Pomona and Torrance, under the direction of plant manager **Charles L. Barrett.**

MADSEN IRON WORKS of Huntington Park, Calif., announces the appointment of the GENERAL EQUIPMENT COMPANY of San Leandro, Calif., as the northern California distributor of the complete line of Madsen road construction equipment. This line includes portable asphalt paving plants, oil-mix plants, gravel-mix machines, cement finishers, batching plants, and rubber-tires rollers.

☆ ☆ ☆

The DAVIS EQUIPMENT COMPANY and FIRST AID SERVICE COMPANY of San Francisco have been appointed western representatives for the Watchemoket plastic safety goggles. They will supplement the activities of CALIFORNIA GOGGLE CO., Los Angeles, western distributors.

SUMNER WILLIAMS, left, general manager, and E. L. SOULE, president of Soulé Equipment Co.

SOULE EQUIPMENT COMPANY, a subsidiary but separate from the SOULE STEEL COMPANY of San Francisco, has been awarded exclusive distribution rights for R. G. LeTOURNEAU, INC., in a number of northern California counties. The company will have its headquarters in Oakland and branch offices in Redding, Fresno, Sacramento, and San Francisco. **Sumner Williams** has been appointed vice-president and general manager of the new company. He has had wide experience in the construction equipment field on the west coast and has been Regional Manager of the construction machinery division of the War Production Board. A rental department for both new and used equipment and other accommodations will be available at each equipment office. **Edward L. Soulé** is president, both of the Steel and Equipment companies.

☆ ☆ ☆

In order to meet the increasing demand among architects and engineers for timber technical services on war and private projects, TIMBER ENGINEERING COMPANY, INC., of Washington, D. C., has opened a San Francisco service and sales office in the Monadnock Building at 681 Market Street. **Alden K. Smith** has been appointed service and sales manager for the Pacific Coast states. Smith has had years of experience with the company and was recently transferred to Portland to open a branch office in the northwest. A complete line of TECO connectors and grooving tools will be available in San Francisco. A product development shop and a wood chemistry laboratory have recently been opened in Washington to serve public and private agencies in better wood utilization and to develop wood products generally. The shop-lab is equipped with a 200,000-lb. hydraulic testing machine.

☆ ☆ ☆

KOEHRING COMPANY, manufacturer of construction equipment at Milwaukee, Wis., has opened a parts service warehouse at 111-113 Eye St., Sacramento, Calif. This warehouse, established to serve Koehring customers in the eleven western states, will have a complete supply of parts available for quick service close to the job. This company has been engaged in the manufacture of construction equipment for 35 years. Its products include power shovels, concrete mixers, earth moving equipment, mud-jacks and longitudinal concrete finishers. The entire output of this company is now allotted to war purposes. The company has been awarded the Army-Navy "E" pennant and a star in recognition of the war-effort put forth by its employees.

☆ ☆ ☆

Charles Mullins, well known equipment man in the west for over 20 years, announces the opening of MULLINS EQUIPMENT COMPANY, located at 3124 E. 14th St., Oakland, Calif. He will handle a full line of construction contractor's equipment.

☆ ☆ ☆

E. J. Zimmer, Jr., has been appointed assistant to **L. B. Keplinger**, vice-president and director of sales for RHEEM MANUFACTURING COMPANY, Richmond, Calif. Zimmer will develop sales for new post-war products which will include household utilities complementary to its current line of automatic water heaters, space heaters, boilers, and pressure tanks. The company also manufactures a full line of steel containers for the petroleum, food and beverage, paint and varnish, and chemical industries.

☆ ☆ ☆

Randle L. Nourse, past power consultant for the Southern California Edison Company in the Tulare, Calif., area, has joined the industrial division staff of Westinghouse in the San Francisco office. Nourse was born in New York in 1904 and studied engineering and business administration at the University of California and the University of Chicago. He has had a number of years of experience as a sales engineer.

☆ ☆ ☆

Fred S. Carpenter, past factory manager of the Los Angeles tire plant of the UNITED STATES RUBBER COMPANY, has been appointed manager of the company's synthetic rubber plant in Los Angeles. **A. E. Jury**, present manager of the synthetic plant, will return to the textile division as manager of new products. **M. A. Kirkland** will re-

tain his former position as manager of the company's textile mills at Winnsboro, South Carolina. Carpenter began working for the company as an engineer in the general laboratories. He has held positions as supervisor of power and factory manager and since 1941 he has been located at the company's main office in New York as general manager of the tire division and subsequently as administrative assistant. Jury joined the United States Rubber Company as a textile expert in 1915. In 1917 he organized the company's textile development laboratory and in 1922 was appointed director of the general laboratories.

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THE AMERICAN HOIST & DERRICK COMPANY, St. Paul, Minn., announces the appointment of the COAST EQUIPMENT COMPANY, located at 948 Bryant St., San Francisco, as exclusive representatives in northern California for their derricks, fittings, hoists, and revolving cranes.

☆ ☆ ☆

WOOD MANUFACTURING COMPANY, Los Angeles, manufacturers of the Wood Roadmixer, announce the appointment of the following firms as distributors: ARNOLD MACHINERY CO., INC., 153 West 2nd St., Salt Lake City, Utah; GARLINGHOUSE BROS., 2416 East 16th St., Los Angeles 21, Calif.; HARDIN & COGGINS, 1717 North Second, Albuquerque, N. M. Previously announced appointments as distributors for the Wood Roadmixer were: COAST EQUIPMENT COMPANY, 948 Bryant St., San Francisco 1, Calif.; and J. E. INGRAM EQUIPMENT CO., 1146 West Laurel St., San Antonio 6, Texas.

☆ ☆ ☆

William H. Searight has become sole owner of the WESTERN CATAPHOTE COMPANY through the purchase of the half-interest held by **Charles T. Harther.** The company started as an affiliate of the Libbey Glass Company in 1930. It engages in highway and other sign business and manufactures reflecting house numbers. Fifty per cent of its present production is used in the war effort.

☆ ☆ ☆

W. C. Walsh has been appointed a district representative of the GENERAL ELECTRIC'S electronics department in the San Francisco office. He will be responsible for the sale of products of the Tube and Specialty divisions in the western division 8, which includes the states of California, Oregon, Washington, Montana, Wyoming, Nevada, Utah, Colorado, Arizona and northern New Mexico. He worked as sales engineer for the General Electric Supply Corporation for a number of years and has recently been associated with the U. S. Department of Agriculture as electrical design engineer. In his new assignment, he will assist military services and war contractors with their tube and specialty product application problems and in the maintenance of their present equipment.

☆ ☆ ☆

H. H. Fuller has been elected vice-president in charge of the west coast steel activities of the BETHLEHEM STEEL COMPANY, succeeding **W. H. Stewart** who, though retiring from active duty, will continue in an advisory and consulting capacity. Fuller entered the employ of Bethlehem and in 1936, became assistant manager of sales for the New York district and two years later was appointed district sales manager. The company's west coast headquarters are at 20th and Illinois Streets, San Francisco, Calif.

☆ ☆ ☆

Robert W. Matthews has become a partner in the BRIZARD-MATTHEWS MACHINERY COMPANY. This company is the Caterpillar distributor for Humboldt, Del Norte and western Trinity and Siskiyou counties in California, and southern Curry county in Oregon. Mr. Matthews has been affiliated with the Brizard organization for 34 years and is well acquainted with logging, mining and construction men.

☆ ☆ ☆

Walter A. Alden, past application engineer in the WESTINGHOUSE SUPPLY AND MANUFACTURING COMPANIES at Los Angeles, has been transferred to the Agency and Specialties division. He will handle industrial, commercial and floodlighting for Westinghouse in the southern California area. From 1914 to 1924, he was illuminating engineer with the Benjamin Electric Manufacturing Company of Chicago.

☆ ☆ ☆

The South San Francisco shipyard of the WESTERN PIPE AND STEEL COMPANY has been awarded a second gold star for its Maritime "M" pennant. The presentation was made in recognition of the excellent war production record of the yard.

☆ ☆ ☆

MARINSHIP CORPORATION, Sausalito, Calif., has been awarded another gold star in recognition of its continued outstanding production achievement in tanker construction. This company has received two additional contracts from the Maritime Commission, which will sustain work at the present levels until July, 1945. These contracts provide for the construction of 8 tankers and the conversion of 6 other tankers to Navy oilers. With only 6 shipways, the 15,000 worker shipyard has been constructing 3 or 4-10,000 horsepower tankers a month. Admiral E. S. Land, Chairman of the Maritime Commission, declared recently in contradiction to an epidemic of irresponsible rumors about impending cutbacks, that the work load in the Nation's shipyards is to be increased.

☆ ☆ ☆

PACIFIC NORTHWEST

Announcement is made by LINK-BELT COMPANY, Pacific Division, of the opening of a sales office and warehouse at South 151 Lincoln St. in Spokane, Wash., with **Homer A. Garland** in charge. Eastern Washington, northern Idaho and a western portion of Montana will be served from the new office. Garland is a pioneer in the Pacific Northwest, having been in the service of Link-Belt for over twenty years.

☆ ☆ ☆

Roy C. Haller has been appointed sales supervisor of the Western division of Building Products, Limited, with headquarters at Winnipeg, Manitoba. He joined the company in 1936 and for the past seven years has been sales representative in Alberta.

John F. Johannsen is now export manager for the WILLAMETTE HYSTER COMPANY of Portland, Ore., and Peoria, Ill. Previously, he was export manager for R. G. LeTourneau, Inc., of Peoria. He has visited 85 foreign countries and has recently been in Washington, D. C., with the International Branch of the Office of the Chief of Engineers of the United States Army. Willamette manufactures winches, hoists, and cranes for use with Caterpillar track-type tractors and a complete line of self-propelled pneumatic tired industrial trucks.

☆ ☆ ☆

The Maritime "M" pennant and the Victory Fleet Flag has been awarded to R. M. WADE & CO., and

its subsidiary, the MULTNOMAH IRON WORKS, both of Portland, Ore., in recognition of outstanding production achievements in the war effort. Arrangements have been made for the official presentation prior to Aug. 7. The firms have been manufacturing many items used in construction of airplane carriers, tankers, Victory ships, and other types of shipping built for the Maritime Commission in the Portland area.

☆ ☆ ☆

Several personnel changes have been made recently in the HYSTER COMPANY of Portland, Ore. **W. B. Morrow**, formerly personnel manager, is head of a new department of a confidential nature. **Cliff Dunham**, who has been in charge of the Chicago office, is personnel manager. **Donald Foster**, of the purchasing department, is office manager of the Chicago office. This company manufactures tractor winches, hoists, and a complete line of industrial lift trucks.

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W. A. Defoe, for more than 20 years in the machinery sales department of the CLYDE EQUIPMENT CO., Seattle, Wash., died recently after a brief illness at the age of 72.

W. J. (Jack) Jarvis is the new manager of the Portland branch factory of FRUEHAUF TRAILER COMPANY. He succeeds the late **Lee Cronkhite**. Jarvis has participated in the development of the modern Fruehauf streamlined logging trailer. He has had years of experience in the design, manufacture and distribution of logging and over-the-road trailers. The Portland plant, located at 906 N. E. Third Ave., is a manufacturing, service and sales branch. The main coast plant is in Los Angeles while other branches are maintained in Seattle, San Francisco, Fresno, Salt Lake City and Spokane.

☆ ☆ ☆

Nigel A. Tomlin succeeded his father, the late Edwin Tomlin, as managing director of the B. C. CEMENT COMPANY LIMITED of Vancouver and Victoria. **Gordon K. Verley**, formerly treasurer, is now secretary-treasurer; **A. B. Stewart**, formerly works manager, is now superintendent of Bamberton, Blubber Bay and Tod Inlet operations. Tomlin joined B. C. Cement in 1942 after managing the Gillespie, Hart & Company Limited, bond department. Verley came in 1937 and Stewart in 1941.

☆ ☆ ☆

A. M. Andresen, Seattle district manager for the CHICAGO PNEUMATIC TOOL COMPANY, died on July 15. He had been with the Tool Company for 32 years.

☆ ☆ ☆

INTERMOUNTAIN

The CHRISTENSEN MACHINE COMPANY of Salt Lake City has received its third Army-Navy "E" award in recognition of its fine record in production. **C. L. Christensen** is the managing partner of the concern. The company manufactures precision gauges and tools.

☆ ☆ ☆

Glenn W. Stroud is the owner and manager of the CUMMINS ENGINE COMPANY'S new dealership at Billings, Mont. This new store will offer sales and service facilities at Billings for the products of the engine company.

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AMONG THE MANUFACTURERS

Edward V. Creagh assumes new duties as the advertising and sales promotion manager of AMERICAN CHAIN & CABLE COMPANY, INC. and associate companies. Since 1936 he has had charge of sales promotion for the company. In addition he will now handle newspaper, magazine, business publications and other forms of advertising. One of the organizers and first president of the Western New England Chapter of National Industrial Advertisers Association, Creagh is now serving as a vice-president of the national organization.

☆ ☆ ☆

Gordon S. McKenty has been named general sales manager for R. G. LeTOURNEAU, INC., of Peoria, Ill. He will succeed **Ed. R. Galvin** who has resigned to become president and director of the TYSON BEARING CORPORATION at Massillon, Ohio. McKenty graduated from the University of Nebraska in 1924 and subsequently served as an engineer in Mexico and China for the INTERNATIONAL TELEPHONE AND TELEGRAPH COMPANY. He began with LeTourneau as a district sales representative in middle western and eastern states. Since 1941, he has managed and expedited $8,000,000 in war department shell contracts and started successful reorganization of LeTourneau's parts shipping.

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The UNION CARBIDE AND CARBON CORPORATION announces the election of the following presidents of subsidiary companies:

Dr. Joseph G. Davidson, president of CARBIDE AND CARBON CHEMICALS CORP. and CARBIDE AND CARBON CHEMICALS, LTD.

Stanley B. Kirk, president of THE LINDE AIR PRODUCTS COMPANY, THE PREST-O-LITE COMPANY, INC., DOMINION OXYGEN CO., LTD. and PREST-O-LITE CO. OF CANADA, LTD.

James W. McLaughlin, president of the BAKELITE CORPORATION.

Arthur V. Wilker, president of NATIONAL CARBON COMPANY, INC., and CANADIAN NATIONAL CARBON COMPANY, LTD.

Francis P. Gormely, president of ELECTRO METALLURGICAL COMPANY in the U. S. and in Canada, HAYNES STELLITE COMPANY, MICHIGAN NORTHERN POWER COMPANY, and UNION CARBIDE COMPANY OF CANADA, LTD.

John D. Swain, president of ELECTRO METALLURGICAL SALES CORPORATION.

John R. Van Fleet, president of UNITED STATES VANADIUM CORPORATION.

☆ ☆ ☆

Henry Ford II will succeed **Charles E. Sorensen** as a member of the Board of Directors of the Automotive Council for War Production. Ford's father, **Edsel B. Ford**, was one of the founders of the Council and served as a board member until his death last year.

AT A WEST COAST meeting of Diesel engine manufacturers at the Palace Hotel in San Francisco, July 14, were, standing l. to r.: E. B. SCOTT, Enterprise Engine & Foundry Co.; W. P. WOOLDRIDGE, Joshua Hendy Iron Works; HOWARD OXSEN, Fairbanks, Morse & Co.; CHAS. G. COX, Enterprise Engine & Foundry Co.; DAVID R. LANE, Union Diesel Engine Co.; Seated, l. to r.: GERALD BRUSHER, Enterprise; ROY F. ANDERSON, Lorimer Diesel Engine Co.; W. M. GRIFFITH, Atlas Imperial Engine Co.; HAROLD D. ELLIS, Diesel Engine Manufacturers Association; ROGER MURRAY, Fairbanks, Morse & Co.; G. F. TWIST, Atlas Imperial Diesel Engine Co.

Cason Jewell Callaway of Hamilton, Georgia, has been elected to the board of directors of UNITED STATES STEEL CORP. For many years Callaway occupied a prominent place in the textile industry, serving as president of the Cotton Manufacturers Association of Georgia and as president of the American Cotton Manufacturers Association. Upon his retirement as active head of Callaway Mills, he devoted his time to the development of additional profitable cash crops for the South and has since become one of the leading experimental farmers in the United States.

☆ ☆ ☆

B. L. McCarthy has been promoted to the position of Assistant General Superintendent and **C. A. Gordon** to the position of Superintendent of Hot Departments at the Buffalo, N. Y., plant of WICKWIRE SPENCER STEEL COMPANY. McCarthy was previously Chief Metallurgist for Wickwire. Gordon has had long experience in open hearth and hot mill management.

☆ ☆ ☆

L. C. Allenbrand has been appointed manager of the merchandise department of CATERPILLAR TRACTOR CO., Peoria, Ill. Allenbrand succeeds **H. R. Murphy**, who will become associated with the "Caterpillar" distributorship in San Antonio, Tex. After graduating from the University of Missouri in 1923, Allenbrand worked for eight years with the JOHN DEERE PLOW CO. of Kansas City, Mo. In 1931 he joined Caterpillar as a special sales representative and in 1932 was assigned to sales training work at San Leandro. He left the company's employ for a short time but returned in 1934 and became manager of the sales development division in 1940. In 1942 he was assigned the task of organizing the job analysis division of the industrial relations department and in January, 1944, he was appointed assistant director of this department.

☆ ☆ ☆

Frederic J. Robinson has been appointed sales manager for Latin America for the SYLVANIA ELECTRIC PRODUCTS, INC. He has been an electrical contractor and export sales manager for Latin America for the Gillette Safety Razor Company. As soon as civilian materials are released, the company expects a big demand for their products, particularly fluorescent lamps, fixtures and accessories. Sylvania's international division will have an engineering staff available for consultation and the representatives of the company will be citizens of their own nations.

☆ ☆ ☆

THE TIMKEN ROLLER BEARING COMPANY OF SOUTH AMERICA, with headquarters in Sao Paulo, Brazil, is the newest subsidiary of THE TIMKEN ROLLER BEARING COMPANY, Canton, Ohio. The South American company will service the millions of Timken bearings now operating in that country.

Timken has been conducting its business there through South American distributors, who will continue in their primary function, that of handling replacement bearing trade.

Heading the new subsidiary is **Jules A. Morland**, former New York representative for the company. Two young Brazilian engineers, **Murillo Garcia Moreira** and **Jose Marianno Chaves**, after a training period in the Timken, Canton, Ohio, plant, will return to South America as field engineers and general representatives for the company.

☆ ☆ ☆

The HABIRSHAW CABLE AND WIRE Division of the Phelps Dodge Copper Products Corporation at Yonkers, N. Y., has just received its third gold star in recognition of its high production standards and in token of appreciation from the men on the fighting fronts.

☆ ☆ ☆

J. M. Strelitz, prominent attorney affiliated with banking and manufacturing interests, was elected as chairman of the board of directors of the MARION STEAM SHOVEL COMPANY of Marion, Ohio. **C. F. LaMarche**, manufacturer and production authority, was appointed as president and general manager. Strelitz has been a director of the company since 1931 and general counsel for the past 20 years. LaMarche has been a director of the company since 1939.

☆ ☆ ☆

The SULLIVAN MACHINERY COMPANY of Michigan City, Ind., announces the election of two new vice-presidents. **O. J. Neslage**, general sales manager, has been elevated to the position of vice-president in charge of sales in the United States and

O. J. NESLAGE

Mexico. **J. A. Drain, Jr.**, who was assistant to the president of the company, and prior to joining the Sullivan company was president of the STEFCO STEEL COMPANY, has been made vice-president in charge of product engineering, research and development.

☆ ☆ ☆

Frank W. Bemis, who has been with the AMERICAN CHAIN & CABLE COMPANY, INC. since 1938, has been appointed Sales Manager of the American Cable and Hazard Wire Rope Divisions of the company. His headquarters will be at 230 Park Avenue, New York City.

☆ ☆ ☆

MAQUINARIA DEL NORTE, S. de R. L. is the name of the new firm which has taken over the exclusive distribution of CUMMINS engines for the entire Republic of Mexico. The address of the firm is Oficinas Provisionales, Av. Dr. Paliza No. 92, Hermosillo, State of Sonora, Mexico. **Sam Rosenkranz** is general manager.

☆ ☆ ☆

The formation of the OXYCHLORIDE CEMENT ASSOCIATION has been announced. The address is 1010 Vermont Avenue, N. W., Washington 5, D. C. Members are the DOW CHEMICAL CO., F. E. SCHUNDLER & CO. and WESTVACO CHLORINE PRODUCTS CORP. The association aims to provide an impartial coordinating body as a practical means of aiding governmental agencies, industry, architects, engineers, and contractors, to obtain best possible results in the use of oxychloride cements. It is a non-profit service organization rendering service in helping to standardize performance tests and application specifications for the benefit of users.

☆ ☆ ☆

The UNION WIRE ROPE CORPORATION has received a 4-star Navy "E" pennant in recognition of its production record in support of our men on the battle fronts. In view of its excellent record the Army and Navy have presented a flag to be retained a year instead of the usual six-month period.

☆ ☆ ☆

Frank K. Metzger has been elected Vice-President in Charge of Sales for THE BALDWIN LOCOMOTIVE WORKS, Philadelphia, Pa. His former position was that of Divisional Vice-President of Standard Steel Works Division. **John D. Tyson** will succeed Metzger as Vice-President of this division.

☆ ☆ ☆

J. Dallas Chapman is the new assistant sales manager for the NOVO ENGINE CO. of Lansing, Michigan. Chapman has been with Novo for 20 years and during that time has had 10 years of experience in all phases of manufacturing construction equipment. Since 1935 he has been district manager of the Central Zone.

☆ ☆ ☆

The name of the American-Terry Derrick Company of South Kearny, N. J., has been changed to the AMERICAN HOIST & DERRICK COMPANY.

☆ ☆ ☆

J. D. Glatz heads the new Repair Sales Division for P&H products, recently established by HARNISCHFEGER CORPORATION, Milwaukee. The creation of the division anticipates a growing demand for repair and replacement parts as a result

of war production burdens on equipment. For two years Glatz was with the W. P. B. as chief of the crane and hoist section in the tools division. Prior to that he was representative for P&H in the Chicago area. The company states that operations of the division under Glatz are of much wider scope than usual because of the wide line of P&H products.

Army-Navy "E" award emblems were conferred upon the employees of the E. D. ETNYRE & CO., Oregon, Ill., during ceremonies at the Coliseum Building on June 21, 1944. At the same time an "E" award flag was presented to the company. Etnyre's production facilities are almost entirely devoted to

war work in the building of special heavy-duty road-building equipment. The company and its employees were highly commended for their increased output and superior standards of workmanship.

☆ ☆ ☆

After 27 years of service with BARBER-GREENE CO., Aurora, Ill., practically all of that time as secretary, **D. G. McIlwraith** has announced his retirement. His position will be filled by **John M. Spence**, chief auditor for the company.

☆ ☆ ☆

Ed. R. Galvin is now president and director of the TYSON BEARING CORPORATION of Massillon, Ohio. He recently resigned as general sales manager for R. G. LeTOURNEAU, INC., of Peoria, Ill. Galvin came to Peoria from Ohio in 1927 to join the CATERPILLAR TRACTOR COMPANY as a district representative. He was soon promoted to eastern sales manager and then to general sales manager. In 1938, he accepted a similar position with LeTourneau.

☆ ☆ ☆

John J. Prochaska, past Cleveland district manager of THE CLEVELAND AUTOMATIC MACHINE COMPANY, has been appointed sales manager to succeed **George A. Collier** who has resigned. **V. J. Hannon**, formerly chief of general accounting at Camco, has been promoted to Cleveland district manager.

☆ ☆ ☆

THE FRANK G. HOUGH COMPANY of Libertyville, Ill., has been awarded a white star for its Army-Navy "E" pennant. This star is given in recognition of the high production standards of this company. Its war-time production is devoted to the manufacture of tractor shovels and sweepers and special ordnance equipment.

☆ ☆ ☆

Dwight R. Means, who has been associated with the COLUMBIA CHEMICAL DIVISION of the PITTSBURGH PLATE GLASS CO. for 21 years, has been named assistant to the vice-president. Prior to his new appointment Means was technical director and had previously served as research director and assistant superintendent.

☆ ☆ ☆

Employees of SKILSAW, INC., Chicago, manufacturers of portable electric tools, have received for the third time the Army-Navy Production Award for high achievement in the production of war materials. This citation adds a second white star to the company's "E" flag.

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Daniel C. Green, chairman of the board and chief executive officer of the CLEVELAND PNEUMATIC TOOL COMPANY and its subsidiary CLEVELAND PNEUMATIC AEROL, INC., died Sunday, July 2. Green was known nationally as a financier and consultant in the operation of public utility properties and had been made board chairman of Cleveland Pneumatic at the request of the War Production Board shortly after the death of L. W. Greve. Under his guidance, the company had greatly expanded its facilities for the manufacture of war-essential products such as airplane landing gear, pneumatic grinders, riveters, valves, couplings and other compressed air equipment, rock drills and other mining and construction equipment and air springs for tanks and trucks. The subsidiary, the Cleveland Pneumatic Aerol, Inc., was built under Green's supervision at a cost of $18,000,000. This company manufactures pneumatic landing gear aerols for aircraft of all types.

NEW EQUIPMENT

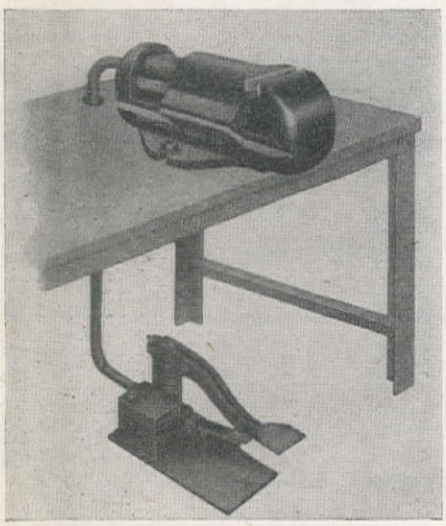
Tractor Crane

Manufacturer: Industrial Equipment Co., Emeryville, California.
Equipment: Full-revolving tractor crane. (Model D.)
Features claimed: The crane, mounted on a Case Model DI tractor, has a lifting capacity ranging from 1,500 lbs. to 6,000 lbs., depending on the boom angle and working radius. The standard boom length is 16

ft. but longer booms and special telescoping and gooseneck designs are available on order. Designed primarily for fast, low-cost handling, the unit features high mobility and rapid, accurate control. With a turning radius of 15 ft. and traveling speeds up to 15 mi. per hr., the highly-maneuverable model D lifts, transports and spot loads quickly in most every situation. Controls are convenient and easy to operate and in addition to the regular tractor controls, a hoists lever and turntable lever control all operations. All load stresses are carried by a heavy-duty welded steel frame bearing directly upon the tractor axles, relieving the tractor crankcase and transmission housing castings of all strains imposed by hoisting and transporting loads. Frame design permits easy access to tractor engine, and the regular tractor rear power take-off and drawbar are left clear so the unit may be used for regular tractor work when not engaged in load handling.

Hydraulic Vise

Manufacturer: Reimuller Brothers Co., Franklin Park, Ill.
Equipment: Foot controlled hydraulic vise.
Features claimed: Designed to meet the problems of mass production by giving high performance on holding or handling of material. The jaws are precision constructed and operated by all-steel hydraulic



foot control so that the operator's hands are free for work. The unit can be mounted vertically and used for a production press for small operations requiring dies or tooling. The vise is portable, being equipped with a flexible hydraulic hose. Two sizes are available: 4-ton with 4" opening, and 7-ton with 7" opening.

Pneumatic Saw

Manufacturer: Davey Compressor Co., Kent, Ohio.
Equipment: New pneumatic saw.
Features claimed: This 18-in. saw operates on the same principle as a cross-cut saw and can be used above or below water. At 225 strokes per min., it can cut an 18-in. timber in less than a minute. An ingenious clamping device, easily operated, carries the weight of the saw and prevents arm-jerking jolts and uneven cuts. The saw can be efficiently operated and maintained by inexperienced workers. It has been used extensively in timber-clearing operations.

Air-operated Clutch

Manufacturer: The Fawick Airflex Co., Cleveland, Ohio.
Equipment: Clutch operated by compressed air.
Features claimed: A tire-like gland expands as compressed air is introduced and effects a union between the driving and driven members of an industrial machine. This clutch utilizes compressed air for smoother, simpler and more positive action. Since there are no moving parts, lubrication and adjustment are unnecessary. Heavy machinery, such as punch presses and shears, oil well drilling hoists, and other equipment where heavy load is intermittently carried through the medium of an engaged clutch between load and power, are using the new type of air clutch with success and satisfaction. The clutch is equally adaptable to light loads. The flexibility of the tire-like gland insures uniform pressure over the entire clutch face and automatically corrects misalignment of driving shaft with the driven shaft.

Heat-resistant Insulators

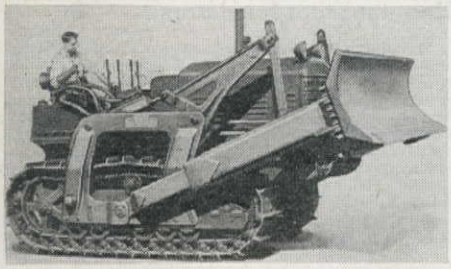
Manufacturer: Dow Corning Corp., Midland, Mich.
Equipment: Silicone insulating materials.
Features claimed: Because of silicone insulation's resistance to heat, electrical equipment for a given output can be reduced in size. This insulation greatly increases the life of electrical units. These machines may be placed in operating locations where surrounding temperatures are higher than has been heretofore possible. The insulation is formed into resins and varnishes by a union of silicon and oxygen. The inherent stability of this combination of elements, yields products of exceptional heat resistance.

Bulldozer

Manufacturer: The Cleveland Tractor Co., Cleveland, Ohio, and The Heil Co., Milwaukee, Wisc.

Equipment: Dozer.

Features claimed: Because of the difficulty of obtaining steel castings, a dozer was designed using as few castings as possible. The result was a completely fabricated unit which incorporated all the latest developments in hydraulic dozer design. Prefabricating the



mounting members and mold board parts reduced the overhang weight more than 2,000 lbs. The blade is 11 in. nearer the tractor and by linkage changes, the blade action has been speeded up to that of a cable-operated blade. The lift of the blade has been increased about 50 per cent, making the total lift of the blade 52 in. These modern streamlined units are built in different sizes from 30 to 100 h.p.

Hard Wood from Soft

Manufacturer: E. I. du Pont de Nemours and Co.

Equipment: Transmuted wood.

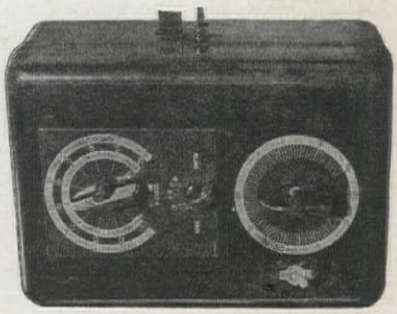
Features claimed: Chemicals derived from coal, air, and water, transform soft wood into hard wood that will not swell, contract, or warp. The process makes timber harder, stronger, stiffer, and more durable. Mars and scratches may be removed by smoothing and rubbing. Color may be imparted permanently throughout the wood by mixing a dye with the impregnating chemical. Veneers become self-bonding and require no adhesive to be formed into plywoods, since heat and pressure fuse the product into a hard, dense substance. Even sawdust and shavings may be molded into articles. It is likewise applicable to bamboo and similar cane and fiber materials. Methylolurea is the chemical agent that effects these fundamental changes. It is compounded by the addition of urea to dimethylolurea which are produced from ammonia, carbon dioxide and methanol, which are synthesized from coal, air and water. The treatment may be used to case harden wood so that strength may be added while retaining impact resistance. This would increase flame resistance and resistance to rot and insect infestation. Simple, easily operable units can be installed at relatively low costs for the treatment of small items.

Tempering Device

Manufacturer: General Electric Co., Schenectady, New York.

Equipment: Spot-welding tempering attachment.

Features claimed: A tempering attachment incorporating the phase-shift method of heat control, is now available for use with G-E synchronous spot-welding controls. The auxiliary control is particularly suitable for use in the spot-welding of airhardenable steels, since it permits tempering the weld while the work is still in the machine, thus reducing hardness



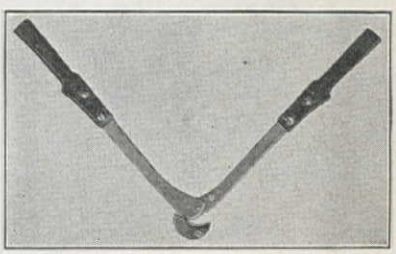
and increasing ductility. The attachment consists of a heat-control and a time-control adjuster for tempering, and the relays which automatically transfer the additional heat-and-time adjustment from the spot-welding control with which the attachment is used. The attachment is enclosed in a metal case designed for wall mounting. The calibrated adjustment dials are mounted on the hinged door of this case, together with an on-off switch, to prevent the relays from being energized during the spot-welding process.

Metal Cutter

Manufacturer: Techtmann Industries, Inc., Milwaukee, Wisconsin.

Equipment: Alpert "lil' giant" cutter.

Features claimed: Weighing 26 oz. and with a leverage range of 40 to 1, the 15-in. cutter will cut up to ¼-in. bolts or wires and ⅜-in. stranded cable. The tool steel standard blades will meet all cutter



requirements in general commercial practice. Insulation of the handles is optional and the blades are easily removed and replaced. A small cam regulates the distance between the cutting edges to take care of wear.

Synthetic Adhesive

Manufacturer: Resinous Products & Chemical Co., Philadelphia, Penn.

Equipment: Synthetic resin adhesive.

Features claimed: This resin, a low-temperature-curing adhesive of the phenol-formaldehyde type, is used for bonding in a variety of heavy lumber and timber constructions. Known as amberlite PR-75B, it is employed in the manufacture of oak ship keels and laminated structural members such as those used in arches and trusses. It finds application in wing and fuselage assembly gluing, hollow spar construction and scarf jointing. In preparation the resin solution is weighed into a suitable container, the catalyst is added and stirred uniformly into the mixture, and normal-room-temperature water is added to the mixture. After stirring the glue is ready for use. Its consistency permits spreading by brush or mechanical

spreaders. The glue should be used within 4 hrs. at 70 deg. F. Hydraulic, pneumatic and gravity pressures are preferable but hand clamps can be used under ideal conditions. Under optimum conditions, a pressure as low as 25 psi. has proved adequate. The bonding time required under pressure will depend on the temperature attained at the innermost glue joint in a given construction.

Rear-dump Hauling Scoop

Manufacturer: Southwest Welding & Manufacturing Co., Alhambra, Calif.

Equipment: Hauling scoop.

Features claimed: The two-wheel single-cable-controlled rear-dump type hauling scoop represents a great improvement in scraper design. The scoop is built in 3, 5, and 8-cu. yd. capacities. A single cable controls all operations. A dozer-scoop hook-up can be

made with a double drum winch, which materially increases a tractor's efficiency. Since the bowl pivots and dumps behind the wheels, operations may be carried on at the top of embankments. The operator can control the depth of spread at all times. This hauling scoop has proved to be economical and adaptable in construction work.

To Harden Steel

Manufacturer: Steeltem Chemical Co., New York, N. Y.

Equipment: Steel hardening solution.

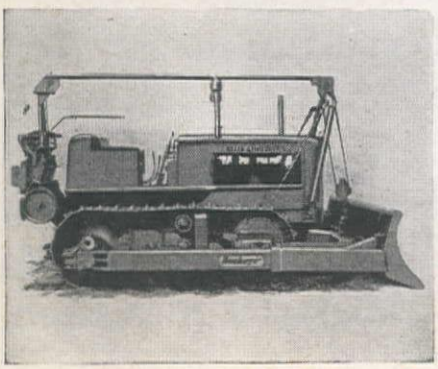
Features claimed: A new solution known as Super-Temp to harden wearing surfaces on gears, pinions, axles, shafting and other maintenance parts of machinery. It is not recommended for shock tools, but is particularly useful for high speed cutting tools operating with a rotary or uniform motion. It will add tremendous hardness and minimize regrindings. The instant maximum hardness is obtained by quenching in the solution, but toughness is sacrificed as the part or tool may achieve glass hardness.

Bulldozer and Trailbuilder

Manufacturer: Buckeye Traction Ditcher Co., Findlay, Ohio.

Equipment: "Centro-Lift" bulldozer and trailbuilder.

Features claimed: The center lift construction of the moldboard provides light weight for its size, simple construction, and straight lift of the blade. The horn is designed so that the moldboard is close to the tractor radiator. The moldboard pivots about a single king pin and can be angled to the right or left simply by removing two landside pins, swinging the moldboard to the desired side, and replacing the landside pins. It can be easily tilted and a vertical adjustment of 12 in. is provided. Maximum height of lift of leading corner of blade is 53 in., while digging depth of blade below grade is unlimited. Trailbuilder moldboard is 12 ft. 9⅝ in. long and 37 $\frac{5}{16}$ in. high and is fitted with reversible cutting edge and replaceable corner bits.



LITERATURE FROM MANUFACTURERS . . .

The B. F. Goodrich Company, Akron, Ohio—An analysis of the present and future truck tire situation and a discussion of the quality and service of synthetic truck tires was given in an address by J. E. Powers of this company. This address is now published in pamphlet form. Facts are presented regarding (1) the stock situation—present and future outlook for tires, (2) quality—the service you can expect from synthetics, and (3) how to get the best results from synthetic tires.

Ransome Machinery Company, Dunellen, New Jersey—The company has produced a new "Operator's Manual on Ransome 34E Dual Drum Pavers" to insure maximum service from these paving machines. The manual contains 103 pages and is divided into three sections: (1) operation, (2) maintenance, and (3) parts list. Carefully drawn diagrams explain in considerable detail the operating, trouble shooting, lubricating, storing and maintenance of the paver. The manual describes the reasonable care and proper maintenance necessary for economical and dependable performance. It is bound in looseleaf form so that new sections may be added from time to time. Each section is prefaced by a complete and detailed table of contents.

Caterpillar Tractor Co., Peoria, Illinois—Looking ahead to the period after the war, a new booklet issued by this company anticipates the tasks which will face city, county and state road officials and equipment operators. Many photos illustrate the versatility of the Caterpillar diesel engine road equipment as well as its speed and economy of operation. When the war-pressure lifts, there will be no reconversion delays as no retooling will be necessary to build the machinery of peace. "A Look Up the Road," form No. 8587, 16 pages in two colors, is published by this company.

American Mutual Alliance, Chicago, Illinois—Mutual casualty companies have published a 21-page booklet "A Plan to Help You Employ Disabled Veterans and Other Handicapped Persons Productively and Safely" which sets forth in detail the steps to be followed in the placement and subsequent supervision of returning veterans and others who have received permanent physical injuries. It stresses the importance to the employer, at the time of re-employment, of knowing and evaluating the nature and the extent of the disablement resulting from injury sustained by

the veteran. It deals with the need for complete and thorough analyzation of jobs and the fitting of the individual into the occupation best suited to him. The plan to help employers understand the more important considerations of the successful employment of persons with handicaps consists of five steps: (1) learn the medical facts, (2) analyze your jobs, (3) match the man and the job, (4) introduce the man to the job, and (5) plan for follow-up.

West Coast Lumbermen's Association, Seattle, Wash.—The Association has just published a Membership Directory which lists the various sawmills, loggers, wood-pipe manufacturers, wood-treating and timber-fabricating companies showing location of plants, principal equipment, species and items produced by each. The data refers to normal prewar conditions. These directories may be obtained free of charge.

Bros Boiler & Manufacturing Company, Minneapolis, Minn.—A series of three brochures describe the wobble wheel, tamping, and all steel rollers which are used in highway and airport work. Color illustrations and engineering specifications are also given.

Sylvania Electric Products Inc., Ipswich, Mass.—A 32-page booklet, "Welcome to Sylvania," which is given to every new employee of the company. The answers are given to such questions as Employees Association Credit Union, savings and retirement plan, vacations with pay, sickness and eyeglass benefits, group insurance, recreation and clubs, the suggestion system, and employee training. A brief description is given of the company products.

Committee for Economic Development, New York, N. Y.—The results of a study of the problems that will arise in the United States during the transition from war to peace, are presented in a 24-page pamphlet, "Postwar Employment and the Liquidation of War Production." The success of the transition will depend upon the readiness of the private economic sectors to sublimate their desires for temporary advantage into the greater satisfaction of restoring the economy to a healthy and durable prosperity. Equal opportunity should be given to all businessmen bidding for government surplus stocks, with special consideration to small business and with safeguards against acquisition of stocks for the furtherance of monopoly. Carefully timed disposal policies could place marketable stocks in use and still prevent dumping and depressing prices. War production should in no case be continued merely to provide employment, but civilian production should be planned in advance to begin as soon as possible.

R. G. Le Tourneau Inc., Peoria, Illinois—A 12-page illustrative pamphlet answers the following questions to be considered when buying post-war construction equipment: (1) have the field units been used long enough to be thoroughly job-proved, (2) do local successful earthmovers use the equipment, (3) do the manufacturers understand local problems, (4) is earthmoving equipment a company specialty or just a sideline, and (5) has the equipment money-making possibilities?

Victor Equipment Company, San Francisco, Calif.—A new bulletin illustrates the design and construction features of certain types of single and two-stage reduction regulators employed in the welding industry. Clear illustrations give evidence of the type of quality and design used in the manufacturing of these regulators. The 14-page pamphlet portrays graphically on pages 12 and 13, the maximum flow rates for regulators.

American Chain & Cable Company, Bridgeport, Connecticut—A new "how to protect your valves" chart is illustrated by graphic sketches which show the right and wrong way to handle valves under different situations. The charts are 11 in. by 17 in. and are printed on heavy stock so that they can be posted.

The Lincoln Electric Company, Cleveland, Ohio—A 6-page folder illustrates many ways in which arc welding has aided the construction industry. A ship can be built by arc welding in ⅙ the time that it can be built by riveting. Manufacturing research and efficiency has reduced the cost and added to the quality of arc welding equipment. Arc welding schools are giving better instruction and training in all phases of welding procedure and engineering.

Wickwire Spencer Steel Company, New York, N. Y.—"Axis in Agony" is a booklet that contains a series of caricatures illustrating war in its vicious, unglorious reality. Each painting presents the brutishness of the Axis—its craven cowardice—its mounting terror as final defeat becomes more imminent. There has been a great demand for this booklet and it has been praised as another definite contribution to printed promotion which helps the war effort.

George S. May Business Foundation, Chicago, Illinois—A 6-page pamphlet, "How Accountancy and Engineering Share in Effective Tool Control," emphasizes the importance of tool control. Five systems are explained in considerable detail, telling the advantages and disadvantages of each. They are: (1) the single check system, (2) the double check system, (3) the triplicate slip, (4) electric machine recording, and (5) plate charge ticket printing. Proper accounting of tools will save countless dollars, release the use

of scarce materials to other purposes and enable tools to produce more by keeping them on the job.

The Thew Shovel Company, Lorain, Ohio—A pamphlet tells the graphic story of mobile Moto-Cranes on the toughest job they have ever tackled. Fourteen illustrations depict jobs that are typical of the work that cranes are doing in all major theaters of war. They lifted parts to assemble guns at Cassino, unloaded supplies at Bougainville, and cleared away the debris from a bombed castle district in London. No conversion time will be lost in changing from war effort to postwar construction when these cranes will be free to work on needed construction.

Southwest Welding & Manufacturing Company, Alhambra, California—The savings, flexibility, and dependability of a two-wheel, rear dump hauling scoop are explained in a 4-page pamphlet. A single cable control, ground clearance in hauling, possible over-bank dumping, low center of gravity, and proper balance are features that are claimed for this scoop.

Builders - Providence Inc., Providence, Rhode Island—The workings of a propel-o-flo meter are described in a 4-page pamphlet. The manufacturers claim perfect visibility and quick reading, unit easily removed for inspection, quality construction, accurate performance, easy to service, and direct reading. Standard meters are suitable for water at ordinary temperatures and special meters can be supplied for hot water.

Link-Belt Company, Chicago, Illinois—A 16-page booklet describes the operation of belt conveyors. A diagram illustrates the development of belt-rolls from 1896 to the present. The design, durability and quality have been greatly improved during this 48-year period. Illustrations are given of a number of types of conveyor rolls. The company designs conveyors to meet individual requirements, builds the various elements and assemblies, and installs the job complete.

Hercules Powder Company, Wilmington, Del.—Just published is a full color leaflet (DDD-62) which tells of the qualities of cellulose acetate plastic—what part it's taking in the war and its significance in the manufacture of products after the war. This plastic, Hercules claims, has great impact strength, will resist acids, oils, gasoline, alcohol and other destructive agents; can be made any color or crystal-clear; can be molded, turned, sawed, filed, drilled, nailed and joined with adhesives. Cellulose acetate plastic has the added advantages of being light weight and of being able to stand high and low temperatures (as low as 70 degrees F. below zero). The leaflet invites the reader to write for technical data and names of fabricators who are formulating plastics with Hercules ethyl cellulose and other Hercules cellulose derivatives.

Madsen Iron Works, Huntington Park, Calif.—Bulletin MP-120-8W illustrates and describes Madsen asphalt paving plants of 2,000, 3,000 and 4,000 lbs. capacity. With photographs, drawings and diagrams this profusely illustrated bulletin demonstrates how Madsen plants work and points out their special features and new wartime developments. Asphalt plant equipment is also shown, and there are two pages of specifications on plants and recommended accessories.

OPPORTUNITY SECTION

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