WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

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JULY • 1945

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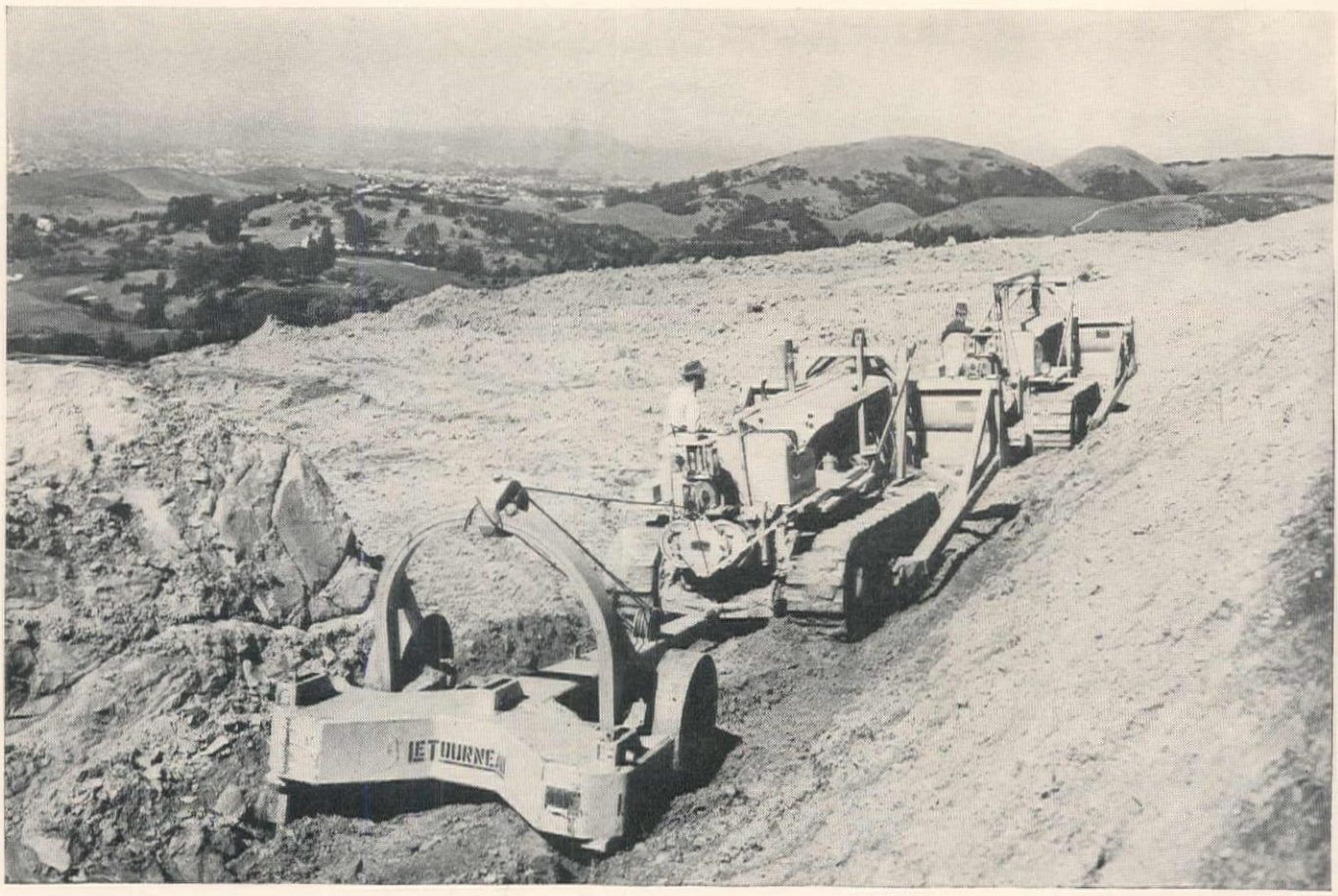
$3.00 PER YEAR

IN THIS ISSUE

STEEL SCRUBBER TOWER installed for the Natural Soda Products Co. of Keeler, Inyo County, California, where industrial soda ash is produced from the brines of a natural occurring deposit.



WAITING . . . 158,466 Miles of Roadwork

IMAGINE *fifty* transcontinental highways, or a road running *six times around the earth* at the equator. That will give you an idea of the estimated mileage of roads scheduled to be rebuilt, widened and relocated after the war. *And this is only one item in an estimated $15 billion expenditure for postwar construction!*

To handle this unprecedented volume of work, construction equipment—old and new—must function at maximum efficiency, with minimum maintenance. Effective lubrication is the biggest single factor in assuring this . . . and, on the basis of experience, contractors everywhere use 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 bearings 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 they are definitely preferred in many fields, a few of which are listed at the right.

Texaco Lubrication Engineering Service is available through more than 2300 Texaco distributing plants in the 48 States. Get in touch with the nearest one, or write:

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

THEY PREFER TEXACO

★ More stationary Diesel horsepower in the U. S. is lubricated with Texaco than with any other brand.

★ More Diesel horsepower on streamlined trains in the U. S. is lubricated with Texaco than with all other brands combined.

★ More locomotives and railroad cars in the U. S. are lubricated with Texaco than with any other brand.

★ More revenue airline miles in the U. S. are flown with Texaco than with any other brand.

★ More buses, more bus lines and more bus-miles are lubricated with Texaco than with any other brand.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

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

Another NORTHWEST WEST-BOUND for Isbell Construction Co. makes fourteen

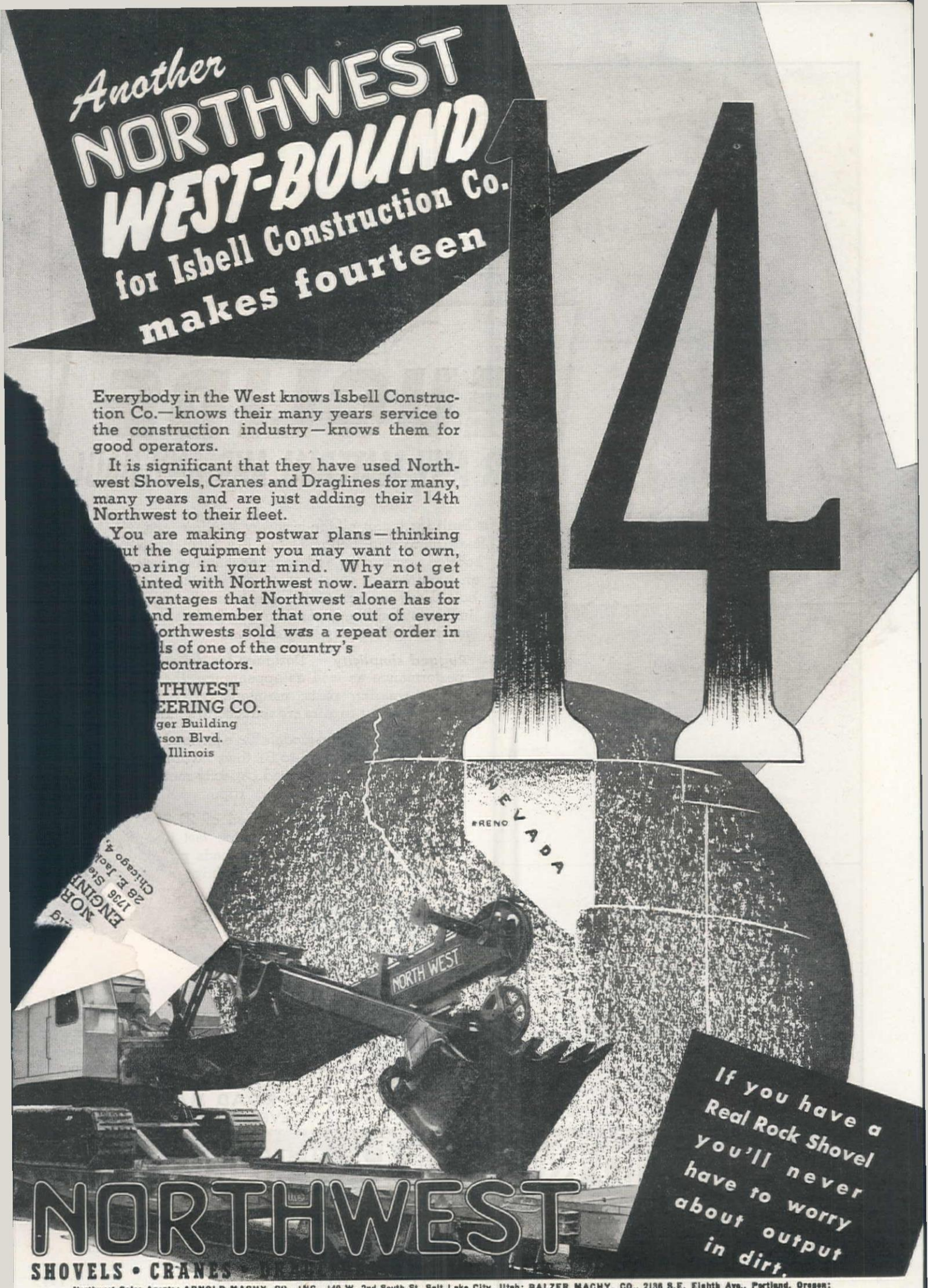
14

Everybody in the West knows Isbell Construction Co.—knows their many years service to the construction industry—knows them for good operators.

It is significant that they have used Northwest Shovels, Cranes and Draglines for many, many years and are just adding their 14th Northwest to their fleet.

You are making postwar plans—thinking ut the equipment you may want to own, paring in your mind. Why not get inted with Northwest now. Learn about vantages that Northwest alone has for nd remember that one out of every orthwests sold was a repeat order in ls of one of the country's contractors.

THWEST
EERING CO.
ger Building
tson Blvd.
Illinois

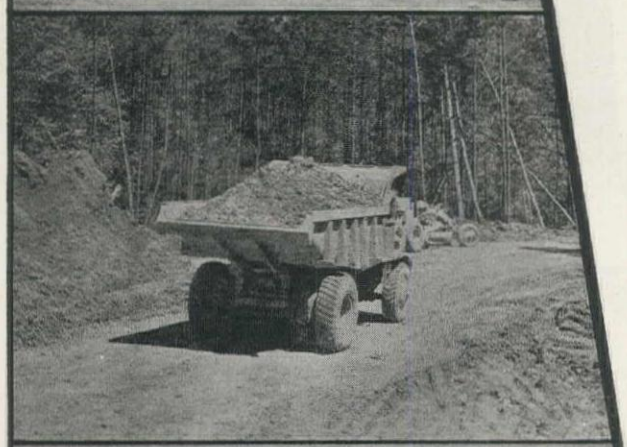


If you have a Real Rock Shovel you'll never have to worry about output in dirt.

NORTHWEST
SHOVELS • CRANES

Northwest Sales Agents: ARNOLD MACHY. CO., INC., 149 W. 2nd South St. Salt Lake City, Utah; BALZER MACHY. CO., 2136 S.E. Eighth Ave., Portland, Oregon; WILSON EQUIPMENT SUPPLY CO., 902 West 22nd St., Cheyenne, Wyoming;

Branch Offices: 255 Tenth St., San Francisco, Calif.; 1234 Sixth Ave., South, Seattle, Wash.; 3707 Santa Fe Avenue, Los Angeles, Calif.



Versatile EUCLIDS FOR ANY MATERIAL AND ANY HAUL

● Built for tough off-the-highway hauling jobs, Rear-Dump and Bottom-Dump EUCLIDS have boosted production and reduced hauling costs on hundreds of construction and mining projects. Here are some of the features that result in the outstanding performance of Euclids in any material and on any length of haul:

Rugged simplicity — Designed for dependable performance as well as appearance, there are fewer wearing parts; maintenance costs and down-time for repairs are reduced to a minimum.

Capacity — Euclid models have payload capacities ranging from 15 to 32 tons; favorable ratio of unit weight to payload capacity means more pay tons hauled on every trip.

Speed — Top speeds loaded of 21.8 to 30 m.p.h., depending on model; fast travel speeds results in more large pay loads per day that can be made with slower equipment.

Versatility — Efficient for hauling any material on any length haul; handle heavy overburden, earth, rock, coal, ore and other materials loaded by shovels, draglines, transfer bins, mobile loaders and other modern digging and loading equipment.

● If you are interested in greater production and lower hauling costs, check the performance records of Euclids on any job. Several new booklets with job illustrations are yours for the asking.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

THE EUCLID ROAD MACHINERY CO.

3710 SAN PABLO AVENUE — PIEDMONT 8046 — EMERYVILLE, CALIFORNIA

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

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

Covering the Western Half of the National Construction Field

Contents for July, 1945

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Sweeping into Popularity

— NEW, FASTER HIGHWAY MAINTENANCE LOADER

With wartime maintenance crews shorthanded and urgent jobs crying for attention, highway departments in ever-increasing numbers are looking to Athey Force-Feed Loaders to solve manpower problems and speed maintenance work.

You'll welcome the fast, clean loading job now possible with this new, modern tool. A companion unit for your "Caterpillar" Motor Grader, this self-propelled, one-man operated loader gathers up windrows of surplus material, removes it from the highway, and loads it into trucks for disposal or salvage.

Here are just a few of the many uses you'll find for Athey Force-Feed Loaders in handling surplus material on maintenance work: Ditch cleaning, Road grading, widening and straightening, building and relocating ditches, and dressing slopes.

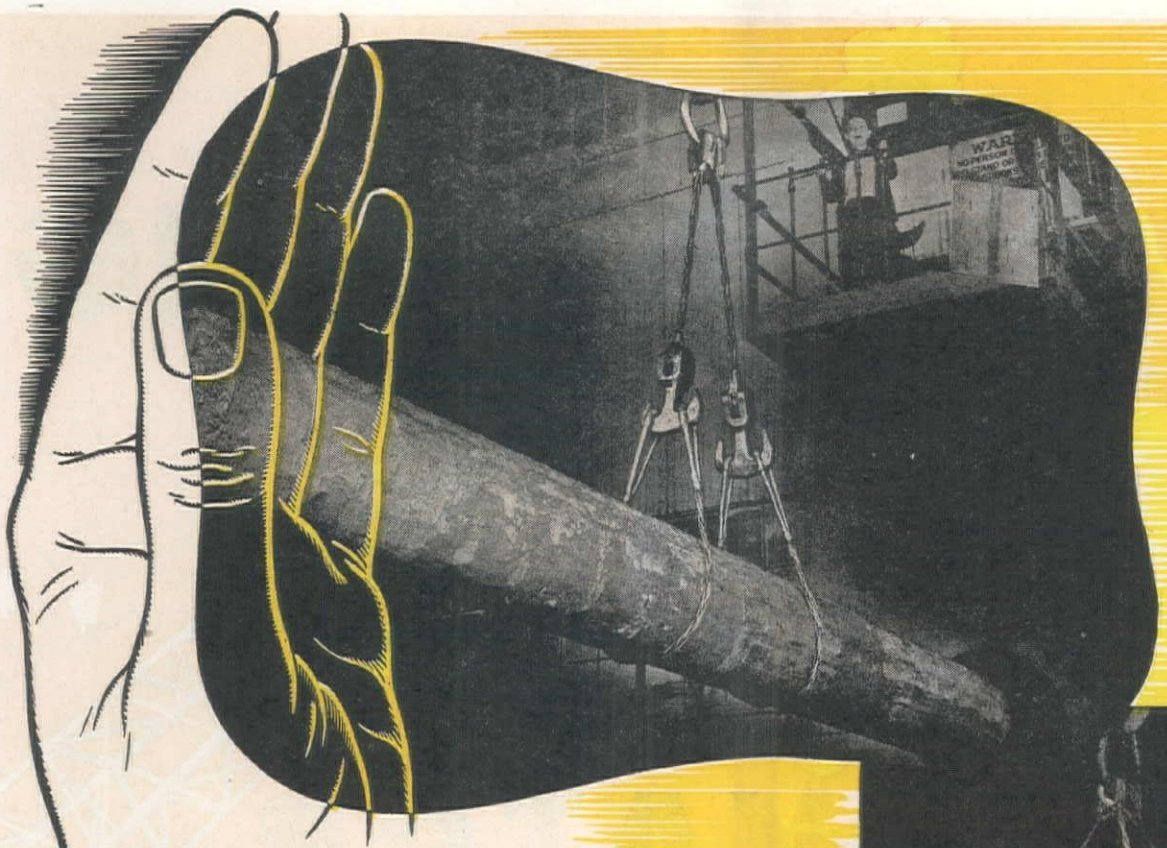
You'll save time and manpower . . . do more work . . . by replacing hand or other slow and expensive methods, with Athey Force-Feed Loaders. Ask your Athey-"Caterpillar" dealer for complete details, or write direct to Athey Truss Wheel Co., 5631 West 65th Street, Chicago 38, Illinois.

Athey DEPENDABLE LOADING & HAULING EQUIPMENT

FORCE-FEED LOADER

FORGED-TRAK TRAILERS

MOBILOADERS



LET 'ER TRAVEL!

Materials move quickly... smoothly... carried by flexible YELLOW STRAND *BRAIDED* SLINGS*

When a job's moving on schedule, it's costly to have it slowed by sling equipment. What you want—in factory, shop, warehouse or yard—is *flow* in the handling of sling loads. Yellow Strand *Braided* Safety Slings promote this smoothness. Their flexibility, kink-resistance and light weight enable operators to give each lift more accurate control . . . to run a series of pickups without wasted time or motion.

Patented *braiding* puts added limberness into long-wearing Yellow Strand Wire Rope. The sling conforms to odd shapes, grips curved objects firmly, takes thimbles, turnbuckles and other fittings readily. Weighing less than chain, *braided* slings are easily carried, fastened and detached, using a minimum crew. Employees welcome their security on big tonnage lifts, their Manila-like convenience for small jobs.

Yellow Strand *Braided* Slings are practicable for loads ranging from a 40-lb. drum to a 300-ton locomotive. Send details of your application now and let B&B engineers offer a recommendation. Broderick & Bascom Rope Co., St. Louis 15, Mo. *Branches:* SEATTLE, Portland, New York, Chicago, Houston. *Factories:* SEATTLE, St. Louis, Peoria.

RIGGERS' HAND BOOK FREE
Shows sling types, fittings, capacities. Write for your copy.

*PATENTS: U.S., 1475859, 1524671, 2142641, 2142642, 2299568; CANADIAN, 252874, 258068

ARMY E NAVY

BRODERICK & BASCOM

Yellow Strand

BRAIDED SAFETY SLINGS

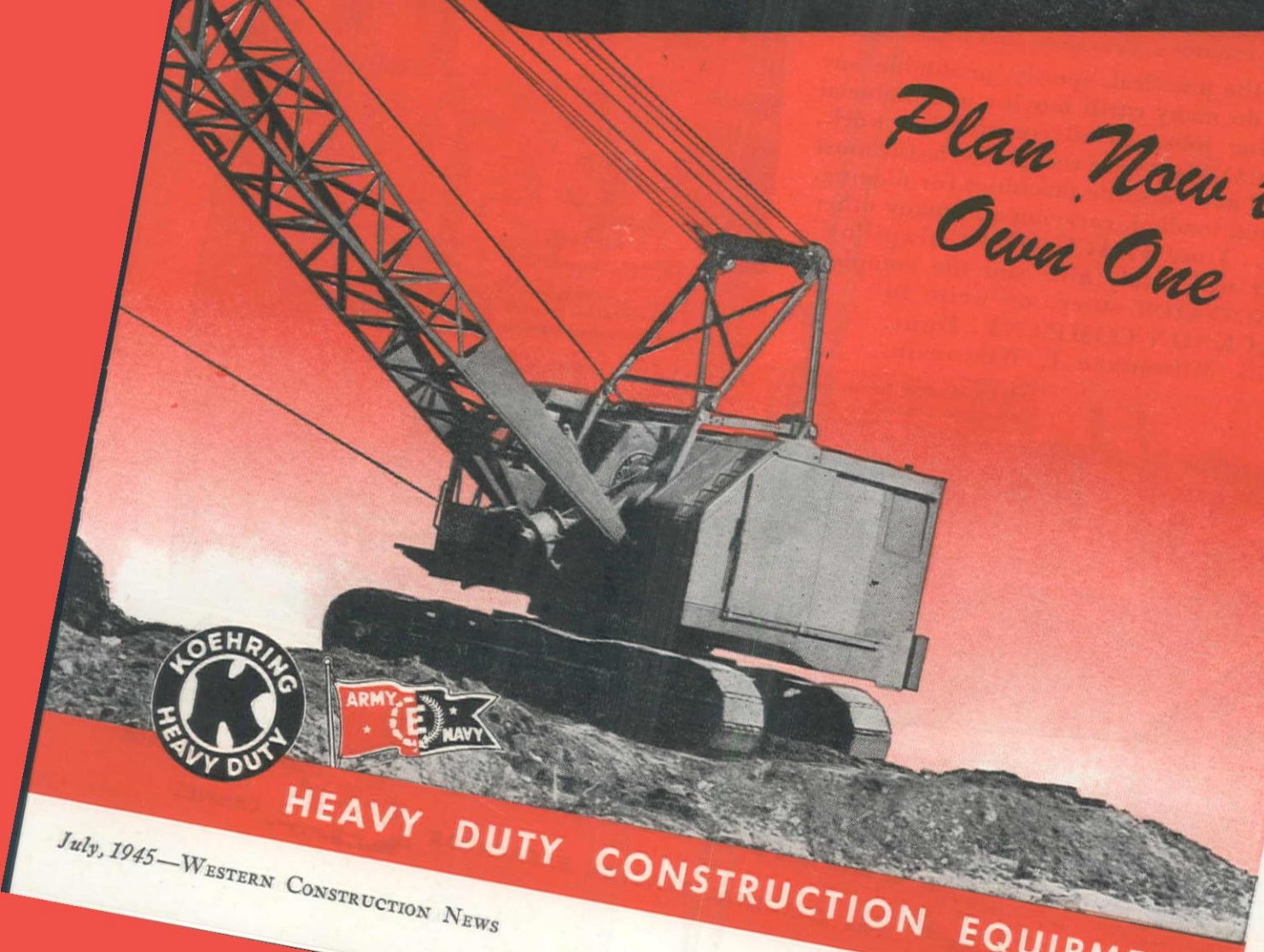
New KOEHRING 605

POSTWAR 1½-YARD EXCAVATOR and 25-TON CRANE

Be among the first to earn greater profits with the new, designed-for-tomorrow 605, latest, but not the last, addition to the Koehring Postwar Line. New ideas in Heavy-Duty excavator design, tested and proven. Plus outstanding, exclusive advantages of earlier Koehring excavators. Greater operating ease. Higher production. More engineered-in strength. Order your Koehring 605 today to get earliest possible delivery.

KOEHRING COMPANY • MILWAUKEE 10, WISCONSIN

Plan Now to Own One



HEAVY DUTY CONSTRUCTION EQUIPMENT

WHEN THERE'S WORK TO BE DONE...

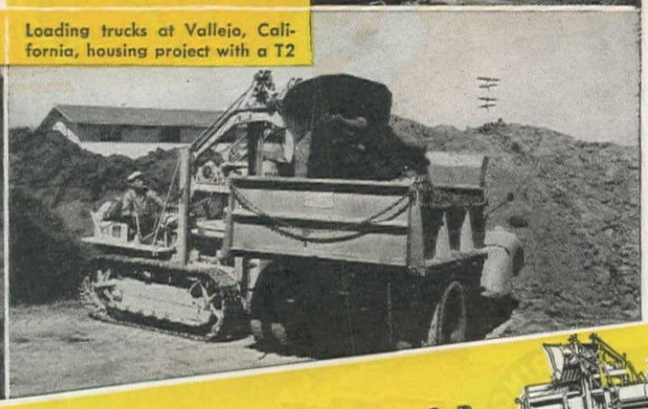
TRAXCAVATE

T7 TRAXCAVATOR on big excavation job in St. Louis, Missouri

IT'S the practical, speedy, profitable way to do many earth moving and material handling jobs. In all construction work, TRAXCAVATORS are recognized as the most rugged and versatile machines for digging, grading, loading, carrying and many other tasks. Your TRACKSON-"Caterpillar" dealer will gladly give you the complete TRAXCAVATOR story, or write to TRACKSON COMPANY, Dept. WC-75, Milwaukee 1, Wisconsin.

A T2 tight-excavating in small basement at Cheyenne, Wyoming

TRAXCAVATOR fine-grading between forms on Indiana road job



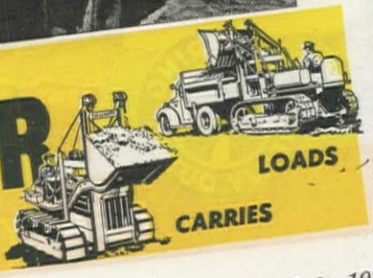
Loading trucks at Vallejo, California, housing project with a T2

DIGS GRADES

TRAXCAVATOR

REG. U. S. PAT. OFF.

THE ORIGINAL TRACTOR EXCAVATOR



LOADS CARRIES

Some of the diversified "Caterpillar" Diesel equipment of the Dutcher Construction Corp. (Queenstown, Md.) working on airport, reservoir, army camp, and munitions plant projects.

His jobs are among the largest in the country. He can go anywhere. Tackle any size contract. And always beat or come close to his monthly yardage estimate . . . because—

He knows he has the right equipment. Knows what it can do. Knows that well-balanced variety enables him to *zone* his equipment for both long and short hauls—for shrewdly planned operation that means *lowest costs on earth*. He knows, too, that there's quick, sure, efficient mechanical and replacement-parts service always near at hand to keep all his machines in tip-top working condition.

In other words, the Dutcher Construction Corporation has reduced contracting guesswork and uncertainties to a minimum by STANDARDIZING on rugged, dependable, versatile and economical "Caterpillar" Diesel equipment all along the line. "In fact," writes Mr. Dutcher, "we have been 100% standardized on 'Caterpillar' equipment since before it was even known as such, prior to 1925."

"A great many of our jobs," continues Mr. Dutcher, "have run 24 hours a day, 7 days a week; and with the 'Caterpillar' equipment, there has been surprisingly little down time for repairs. In the few cases where we had to rent additional equipment of other makes, our operating cost records have shown that its upkeep greatly exceeded that of our own."

In dozens of big ways and hundreds of smaller ones, *it pays to* STANDARDIZE *on "Caterpillar" Diesel equipment.*

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

• The Dutcher Construction Corporation owns and operates 34 pieces of "Caterpillar" equipment — composed of D8 and D7 track-type Tractors, DW10 Wheel Tractors, Motor Graders, Elevating Graders, and Diesel Electric Sets. "Caterpillar" Diesel Engines also power the cranes they use.

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

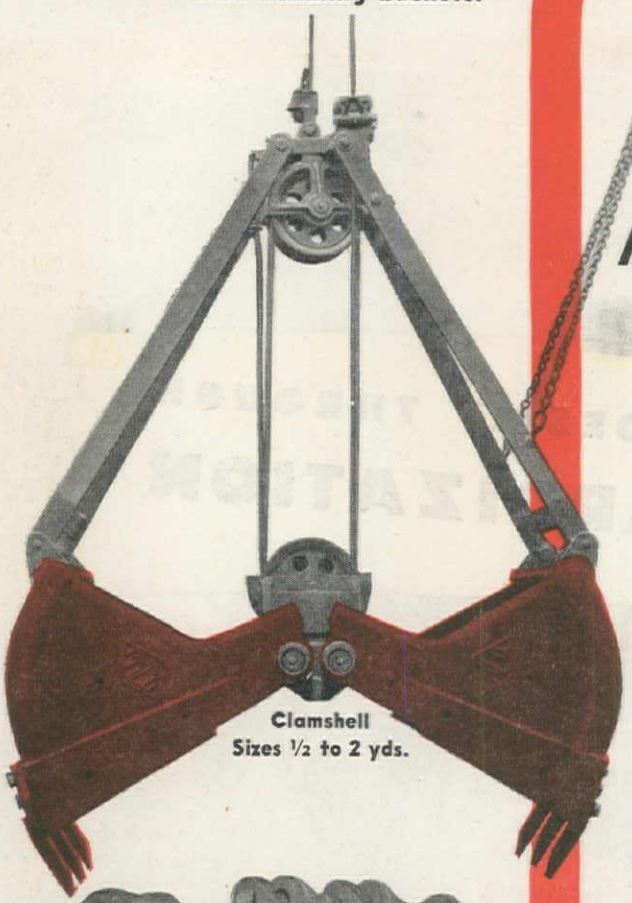
The discharged veteran wears this emblem. Remember his service and honor him.

America's most complete line of material handling buckets.

WE BUILD ALL 4 MATERIAL HANDLING BUCKETS

PMCO ALL PURPOSE

- SHOVEL
- PULLSHOVEL
- DRAGLINE
- CLAMSHELL



Clamshell
Sizes ½ to 2 yds.

We build a wider and more complete line of material handling buckets than any other manufacturer. Volume production methods enable us to build a better bucket with amazing economies in manufacturing.

FRONTS, BOTTOMS, SCOOPS, and teeth, shown in red on buckets, are 14% manganese steel developing up to 120,000 tensile p.s.i. for long service life and hard abuse.

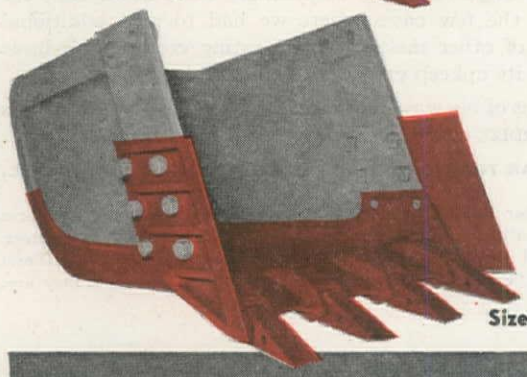
Experience Counts

See your shovel engineer or equipment dealer about PMCO Dippers and Buckets.

On the ½ yd. and ¾ yd. Shovel, Pullshovel, and Dragline Buckets, all teeth are interchangeable . . . a great advantage to operators.

Shovel
Sizes ½ to 18 yds.

Dragline
Sizes ½, ¾, 1, 1½, 2, 2½ yds.



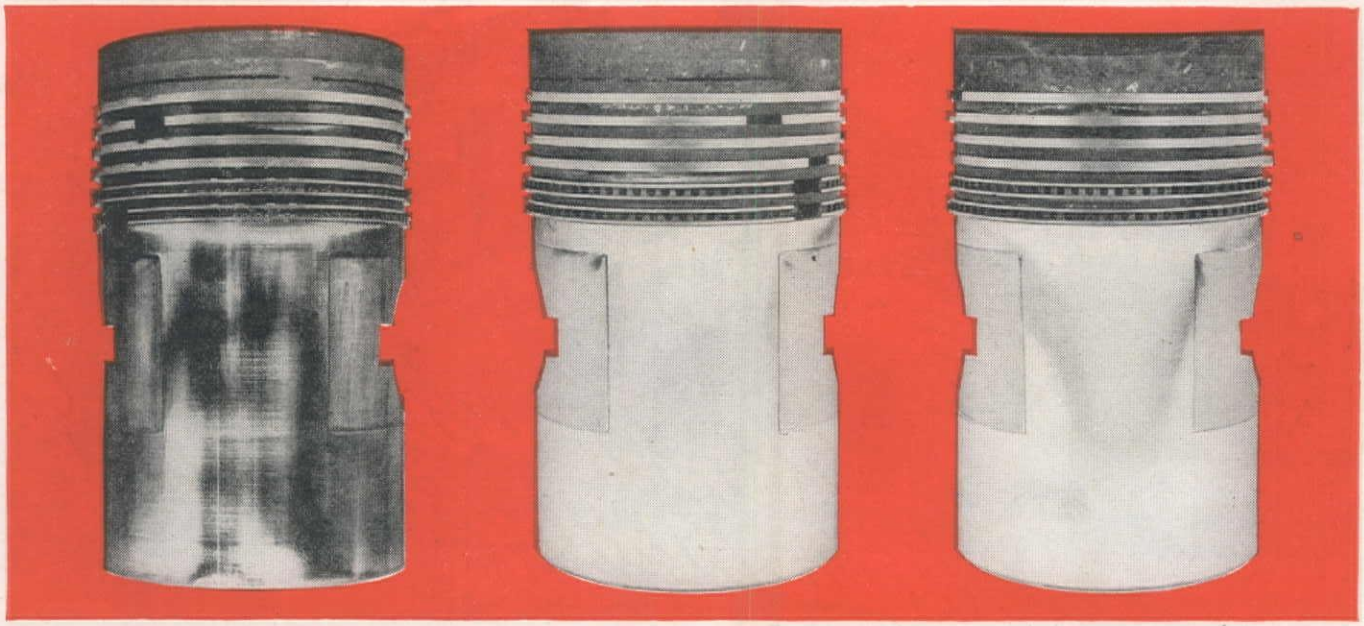
Pullshovel
Sizes ½ and ¾ yd.

Quality Since 1880

PETTIBONE MULLIKEN CORP. CHICAGO 51, U. S. A.

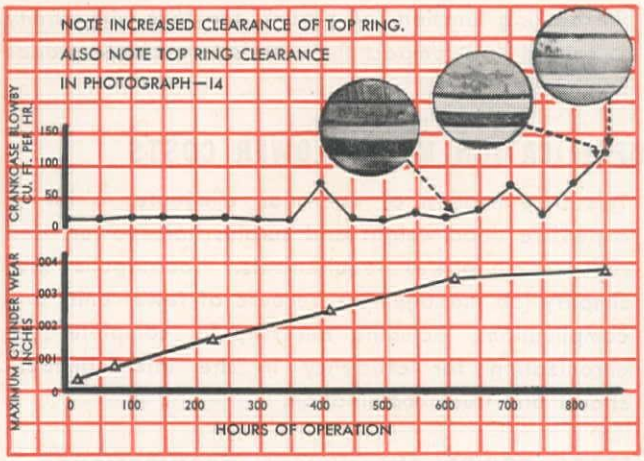
WE OPERATE THE LARGEST AND MOST COMPLETE MANGANESE STEEL FOUNDRY IN THE UNITED STATES.

How RPM DELO OIL prevents ring sticking

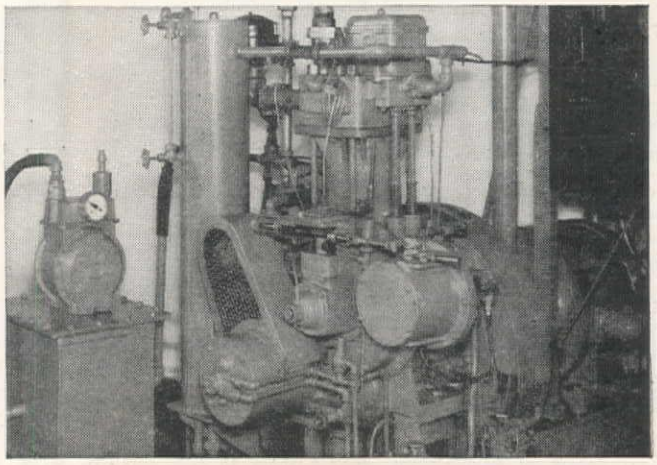


Even the finest uncompounded mineral oil will leave deposits on rings and skirts when operated under severe engine conditions. The above photo shows a test engine piston after 264 hours operation with the finest obtainable uncompounded Diesel engine oil.

Here's the same test made with RPM DELO Oil, only this time for 1000 hours—more than double the 480-hour test required in current military specifications. The photographs above show both thrust and anti-thrust sides of a piston after a 1000-hour test with RPM DELO Diesel Engine Lubricating Oil. Note that RPM DELO Oil has almost entirely prevented any deposits on skirts. Dark areas around rings are only soft carbon, not sticky varnish. The compounding in RPM DELO Oil makes this possible by preventing the initial formation of sticky varnish.



How blowby caused by cylinder and ring groove wear increases rapidly is shown by the above chart. Excessive side clearance caused by ring groove wear allows the ring to rock in its groove and "bite" into cylinder walls. RPM DELO Oil checks this wear at the start by an adhering agent which makes it cling to hot cylinder walls.



This single cylinder laboratory engine is used to measure the ring-sticking characteristics of Diesel lubricants. The test record of RPM DELO Oil has been confirmed by sales of millions of gallons since its development. For more technical information on RPM DELO Oil, write for Booklet T-7, Standard of California, San Francisco 20, California.

Detergent compound to clean engine.

Anti-oxidant to prevent gum and sludge.

Wear-reducing compound.

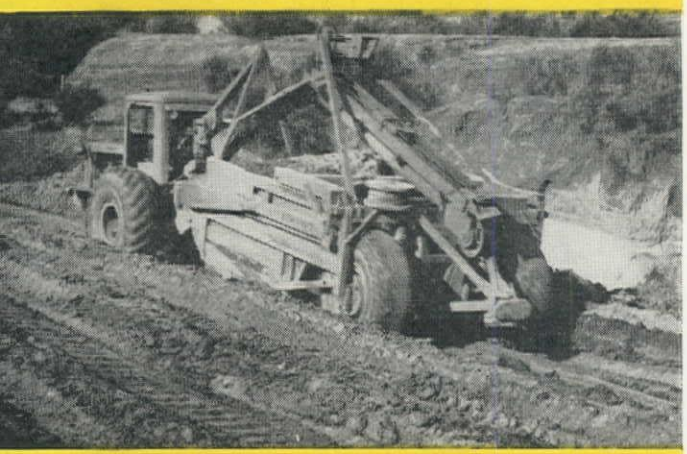
STANDARD OF CALIFORNIA

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

TOURNAPULLS or SHOVEL & TRUCKS

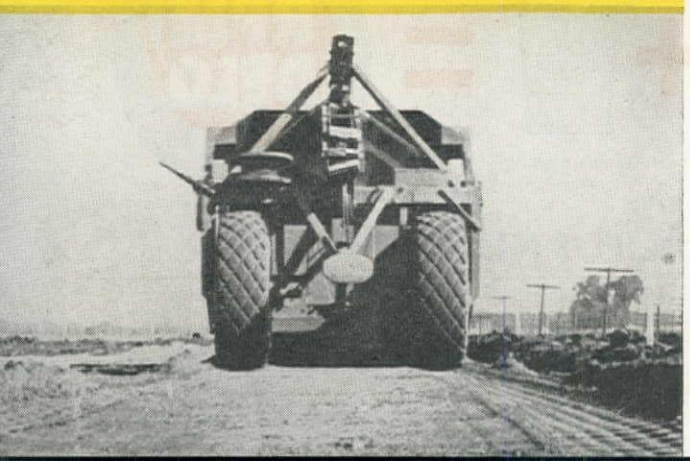
Which Will Make More Money For You?

Tournapulls load any materials a Rooter can break loose. In this Alabama coal mine, S. R. Batson Company's Super C Tournapulls with snatch tractor heap 15-yard loads in shale.



Tournapulls are built for off-road work. Big single tires plus 2-wheel design of prime-mover, enable them to pull through where ordinary hauling units bog down. Here, Hendricks Bros. Inc. are using 5 Tournapulls under extremely tough hauling conditions on the Chesapeake and Delaware Canal.

Tournapulls spread loads in even layers to accurate grades, provide fill compaction without using dozers or rollers. On this Illinois road job, Raemisch-Madden loaded, hauled and spread 47,000 cu. yds. of sub-base gravel in place with Tournapulls, eliminated need for trucks and spreader boxes. Haul: 3 miles one way



IN ONE SIMPLE UNIT, Tournapulls combine both the loading functions of a shovel or dragline, plus the hauling functions of a truck, together with ability to spread and compact their loads to accurate grades on the fill.

SIMPLIFICATION MEANS LOWER COSTS

This simplification of operation eliminates a lot of expensive dead-weight and surplus horsepower, and reduces manpower requirements. Tournapulls also simplify job management because of fewer units and complications, including necessity for complete synchronization for efficiency in the interdependent shovel and truck combination.

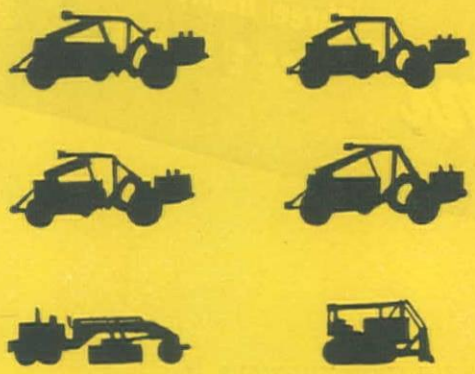
COMPARE POWER AND WEIGHT REQUIREMENTS

Study the chart on the opposite page. Then, set up a similar comparison on any job you are now planning. You will readily see why Tournapulls have proved their ability to beat shovel-truck costs on any jobs suitable for scraper loading. With modern developments in use of Rooters to break hard materials at large savings under drilling-and-blasting costs, you can count on Tournapull-Scrapers for the major percentage of your dirt-moving jobs.

STUDY TOURNAPULL FLEXIBILITY OF OPERATION

In addition to ability to move dirt at the lowest-net-cost-per-yard, Tournapulls offer further overall economies: (1) in their flexibility to work on any part of the job at any time without moving delay; (2) make job-to-job moves under their own power at considerable saving of time and money; (3) because of big tires (5'6" diameter) and weight distribution,

TOURNAPULL FLEET



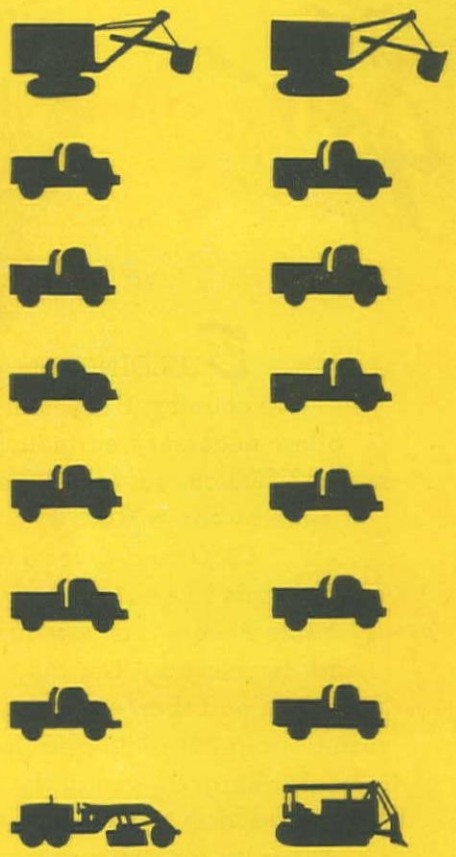
4 15-yard Tournapulls
1 113 hp snatch-tractor with dozer
1 motor patrol

6-man operating crew
788 operating horsepower
188,400 lbs. equipment

ONLY 38½% OF SHOVEL AND TRUCK EQUIPMENT INVESTMENT

Charts show equipment required to move 350 pay yards per hour on half-mile one-way haul in common.

SHOVEL & TRUCK FLEET



2 1¾-yard shovels
12 7½-ton (6-yd.) trucks
1 75 hp tractor-dozer on dump
1 motor patrol

18-man operating crew
2250 operating horsepower
459,000 lbs. equipment

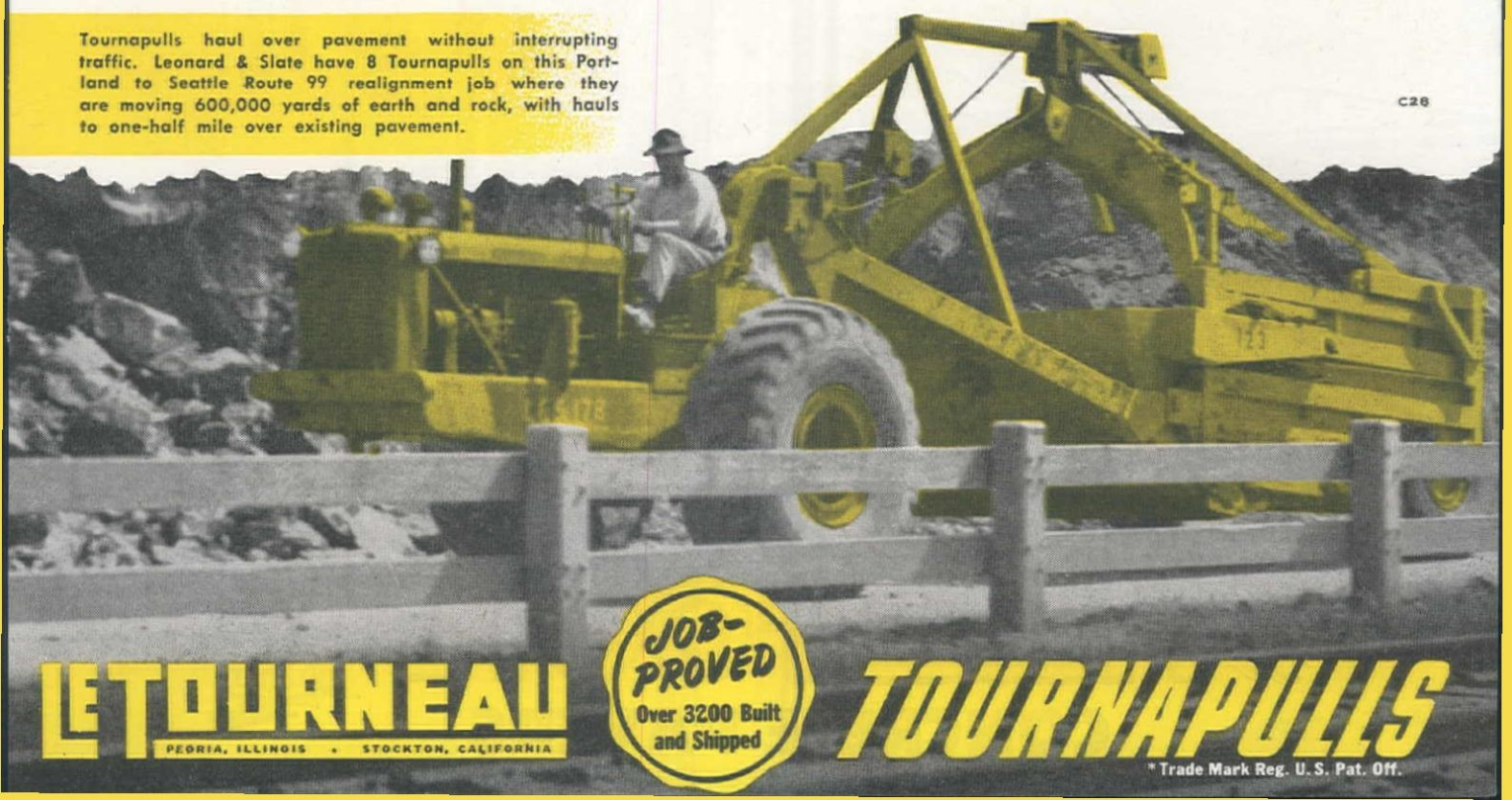
OVER 2½ TIMES TOURNAPULL FLEET EQUIPMENT INVESTMENT

they go through where trucks can't go, operate in wet weather when trucks shut down.

INVESTIGATE TOURNAPULL CLAIMS

Before you buy any additional dirtmoving equipment, be sure to check your job estimates against Tournapull costs. Your LeTourneau distributor will be glad to give you every assistance in setting up these figures and showing you how to check and prove them to your own satisfaction. Investigate Tournapull lowest-net-cost-per-yard claims NOW. It's vitally important to your planing and profits.

Tournapulls haul over pavement without interrupting traffic. Leonard & Slate have 8 Tournapulls on this Portland to Seattle Route 99 realignment job where they are moving 600,000 yards of earth and rock, with hauls to one-half mile over existing pavement.



C28

LETOURNEAU
PEORIA, ILLINOIS • STOCKTON, CALIFORNIA

JOB-PROVED
Over 3200 Built and Shipped

TOURNAPULLS*

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

the Job— Laying 103,500 cu. yd. of concrete in a hurry

the Equipment — Three Multi Foote 34 E Pavers

BUILDING one of the longest and best constructed airport runways in the country, 8500 feet long, 200 feet wide, and 12 inches thick, and laying other necessary surfacing for handling 175,000-lb. wheel loads for a total of 103,500 cu. yd. of concrete is one of the more recent jobs finished in record time by three Multi Foote 34 E Pavers. The average concrete production was 1560 cu. yd. for a ten hour shift, with a high day of 2258 cu. yd.

Records like this for paving airports and roads are everyday production for Multi Foote Pavers because every feature is built for better mixing and faster charging and discharging. Double cone drum with its end-to-end scouring action insures a complete and thorough mix of every batch. Rotary discharge takes only a quarter turn to pour concrete into the big bucket ready to speed out the long boom to be discharged. One of the most important features of every Multi Foote is the high operating platform which provides greater visiblity for faster, more accurate work.

Write direct or ask your Foote dealer for details.

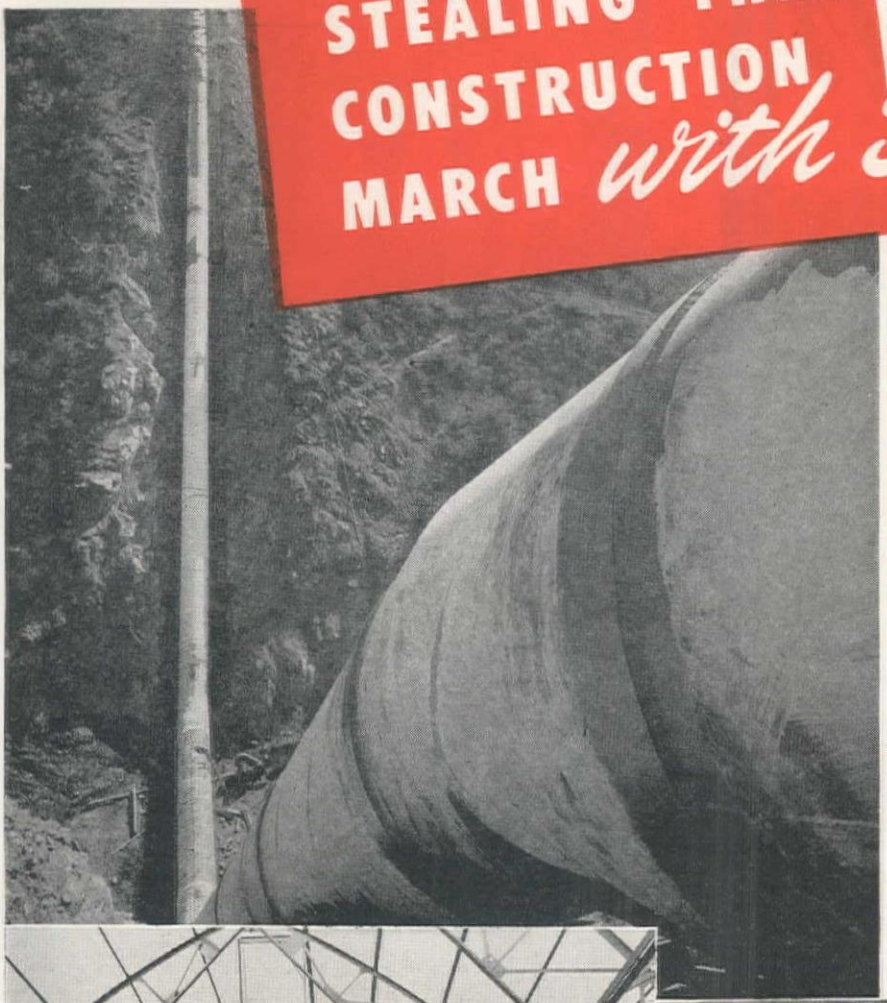
THE FOOTE CO., INC.
1908 State Street, Nunda, N. Y.

ARMY E NAVY

MULTI FOOTE
CONCRETE PAVERS

ADNUN BLACKTOP PAVER

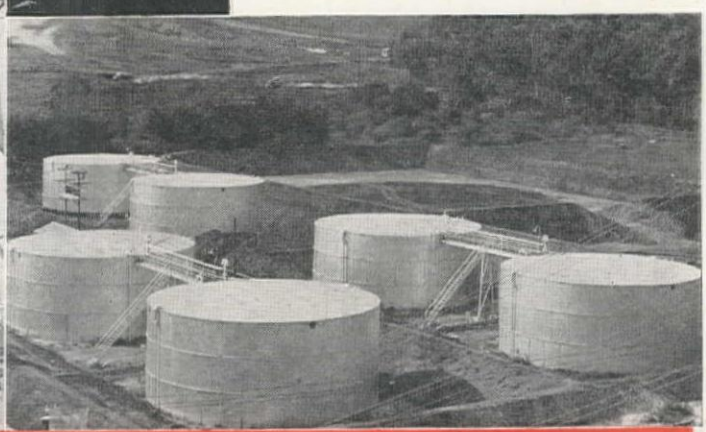
STEALING THE CONSTRUCTION MARCH *with steel!*



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

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

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



WESTERN BUILT PRODUCTS INCLUDE:

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

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

WALKWAYS
STRUCTURAL

Western PIPE & STEEL COMPANY OF CALIFORNIA

Fabricators and Erectors

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

200 Bush Street
San Francisco 6
California

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

BUILD BETTER *Airports*

Use a CEDARAPIDS Model "E" ASPHALT PLANT

Courtesy of TWA

The three thousand new airports to be built after the war must be smooth, permanent, dustless, all-weather, have tremendous load-carrying capacity and be economical to build and maintain. All these features can be had by building runways, taxi strips, aprons, service roads and hangar floors with asphalt. Here's the opportunity for real profits for contractors with Cedarapids asphalt plants. The Cedarapids line of bituminous mixing plants is the most diversified and complete offered by any manufacturer. Take the Model "E" for example, which will enable you to bid successfully on any bituminous job that comes along. Power consumption is low. Grading and proportioning are accurate beyond the tolerances of the most rigid specifications. Its 3000 or 4000-lb. capacity is large enough to handle the largest jobs. The "E" can be set up as a permanent installation or used as a portable plant. Erecting, knocking-down and transporting are exceptionally easy for a plant of this size. Everything has been included that contributes to money-making production. Remember Iowa is also headquarters for aggregate producing equipment too. See your local Iowa dealer for full information.

Cedarapids

Built by IOWA

THE IOWA LINE

of Material Handling Equipment Distributed by:

HOWARD-COOPER CORP.
Seattle, Wash. and Portland, Ore.

BROWN-BEVIS MACHY. CO.
Los Angeles, Calif.

HALL-PERRY MACHY. CORP.
Butte, Mont.

H. W. MOORE EQUIPMENT CO.
Denver, Colo.

INTERMOUNTAIN EQUIP. CO.
Boise, Idaho and Spokane, Wash.

ARIZONA CEDAR RAPIDS CO.
Phoenix, Ariz.

WORTHAM MACHY. CO.
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EDWARD F. HALE CO.
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LUND MACHY. CO.
Salt Lake City, Utah

R. L. HARRISON CO., INC.
Albuquerque, N. M.

SIERRA MACHINERY CO.
Reno, Nev.

ARMY E NAVY

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

Prolonged production of wartime necessities has placed a strenuous test on civilian equipment. Replacements are hard to get nowadays . . . impossible in some cases. It takes superb equipment, properly serviced, to successfully bridge the gap between prewar and postwar supplies. Gar Wood equipment is well known for its ability to deliver rugged, dependable day-in, day-out performance. That reputation was not easily won. Present-day owners of Gar Wood equipment know that it was designed and built to last a long time . . . to get work done quickly and efficiently without babying and constant attention.

"BUY WAR BONDS—AND KEEP THEM"

GAR WOOD INDUSTRIES, INC.

DETROIT 11, MICH. WORLD'S LARGEST MANUFACTURER OF TRUCK AND TRAILER EQUIPMENT

HOISTS AND BODIES • WINCHES AND CRANES • TANKS • ROAD MACHINERY • HEATING EQUIPMENT • MOTOR BOATS

PATTERN FOR PULLING POWER

THE RIGHT TIRE FOR EVERY JOB

HARD ROCK LUG
for all rock work

ALL-WEATHER EARTH-MOVER
for drawn vehicles

How much you haul — and how fast — is what sets the pace for profit on your construction jobs. So drive-wheel tires *must* grip and pull to keep today's bigger yardages moving on schedule.

That's the prime reason why more and more contractors buy Goodyear Sure-Grips for their drive wheels. For this great worker is powered with Goodyear's *open center* tread that gives each husky cleat an entering edge all along the center of the tread. That permits the whole of each lug to dig in deeper and cleaner, take firmer hold in the ground and provide steady, maximum traction under all conditions.

And with no closed corners to trap mud, it's a *true* self-cleaning tread. Those wide, unblocked channels sluice out dirt, mud and stones and leave the sturdy lugs free and clear to bite deep and pull better every time.

Now superarmored with Goodyear's patented Rayotwist cord — *which makes the strongest body we've ever used in a work tire* — these really tough huskies are the finest off-the-road tires that can be built from today's synthetic and permissible natural rubber.

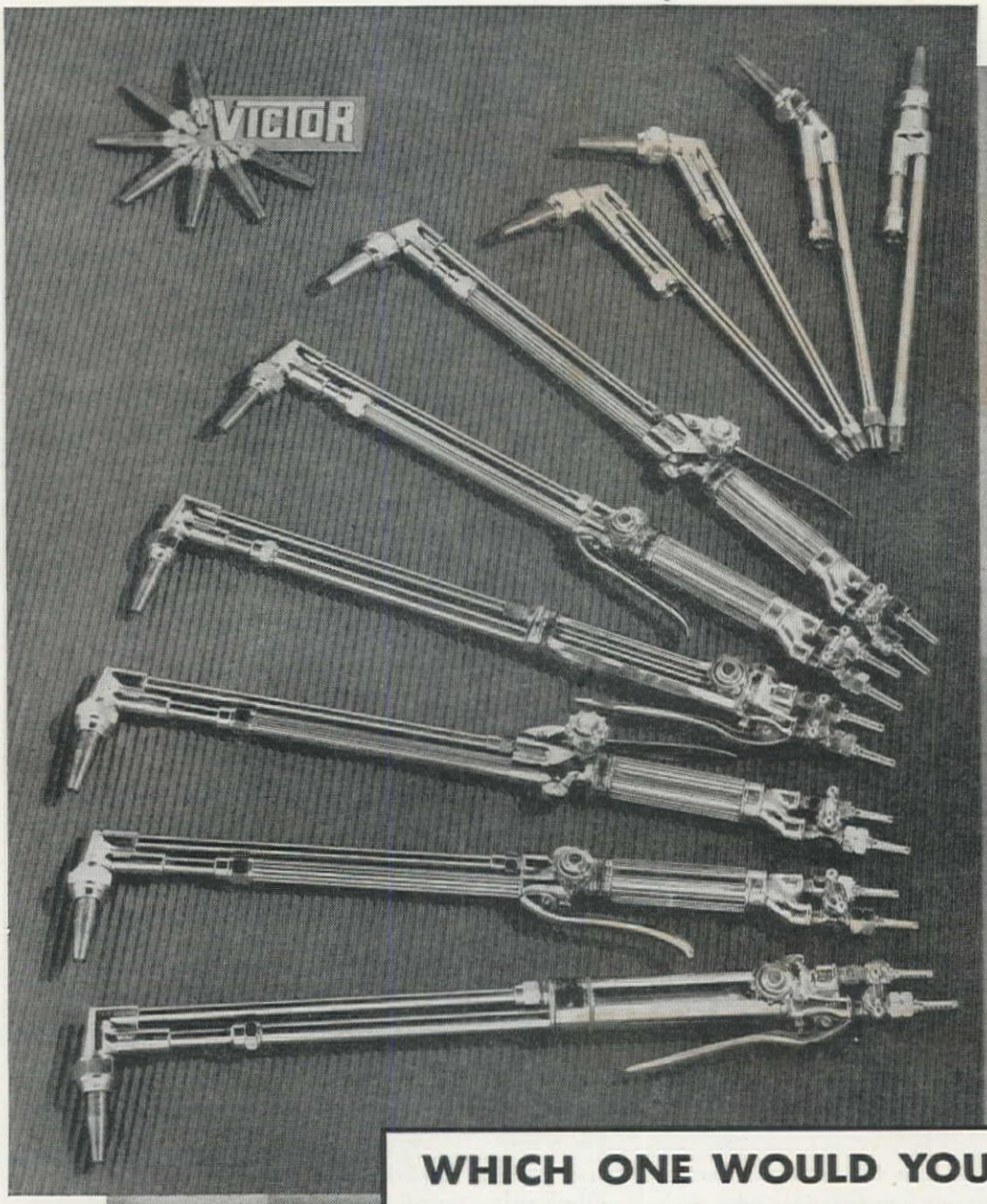
Get Goodyears on your units and you'll soon know why *"more tons are hauled on Goodyear truck tires than on any other kind."*

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

THE GREATEST NAME IN RUBBER

GOODYEAR

BUY MORE WAR BONDS — BUY FOR KEEPS



WHICH ONE WOULD YOU CHOOSE?

COMFORT TOO SAVES MONEY

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

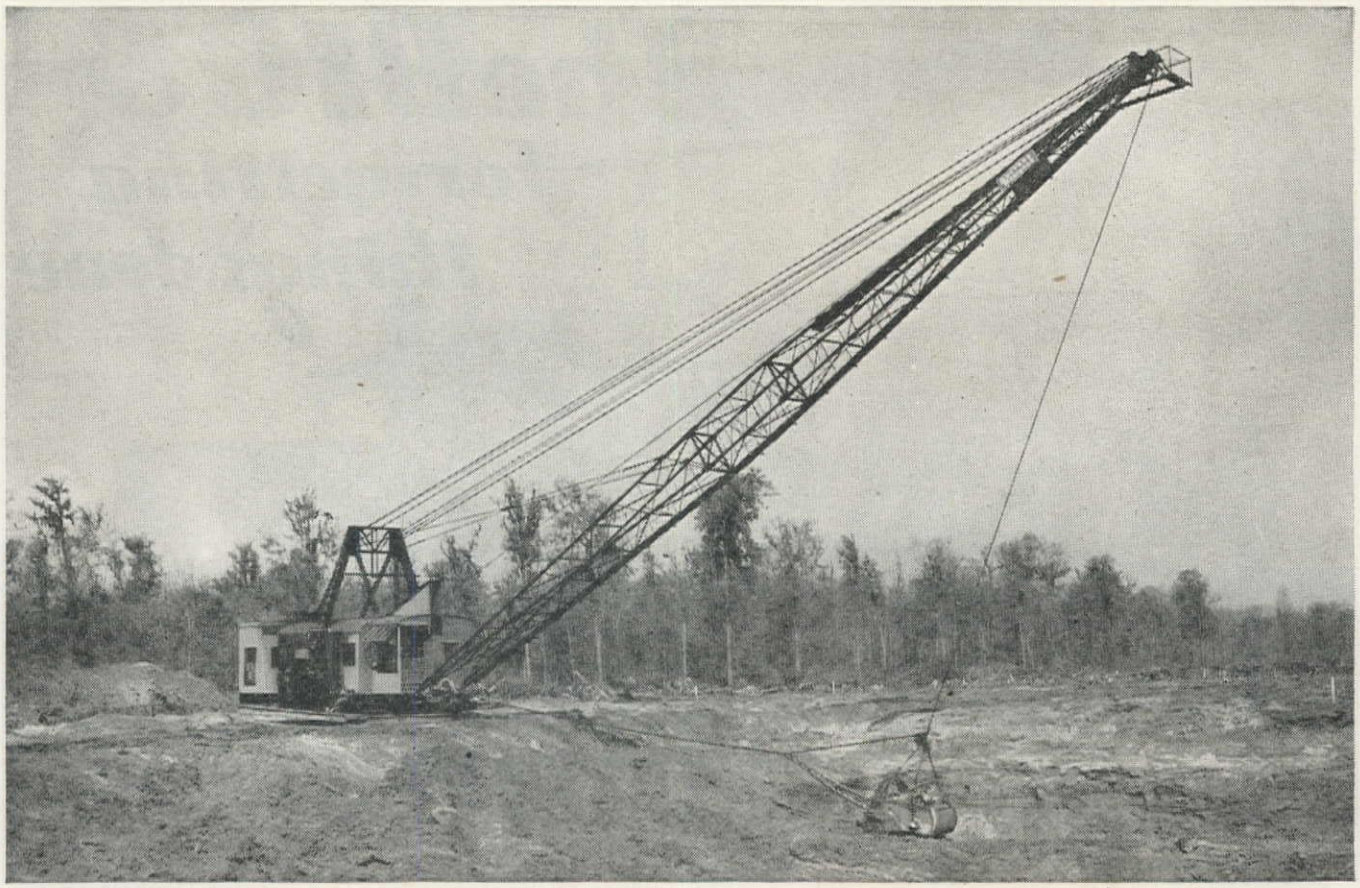
VICTOR

ARMY E NAVY

VICTOR EQUIPMENT COMPANY

844 FOLSOM ST. • SAN FRANCISCO 7, CALIFORNIA

Ad 134



Good for MILLIONS of Yards

BUCYRUS MONIGHAN

Available with booms up to 250 ft.; buckets up to 50 cu. yards.

Smooth walking action and simple durable machinery —these are big reasons why you can count on Bucyrus-Monighan walking draglines for fast dependable service throughout a "life" of millions of yards of output.

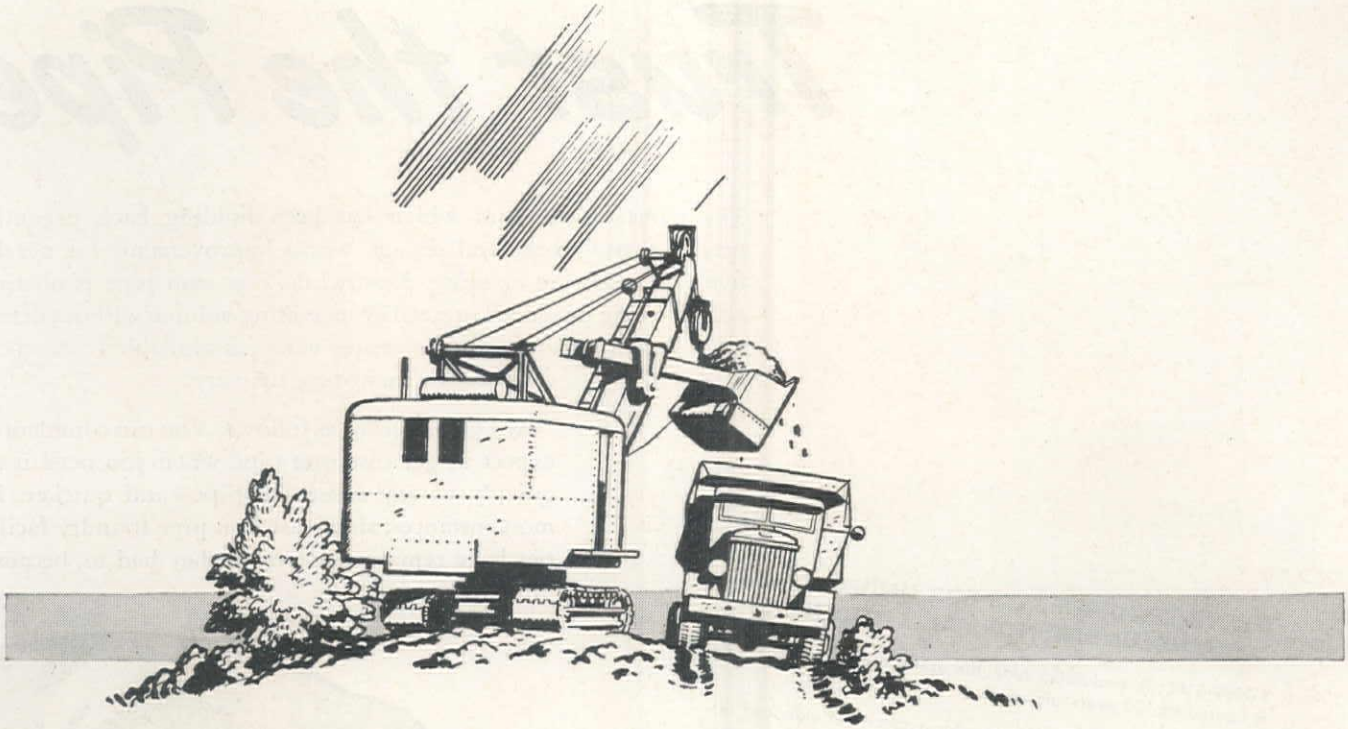
Over rough ground or soft, Bucyrus-Monighans walk smoothly, cushioning down their weight evenly with each step, without the bumps or jars that cause destructive stresses. That's why their walking action lasts . . . why they step out safely, positively, and gently even after moving 15 or 20 million cubic yards. Their "years ahead" digging speed and smoothness lasts, too, because machinery design has the simplicity that keeps maintenance requirements low, digging efficiency high through many years of hard service.

3M45

Sold by

BUCYRUS - ERIE COMPANY

SOUTH MILWAUKEE, WISCONSIN.

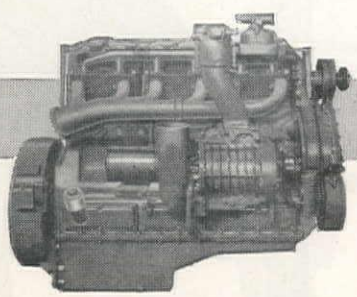


Of this... YOU CAN BE *SURE*

SURPLUS POWER IS PROTECTION . . . protection against the damaging shocks, jerks and strains that add to the abuse and shorten the life of powered earth moving and material handling equipment when there is barely "enough power" for *normal* requirements. *Surplus power* is protection, too, against lagging work cycles or accidents because reserve power is always available for peak loads or to meet any emergency.

For your wheel or crawler-mounted equipment or stationary applications, you can be sure of *surplus power* at the minimum cost in space and weight by standardizing on Cummins Dependable Diesels. Three compact, low-weight-per-horsepower models—150, 200 and 275 hp.—have almost the same mounting dimensions and may be used interchangeably in many cases. All have the same basic design and incorporate a large percentage of the same parts. This assures a simplified service procedure and reduces the parts inventory . . . important points in holding down costs and increasing profits.

Have you carefully considered these advantages in specifying Cummins Diesels for your equipment?



Illustrated is the supercharged, 275 hp. Model NHS Cummins Diesel. In design, dimensions and weight it closely approaches the 150 hp. Model H and the 200 hp. Model NH. All are designed for automotive, portable and stationary power applications. Ask for specifications.

CUMMINS *Dependable* DIESELS

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

CUMMINS ENGINE COMPANY, INC., COLUMBUS, INDIANA

Trust the Pipe

The gates of the dam which has been holding back urgently needed water works and sewage works improvements for nearly five war years are opening. Meanwhile, cast iron pipe is obtainable, is being produced in steadily increasing volume without detriment to war orders, and to a limited extent is available from stock on hand for immediate delivery.

We go on record as follows: You can confidently expect to get cast iron pipe when you need it as quickly as any substitute pipe—and quicker, in most instances, since cast iron pipe foundry facilities have remained intact, as they had to, because

THE 10 REQUIREMENTS FOR UNDERGROUND MAINS UNDER NORMAL CONDITIONS

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

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

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

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

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

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

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

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

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

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

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

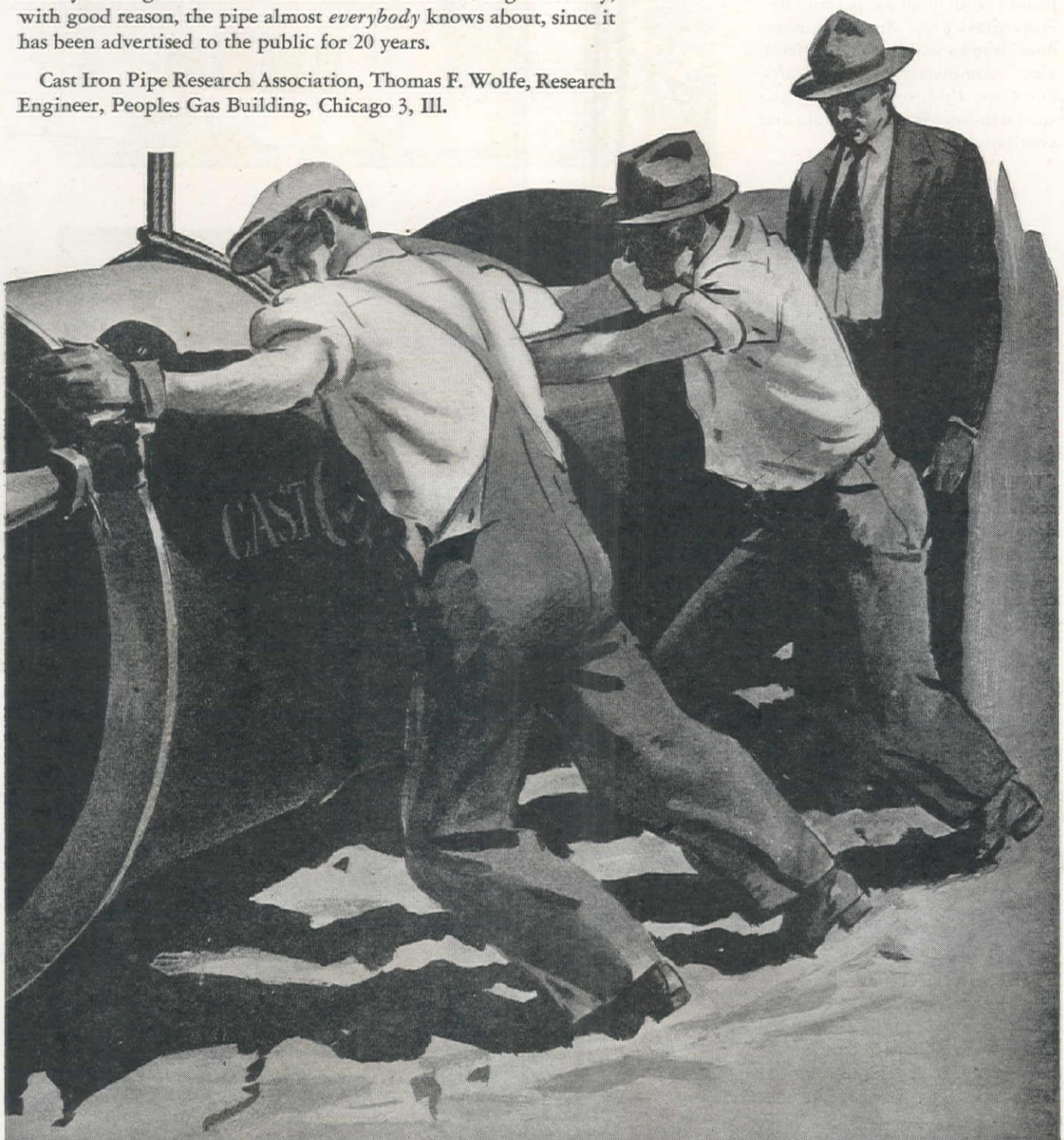
★ ★ ★ CAST IRON PIPE

You Know About

of war construction requirements. *They do not require reconversion.*

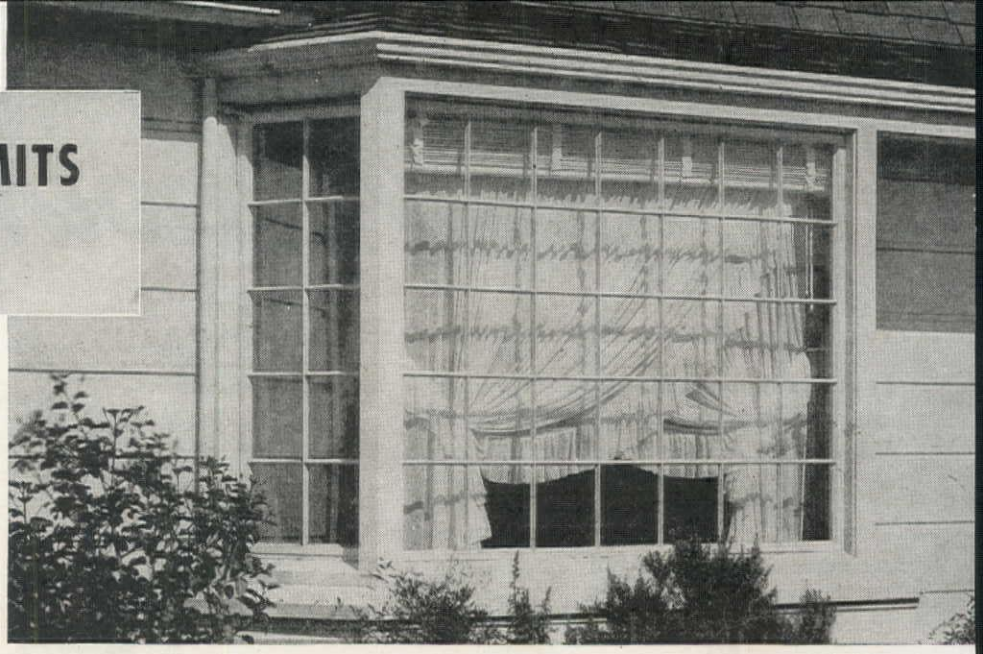
Put your trust in pipe you know about—cast iron pipe with its history of long life and low maintenance cost. We might also say, with good reason, the pipe almost *everybody* knows about, since it has been advertised to the public for 20 years.

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



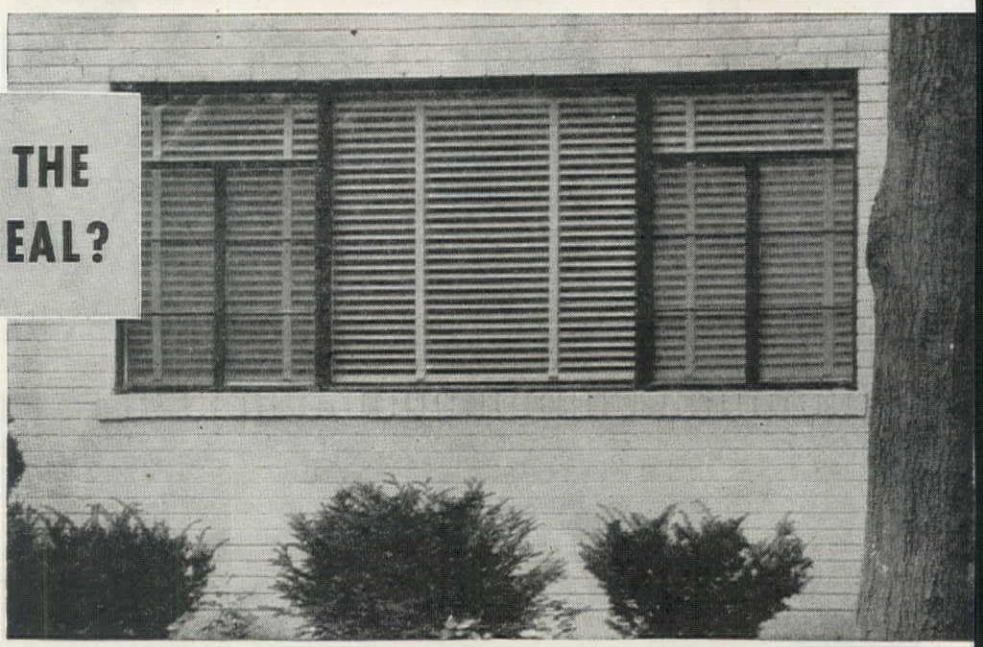
SERVES FOR CENTURIES ★ ★ ★

WHAT WINDOW ADMITS THE MOST LIGHT?



STEEL, as you know! Slender frames and muntins permit 30% more glass area. Steel casements flood homes with light, and fresh air . . . completely control drafts. For Cape Cod, or Modern, Ceco steel windows give more light and ventilation!

WHAT WINDOW HAS THE TIGHTEST WEATHER SEAL?



STEEL! . . . According to a recent scientific study of the Metal Window Institute. So when you design or build a home specify Ceco casements and save on fuel and air conditioning costs.

WHAT WINDOW COSTS THE LEAST?

STEEL! In steel casements the initial cost is the *final* cost. In other windows there are hidden costs you are likely to overlook—hardware, accessories, additional labor costs, etc. So save on window cost . . . specify Ceco *Steel* casements!

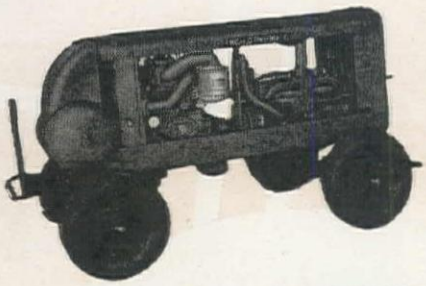
Concrete Engineering Division: Meyer Steel forms, adjustable shores and clamps, reinforcing bars, fabric, etc. **Manufacturing Division:** steel windows and doors, metal lath, metal weatherstrip, metal frame screens, steel joists, steel roof deck. **Highway Products Division. Sheet Steel and Wire Division.**

CECO STEEL PRODUCTS CORPORATION

Manufacturing Division—5701 W. 26th St., Chicago, Ill.

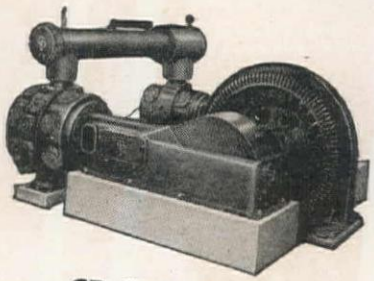
ENGINEERING MAKES THE BIG DIFFERENCE IN CECO CONSTRUCTION PRODUCTS

Your CP Distributor



CP PORTABLE COMPRESSORS

Design refinements in CP Portable Compressors assure 15% to 35% more air per gallon of fuel. Speed varies with air demand — not by steps, but gradually — resulting in marked fuel economy and reduction in wear. CP Portables are available in gasoline-powered models of 60, 105, 160, 210 and 315 c.f.m.; and in Diesel-powered sizes of 105, 160, 210, 315 and 500 c.f.m.



CP CLASS O-CE STATIONARY COMPRESSORS

Ruggedly built and conservatively rated, CP Class O-CE Horizontal-Duplex Motor-Driven Air Compressors meet every requirement of heavy-duty, day-after-day service. They are available in capacities up to 10,000 c.f.m. Other CP Stationary Compressors are also available in vertical and horizontal designs for steam, belt and electric motor drive in a wide variety of capicities and pressures.

CP-42 SINKER DRILL

Fast drilling speed, strong rotation and good hole-cleaning qualities make the CP-42 Sinker the preferred tool for shaft sinking, quarry drilling, general excavation and road work. Low air consumption makes it particularly suited for portable air compressors.

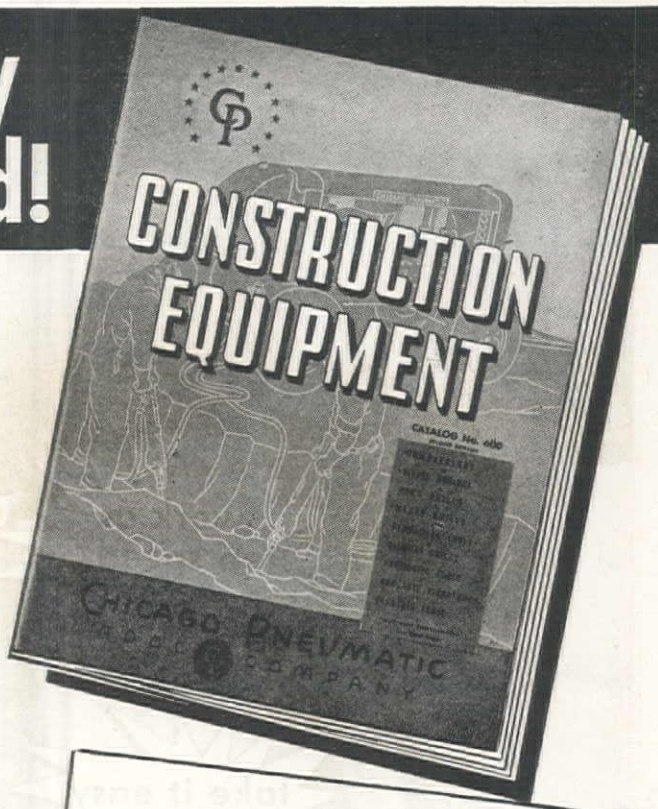
CP-115 DEMOLITION TOOL

Weighing only 59 lbs. with latch type retainer and 55 lbs. with spring type, gives outstanding performance for a medium weight tool. Valve-actuated, it operates smoothly with minimum kick back. Full cushioning eliminates need for side rod springs — protects the head from punishment in "breaking through." Gooseneck air inlet prevents the operator's hand from catching in swing of hose.

CP-116 SHEETING DRIVER

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

...Is Always Ready with Practical Aid!

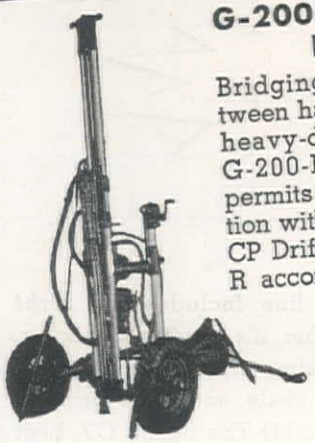


CP Distributors are selected for their thorough knowledge of the contracting field. In addition, each is backed by over 45 years of Chicago Pneumatic experience in successfully supplying contractors' needs. Your CP Distributor can furnish all desired information on efficient, economical Air Compressors, Rock Drills, Pneumatic Tools and other CP products.

CHICAGO PNEUMATIC TOOL COMPANY

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

G-200-R WAGON DRILL



Bridging the gap between hand sinkers and heavy-duty CP G-500, G-200-R Wagon Drill permits one-man operation with most powerful CP Drifter Drills. G-200-R accommodates 6-foot steel changes; 18 to 24-foot steels are easily handled.

CP SUMP PUMP

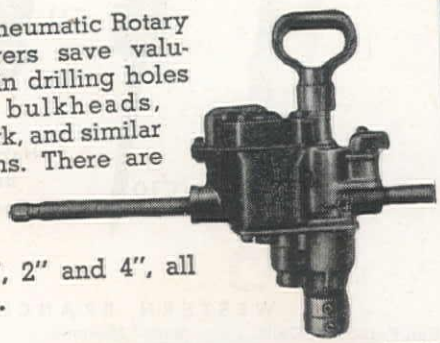
For removing water from manholes, ditches, tanks or pits quickly and cheaply. Requires no priming. CP Sump Pumps will operate from any air compressor delivering 100 or more cubic feet per minute.

CP BACKFILL TAMPERS

In trench work particularly, CP Backfill Tampers quickly earn their cost by saving the time and labor involved in hauling surplus excavated material. For general tamping, CP-3 is recommended; for heavy tamping, CP-MM; for extremely heavy tamping, CP-4.

CP ROTARY WOOD BORERS

Chicago Pneumatic Rotary Wood Borers save valuable time in drilling holes in piers, bulkheads, trestle work, and similar applications. There are three sizes of CP Wood Borers, 1", 2" and 4", all reversible.



Distributors

BALZER MACHINERY CO., Portland, Oregon

WESTERN MACHINERY CO., Spokane, Washington

HALL-PERRY MACHINERY CO., Butte, Montana

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

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

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

Help Finish the Fight! Buy MORE War Bonds and Stamps!

☆ The complete Cleveland line includes the *right* model for *every* job—whether it's paving breaking, demolition work, frost breaking, ripping up foundations or masonry, breaking shale and hard ground, etc. Make your choice from: (1) The 80 lb. C7, best for average work; two run from a No. 85 compressor. (2) The 82 lb. C7, a slugger for the hardest work; two run from a No. 85 compressor. (3) The 35 lb. C10, a smaller tool for lighter work; three run from a No. 85 compressor. (4) The 58 lb. C11, with long stroke and heavy, slugging blow. Two run from a No. 85 compressor. All these Cleveland models have *always* been air cushioned.

To help you further there are "Cleveloy" *armor-plated* chisels, moils and tools; durable "Veribest" air hose and Cleveland quick-acting hose couplings.

Write for Bulletin 128 on Cleveland Paving Breakers

WESTERN BRANCHES

San Francisco, Calif. 582 Sixth Street
Butte, Montana 41 East Broadway
Wallace, Idaho 515 Bank Street
El Paso, Texas 1225 Texas St.
Salt Lake City, Utah 65 W. Fourth South St.
Los Angeles, Calif. 3817 Santa Fe Ave.

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THE RIX COMPANY, INC. San Francisco 3, Calif.
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NELSON EQUIPMENT CO. Portland, Oregon
A. H. COX CO., INC. Seattle, Washington

The Cleveland Rock Drill Co.

Division of the Cleveland Pneumatic Tool Company

CLEVELAND 5, OHIO

BRANCH OFFICES IN PRINCIPAL CITIES AND MINING CENTERS

★ LEADERS IN DRILLING EQUIPMENT ★

"...now use Ring-Free exclusively..."

Excerpts from letter of—
N. G. HILL
N. G. Hill & Co., Contractors
Phoenix, Arizona

"...four years ago, after we purchased a fleet of Chevrolet trucks for a road construction job on Highway 77, we were induced to try Ring-Free Motor Oil.

...the test was a tough one due to weather conditions...heavy snow and rain in winter...heat and dust storms in summer.

...during all this time we did not pull a head or pan in any of the trucks except one damaged by striking a huge boulder.

...after the job was completed we removed heads and pans on all motors which had from 50,000 to 60,000 motor miles.

...all compression rings were free...all drain holes in oil rings open...also drain back holes in pistons completely open and no carbon on the under side of the pistons. Cylinder heads and valves were also clean and all valve stems free in the guides. Engine pans and oil pump screens were cleaner than we expected...all bearings were in good shape.

...we now use Ring-Free exclusively in all our equipment*...we recommend Ring-Free Motor Oil to other contractors."

** 36 Trucks—Fords, Chevrolets, Internationals; 6 A.C. Tractors, Diesel powered. 1 D-8 Caterpillar; 3 Graders—2 powered by International and 1 by Caterpillar motor; 1 International T. D-40 Tractor; 1 Lorraine 40—¾ cubic yard power shovel; 3 Light Plants powered by Kohler motors; 1 Gravel plant powered by 8800 Caterpillar Diesel. Also numerous pick-ups and station wagons.*

Operators of all types of equipment report lower-cost, more efficient performance with Ring-Free Motor Oil. Find out how Ring-Free can help lick your toughest lubrication problems... Phone or write the nearest Macmillan office.

MACMILLAN PETROLEUM CORPORATION

MACMILLAN RING-FREE MOTOR OIL

50 W. 50th Street, New York 20 • 624 So. Michigan Avenue, Chicago 5 • 530 W. Sixth Street, Los Angeles 14 •

HOW A B-G BUCKET LOADER KEEPS YOUR TRUCKS Rolling

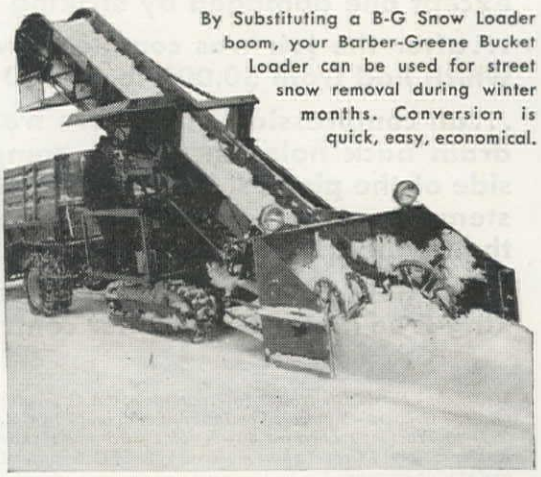
• Cut down their idle time. Keep trucks moving in rapid rotation with a fast feeding Barber-Greene Bucket Loader.

There is no cheaper way to load bulk materials . . . no better way to hold labor costs down.

No time lost getting into position. With its crawler mounting, you can get over soft spots, maneuver in cramped corners easily.

Cutting action across the full width of the feeding spirals keeps the buckets full. Material is delivered at top capacity from stockpiles, natural deposits and during light excavating, stripping, or shoulder shaping. You have twelve crowding speeds to cope with any loading condition.

There are a score of other advanced mechanical features in the B-G Bucket Loader that will help you save money on every material handling job. Write for free literature. Barber-Greene Company, Aurora, Illinois.



By Substituting a B-G Snow Loader boom, your Barber-Greene Bucket Loader can be used for street snow removal during winter months. Conversion is quick, easy, economical.

45-7

Barber-Greene B-G *Constant Flow Equipment*

Heavy-Duty Autocar-Diesels!

A limited quantity of new, heavy-duty Autocar Trucks are now being built by Government authorization. A fortunate few haulers of essential loads can get them. Maybe you can qualify.

Superbly engineered and precision-built *by Autocar,* Autocar-Diesels cost more *because they're worth more.* No one knows this better than Associated Lumber and Box Company, one of the leading producers of special lumber in the United States. They rely on these famous, heavy-duty trucks to haul Ponderosa Pine and Sugar Pine in the Sierra-Nevadas. They know that heavy-duty Autocars do the rugged, brutal work they're built to do . . . profitably, economically, tirelessly.

Follow the leaders, for they know the way!

THE AUTOCAR COMPANY

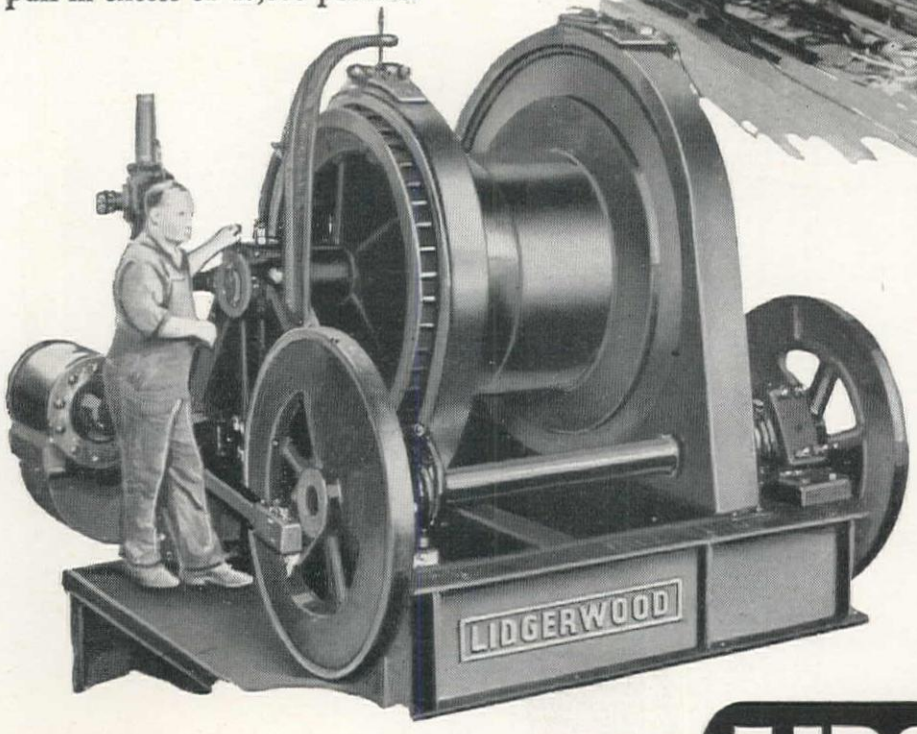
BIG PRODUCERS OF BIG DIESEL TRUCKS

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

LIDGERWOOD builds the BIG ones too...

These giant floating derricks—considered the largest in use today—are equipped with dependable LIDGERWOOD heavy-duty steam operated MAIN LINE, AUXILIARY and LUFFING hoist engines.

Rugged LIDGERWOOD construction shows clearly in the illustration (below) of the double cylinder, 16" x 18" reverse link motion MAIN LINE steam hoist. This hoist provides power to spare for the operation of the huge 150 ton capacity floating derricks—affording a reserve that has permitted handling loads in excess of 250 tons. The engine is geared for a single line pull in excess of 40,000 pounds.



LIDGERWOOD Steam, Electric, Diesel, Gasoline and Belt operated hoists are *built to fit the job.* While they are currently being furnished exclusively to the Government and war-related industries, our available facilities are at your disposal, to study your needs and make recommendations on your present *and* post-war requirements.

Send for *the new LIDGERWOOD Combination and Illustrated Hoist Bulletins. They will be sent promptly at your request on your business stationery.*

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

Represented in California by Industrial Equipment Co., Emeryville, California

SMOOTH, ACCURATE WORK... A "Cinch" with Adams

● Sound engineering design and rugged mechanical construction are absolutely essential to smooth, accurate blading and scarifying.

These important, necessary characteristics are inherent in every Adams Motor Grader: (1) *Balanced Weight Distribution,* assuring always-ample pressures for forcing blade and scarifier into hard materials; (2) *Positive-Acting Mechanical Controls,* providing fast, accurate blade and scarifier adjustments; (3) *Built-in Rigidity* and absence of lost motion in controls hold blade and scarifier solidly in place.

Let your near-by Adams dealer show you how these, and many other outstanding Adams features, will materially speed grading operations and reduce operating costs for you.

Local Adams Dealers

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CALIFORNIA	—Lee & Thatro Equipment Co., Los Angeles Sutton Tractor & Equip. Co., Sacramento J. G. Bastain, Redding Valley Equipment Co., San Jose, San Francisco Brown Tractor Co., Fresno Thompson-Sage, Inc., Stockton Farmers Mercantile Co., Salinas Stevenson Farm Equip. Co., Santa Rosa Stanislaus Impl. & Hdwe. Co., Modesto Exeter Mercantile Co., Visalia Gallagher Tractor & Impl. Co., Merced
COLORADO	—McKelvy Machinery Co., Denver
IDAHO	—Intermountain Equipment Co., Boise, Pocatello
MONTANA	—Industrial Equip. Co., Billings, Missoula
NEVADA	—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 Intermountain Equipment Co., Spokane
WYOMING	—Industrial Equip. Co., Billings, Mont. The Lang Company, Salt Lake City, Utah

J. D. ADAMS MANUFACTURING CO.
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Sales and Service Throughout the World

ADAMS

ROAD-BUILDING AND EARTH-MOVING EQUIPMENT

TOMORROW'S SHOVEL

TESTED • PROVED APPROVED

Soon available to shovel users . . . for excavating and material handling

The speed required in mobile, mechanized warfare now results in new speedy mobility for power shovels and cranes.

Here is Byers "Traveler", a half yard shovel (convertible to all attachments) which sets new high standards for efficiency, output and performance. Until recently available only on high priorities . . . soon available to all shovel and crane users for general excavating and material handling. You can profit with the following outstanding features:—

1. **Self Propelled . . . around the job or on the highway.**
   ELIMINATES TRAILER

2. **One man operated . . . All controls conveniently grouped for operating or steering by the one operator.**
   ELIMINATES SECOND MAN

3. **4-wheel drive . . . 6 wheel traction, mud grip tires.**
   SPECIALLY ENGINEERED CHASSIS

4. **Digs all around . . . Over front, sides, back.**
   A FULL CIRCLE MACHINE

5. **Air controls, hydraulic brakes. Power steer.**
   NOT AN "OLD" DESIGN MODERNIZED

6. **New smooth "Airflex" cool internal expanding clutches.**
   FREE FROM ADJUSTMENT AND REPAIR

7. **Enclosed gears running in flowing oil.**
   EFFICIENT, CLEAN, LONG-LIVED

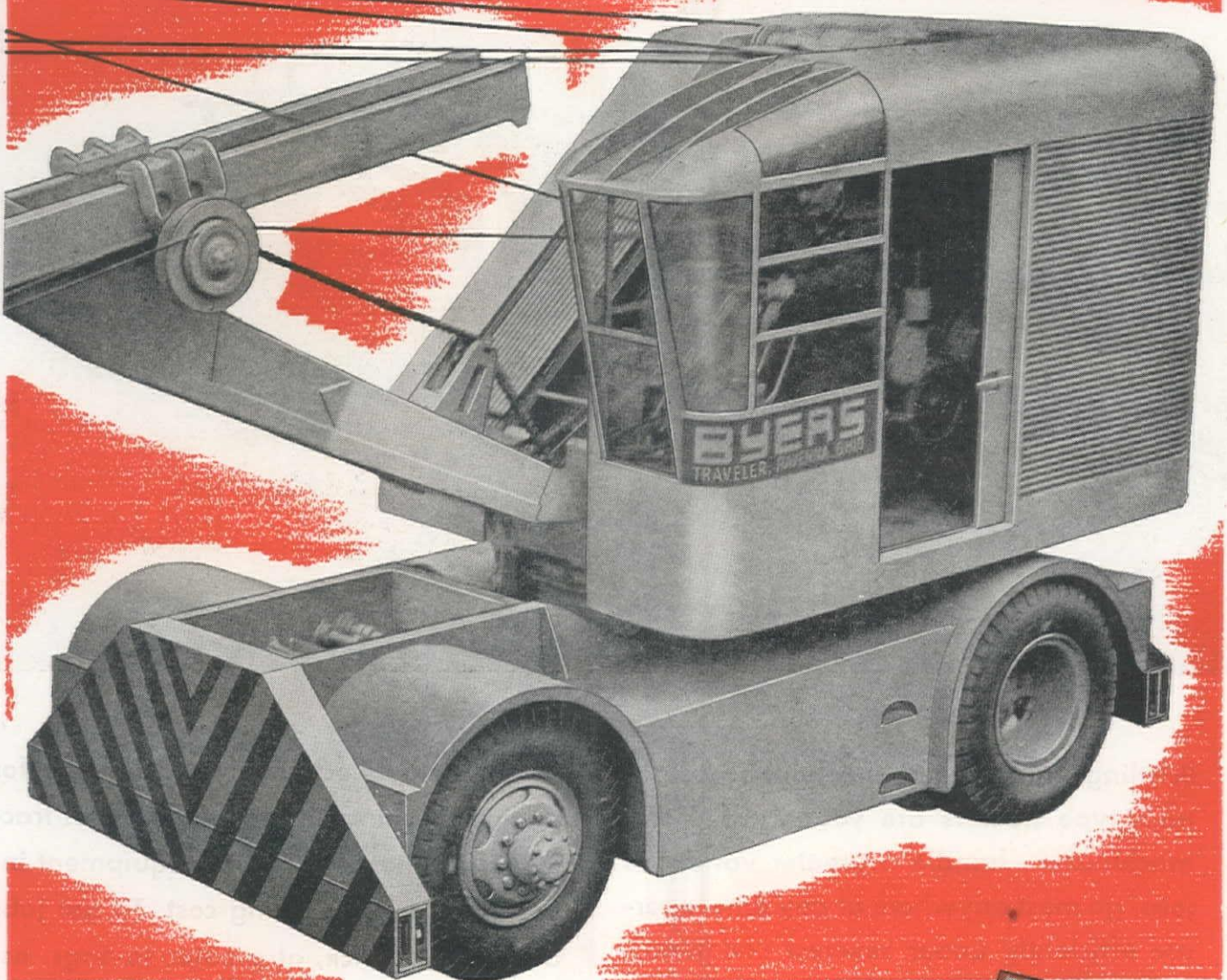
Inquire Today for Descriptive Booklet. FREE

BYERS HALF YARD TRAVELER

IS HERE *Today!*

Tomorrow's shovel needs no trailer to carry it from job to job . . . it carries itself at truck speeds.

Byers shovels are distributed through:
Edward R. Bacon Co., San Francisco
Nelson Equipment Co., Portland & Seattle Offices
Ray Corson Machinery Co., Denver
Willard Equipment, Ltd., Vancouver, B. C.



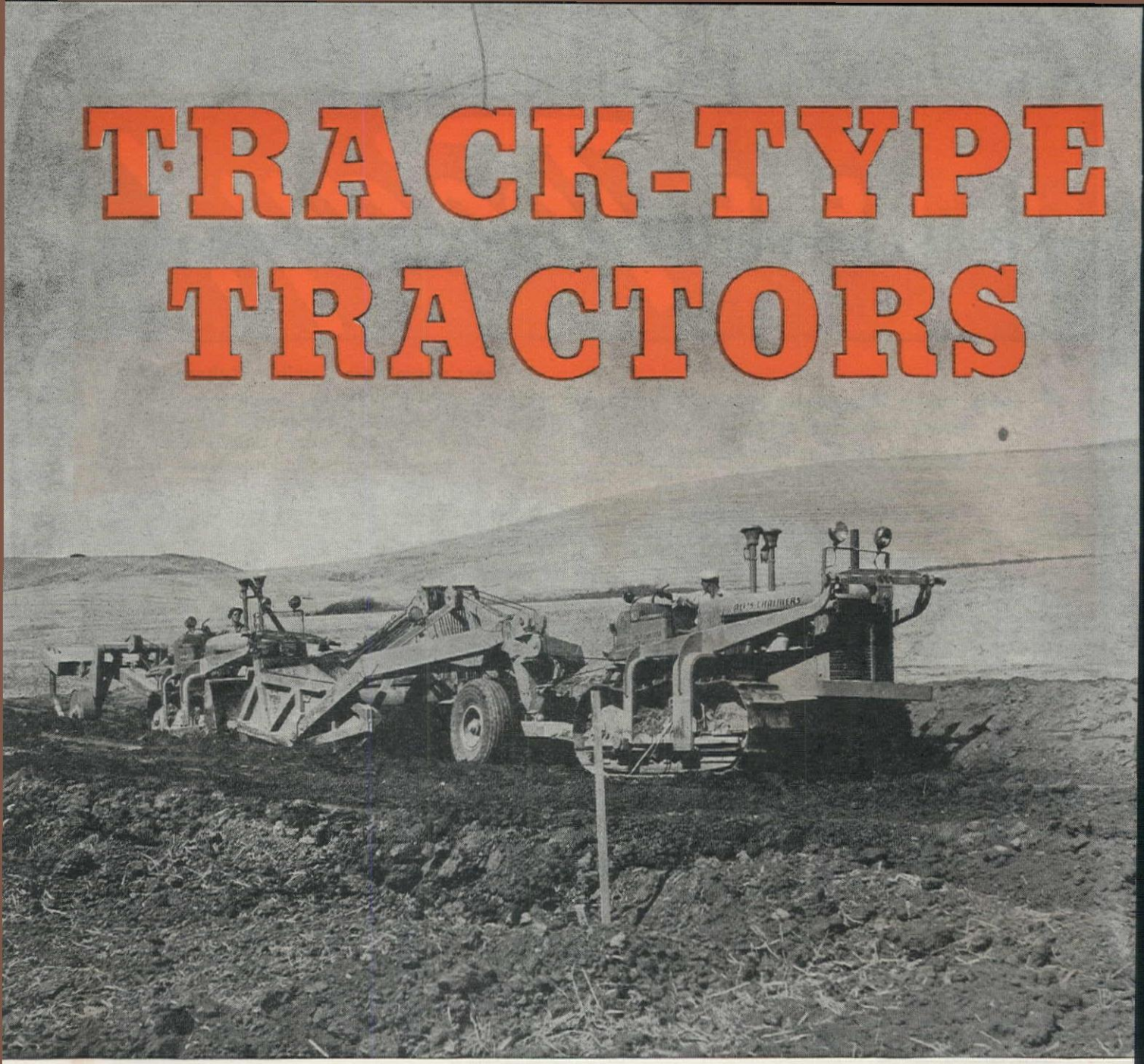
***INQUIRE TODAY** for this valuable booklet that tells what to look for in any new shovel or crane you buy*

THE BYERS MACHINE COMPANY

RAVENNA, OHIO

Distributors Throughout The World

TRACK-TYPE TRACTORS



Bristling with power and built to use it, track-type tractors are your most useful machines — handle a greater variety of jobs, go most anywhere at any time, operate efficiently under severest conditions. Work in mud, sand, clay, gravel, rock, dirt . . . in lowlands or mountains, on steep grades, narrowest quarters, any climate!

A complete selection of attachments for pulling, pushing, lifting, widens your tractor's usefulness . . . reduces equipment investment and operating cost. To get jobs done right, quick, at greater savings, assign them to your TRACK-TYPE TRACTORS!

• • •

FIGHT TO VICTORY WITH WAR BONDS

WATCH 2-CYCLE . . . the Modern Diesel Power

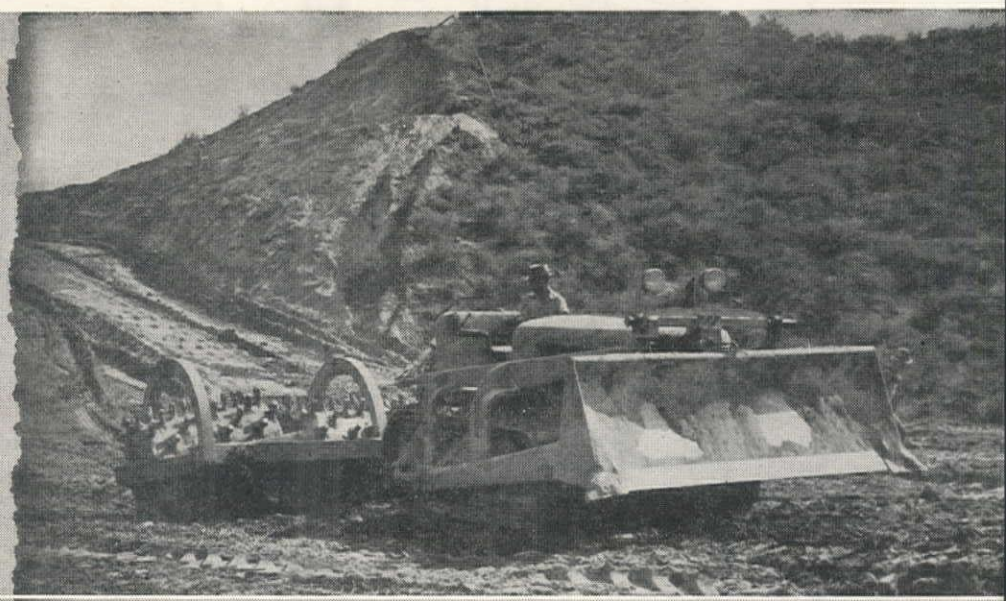
ALLIS-CHALMERS

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

your most *Versatile* machines

Pull

Just hitch it to the drawbar! A track-type tractor efficiently handles any pulling job—hauling scrapers, graders, sheepfoot rollers, rippers and other equipment.

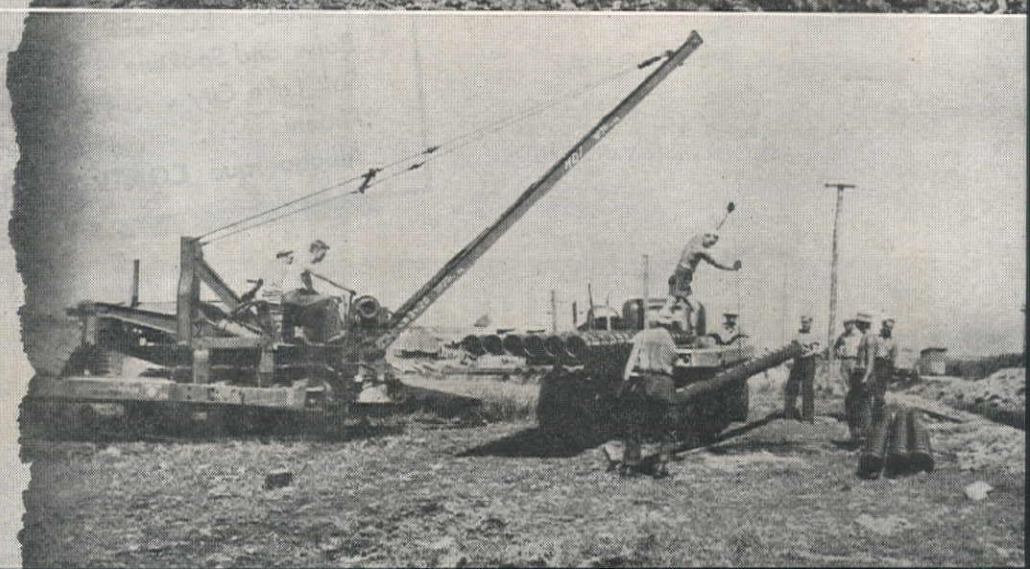


Push

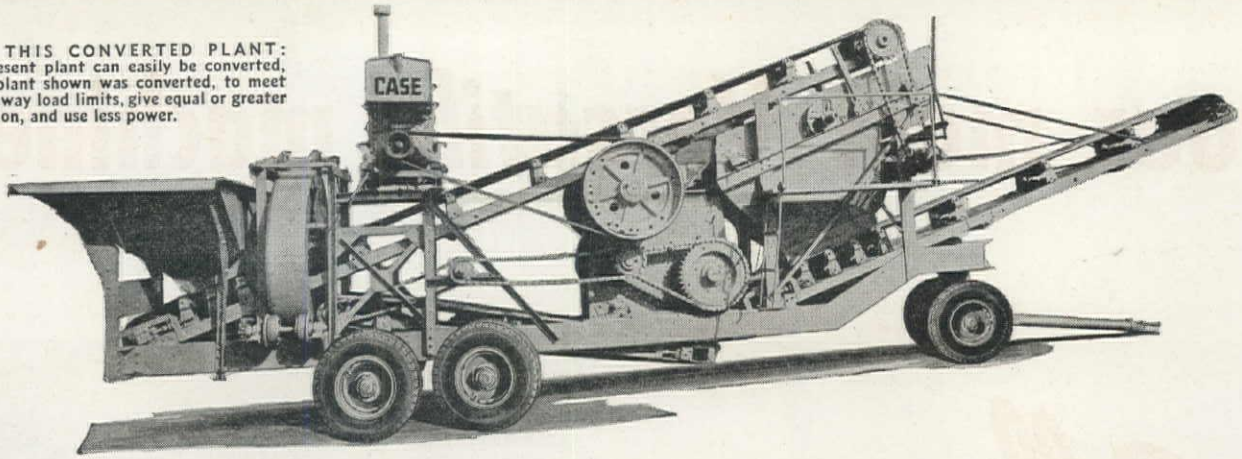
Many are the jobs that call for a track-type tractor's ground-gripping traction and great pushing power — bulldozing, pusher-loading, clearing, boosting other equipment!

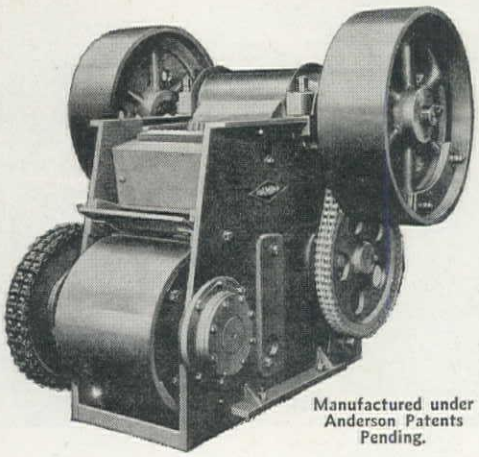
Lift

You can make a crane, a hoist or a shovel out of a tractor by simply mounting the auxiliary equipment. Your track-type tractor is your basic tool!



NOTE THIS CONVERTED PLANT:
Your present plant can easily be converted, as this plant shown was converted, to meet any highway load limits, give equal or greater production, and use less power.





Manufactured under Anderson Patents Pending.

DUAL-ACTION
Jaw and Roll Combined
IN BUT ONE UNIT

A DIAMOND Dual-Action PLANT
weighs LESS than 40,000 lbs.

That's right, mister! This revolutionary, new, DIAMOND Crusher is jaw and roll combined — half the weight, less space, less power and all the capacity or more.

Install it in your present used plant (as illustrated above), or get a complete DIAMOND "DUAL-ACTION" PLANT designed especially for this great Crusher. Three standard sizes — No. 20, No. 30 and No. 40 — weighing complete only approximately 26,000, 32,000 and 38,000 pounds.

Your DIAMOND dealer has all the details about this Crusher and how it can be installed in a used plant, and about the new standard "DUAL-ACTION" plants. Ask him for DIAMOND Bulletin D-45-M and get the amazing story of this most revolutionary advance in crushing since the invention of the eccentric jaw.

Other Diamond Products:
Washing and Screening Plants, Hammermills, Screens, Conveyors, Bins, Feeders

Write for Bulletin D-45-M on DIAMOND "DUAL-ACTION" CRUSHERS AND PLANTS.

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DIAMOND

DIAMOND IRON WORKS, INC.
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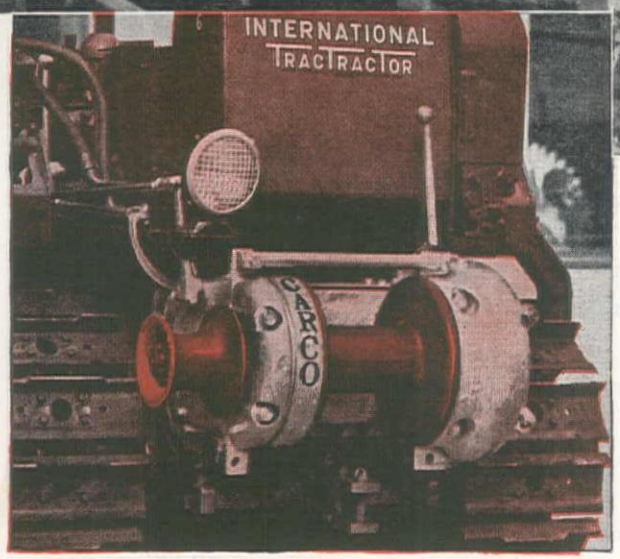
TRACTOR WINCHES by CARCO



ROAD CONSTRUCTION—WEYERHAEUSER TIMBER COMPANY, MOLALLA, OREGON

A CARCO Winch will save you *time* and *money*. . . . Every time there's a hoisting, towing or skidding job . . . every time your truck or tractor is stuck . . . every time there are logs, stumps or rocks to move, material or machinery to be handled . . . every time there's clearing or road building to be done.

A powerful CARCO Winch, mounted on your tractor, will be used continually. On any logging, construction or industrial project, a CARCO Winch increases the tractor's usefulness many times.

Most sales of CARCO Winches are repeat orders—proof that once you own a CARCO Winch you'll never be satisfied with anything else.

See your nearest tractor dealer today. He will help you select the proper size and type of single or double drum CARCO Winch or Hoist, designed for matched performance with your tractor.

PACIFIC CAR AND FOUNDRY COMPANY

CARCO

SEATTLE AND RENTON, WASHINGTON, U. S. A.

THE NEWS IS OUT

"COMBINATION

Northern Calif. and Nevada

OFFICES NOW OPEN IN SAN FRANCISCO

The Moore Equipment Co. have entered the heavy-duty equipment field with a trained and experienced organization to give contractors of the West a complete rounded-out service.

Featuring leading lines of equipment . . . our own special facilities and many other services to come . . . we have many advantages to offer contractors both NOW and post-war.

Our San Francisco offices are temporary . . . and as soon as conditions permit, will have full sized quarters with adequate sales and show rooms . . . service and parts departments.

Meanwhile let our representative tell you complete details of our "Combination of Services."

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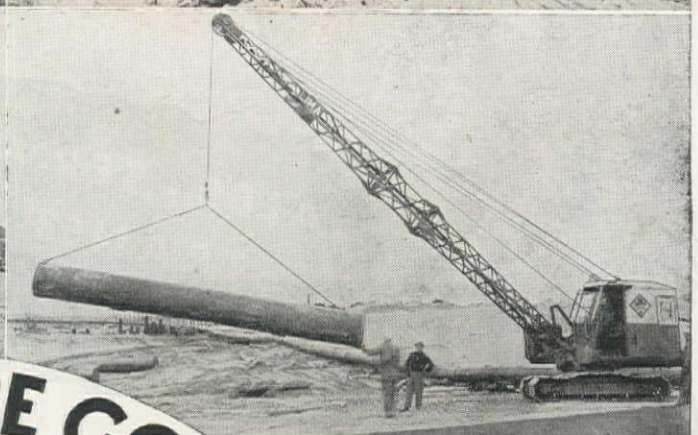

SOME DAY YOU ARE GOING TO BUY A 3/4 yd. Paymaster

When you buy your next 3/4 yard shovel, crane, dragline or pull-shovel you can make no better choice than a LIMA *PAYMASTER*. The *PAYMASTER* is relatively light in weight yet rugged enough to withstand the most severe conditions encountered in hard digging. It is equipped with an 18′ box type boom and 15′ tubular type dipper handle. When equipped as a shovel the *PAYMASTER* can easily be converted to a crane, dragline or pull-shovel or conversely without major dismantling. Such an advantage makes the *PAYMASTER* an efficient tool, adaptable to many kinds of work. A LIMA shovel, crane or dragline is identified by the Diamond on the cab. The LIMA Diamond is a symbol of 75 years of quality workmanship and dependable service.

Write now for a copy of bulletin No. 034C.

LIMA LOCOMOTIVE WORKS, Incorporated
SHOVEL and CRANE DIVISION LIMA, OHIO

NEWARK, N. J. NEW YORK, N. Y. DALLAS, TEXAS MEMPHIS, TENN.
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LIMA

LIMA

SHOVELS • DRAGLINES • CRANES • PULL-SHOVELS

Our Seattle Office, 1932 First Avenue South; Feenaughty Machinery Co., 112 S. E. Belmont St., Portland; and their Boise address, 600 Front St.; Garfield and Co., 1232 Hearst Bldg., San Francisco; Smith Booth Usher Co., 2001 Santa Fe Ave., Los Angeles; Held & McCoy Machinery Co., 3201 Brighton Blvd., Denver; Smith Booth Usher Co., 1756 Grand Ave., Phoenix; Steffeck Equipment Co., Main and Cutter Streets, Helena, Montana; Willard Equipment Limited, 860 Beach Ave., Vancouver, British Columbia, Canada; Western Machinery Co., P. O. Box 2196 (748 W. 8th Street), Salt Lake City, Utah; Contractors' Equipment and Supply Co., Springer Bldg., P. O. Box 456, Albuquerque, New Mexico; Wells Alaska Motors, Fairbanks, Alaska, and Modern Machinery Co., Inc., N. 2417 Division St., Spokane, Washington.

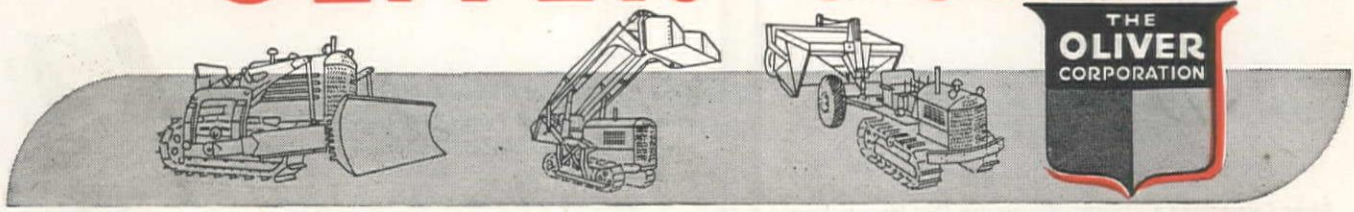
• Combine the sure-footed power of an Oliver "Cletrac" crawler tractor with the versatility of a Sargent overhead shovel and you get a one man construction crew that really speeds job progress.

You get maximum traction to crowd backwards into the pile and get a full dipper every time . . . to speed forward and discharge fast . . . even in the muddiest going.

This "one man gang" speeds loading out trucks . . . stripping loam or overburden . . . handling snow removal . . . digging foundations . . . tearing up and loading out old cobblestone or black top street surfaces . . . or on any job that calls for a speedy, powerful tractor shovel. And in a very few minutes a cable operated bulldozer or angledozer can be attached for grading or spreading operations. It's an all purpose unit . . . tractor, loader, angledozer, or tractor shovel.

For complete information on the "one man gang" that can help step up the pace of your jobs, see your Oliver "Cletrac" dealer. Substantial numbers are now being released for essential use. Your dealer will gladly assist you in making application. **The OLIVER Corporation,** 19300 Euclid Avenue, Cleveland, Ohio.

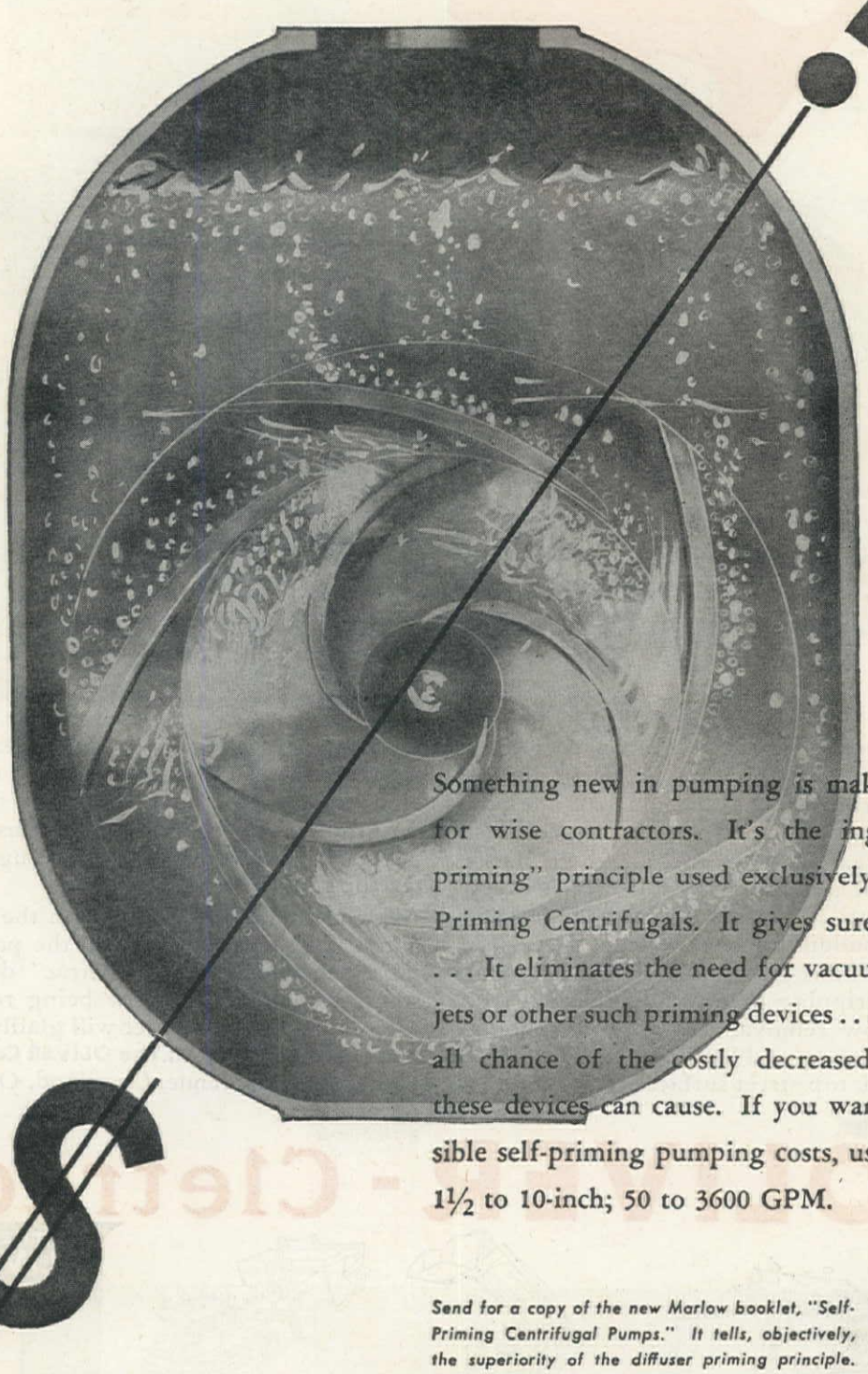
OLIVER - Cletrac



State of California: Gustafson Tractor Co., Eureka, Calif.; Mechanical Farm Equipment Dist., Inc., San Jose, Calif.; Comber & Mindach, Modesto, Calif.; Nelson Equipment Co., Los Angeles, Calif.; Tractor & Equipment Co., San Leandro, Calif.; Flood Equipment Co., Sacramento, Calif.; W. J. Yandle, Santa Rosa, Calif. State of Washington; Burrows Motor Co., Yakima, Wash.; Inland Truck & Diesel Co., Spokane, Wash.; Pacific Hoist & Derrick Co., Seattle, Wash. State of Oregon: Loggers & Contractors Machinery Co., Portland, Ore. State of Idaho: Idaho Cletrac Sales Co., Lewiston, Idaho; The Sawtooth Company, Boise, Idaho. Western Montana: Western Construction Equipment Company, Billings, Mont. British Columbia: A. R. Williams Machinery Co., Vancouver, B. C.

Is this NEW pumping principle

MAKING MONEY *for YOU*



Something new in pumping is making more money for wise contractors. It's the ingenious "diffuser priming" principle used exclusively in Marlow Self-Priming Centrifugals. It gives surer, faster priming . . . It eliminates the need for vacuum pumps, valves, jets or other such priming devices . . . thus it eliminates all chance of the costly decreased efficiency which these devices can cause. If you want the lowest possible self-priming pumping costs, use Marlows. Sizes 1½ to 10-inch; 50 to 3600 GPM.

Send for a copy of the new Marlow booklet, "Self-Priming Centrifugal Pumps." It tells, objectively, the superiority of the diffuser priming principle. Write—it's free.

DISTRIBUTORS

Glenn Carrington Co., Seattle, Washington (For Interior Alaska)
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ENGINEERED BY MARLOW

MARLOW PUMPS, RIDGEWOOD, NEW JERSEY

For the LOW BIDS Ahead!

GAR WOOD ROAD MACHINERY

WITH ALLIS-CHALMERS DIESEL POWER

Make your share of the huge after-Victory program of road building and construction a profitable share. All out competition and low bids will be the rule. Your profit margins will depend largely on your ability to cut the costs of getting jobs done.

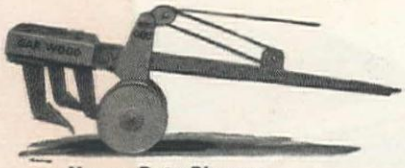
For lowest costs in all of your earth moving operations, you can count on Gar Wood Road Machinery and Allis-Chalmers Diesel Power. This is the combination with proved ability to make fast work of the toughest jobs. It is the choice of many leading contractors on the basis of actual savings in operating costs. Make these savings yours. Get the facts about Gar Wood Road Machinery from your Allis-Chalmers dealer.

SPECIFY GAR WOOD FOR OUTSTANDING PERFORMANCE

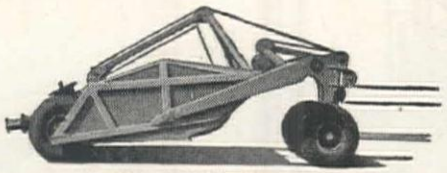
Cable Dozecasters

4-Wheel Hydraulic Scrapers

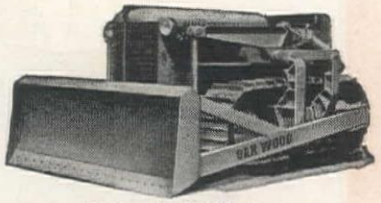
2-Wheel Hydraulic Scrapers



Heavy Duty Rippers



4-Wheel Cable Scrapers



Hydraulic Bulldozers

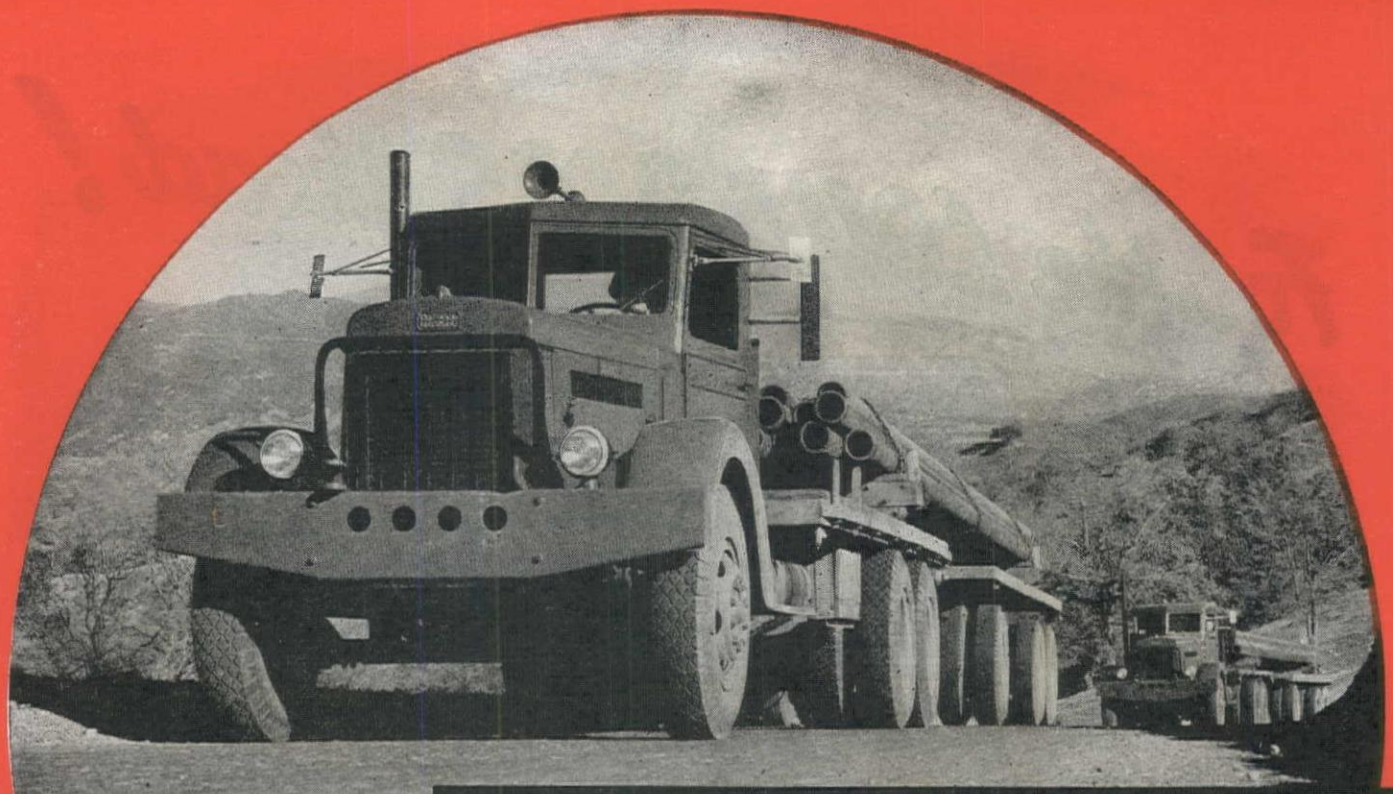
GW ROAD MACHINERY is Sold Through ALLIS-CHALMERS Dealers Everywhere

ROAD MACHINERY DIVISION

GAR WOOD INDUSTRIES, Inc.

DETROIT 11, MICHIGAN

OTHER GAR WOOD PRODUCTS: HOISTS AND BODIES • WINCHES AND CRANES • TANKS • HEATING EQUIPMENT • MOTOR BOATS

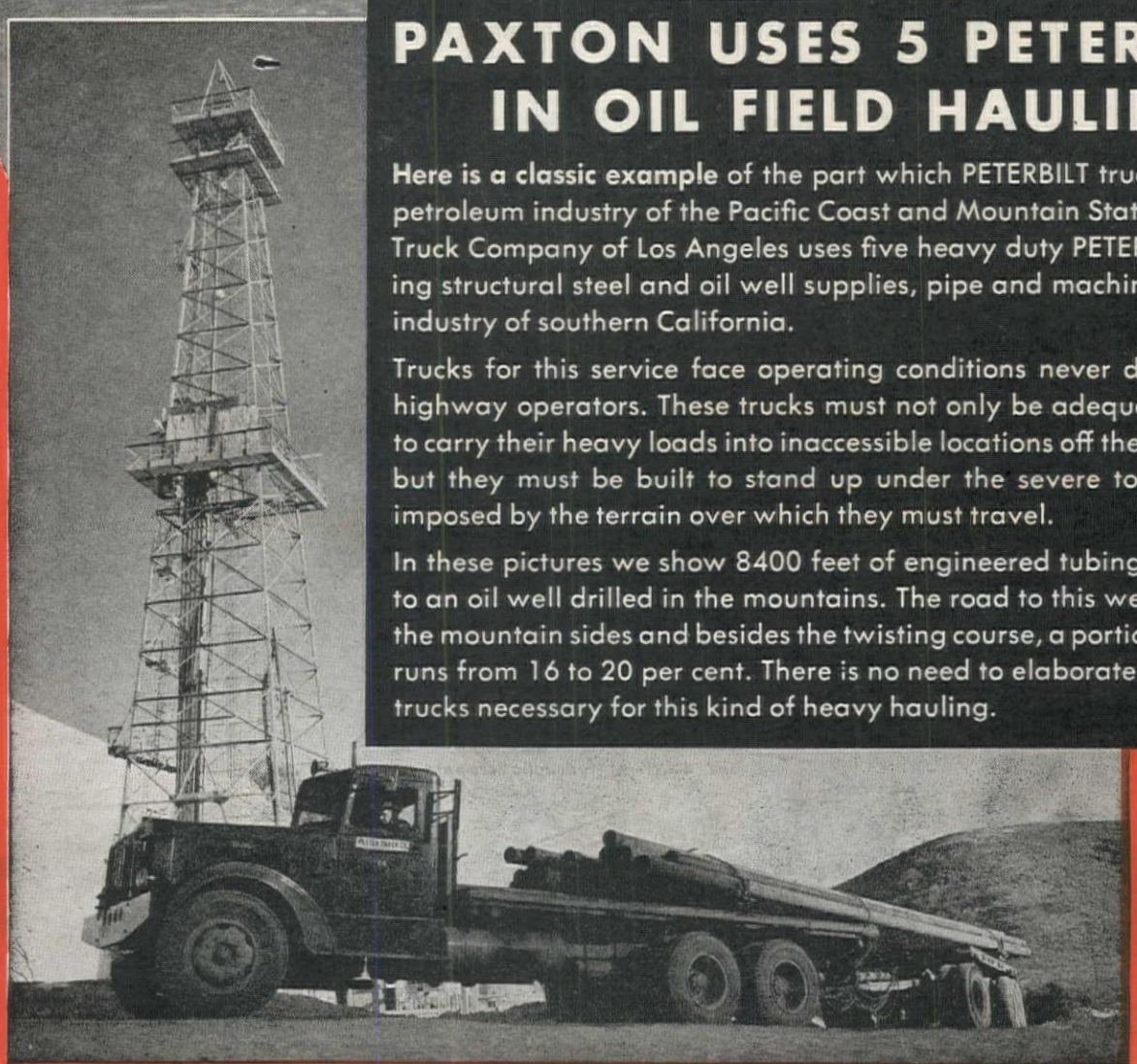


PAXTON USES 5 PETERBILTS IN OIL FIELD HAULING

Here is a classic example of the part which PETERBILT trucks play in the petroleum industry of the Pacific Coast and Mountain States. The Paxton Truck Company of Los Angeles uses five heavy duty PETERBILTS in hauling structural steel and oil well supplies, pipe and machinery for the oil industry of southern California.

Trucks for this service face operating conditions never dreamed of by highway operators. These trucks must not only be adequately powered to carry their heavy loads into inaccessible locations off the beaten paths, but they must be built to stand up under the severe torsional strains imposed by the terrain over which they must travel.

In these pictures we show 8400 feet of engineered tubing being hauled to an oil well drilled in the mountains. The road to this well was cut into the mountain sides and besides the twisting course, a portion of the grade runs from 16 to 20 per cent. There is no need to elaborate on the type of trucks necessary for this kind of heavy hauling.



Peterbilt Motors Company

107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORN

THIS GREASE PROTECTS THE CORE OF THE CABLE

1. Internal lubrication of wire rope is highly important, but smearing just any kind of grease on the outside is not lubricating it. You need a special grease that will *get to the core.*

2. Unacal Cable Lubricant does this because it contains a solvent that permits it to penetrate to the core in less than a minute. Then the solvent evaporates, leaving a reservoir of protective oil inside the cable.

3. This reservoir *within* the rope keeps oiling the wires and feeding lubricant to the rope as it works, thus protecting both the inner and outer strands from abrasion and excessive wear.

4. As an added precaution, Union Oil puts a special rust preventive in Unacal Cable Lubricant to stop rust and corrosion when the wire is used around water and corrosive liquids.

5. Unacal Cable Lubricant is easy to use . . . you simply apply it directly with a paintbrush or by any other convenient method. Then your cables last longer and give safer, better service.

Ask your local Union oilman today — or write Union Oil Company, Los Angeles 14, Calif. — for a supply of Unacal Cable Lubricant, the grease that protects all of the cable.

UNACAL CABLE LUBRICANT

UNION 76

Another UNION OIL *Success-Tested Product*

Affiliate Member, Associated General Contractors of America

Preformed wire rope

SAVES REPLACEMENT 3 WAYS

Since preformed wire rope lasts longer, obviously it reduces frequency of replacing the rope itself. Not quite so obvious, but equally important, is the ease with which preformed wire rope adjusts itself to different uses. Because of its ready adaptability—its resistance to rotating in sheave grooves and its better spooling qualities—preformed postpones the replacement of machine parts or shut-downs for repairing. A third way in which preformed wire rope saves replacement is with the men on the job. As preformed rope is safer to handle it reduces lost-time accidents. Make certain your next wire rope is preformed.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

How Rains, Cold Weather, Poor Soil Conditions Were Licked at Gustavus

Grading, draining and paving methods which successfully solved unusually tough problems encountered in building an isolated airport in Alaska's rain belt

EARLY RECONNAISS
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Strait to the south.

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DO A VARIETY OF JOBS WITH A *Single* PIECE OF EQUIPMENT

The most versatile piece of excavating and construction equipment on the market. Goes anywhere a truck will go, at road speed. Works on soft ground where heavy equipment bogs down. Operates efficiently, under adverse conditions, where big machines cannot go. Requires no time for loadings when ready to move to the next job.

There's no limit to the number of jobs that can be done with a Quick-Way Truck Shovel. Custom built attachments make possible quick conversion of shovel into dragline, trench hoe, orange peel, clamshell, crane or pile driver in less than two hours, right on the job.

Get better profits from small jobs. Do them with a Quick-Way Truck Shovel, the shovel that does a variety of jobs better, because of these outstanding features:

1. MOBILITY PLUS SPEED.
2. BALANCED FOR SHOVEL OPERATION WITHOUT COUNTER WEIGHT OR OUTRIGGERS.
3. QUICK CONVERSION OF SHOVEL TO ANY ATTACHMENT.
4. ACCESSIBILITY TO AND INTERCHANGEABILITY OF PARTS.
5. HEAVY DUTY ENGINE FOR SHOVEL OPERATING POWER. STANDARD TRUCK ENGINE FOR SPEEDY TRAVEL TO THE JOB.
6. TOUGH STEEL CONSTRUCTION FOR DURABILITY.
7. SIMPLICITY OF DESIGN.

The "QUICK-WAY" is the best way to do MORE jobs for Greater Profits

WRITE FOR COMPLETE INFORMATION

SALES REPRESENTATIVES
George L. Meffley & Co.
820 UNIVERSITY BLDG., DENVER 2, COLO.

QUICK-WAY
TRUCK SHOVEL CO. DENVER 1, COLO., U. S. A.

CYCOL FORM OILS

For Smoother Finish, Faster Operation

CYCOL COMPOUND FORM OIL: For *Metal* Forms. This is an *additive* Form Lubricant, containing an oiliness agent for easier handling and removal. This outstanding Tide Water Associated product resists every action of water in the mix to penetrate its protective film.

CYCOL FORM OIL—REGULAR: For *Wood* Forms. Assures easy removal of any wood form used in concrete work . . . and a smoother job.

Cycol Form Oils are time and money savers. If you are not now using them, see your nearest Associated Representative for full information and quick delivery in any quantity.

TIDE WATER ASSOCIATED OIL COMPANY

LET'S GET ASSOCIATED

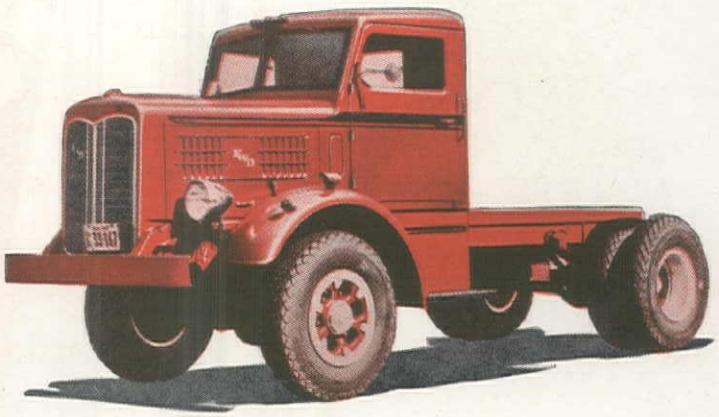
SPECIALIZED LUBRICANTS
FOR EVERY INDUSTRIAL PURPOSE

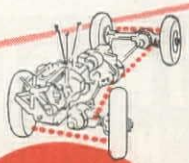
☆ VICTORY ☆ ☆ ☆ ☆ ☆
still depends on you

Wood is vital for war
— prevent forest fires

SPEED with SAFETY....

Plus Ample Reserves of "Going Power" for Any Emergency





Whether it's new highway construction or seasonal maintenance work — blading a road, hauling material, clearing snow — or an emergency job demanding better than usual truck performance, rely on an FWD to do the work with speed — safety — low cost.

The superior performance and stamina of FWDs in all classes of highway work originates in experienced, specialized four-wheel-drive engineering — engineering that provides the highest development of the true four-wheel-drive principle with center differential — engineering that equalizes power and load distribution — engineering that divides working strains over two driving axles — engineering that means a rugged, dependable highway "worker" in every detail.

There are good reasons why FWD trucks are the first choice of highway men.

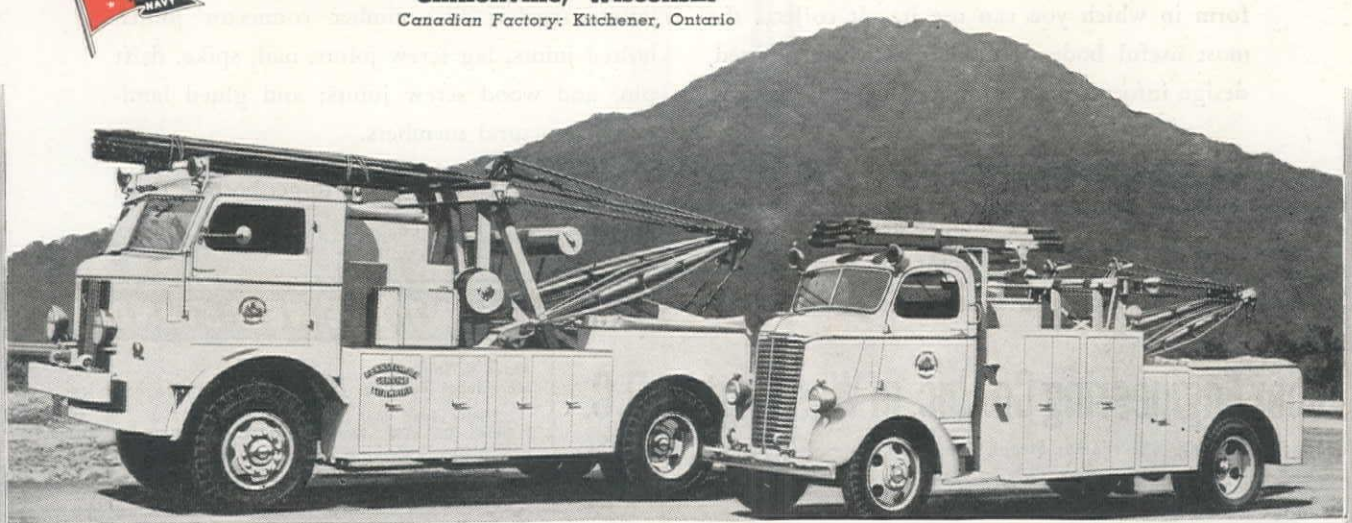
Write us or see your FWD dealer for information on available FWD trucks.

FWD TRUCKS

THE ORIGINAL EXCLUSIVE BUILDERS OF FOUR-WHEEL-DRIVE TRUCKS

ARMY NAVY

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



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

INTRODUCING A NEW DESIGN PARTNER

"National Design Specification", a new convenience volume, joins with TECO DESIGN MANUAL to conserve your time . . . effort!

You can now throw "rule of thumb" design data for timber out the drafting room window and save time locating widely separated information you need for engineering in timber.

The new . . . *National Design Standard for Stress-Grade Lumber and Its Fastenings* . . . gives you just what you need quickly and in the form in which you can use it. It collects the most useful body of modern, scientific, tested, design information on timber and its fastenings.

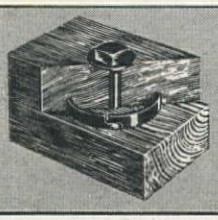
Recommended by the National Lumber Manufacturers Association as a technically sound national standard for lumber design practice, it correlates in a single volume the miscellaneous references you need. Used in combination with the *Teco Design Manual*, the two books provide the basic foundation for your . . . How-To-Design-It-In-Timber Library.

The *Specification's* data is divided into the following classifications . . . general provisions; allowable unit stresses for stress-grade lumber; design loads; design formulas for beams, columns, trusses, etc.; timber connector joints, bolted joints, lag screw joints, nail, spike, drift pin, and wood screw joints; and glued laminated structural members.

Use the COUPON NOW to get both of these books . . . they are free.

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

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



SPECIFY TECO CONNECTORS
SPLIT RINGS • SHEAR PLATES
GROOVING TOOLS

I WANT THE NEW STANDARD

WCN

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

Please send me without charge the new . . . NATIONAL DESIGN STANDARD FOR STRESS-GRADE LUMBER AND ITS FASTENINGS.

I would also like a copy of TECO DESIGN MANUAL (Check.....).

Name.....

Firm.....

Business.....

Address.....

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

POWER FOR DEEP HOLES with I-R Wagon Drills

The X71-WD drill, that is used on FM-2 Wagon Mountings, has the power required to turn long drill steels and to provide the slugging blow necessary to maintain high drilling speed in deep holes. The piston is the heaviest used in any hammer drill, and has an extremely long stroke. It hits a heavy blow and its unique follow-through characteristic overcomes the inertia of long, heavy drill steel. Strong rotation results, hence the bit is always taking deep, fresh bites in the rock. The cuttings are easily removed by the drill's unusually effective method of hole cleaning.

The flexibility of the FM-2 Wagon Mounting permits the use of the powerful X71-WD drill in all kinds of ground. Holes can be drilled at any angle—wherever you want them. If you have a tough job of drilling to do, these are the Wagon Drills to use. Your footage per shift will be greater and your costs lower.

Ingersoll-Rand

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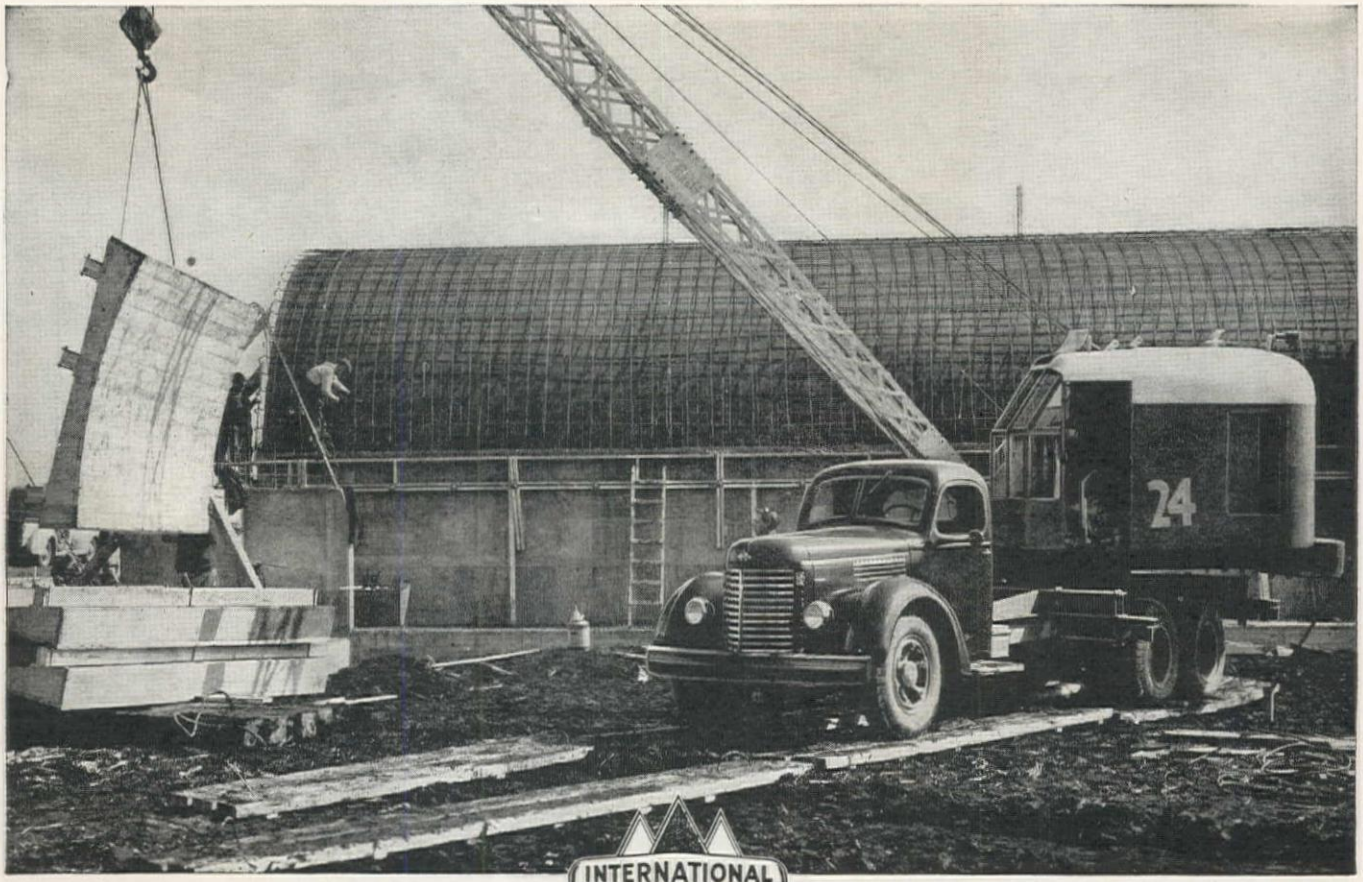
COMPRESSORS • TURBO BLOWERS • ROCK DRILLS • AIR TOOLS • CENTRIFUGAL PUMPS • CONDENSERS • OIL AND GAS ENGINES



INSTRUMENTS OF POWER

...So Common We Miss Their Meaning

AN instrument of power, the truck and crane above. We take them in our stride, these instruments of power, as we do almost all the amazing things about us. We see big, heavy-duty trucks at work on construction jobs, but we never stop and say: "There is a miracle of American ingenuity... an idea embodied in steel and rubber... there is power... American power that throws its full weight on the enemy."

The performance of American trucks, drivers, and truck service men, here on the home front, has been a real battle story through the war years. Trucks without number are old—too old, we would have said a few years ago. But they've gone on, these trucks, nursed by their drivers and coddled by service men. And their jobs have been done—the long, long list of jobs the Nation needs done when the chips are down.

Watch these old trucks—the heavy haulers! See how many of them wear the Triple-Diamond Emblem of International Harvester. . . . In the ten years before the war more Heavy-Duty Internationals were sold than any other make. The truck itself was the reason. The truck itself is still the reason—the rugged International Truck dependability that still enables these veterans to do a full day's work.

INTERNATIONAL HARVESTER COMPANY

HARVESTER

180 North Michigan Avenue
Chicago 1, Illinois

New Trucks: The government has authorized the manufacture of a limited quantity of International Trucks for civilian hauling. See your International Dealer or Branch for valuable help in making your application.

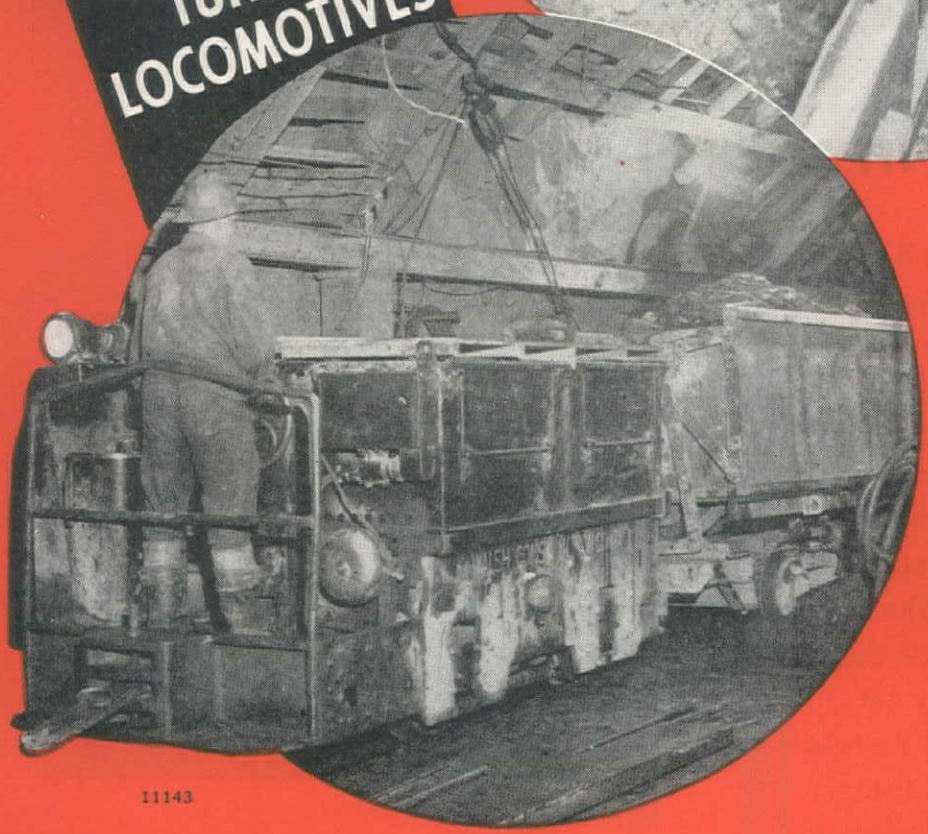
International Truck Branches located at San Diego, Los Angeles, West Los Angeles, Glendale, Fresno, Sacramento, Oakland, San Francisco, Portland, Tacoma, Seattle, Spokane, and Salt Lake City.

INTERNATIONAL *Trucks*

Loading Speed With **CONWAY MUCKING SHOVELS**

Haulage Speed With **GOODMAN TUNNEL LOCOMOTIVES**

14422



11143

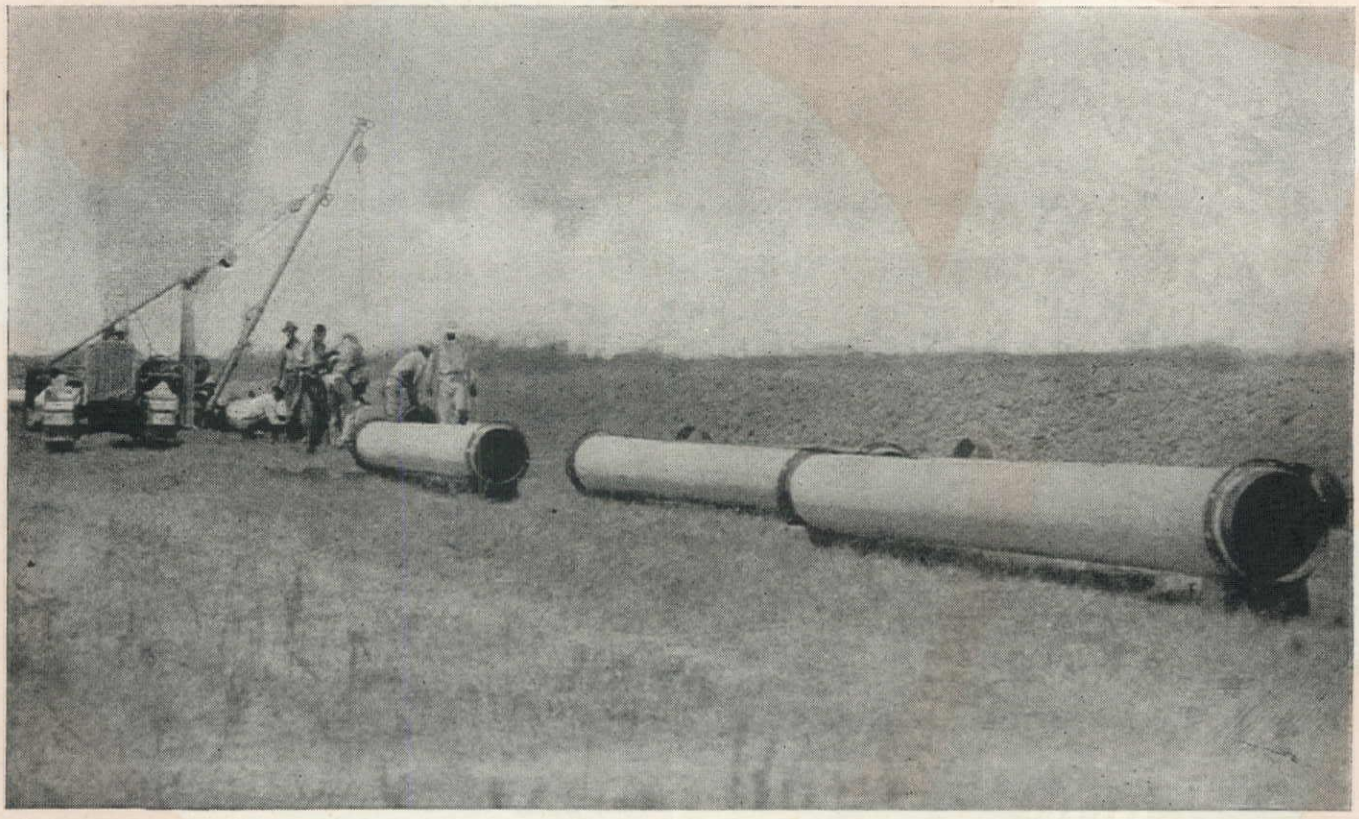
Goodman builds a special line of mucking shovels and electric locomotives for tunnel work. Conway shovels, long noted for unequaled loading records and low mucking costs, are built in many sizes and types to suit the various conditions of excavation projects. Goodman locomotives, in both trolley and battery types, are designed to fit the specific requirements of the job.

Ask a Goodman sales engineer to explain how Goodman equipment can serve you with profit.

Goodman

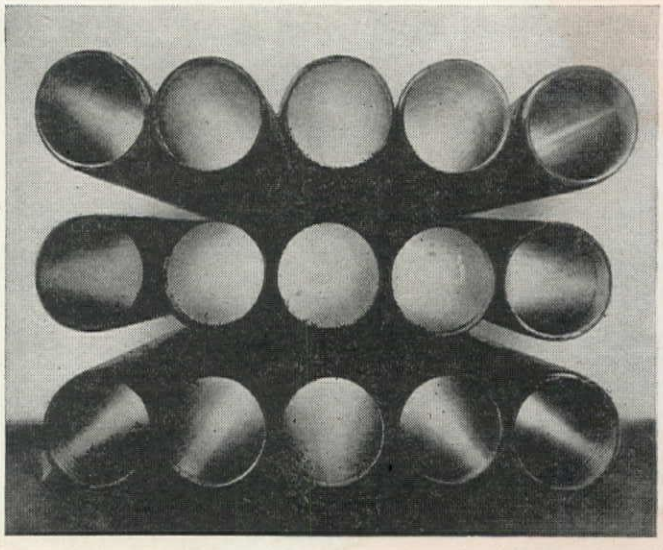
MANUFACTURING COMPANY

HALSTED STREET AT 48TH • CHICAGO, 9, ILLINOIS



Steel pipe in water works service

Small-diameter steel pipe, lined and coated at the pipe mills, is specified by engineers because of the successful experience in the speed and ease of installation.



Barrett Coal-tar Enamel provides a smooth, mirror-like coating that reduces surface friction and maintains peak capacity operation.
For many years to come, its superior resistance to water absorption and electrolytic corrosion answers all requirements for heavy duty, and meets American Water Works Association's standard specifications 7A.5-7A.6-1940.

THE BARRETT DIVISION
ALLIED CHEMICAL & DYE CORPORATION
40 RECTOR STREET, NEW YORK 6, N. Y.

Barrett
COAL-TAR ENAMEL

FIELD SERVICE—Our Pipeline Service Department and staff of field servicemen are equipped to provide both technical and on-the-job assistance to Engineers and Construction men, in the use of Barrett Enamels.

High Speed TRAVEL AND SPREADING OF FULL YARDAGE LOADS

Powerful Air-Operated Cable Hoist

Smooth operation at touch of a finger avoids "jerky" starts and stops. Takes up or releases to exact position desired. Saves cable wear and down time for repair.

● You never have to slacken speed with a Wooldridge Terra-Cobra while traveling, spreading or turning due to positive two-wheel hydraulic steering. Both wheels are controlled by a single steering bar. There are no steering clutches to fight nor individual brakes to grab—no danger of "jacknifing." The front drive wheels are under full traction and power at all times even on turns—and they maintain a fixed direction of travel over soft, rough, rocky or uneven ground. Rapid acceleration and surplus rim pull insures high average speeds and greater yardages at a lower cost. Get the full details on high speed earthmoving.

WRITE TODAY FOR NEW TERRA-COBRA BULLETIN

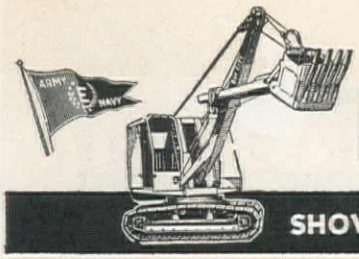
WOOLDRIDGE MANUFACTURING CO.
SUNNYVALE, CALIFORNIA

WOOLDRIDGE TERRA COBRA
SELF-PROPELLED EARTHMOVER

CAPITOL TRACTOR AND EQUIPMENT CO., 1001 Del Paso Blvd., Sacramento, Calif.; FEENAUGHTY MACHINERY CO., 112 S. E. Belmont St., Portland, Oregon; BUD FISHER COMPANY, 2004 North Fourth St., Albuquerque, New Mexico; MOTY & VAN DYKE, INC., Klamath Falls, Oregon; PEERLESS PUMP DIV., FOOD MACHINERY CORP., 1755 Broadway St., Fresno, Calif.; SHAW SALES & SERVICE CO., 2027 South Santa Fe, Los Angeles 21, Calif.

JUST OFF THE PRESS—
36-PAGE ILLUSTRATED BOOK
OF FACTS ABOUT BAY CITY SHOVELS!

For a graphic presentation of the reasons why BAY CITY shovels and cranes have earned their enviable record in excavating and material handling, get your free copy of the new 36-page BAY CITY catalog. It's crammed with cold facts, technical specifications and data, and on-the-job illustrations. It outlines and illustrates the design principles and engineering refinements which have put BAY CITY shovels and cranes among the leaders in fast, economical excavating and material handling equipment. It shows how the BAY CITY CraneMobile, the modern pneumatic-tire-mounted crane, will enable you to handle more jobs in a greater area—swiftly, economically, profitably. This big book is yours for the asking. No obligation, of course. Write for catalog M-8 • BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN.

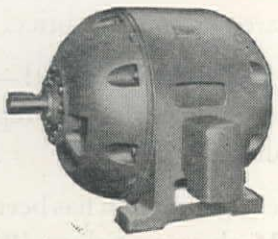


BAY CITY

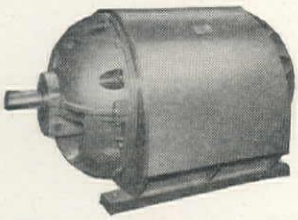
SHOVELS • CRANES • DRAGLINES • TRENCH HOES

NOW your *big drives* can have it* too!

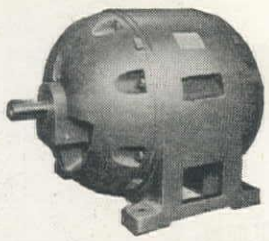
*The EXTRA protection of TRI/CLAD construction



Typical, large-size, sleeve-bearing Tri-Clad polyphase motor, now standard up to 2000 horsepower



Modified cast-iron frame construction used for certain large sizes of the ex-ended Tri-Clad motor line



Separable housing construction used for large-size ball- or roller-bearing Tri-Clad motors. Roller bearings are stand-ard at coupling end

G-E STANDARD Tri-Clad Induction Motors Now Available to 2000 Hp.

For that important *big* drive (up to 2000 hp, 3600 rpm) you can now get a G-E standard Tri-Clad induction motor with all the protective features that have proved so valuable in the more widely used sizes.

1. EXTRA PROTECTION FROM PHYSICAL DAMAGE

Cast-iron construction with upper portion completely enclosed to keep out falling objects, dripping liquids. Streamline, cast-iron end shields. Corrosion-resisting finish.

2. EXTRA PROTECTION FROM ELECTRICAL BREAKDOWN

Windings of Formex wire are solidly bonded with synthetic resins that are strongly resistant to oil and moisture. Formex wire insulation stands up remarkably under abrasion or "heat-shock."

3. EXTRA PROTECTION FROM OPERATING WEAR AND TEAR

Available with either sleeve or ball bearings—in dust-tight housings. Sleeve-bearing design is a further refinement of well-proved Tri-Clad motor bearing proportions, efficiently lubricated, with "air seal" to insure oil-tightness of the housing.

The Tri-Clad, in its wide range of types and sizes, is G.E.'s most widely used (integral-hp) motor. Chances are there's a Tri-Clad to meet your drive requirements "on the nose." Ask for Bulletin GEA-3580. *General Electric Company, Schenectady 5, N. Y.*

NEW 2000-hp INDUCTION MOTOR LARGEST MEMBER OF TRI-CLAD FAMILY

Dwarfing the original Tri-Clad motor (resting on the conduit box) in size, this new 2000-hp "big brother" embodies all of the same protective construction features. It operates at 1800 rpm, on 2300 volts, 60 cycles. This new 3-phase motor is in the 6360-frame series, which is five steps larger than the largest standard industry frame size (namely 505).

Here's Today's Wider Range of Standard Sizes	
TYPE K	1 hp to 2000 hp at 1800 rpm
TYPE KG (High starting torque, low starting current)	5 hp to 200 hp at 1800 rpm
TYPE KR (High starting torque, high slip)	Available to 100 hp in speeds required for high-slip, flywheel drive (punch presses, etc.)

Special motors can be custom-built in Tri-Clad design for YOUR problem. Induction motors specially designed to the job can generally be built with many of the Tri-Clad motor's strong points, such as enclosed upper portion, smooth cast-iron end shields, windings of Formex wire, and double-end ventilation.

GENERAL ELECTRIC

750-264C-1590

Buy all the BONDS you can
—and keep all you buy

How many dollars is a good truck worth?...

When Lincoln was asked how long a man's legs should be, he answered, "Long enough to reach the ground."

The same homespun reasoning applies to the worth of a motor truck. The work you get out of it is what counts.

That is why Mack trucks are bargains—*on the job!* Mack trucks are *built* to work harder, to last longer and to operate at lower ton-mile cost.

For instance, when you use heat-treated alloy steel to the extent Mack does in every truck, you aren't aiming at price.

What you do aim at—and get!—is more work for longer time with less repairs and lower overall cost.

Mack's better construction has been making money for Mack owners since 1900. Now is the time to find out what it can do for you.

★ BUY THAT EXTRA WAR BOND TODAY ★

Mack-International Motor Truck Corporation, Los Angeles, Sacramento, Salt Lake City, San Francisco, Seattle, Portland. Other factory branches and dealers in principal cities throughout the country.

Mack

TRUCKS

FOR EVERY PURPOSE

ONE TON TO FORTY-FIVE TONS

NEW Mack Trucks are available for essential civilian use. Ask for details.

Easy way to break up big ones...

HI-VELOCITY GELATIN saves labor, money and time

1. Du Pont research scores again by giving you a new method of secondary blasting. With Du Pont "Hi-Velocity" Gelatin dynamite it is not necessary either to remove the explosive from the wrapper or to confine the charge with mud.

2. A charge of Du Pont "Hi-Velocity" Gelatin is placed on the boulder above. Because this powerful dynamite always detonates at its highest velocity, less is required, saving from ⅓ to ½ the amount of explosives normally used for secondary blasting.

3. Blasting cap and fuse are attached to the primer. Cartridges weigh a pound each, so that the required charge can be measured readily. No handling of the raw dynamite is necessary.

√ CHECK THESE FEATURES OF "HI-VELOCITY" GELATIN:

1. **DEPENDABLE.** "Hi-Velocity" Gelatin always detonates at its top velocity.
2. **ECONOMICAL.** Saves labor . . . reduces explosives cost.
3. **CONVENIENT.** Easy to handle . . . easy to measure. Available in cartridges of 1¾" x 8" weighing 1 lb., also 3" by 5 lbs.; 4" by 10 lbs.; 5" by 25 lbs.

4. Result of the blast . . . the strong, shattering action of "Hi-Velocity" Gelatin has broken the big boulder into pieces that can easily be moved. Labor, money and time have been saved.

Ask your Du Pont Explosives representative about this simple and economical method of secondary blasting. He'll be glad to give you full details. E. I. du Pont de Nemours & Co. (Inc.), Hoge Bldg., Seattle, Wash.—Old National Bank Bldg., Spokane, Wash.—Midland Savings Bldg., Denver, Colo.—111 Sutter St., San Francisco, Calif.

DU PONT

REG. U.S. PAT. OFF.

DU PONT EXPLOSIVES

BLASTING SUPPLIES AND ACCESSORIES

Dependably Governed

...FOR EFFICIENT SERVICE

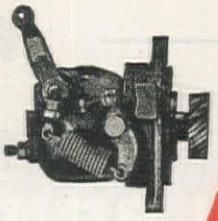
● The new Byers Traveler half-yard excavator is another addition to the long list of fine internal combustion engine-powered construction and industrial equipment which is regulated and protected by Pierce Precision Flyball Governors.

Pierce Flyball Governors are original equipment on many of the world's finest and most widely used engines—gas, gasoline and diesel—because they give completely dependable, accurate regulation to constant speed—and unfailing protection against overspeed and abuse.

Pierce Governors employ the time-proved centrifugal principle. They do not gum or stick or interfere with carburetion. They respond with imperceptible lag to variations in load—even within extremely close limits. They frequently outlast the engines themselves without readjustment or service.

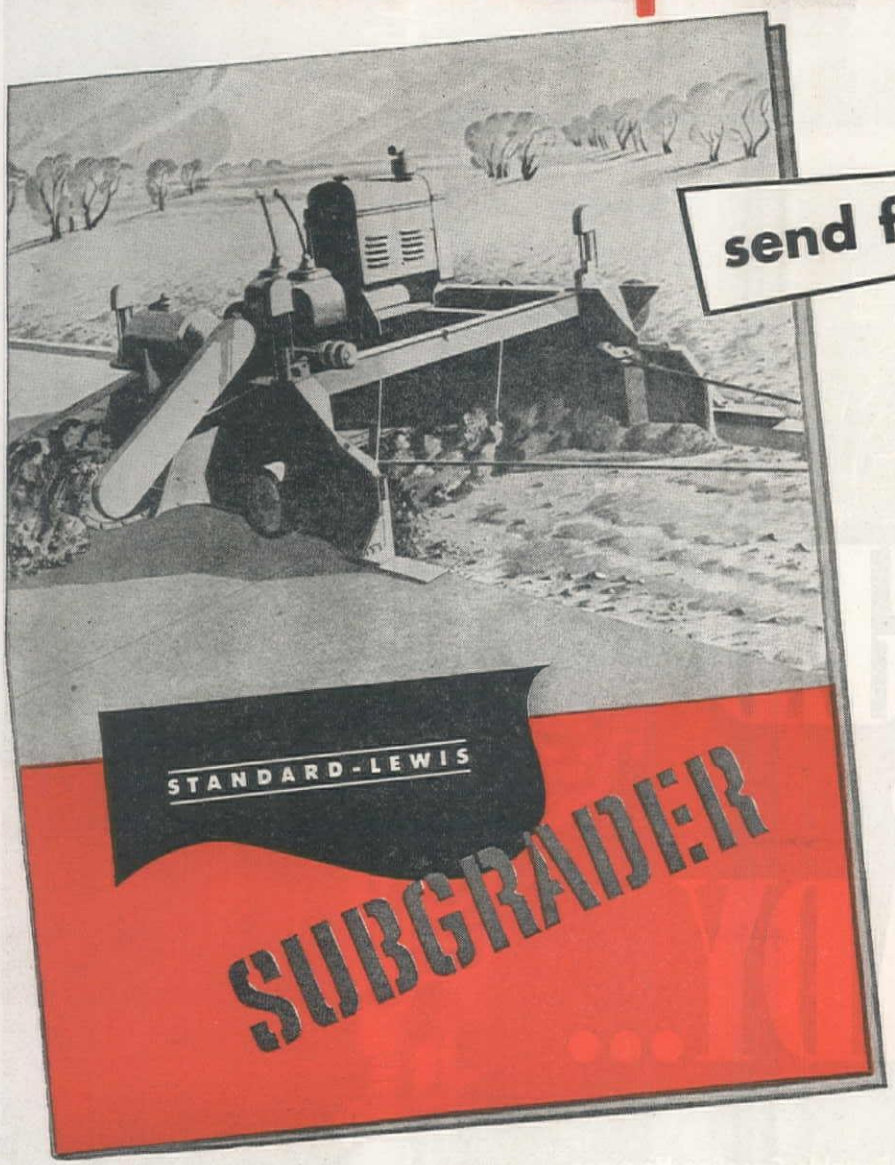
Specify Pierce Governors for the new equipment you buy—and write for full information and the Pierce catalog if your present equipment is not Pierce-governed.

THE PIERCE GOVERNOR CO., INC.
1645 OHIO AVENUE • ANDERSON, INDIANA
Manufacturers of Pierce Precision Governors and Sisson Automatic Chokes



PIERCE GOVERNORS

For Complete Facts



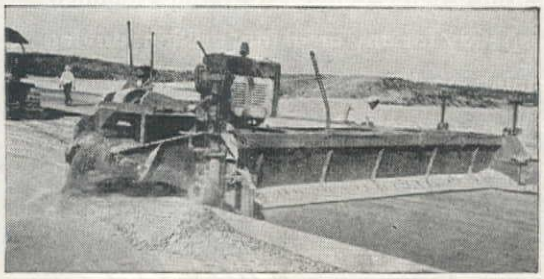
send for this folder

The many unique features embodied in the new Standard-Lewis Subgrader come as a result of design by practical paving equipment engineers. These men know well the problems encountered and have built into this machine many practical improvements that save contractors, time, labor and money.

The new Standard Steel 8-page folder covers in detail all information relating to the efficient operation and economy provided by this ingenious Subgrader.

A request on your letterhead will bring a copy promptly.

This is an example of deep cutting into tough material—gravel as large as 14" in diameter is handled with ease.



No chipped or broken edges of concrete pavement is experienced with the solid rubber tired wheels you can use on the STANDARD-LEWIS Subgrader.

OTHER STANDARD PRODUCTS

ASPHALT AND CONCRETE FINISHERS
TANDEM ROLLERS
TOW BROOMS
BINS AND BATCHERS
CONCRETE SPREADERS

STANDARD
STEEL CORPORATION
General Offices and Plant: 5001 South Boyle Avenue
Los Angeles 11, California

IMAGINATION
has paved the way

"It can't be done!"

Yet, practically every step in the march of progress has been made by the men who set out to do the seemingly impossible.

Through years of trial and error, of proof and improvement, men with ideas and imagination have solved the problem of building roads of native soils—"in place" materials. In so doing, they have eliminated the largest single element of cost. What this will mean in terms of low-cost roads is not yet fully realized by the public at large.

But it was realized by P&H Engineers. And they have been at work. Collaborating with leading research engineers and highway authorities, they have pooled their experience to develop equipment that simplifies the basic operations — controls the processing of native soils — performs the entire task at a *single pass*, leaving the road ready for compaction.

The P&H *Single Pass STABILIZER* has successfully completed its field tests — handling all kinds of commercial admixtures — in all kinds of soils. It is ready whenever you are ready — to reduce the cost of building base courses, light traffic roads, streets, airport runways, taxiways and parking lots.

Contractors or highway departments contemplating work of this nature in the near future, should investigate now.

P&H

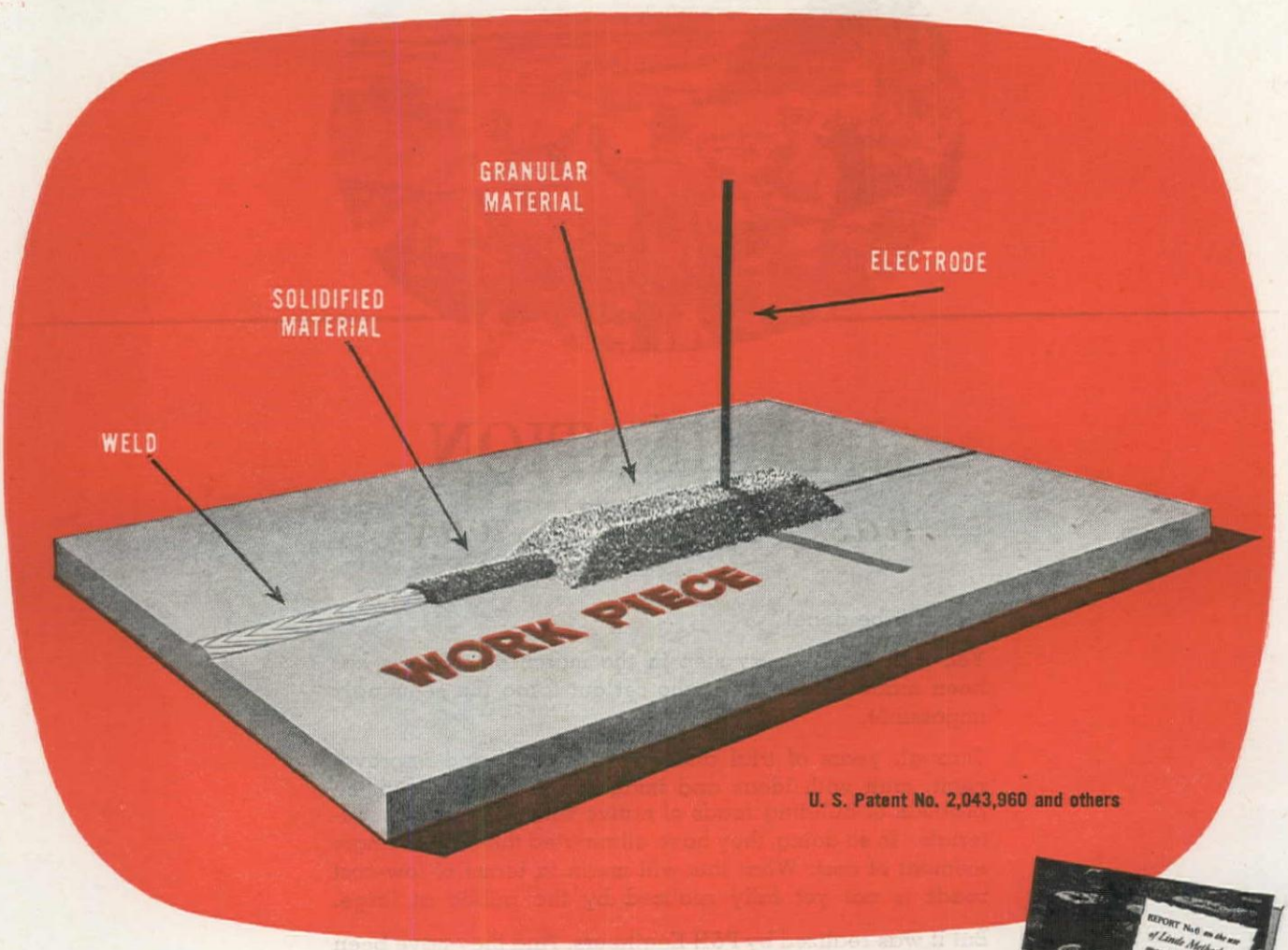
SINGLE PASS STABILIZERS

4490 West National Avenue,
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS - ELECTRIC CRANES - ARC WELDERS — HOISTS - WELDING ELECTRODES - MOTORS

THIS IS UNIONMELT WELDING



UNIONMELT Welding is easy to recognize. It is electric welding done as diagrammed above—and it makes top quality welds at speeds that are greater than with any other similarly applicable process!

UNIONMELT Welding, a process of welding electrically beneath a mineral melt, has received wide application since U. S. Patent No. 2,043,960 was issued. It is the electric welding process that is rated by many as one of the most important factors in the great wartime fabrication of steel.

Anyone may obtain a license to use UNIONMELT Welding through its developers—The Linde Air Products Company.

Linde can supply a wide variety of equipment and materials to apply UNIONMELT Welding. Linde representatives can help you determine where you can use the UNIONMELT process advantageously and what type of equipment is best suited to your work.

For additional information send for the folder "Report No. 6 on the Use of Linde Methods in Mass Production."

MARITIME "M" AWARD FOR OUTSTANDING PRODUCTION ACHIEVEMENT

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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

In Canada: Dominion Oxygen Company, Limited, Toronto

The word "Unionmelt" is a registered trade-mark of The Linde Air Products Company.

★ BUY UNITED STATES WAR BONDS AND STAMPS ★

MISSISSIPPI WAGONS GIVE PROFIT INSURANCE - - -

- - - WHERE MAXIMUM FLOTATION AND TRACTION ARE MANDATORY FOR HAULING FULL PAYLOADS

CONTRACTORS are assured "profit insurance" against tough hauling jobs in sand, mud, and loose dirt when they invest in MISSISSIPPI WAGONS, and here is why:

The MISSISSIPPI WAGON with unusually good flotation provided by the four-wheel trailer and tractor, together with the low-pressure drive tires, must only carry 30 pounds weight a square inch of ground contact area, as compared with 54 pounds weight a square inch with semitrailers hauling the same load.

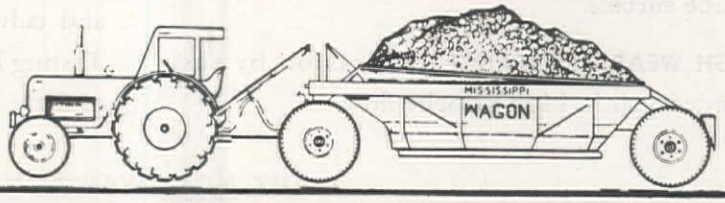
This means profitable hauls over haul roads where semitrailers and other equipment either "bog down" with a full payload, or operate with part-loads at a loss.

The low pressure tires used on the rear of the tractor require a maximum of only 12 pounds air pressure and provide approximately 350% more ground contact area than high-pressure load carrying tires used on semitrailer units.

Yes, Mr. Contractor, when you own MISSISSIPPI WAGONS you can bid the tough hauling jobs and know if any rubber tired hauling unit can do the job it will be your MISSISSIPPI WAGONS.

AND, IF IT IS A LONG HAUL OVER DEEP SAND YOUR ONLY COMPETITION WILL BE SOME OTHER OWNER OF MISSISSIPPI WAGONS.

"THE WORLD'S MOST MODERN HAULING UNIT"



MRS MANUFACTURING CO.

JACKSON, MISSISSIPPI

Twelve lines of 24 inch reinforced concrete culvert pipe installed by the California Division of Highways under U. S. Highway 99 in Kern County. This structure is designed to convey water from flash floods rapidly under the four-lane highway.

Low Headroom but Adequate Drainage with

CONCRETE PIPE LINES

Long service records of concrete pipe lines for sewerage, drainage structures for Highways, Railroads and airports demonstrate these advantages:

AMPLE STRENGTH for most severe load and impact conditions is built into concrete pipe.

MAXIMUM HYDRAULIC CAPACITY is assured by clean, even joints and smooth texture of inside surface.

HIGH WEAR RESISTANCE to abrasion by suspended grit in high velocity flow.

MINIMUM INFILTRATION and LEAKAGE assured by tight joints and uniformly dense concrete.

ACCURATE CONCENTRICITY—can be laid true to line and grade.

Members of this Association—list furnished on request—manufacture concrete pipe in strict compliance with the standard specifications for concrete sewer pipe, reinforced concrete sewer and culvert pipe of the American Society for Testing Materials and the American Association of State Highway Officials.

BUY MORE WAR BONDS

CALIFORNIA ASSOCIATED CONCRETE PIPE MANUFACTURERS

P. O. BOX 152 — FRESNO 7, CALIF.

The RIGHT TOOL

Makes His Skill the Keener

No watchmaker uses a mechanic's screw driver. He needs the tool fitted to the job to make the most of his skill.

So it is with blasters. They, too, need the explosive best fitted for the job in hand. Used correctly, in the right amount, it produces the blasting result that is wanted.

While some explosives produce the results on many jobs, no one type explosive can be used with effectiveness on every job.

ATLAS EXTRA DYNAMITES (Ammonia Dynamites) Medium velocity. Heaving and stressing action. A good all-around construction and quarry explosive.

ATLAS EXTRA DYNAMITES (AMMONIA DYNAMITES)

GRADE	% Weight Strength	Velocity, feet per second, in the open 1¼" x 8"	Velocity, feet per second, confined in pipe 1¼" x 8"	MINIMUM NUMBER OF 8" CARTRIDGES PER 50 LBS. (MAXIMUM 10% MORE)								
				⅞"	1"	1⅛"	1¼"	1½"	1¾"	2"	4"	5"
60%	60	12000	17000	208	160	128	105	72	54	41	11	7
50%	50	10500	13000	208	160	128	105	72	54	41	11	7
45%	45	10000	12900	208	160	128	105	72	54	41	11	7
40%	40	9300	12000	208	160	128	105	72	54	41	11	7
33%	33	8900	11500	208	160	128	105	72	54	41	11	7
30%	30	8500	11000	208	160	128	105	72	54	41	11	7
25%	25	8200	10500	208	160	128	105	72	54	41	11	7
20%	20	7800	10000	208	160	128	105	72	54	41	11	7
15%	15	7300	8500	208	160	128	105	72	54	41	11	7

Talk over your blasting problems with the Atlas Representative. You know your operation. Add his training and experience in both explosives and their application to field conditions and find the one explosive and blasting formula for the right blasting result.

ATLAS EXPLOSIVES *"Everything for Blasting"*

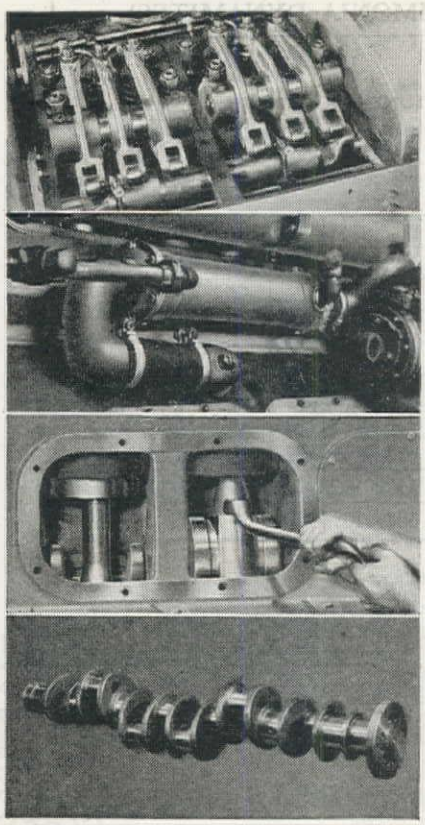
CHEMICALS ATLAS EXPLOSIVES

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

Announcing:

THE NEW SERIES 20 HENDY DIESEL

NOW in the 190 to 250 horsepower range—Hendy Series 20 Diesels bring new standards of dependability and economy to the industrial field. They are designed from the owner's viewpoint entirely—no concessions were made in design, use of old patterns, practices, or tooling. Consequently, Series 20 Diesels have features never before available in engines of this size. The industrial users of Diesel power can *now* obtain the very latest in tested Diesel-engine performance.



REDUCED MAINTENANCE:

Unit fuel pumps and injectors and the overhead camshaft eliminate all high-pressure fuel lines and many moving parts. Air-starting valves, intake and exhaust valves, and fuel injectors and pumps are actuated by rocker arms bearing directly on the overhead camshaft. Inspection and adjustments of valves and injection system can be made by removal of cylinder-head covers.

EFFICIENT OPERATION:

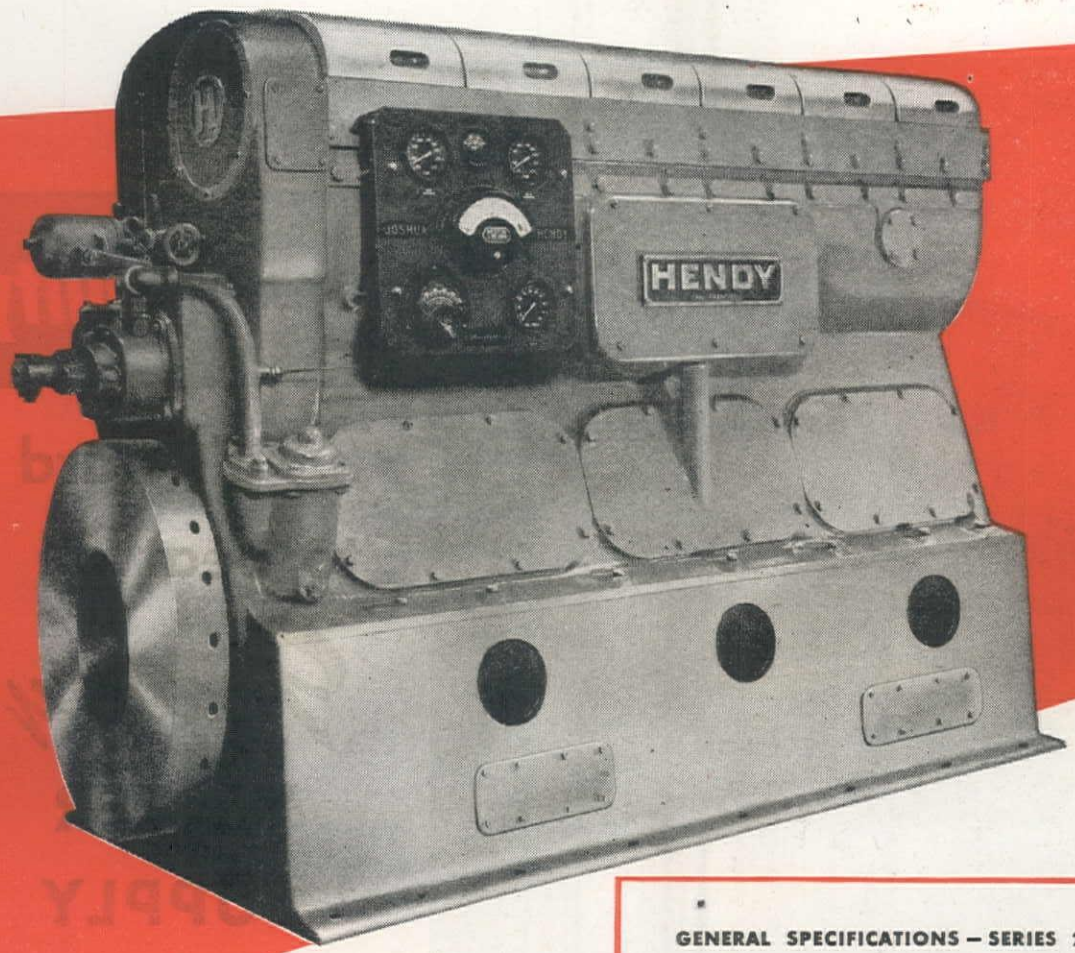
Full pressure lubrication to moving parts provides correct lubrication at all times. An integral oil-cooler keeps the oil at an efficient operating temperature. Uniform cylinder and head temperatures are assured by high velocity, controlled flow of the cooling water and the advanced design of the water jackets.

EASY SERVICING:

Fuel-oil filters, lube-oil conditioners, and fuel-transfer and lube-oil pumps are conveniently located for easy and quick servicing. Each can be removed without disturbing other assemblies. Unit fuel pumps and injectors can also be easily removed for inspection or service. Main and crankpin bearings are readily accessible by quickly removing the large hand-hole plates...without disturbing any other assembly.

LONGER LIFE:

The crankshaft is dynamically balanced, to minimize vibration at *all* speeds, and is large and well proportioned to assure long life and smooth operation. All bearing surfaces receive positive pressure lubrication. The crankshaft is supported by large, replaceable, bronze-backed bearings.



GENERAL SPECIFICATIONS — SERIES 20

Bore 7¼"; Stroke 8½"; 4-cycle; Air starting; 6-cylinder model (D-26) develops 190 hp, 8-cylinder model (D-28) develops 250 hp, both at 79 lbs. bmep and at 900 rpm. Cylinder block fitted with wet-type replaceable liners; Cylinder heads individually cast; Exhaust manifold water-jacketed and cast in sections; Pistons, cast iron; Full pressure lubrication to moving parts, with oil cooled and filtered before entering distribution manifold. Optional equipment includes: closed-circuit cooling systems; clutch power take-offs from either end; belt-driven starting-air compressor. Also available as complete electric generating plants.

Diesel-power users will appreciate many important features in addition to those listed at the left. These new engines were designed specifically to meet the most rigid tests for economy and maximum dependability. And, what is equally important, they are built by skilled mechanics in plants unusually well equipped with modern, precision machine tools that take full advantage of production-line methods. Other Hendy Diesels available up to 800 horsepower. Joshua Hendy Iron Works, Sunnyvale, California.

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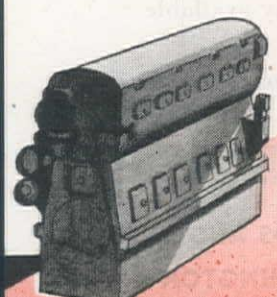
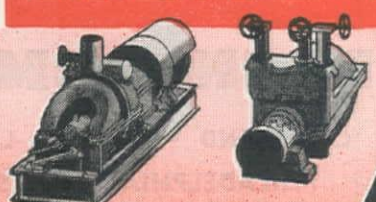
WRITE TODAY for complete details. Just clip and mail the convenient coupon.



HENDY



IESELS REDUCTION GEARS TURBO-GENERATORS TURBINES

JOSHUA **HENDY** IRON WORKS
ESTABLISHED 1856
SUNNYVALE, CALIFORNIA

Please send me complete details on Hendy Series 20 Stationary Diesel engines ☐. Hendy Series 20 Diesel-generator sets ☐.

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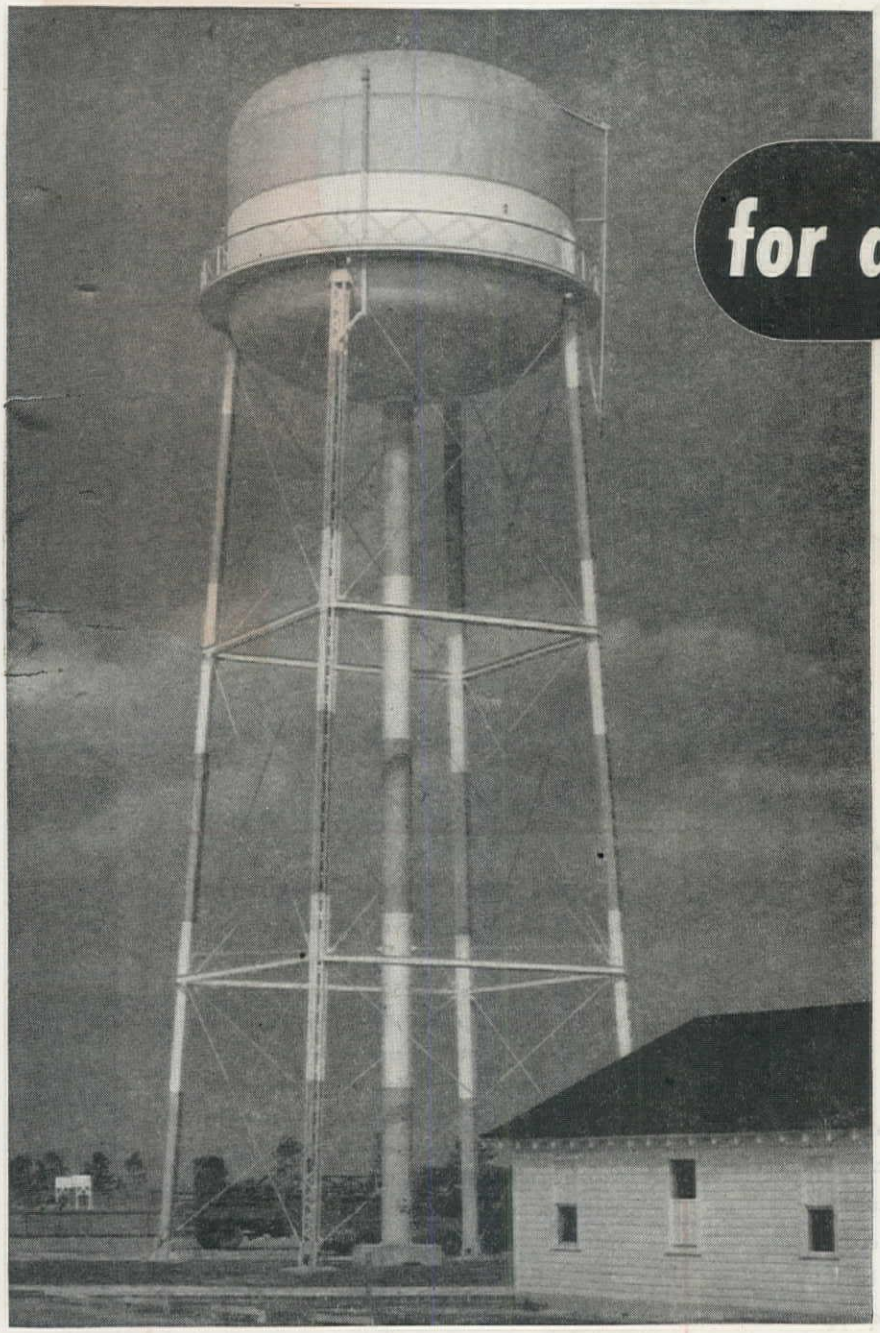

for dependability

. . . it's hard to beat a *Gravity* WATER SUPPLY

The 100,000-gal. Horton elevated water storage tank shown at the left is used for general water service at a U. S. Navy training field. The tank is 74 ft. 11 in. to bottom and has an ellipsoidal roof and ellipsoidal bottom.

HORTON elevated water storage tanks provide military camps, municipalities and industrial plants with a gravity water supply that is hard to beat *for dependability*. Engineers responsible for water supply and service at training camps recognize the advantages of *elevated* tanks, as they have used gravity pressure, for years, to solve the basic water distribution problems in municipalities and at factories.

We design, fabricate and erect Horton elevated water tanks in a complete range of standard sizes as well as in special designs to meet your requirements. Standard designs include ellipsoidal bottom tanks with ellipsoidal roofs (like the one shown above), ellipsoidal bottom tanks with cone roofs and, in the larger sizes, radial-cone bottom tanks with cone, dome or ellipsoidal roofs.

Here are some of the advantages of Horton elevated water storage tanks:

1. Uniform distribution pressures.
2. Provision for pumping during off-peak periods.
3. An adequate reserve immediately available for fire protection.

Write our nearest office for quotations.

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Plants at BIRMINGHAM, CHICAGO, and GREENVILLE, PENNSYLVANIA

July, 1945

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Vol. 20, No. 7

A Real American

HAVING JUST RETURNED from the closing session of the United Nations Conference on International Organization, which met in San Francisco from April 25 to June 26, this editor is moved to report at least one impression to readers of *Western Construction News*.

It is our sense of pride and satisfaction in our new president, Harry S. Truman, who delivered the closing address at the historic conference.

On the editorial page of our May issue, we expressed some opinions of, and pledged our support to, Mr. Truman. And his appearance at the closing conference session more than justifies those statements. Truman is a real American, solid and honest. Beyond all comparison, in our opinion, he was the finest man in the conference.

Not particularly polished as a public speaker, the sincerity, the hope, the determination, the honesty, which shone out of his words, his manner, and his appearance, made him stand so far above the dozen "run-of-the-mill" diplomats and politicians from other nations who addressed the same session that they became as badly-frayed back numbers.

Whereas in sonorous platitudes and diplomatic insincerity they prated of the difficulties they'd overcome, the greatness of the document they'd forged, the hospitality of San Francisco, the heroism of their armies, and the hallowed memory of the late President Roosevelt, Truman in frank and simple English spoke of the yearnings of his heart and the heart of America for peace, and showed this document to be not a guarantee of peace, but only a stepping stone, the machinery which, if implemented by the sincere desire of the peoples and governments of the world, would realize lasting and just peace.

Said Truman, "If we had had this charter a few years ago —and, above all, **the will to use it**—millions now dead would be alive. If we should falter in the future in our will to use it, millions now living will surely die." Later he said, "The world must now use it! If we fail to **use it,** we shall betray all those who have died in order that we might meet here in freedom and safety to create it. If we seek to use it selfishly —for the advantage of any one nation or any small group of nations—we shall be equally guilty of that betrayal." In closing, he appealed, "Let us not fail to grasp this supreme chance to establish a world-wide rule of reason—to create an enduring peace under the guidance of God."

While it is our humble opinion that the organization proposed by the conference has no chance of maintaining peace, since, like its predecessor, the League of Nations, it has been designed by politicians not to build a world of equality, security, and happiness, but to enforce the terms of whatever peace treaty is eventually arrived at, and weakened as it is in its own body by the presence of the "veto" clause, by which the only nations capable of any aggression have the power to stop preventive or punitive action against themselves, we glory in the faith, enthusiasm, and hope combined with realism, of Mr. Truman.

America has a great and humble (the two must go together) President, and the future looks bright. Not only are wonderfully heartening changes taking place in our internal organization, but the international future is hopeful with the force, enthusiasm and straightforwardness of this man directing our leadership in world affairs.

New Water Mains

WITH MANY WESTERN cities faced with extensive replacements and extensions of their water main system as soon as postwar materials are available, *Western Construction News* urges water department designing engineers to consider the two-main system for heavy traffic and business streets.

It has long been the custom to lay a single main in the center of the street, requiring cross trenches for every service connection, with resultant time lost, hazards to both traffic and workmen, and permanent rupture of the pavement.

If mains are placed along the parkway or near the curbing on both sides of the street, all these difficulties are eliminated. Costs are by no means doubled, and may in fact result in a saving. It is, for instance, not necessary to have two mains as large as the single one in the center. The carrying capacity can be more or less equally divided, or the main on one side can carry the heaviest flow, being responsible for service to fire hydrants, while that on the opposite side is large enough only for building service. Cross main connections will be installed perhaps one in each block, or at even longer intervals. The most economical sizes can be arrived at quickly by engineering study.

The system of double mains, however, is one which *Western Construction News* favors for city water service. First costs often, maintenance costs always, are lower; pavements are undisturbed; traffic delays, detours and accidents due to trenching and other excavation are eliminated; street manholes are not needed; it saves a considerable length of service connection pipe, and gives direct connection to fireplugs. The system is used in only one major Western city, but should be extended in the postwar replacement program.

An Inland Passage

THE WASHINGTON STATE Legislature has memorialized Congress, asking consideration for construction of an inland waterway connection between the Columbia River and Puget Sound. Involved in the project would be three canals, all across low-lying land, requiring comparatively little excavation.

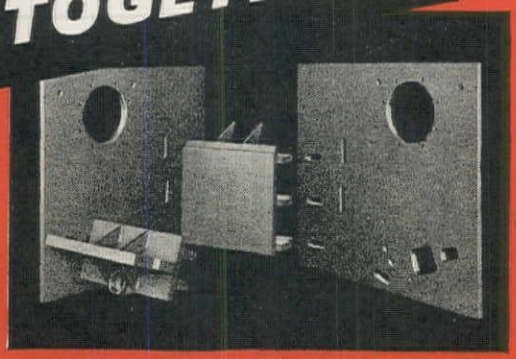
The first would connect the Columbia River in the vicinity of Ilwaco with the southern extremity of Willapa Bay. The land neck here is only about 5 mi. wide. The route would then traverse Willapa Bay for about 25 mi. and enter another canal in the vicinity of Tokeland, emerging in Grays Harbor south of Bay City. This would require a canal about 9 mi. long.

Shipping would then cross Grays Harbor to Aberdeen, and follow a canal (partly a canalized section of the Chehalis river) to the closest arm of Puget Sound, a distance of perhaps 35 mi. The heaviest excavation would of course be encountered in this latter section, but as shown by a survey and proposal of the Washington State Canal Commission some years ago, would not be prohibitive.

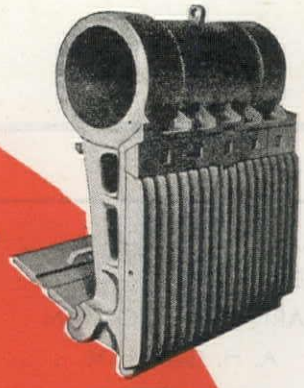
While the memorial to Congress specifically emphasizes the use of the canal system for transportation of logs, it could also be used for safe and short water transportation of a variety of other materials, and it appears might have military value in case offshore waters were ever subject to submarine blockade. It would, in effect, extend the Inland Passage to Alaska as far south as the Columbia River, bypassing the notably rough water off Cape Flattery.

Western Construction News adds its "Amen" to Washington's memorial, urging early consideration by Congress, and suggesting that money be appropriated for the construction of the project at an early date.

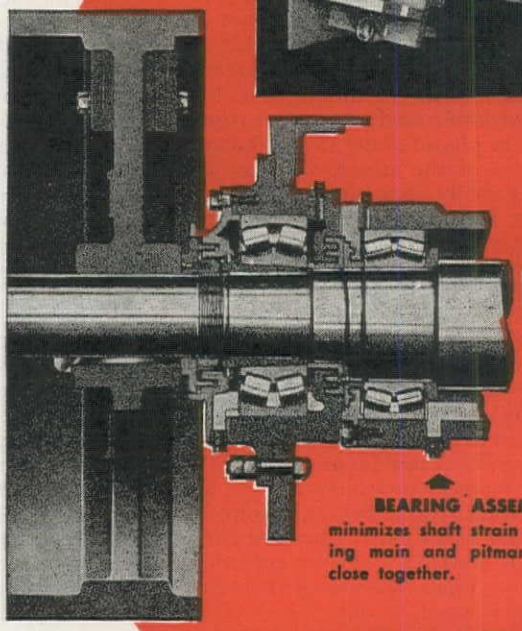
PUT THEM ALL TOGETHER



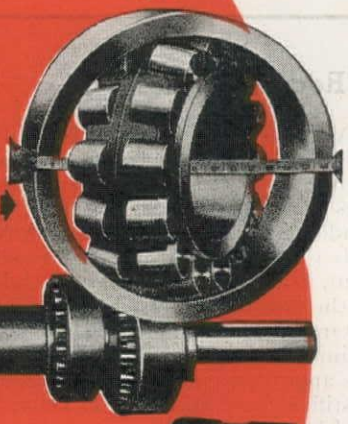
HEAVY PITMAN
is accurately bored to accomodate the precision eccentric bearings.



MAIN FRAME
of welded, high carbon steel plates, combines tremendous strength with light weight.

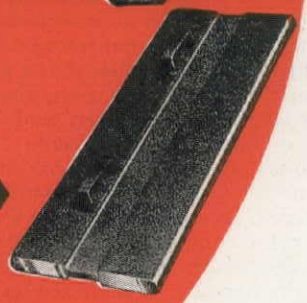


S.K.F. BEARINGS
of self-aligning type, protect load-bearing surfaces.



MAIN SHAFT
is forged, heat-treated, machined, ground, and polished.

BEARING ASSEMBLY
minimizes shaft strain by mounting main and pitman bearings close together.



STEEL TOGGLE
is of uniform width, and proper and uniform strength.

AND YOU GET MAXIMUM ALL-AROUND PERFORMANCE

• Pictured on this page are but a few of the many exclusive features of design and construction which are responsible for the ability of *Austin-Western High-Speed Jaw Crushers* to exceed ordinary output standards by wide margins.

Bulletin 1960 tells the whole story. Your nearby A-W distributor will be glad to send you a copy.

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

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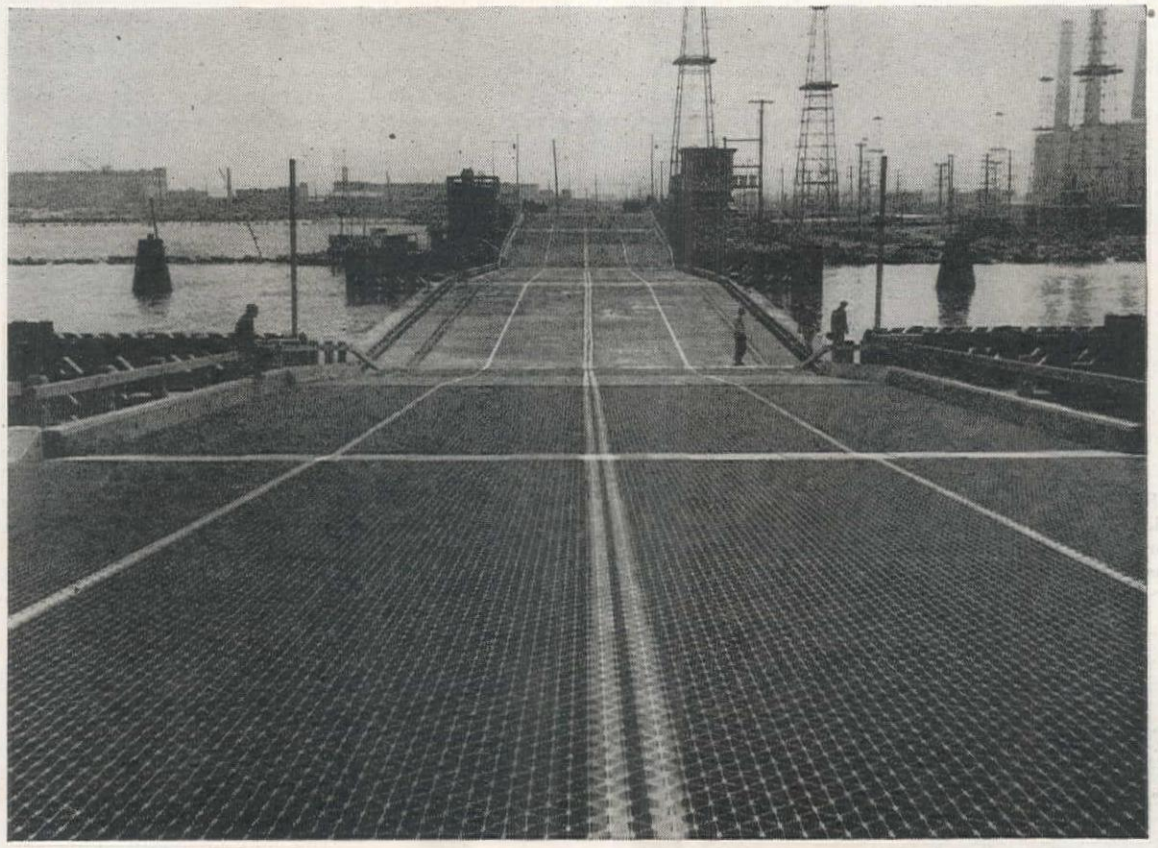
SMITH BOOTH USHER COMPANY . . . . Los Angeles 54	**OREGON**—COLUMBIA EQUIPMENT COMPANY . . . . . Portland 14
COLORADO—LIBERTY TRUCKS & PARTS CO. . . . . Denver 1	**UTAH**—WESTERN MACHINERY COMPANY . . . . . Salt Lake City 13
MONTANA—WESTERN CONSTRUCTION EQUIPMENT COMPANY . . Billings	**WASHINGTON**—COLUMBIA EQUIPMENT COMPANY . . . . . Seattle

WYOMING—WILSON EQUIPMENT AND SUPPLY CO. . . . . Cheyenne

WESTERN CONSTRUCTION NEWS

JULY • 1945



Photos by Long Beach Press-Telegram.

Floating Bridge—
Pontoons Retract Under Approaches

Terminal Island Naval Base served by unique 4-lane retracting pontoon bridge, constructed of reinforced concrete to save critical steel and timber materials—Twenty thousand vehicles per day enter the base over this span, notwithstanding an average of 35 interruptions to pass ships

A RETRACTABLE PONTOON bridge has been constructed to provide an additional security and service avenue for the Naval drydocks on Terminal Island in Los Angeles Harbor, and to relieve the congested traffic which formerly all moved over the Henry Ford Ave. bridge. The new bridge connects Terminal Island's Seaside Ave., with Ocean Boulevard in Long Beach. This site imposed limitations of space for the bridge approaches due to the presence of public utility plants and other nearby industrial property.

In sponsoring this type of bridge, the Navy Department's Bureau of Yards and Docks was interested in securing the rapid construction of a durable structure, made principally of reinforced concrete, and with a minimum use of critical steel and timber.

Floating beam with ramps

The bridge as designed is essentially a floating beam composed of two 50 by 130-ft. barge type pontoons. The offshore ends of the pontoons are arranged to lock together, thus forming a single beam, secured to identical ramps from the approaches. When the bridge is opening the two pontoons are stabilized by a double set of outlying abutment towers, which also serve to partially support the ramps and a fabricated steel yoke. The purpose of the yoke is to guide and control the movement of the pontoon, which freely retracts through the yoke and under the ramp to clear the ship channel. The lower end of the ramp and yoke are supported on rollers in contact with the traffic deck, and the upper ends are pivoted to the abutment towers and approach. In this way both ramp and yoke are free to follow the vertical tidal movements of the pontoon.

Each 120-ft. ramp is divided into equal sections by a cross beam support. The upper section is semi-stationary, being fixed to the approach above and hinged to the mid-beam support below. The lower section is hinged to the mid-beam support with its free end resting on the pontoon deck. Adjustments can be made to equalize the grade on the two sections

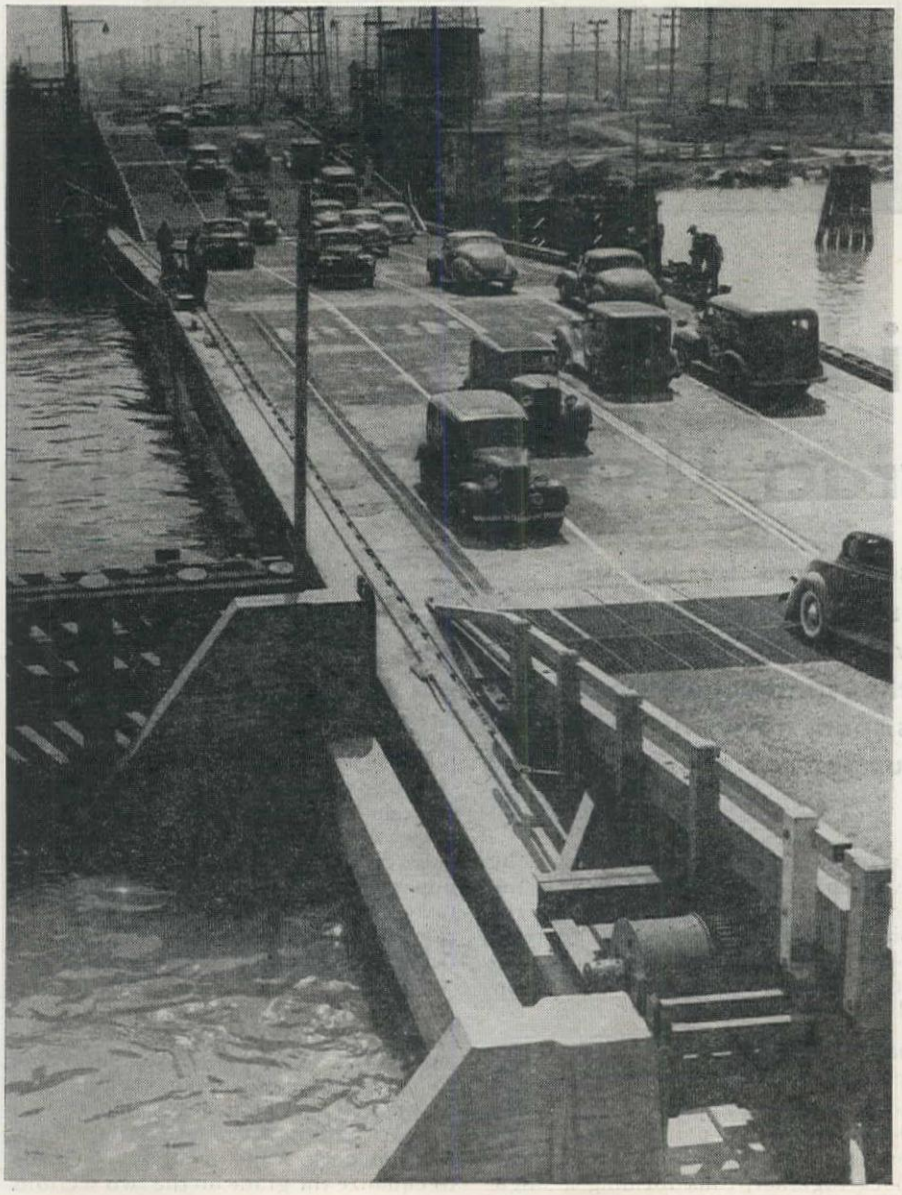
of the ramp by raising or lowering the mid-support beam. The ends of this beam are carried on an 8-part wire rope rigging in the abutment towers. The weight of the ramp is counterbalanced by a 9-ton weight suspended from this rigging in each tower. In addition to the counterbalance there is a hoisting mechanism rigged through an 8-part ¾-in. line to the beam ends and powered by a 7½-h.p. motor which is used to make ramp adjustments.

When an ebb tide lowers the pontoon and consequently increases the pitch of the hinged section to the ramp, buses and other long vehicles tend to foul their under rigging on the break in the slope between the two sections of the ramp. To prevent this, the operator makes adjustments with the tide by raising or lowering the counterbalanced beam support. Although the two hoisting motors are rigged to start simultaneously from the same switch, in practice after several adjustments have been made, one end of the beam tends to lag behind the other causing the ramp to sag on one side. To correct this the operator is provided with a single control switch connected in such a manner that it will run only the motor controlling one end of the ramp supporting beam. If the two sections of the ramp are kept in the same plane by making frequent adjustments of the supporting beam, the grade of the ramp never exceeds 16 per cent and traffic can move over the bridge quite steadily.

The ramps are decked with Irving subway grating to reduce the weight of this part of the structure. This is particularly important to prevent excessive weight bearing on the ends of the pontoons, for that would cause the opposite end to pitch up. In case the bridge is open such plunging would cause the pontoon to foul under the approach ramp, and when the bridge is closed it would tend to create a hump in the center span. It is difficult to ballast against this pitching because the offending weight shifts from one end of the pontoon to the other every time the bridge is opened or closed.

The approach to this bridge is unusual in that it is elevated with the ramps inclined down to the main pontoon span. This elevated approach serves two purposes. First, when the bridge is closed, it provides sufficient clearance for small craft to pass under each approach. These openings are approximately 30 ft. wide with a minimum of 11 ft. of vertical clearance at high tide. The second and more important use of this same space is to provide clearance for the pontoons to retract under the ramp approaches when the bridge opens.

TRAFFIC CROSSING the pontoon section of the bridge. The bare drum suspended from the yoke framework in the right foreground is not yet threaded with the cable drive. The bridge was opened to limited service by using auxiliary hoists to control the pontoons until the electrically driven remote control equipment was available. Guide rollers, near broom, assure alignment.



Operation of the bridge

To open the bridge when a ship signals for clearance the operator first answers by means of an electric horn and then closes traffic gates to entering vehicles. It normally takes about two minutes for the remaining vehicles to clear the bridge and its ramps. The only manual function necessary to the operation of the bridge is to release or secure the locking mechanism. The lock is a combination of two sets of truncated pyramidal shear keys, together with their complementary recesses in the opposing pontoon, and two sets of tension links which secure the corners of the pontoons.

To release these locks the operator adjusts a valve to connect an electric driven pump to a hydraulic cylinder with its piston arranged to exert a strain on the locking chain. This action relieves the safety pin which is removed and the valve reversed to cause the piston to run forward giving slack to the linkage. With the slack thus gained the operator is able to free the link holding the two pontoons. As soon as both locks are free the shear keys disengage and the operating engineer in the control tower retracts both pontoons under their respective ramps. Excepting the operation of the locking mechanism all other control of the bridge is handled through a master remote control panel located in the tower overlooking both the bridge and ship channel. Submarine electrical cables traverse the channel to carry both power and control circuits to the independently equipped halves of the bridge. Through the panel both sections are synchronized to move as a single unit.

Control of the pontoons is accomplished by a combination of cable bridles extending from the sides of the yoke to both fore and aft corners of the pontoon and a set of guide rollers, through which the pontoon is free to move parallel to the bridge center line, but which also align the pontoons so they meet perfectly at mid-channel.

The cable bridles lay along the outside of the traffic curb at the edge of the pontoon deck, and power is transmitted to them from two thread grooved cable drums, around which the cable passes three times. The drums are suspended from the yoke framework and driven by a gear reduction 40-h.p. variable speed motor. The pontoons and rigging are protected from damage by overrunning

through the use of limit switches, stationed to check the motion of the pontoon at the "nearly closed" and "nearly open" positions. In order to complete the bridge movement the operator is required to depress a switch with his foot which shunts out the limit switch and again close the main drum switch. With the shunt switch in the circuit it is impossible to apply full power to the motor, thus slow speed is assured as the mechanism reaches the limit of its motion. The pontoon motion is again checked by a second limit switch when the bridge nears the final position.

In case the ship passing through the bridge is a large one the pontoons can be run past the limit switch at reduced speed to gain additional ship clearance. The last position places the ends of the pontoons behind the pile fender which protects the abutment piers. In closing the bridge the limit switch checks the motion just before the pontoons touch and the final motion is completed by the hydraulic locking device. With these safety regulations in practice the pontoons are protected from impact damage or wave motion; however, a set of limit chains have been attached to each pontoon to prevent them from drifting beyond the limits of the ramp in case of accidental damage to the control mechanism.

Construction contracts

Construction of the bridge was let under the unit quantity basis under two separate contracts. The Guy F. Atkinson Co. was awarded both contracts as follows: for the bridge and gear, NOY 8012 completed for the sum of $509,000 and for the construction of two pontoons as specified in contract NOY 8013 for $160,000.

The construction of the pontoons was carried out in an excavated basin near the channel. A series of well points were driven around the basin in order to lower the water table adjacent to this area, by pumping the water from the well points. Forming and pouring of the reinforced concrete pontoons progressed in the normal manner within the basin.

Each pontoon is divided into eight compartments to provide additional seaworthiness in case of accidental damage. These compartments are also equipped with pump connections and seacocks, and four water ballast tanks are provided to trim the vessel. In order to improve the flotation of the pontoons the deck and upper 2½ ft. of the structure was poured with light weight concrete mixed with cellular volcanic aggregate.

The pontoons were launched from the basin by excavating the remaining ground between the channel and the casting basin. From the basin the floats were towed into position for erection in the bridge structure.

Construction was started on the project Jan. 31, 1944 and the bridge was placed in limited operation July 12, 1944. The delay was due to certain electrical and switching gear being unobtainable at the time the heavy construction was completed. It was received and installed to open the bridge to unlimited service on Oct. 15, 1944. During this interval two gas-engine hoists were rigged through a 3-part line to open and close the pontoon span. This engine driven equipment is still held in readiness to operate the bridge in the event that either a power or electrical equipment failure occurs.

Electrical energy is carried to the cable drive, pumps and lights situated on the pontoon by the use of two Appleton cable reel units. The reel units pay out and retrieve multiconductor cables with the motion of the pontoons. Power is transmitted through a 7-conductor No. 12 rubber covered cable, while an 8-conductor No. 16 wire cable is used for control circuits.

Both marine and vehicular traffic has been heavy since the bridge was placed in service. Traffic counts indicate that an average of 20,000 vehicles per day pass over the bridge to enter the shipbuilding and repair yards on Terminal Island. The bridge opens for ships an average of 35 times every 24 hours, and has a peak record of 42 openings in one day. The heavy traffic encountered imposes the necessity for rapid transitions from one type of traffic to the other, which the bridge is capable of doing. The actual mechanical opening of the span takes from 1½ to 2 minutes, and it closes with equal rapidity. When the pontoons are fully retracted the ship channel has 180 ft. of clearance. The bridge handles four lanes of traffic without restrictions other than a speed limit of 15 miles per hour.

Personnel

The bridge was designed and built under the direction of Vice-Admiral Ben Moreell, CEC, USN, Chief of the Bureau of Yards and Docks, Davy Dept. The design was developed in the office of Austin W. Earl, consulting engineer, San Francisco, where J. G. Wright and H. O. Sjoberg were in direct charge of the structural design. The electrical details were handled by M. G. Lewis. C. E. Andrew, bridge expert, of Tacoma, Washington, acted as consulting engineer. Guy F. Atkinson Co., San Francisco, was general contractor.

California Highway Division Issues New Specification Manual on July 1

THE CALIFORNIA Division of Highways has issued a new volume of Standard Specifications dated April, 1945, which will apply on all highway and bridge work, both current and postwar, advertised after July 1, 1945. The former issue will continue to apply to contracts under way and to all work advertised previous to July 1, 1945.

According to State Highway Engineer G. T. McCoy, the most important policy changes which have been made are:

Section 2. Proposal Requirements and Conditions. Article (c). The new provisions permit the contractor to examine the records of preliminary investigations of sub-surface conditions, the State not assuming any responsibility as to their accuracy.

Section 4. Scope of Work. Article (c). The matter concerning alterations has been completely revised to include the so-called 25 per cent clause and to define alterations which do and do not change the character of the work.

Section 6. Control of Materials. A provision has been included to permit bidders to study the results of tests of materials from sites other than those designated in the special provisions without the State assuming any responsibility as to their accuracy. Article (f). New tests have been added and some of the old ones are re-defined.

Section 7. Legal Relations and Responsibility. Article (m). Revisions included concerning suspension of work, responsibility for materials, etc. Article (n). Revised as to the State's interests in materials delivered to the work.

Section 8. Prosecution and Progress. Article (e). Revised to provide for contractor's responsibility to maintain a passageway through the work during a suspension of operations.

Section 9. Measurement and Payment. Article (a). Revisions included concerning measurement of material. Article (d). This is the force account article and has been revised to provide for payment to the contractor for contributions in connection with the Unemployment Reserve Act and the Social Securities Act. Article (g). Final Payment. This article has been completely revised.

Section 12. Earthwork. An alternative method of measurement has been included, in the event that the method of average and areas is not practicable. New provisions have been included concerning compaction of the natural ground upon which embankment is to be placed. The weights of tamping rollers have been increased.

General. A new section has been included covering slope erosion protection and the section on subgrade has been completely revised. New grading tables have been included for aggregates for the various surface treatments and for Portland cement concrete.

For the most part the changes which have been made throughout the various sections other than those mentioned above, include revisions which have been carried in the special provisions.

Copies of the new Standard have been sent to contractors doing highway work and to other interested persons and firms. If additional copies are needed, they should be requested direct from the Division of Highways, Public Works Building, P. O. Box 1499, Sacramento 7, California.

Harbor Blast Debris Cleared

Fragmentary ship hulls, live ammunition and freight cars safely removed from Port Chicago channel by veteran industrial divers, with the combined use of a special floating crane, underwater cutting torches and demolition work

SALVAGE AND demolition of submerged ship sections and explosives, the nature of which were undetermined, and the removal process unexplored, were among the unknown quantities and conditions encountered by contractors J. D. Proctor, Inc. and Le Boeuf-Dougherty & Co., Point Richmond, California, in their joint venture contract to clean up the wreckage of two ammunition ships and two submerged box cars containing aerial depth charges and incendiaries involved in the Port Chicago explosion of July 18, 1944.

The explosion of the Liberty ship A. E. BRYAN presumably touched off a series of blasts including one on the QUINAULT VICTORY, moored alongside the BRYAN at the loading pier of the Naval Ammunition Depot, Port Chicago. The blasts rocked buildings on their foundations miles from the scene of the disaster, hurling glass, debris, and pieces of fragmentary steel weighing many tons, high into the air, causing 369 deaths and injury to a thousand or more people.

Very little of the wreckage of the BRYAN was ever found, and the QUINAULT VICTORY was torn into hundreds of pieces scattered over a rectangular area of two thousand by three thousand feet. Three large sections remained in some semblance of their original form—the bow, the stern, and the midship section.

Channel unnavigable without clean-up

Inasmuch as the area involved was in the Sacramento River where it empties into Suisun Bay, the work of cleaning up the harbor fell under the jurisdiction of the U. S. Army Engineers. A large section of the channel and basin were rendered unsafe for navigation by the blast.

Instructions to the bidders required that lump sum bids be made for the removal of three objects: Object A—the stern section; Object B—the bow section; Object C—the two box cars. Item bids were also requested for each lift, and for each diver minute.

The joint venture of J. D. Proctor, Inc. and Le Boeuf-Dougherty & Co., submitted the low bid of $460,000 for the removal of the three prime items. The nearest unsuccessful bid amounted to $680,000.

Organization of the project

Harry W. Erickson, vice-president of the Proctor firm, functioned as general superintendent in full charge of field operations. J. D. Proctor, president of the firm, and considered one of the country's ablest industrial divers, handled the reconnaissance and layout for his diving crews. He also worked with his divers in the underwater rigging, burning and blasting. Don Davis, Arthur Low and Harry Groshong were the other working divers on the job. All three of these divers have been associated with the firm for a number of years, and have developed a high degree of skill not only as divers, but also as riggers and general mechanics. These combined skills contributed materially to the speed, safety and efficiency which was characteristic of the operation.

This explosion cleanup represented a set-up of difficult conditions. It meant underwater work in black water to remove tons of unexpended ammunition. Equipment capable of lifting such heavy sections as were found in Port Chicago was not available in the area. Strong tidal and river currents ran through the narrow channel. Sharp steel fragments in the water which menaced divers' life lines and suits were present. So were large amounts of oil trapped in the tanks of the demolished ships which added to the hazards of underwater work with oxygen and hydrogen torches.

Procedure on the project

The general plan of procedure was (1) To make a comprehensive survey of the entire area in order to ascertain the general location, nature and size of the wreckage; (2) To design and construct adequate hoisting equipment to handle the enormous weights involved; (3) To determine the most feasible methods and

sequence of removal; (4) To determine the most rapid and economical method of disposal.

To keep the reconnaissance systematic, ranges were established on shore, dividing the area into large squares. One section at a time was then carefully "swept" by means of dragging a 1,000-ft. length of ¾-in. cable along the bottom. This was accomplished by attaching each end of the cable to the deck winch of a tug. The two tugs, running parallel courses and spaced about 200 yd. apart, then proceeded to drag the bight of the cable along the bottom of the harbor through each of the range sections.

Upon striking an object of appreciable size, the cable would hang up and bring the tugs to a halt. The deck winch on each tug would take up the slack and pull the tugs backwards so that they met at a point directly over the object, whereupon a diver would follow the cable down to the object, estimate its nature and size, and attach a buoy as a marker for future reference.

Geophysical magnetometer experiment

For experimentation, a geophysical magnetometer was mounted on a small barge and dragged over the area. The operator, using earphones, was apprised of the presence of metal by a shrill insistent sound, which returned to the phones when the poles of the instrument were aligned with the direction of the metal. As the object was approached the sound would increase in pitch and volume.

The use of the magnetometer was abandoned after several experiments, as the Army Engineers were only interested in the removal of objects of sufficient size to present a navigational hazard. The instrument was incapable of selectivity, and inasmuch as the harbor floor was literally carpeted with fragments too small to warrant removal, the response of the magnetometer was continuous, and therefore of no value. The experiment proved, however, that the magnetometer would be of great value in locating large masses of isolated metal in relatively deep water.

Box car removed

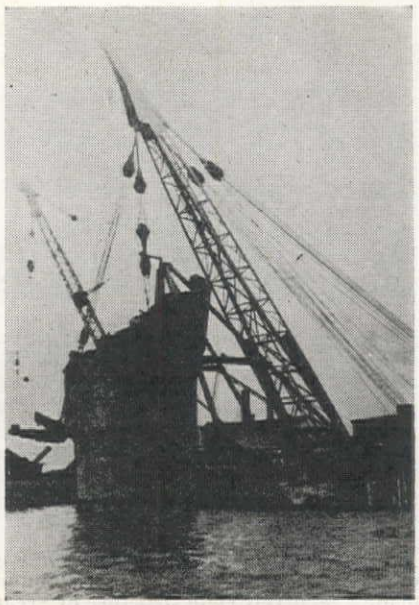
Among the first sunken objects removed were the box cars loaded with depth charges and magnesium and thermite incendiary bombs.

A sandbar, far from navigable waters and from any habitation, was purchased by the joint venture, where a large pit was excavated by means of a clam-bucket barge.

Divers then rigged the lines of the A-Frame barge to the cars containing the depth charges and raised the cars intact to a point just below the surface of the water. Two tugs towed the A-Frame and its load to the pre-excavated pit, where the box cars were buried.

Naval Ordnance officers gave assurance that exposure to the corrosive effect of sea water would result in the oxidization of a ⅛-in. shell casing and the dissolution of the explosives inside, within a few months.

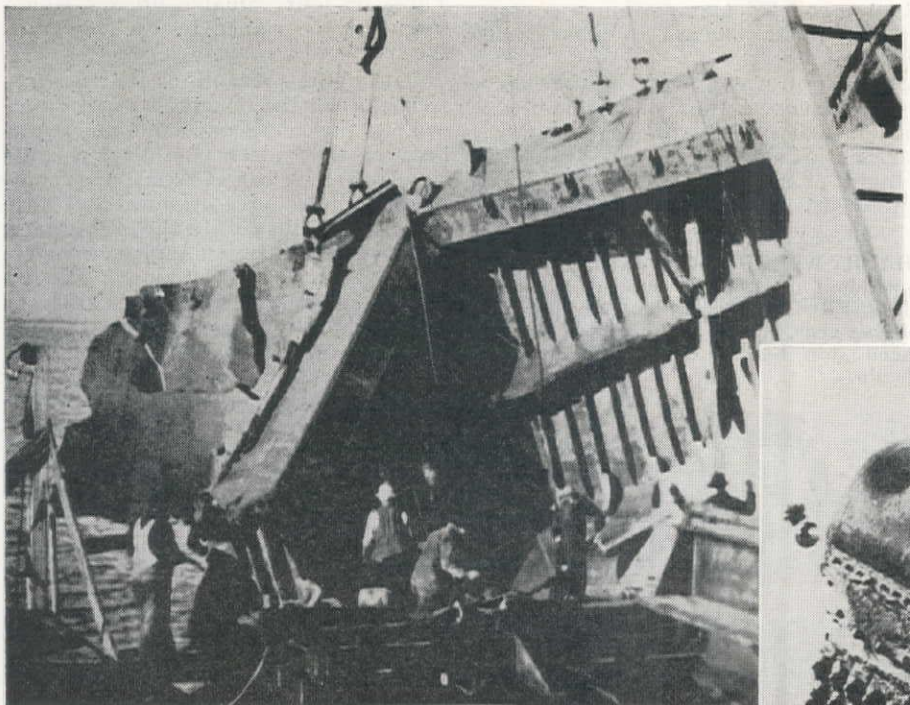
The after section was thrown into the air by the explosion, and came to rest upside down in thirty-five feet of water about 200 yd. from the dock. The screw and part of the stern casting projected above the water, about 200 ft. from the bow in 50 ft. of water. The midship section was found submerged in deep water about 800 ft. from the bow and stern.

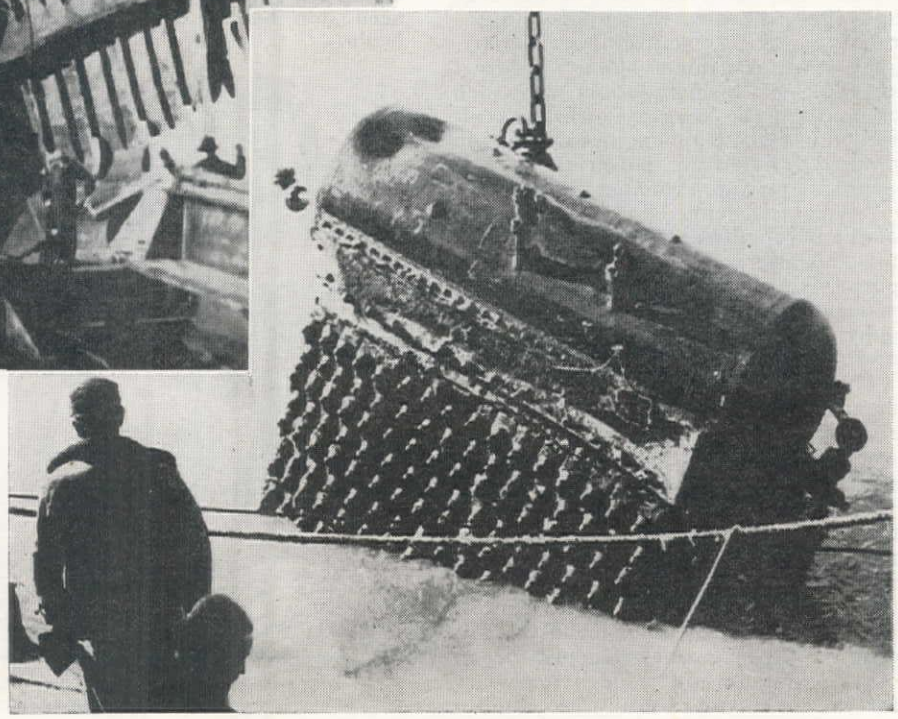


FLOATING CRANE lifting part of ship's hull from the dock area, where it constituted a navigation hazard that had to be cleared.

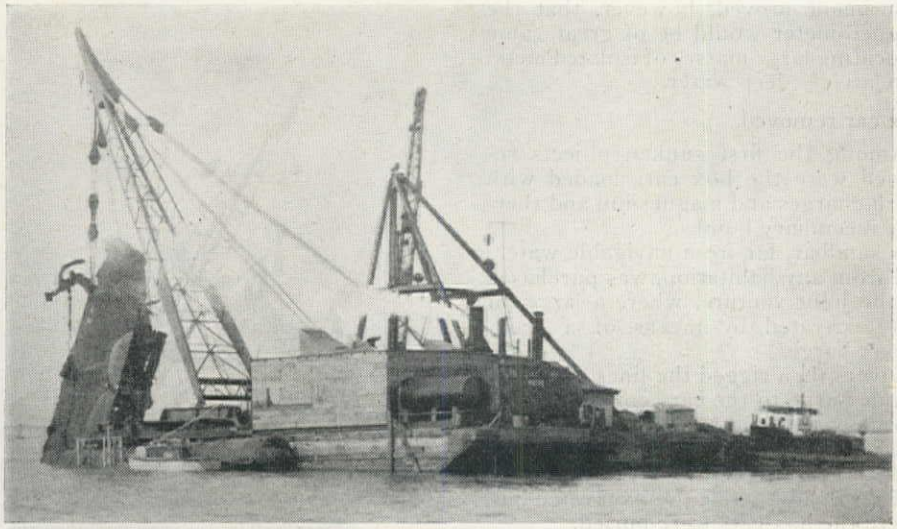
In addition to these objects, thousands of tons of jagged steel were strewn about a wide area over the bottom of the bay. Some of these fragments were large enough to cause eddies and whirlpools on the surface at low tide, although they lay in water 40 ft. or more in depth.

Divers' reconnaissance revealed that the bow section which remained relatively intact consisted of that portion of Bulkhead 37 from the flat keel to the forecastle deck. It included the forepeak and the forecastle, together with the





PART OF FORWARD hold from explosion-wrecked ship (left). Below, ship's boiler salvaged from the ammunition depot harbor during the channel clearing.



THE SPECIALLY DESIGNED crane was given additional lifting capacity by the use of two 7-ft. diam. by 70-ft. steel pontoons rigged outboard to heavy I-beams, which made a relatively rigid structure of great buoyancy, capable of lifting up to 250 tons.

boatswain's stores, the forward ammunition magazine, the chain locker, and the forward part of hold No. 1.

The after section contained the after peak, fantail, the after fuel tanks, after ammunition magazines, parts of the shaft alley, a portion of hold No. 5, and the shaft and screw.

The midship section consisted of the main deckhouse, bridge, and part of the engine room.

Special equipment

Because no floating equipment capable of 200-ton lifts was available in the area, special equipment was hurriedly designed by Joshua L. Pierson, one of the J. D. Proctor, Inc., engineers.

Two cylindrical steel pontoons, 7 ft. in diameter and 70 ft. in length, which had been used in a previous salvage operation, were attached, outrigger fashion, to the sides of a 32 x 105 x 9-ft. wooden barge. Heavy 24-in. I-beams were laid transversely across the deck of the barge and the pontoons, thereby forming a relatively rigid structure of great buoyancy. An A-Frame boom of great strength, of special design, was then erected on the barge. Power was afforded by two steam engines working in tandem. The lifting power of the assembled unit approximated 250 tons.

All material removed from the bottom of the harbor was placed on barges and towed to a scrap yard established for the purpose in Antioch, Calif. The ferrous material was there segregated from the more critical materials, cleaned and cut up to smelter size to be used as scrap.

Having removed the smaller fragments from the area, as well as the depth charges and incendiary bombs, steps were taken to break up and remove the stern, the bow, and the midship section.

Underwater burning was used continuously, but was reduced to a minimum, due to the presence of large quantities of fuel oil trapped in the tanks of the after section, and to the presence of large quantities of unexpended ammunition in the magazines. The pressure of oil and ammunition made it necessary for the divers to carefully reconnoiter both sides of a section before applying a torch. Despite all precautions, two small underwater explosions resulted from the contact of torches with oil. No injuries were incurred however, as a result of these explosions.

Explosives used to rid remaining salvage

Several plans were considered and rejected before a final method of removing the remaining wreckage was determined. The unexploded ammunition was converted from a menace to a welcome source of power.

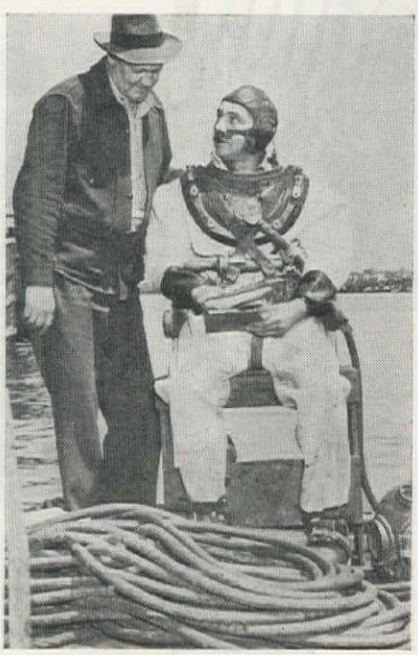
Permission was granted by the Navy to use explosives in limited quantities and at such time as the loading dock was clear of shipping.

Light charges were set off against critical structural points in order to establish planes of weakness calculated to break the unit into pieces smaller than 200 tons. J. D. Proctor then descended in a diving suit to place several boxes of 80 per cent dynamite in the after magazine, which contained a sizeable number of shells, and attached an electric blasting fuse. He then returned to the surface, and had the barge towed to a safe distance, unreeling the detonator wire from reels as the barge retreated.

The resultant blast broke the after section into thirteen pieces, all of which were later easily removed by means of the A-Frame.

Explosives were also used to very good advantage on the other large sections, reducing the operation time and hazard to a minimum.

HARRY W. ERICKSON, standing, vice-president of J. D. Proctor, Inc., and J. D. PROCTOR, president, dressed in diving gear, review a blueprint of damaged ship before salvage operations begin.



No lost time accidents

Recognizing the hazardous nature of the work, due to the presence of explosives, oil, jagged steel fragments and swift currents, Proctor and Erickson planned and personally supervised each step with safety as their prime objective. Proctor made many personal inspection dives so that he would be in a position to evaluate the underwater hazards and counsel the divers accordingly. At the same time, Erickson coordinated the surface activities, with subsurface hazards in mind at all times. The sharp edges and spears of steel were so numerous that despite all precautions, the divers' dresses were ripped frequently. Three or four valuable dresses would frequently be ruined by each diver in the course of a week.

One of the precautions that was responsible for the remarkable safety record was the emergency communications between the barges. One diver was assigned to each barge. A fast tug, complete with compressor, line, and hose stood by at all times. In the event that a diver's line became entangled, an emergency whistle would be blown. The tug would then race to the nearest adjacent barge, and pick up its diver. On the way to the scene of the trouble the diver would be dressed in, if necessary, and his hose would be hooked up to the compressor. As a result of this precaution, a diver could descend to the assistance of the man in trouble at five minutes' notice.

Handicapped by dangerous unexpended ammunition and oil, unknown underwater conditions, and complete lack of facilities in this area for salvage removal, the joint venture, with resourcefulness and unique engineering methods, fulfilled their contract. For this they received commendation and praise from both the Army Engineers and the Navy Department for completing the job within the given time and without a single lost time accident.

In three and a half years of business, J. D. Proctor, Inc., has had no accidents or loss of men, an enviable and highly commendable record in view of the hazardous operations completed.

The entire Port Chicago project was closely supervised by the U. S. Army Engineers, who have cognizance of such matters as an example of work required in reconquered Pacific Areas.

Pan-American Road—
Editors Take a Look at the Record

Radio broadcast series attacking the construction of one major link of the Pan-American Highway calls for clarification of charges and insinuations relating to the contractor—Western Construction News editors check the record with responsible authorities.

AN EASTERN RADIO commentator named Fulton Lewis, Jr., began early in June a series of broadcasts criticizing various phases of the construction of the Pan-American Highway. At the time of writing this editorial it is not clear exactly what or who is his ultimate target, although the broadcasts appear to be aimed at General Somervell, Chief of Supply for the Army, and the Corps of Engineers.

As a result of Lewis' "disclosures" the Mead Committee of the Senate is about to commence a thorough investigation of the Pan-American work specifically, and broadly of all Army Engineer construction jobs.

Western Construction News has taken a leading position in demanding economy by Army Engineers and other Federal agencies engaged in construction work and continues to stand solidly in the position of asking officials in charge to spend the citizens' tax and bond money to the best advantage, and with a minimum of waste.

If Lewis' motives are wholly and solely patriotic, then this magazine stands side by side with him in his objectives. If politics or acquisition of personal renown are his causes for action, there is a divergence of aim.

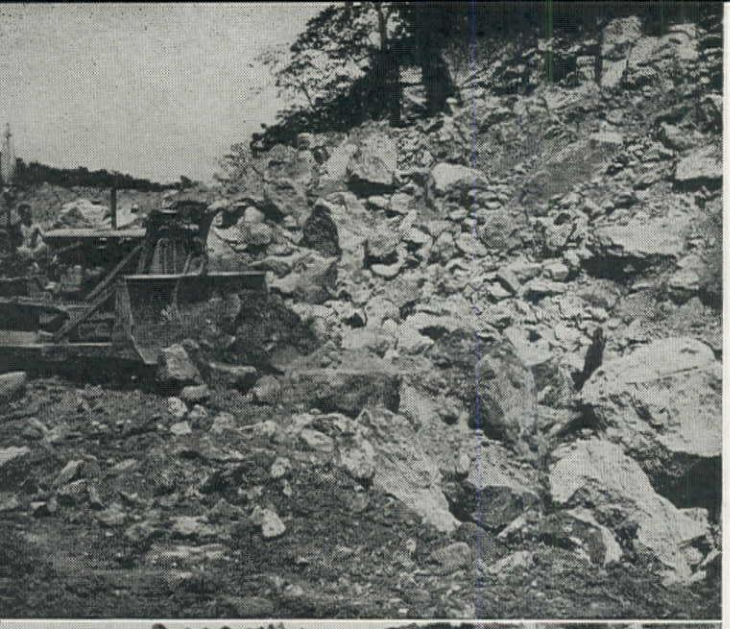
There is little doubt that a thorough and impartial examination will reveal bad errors in planning and execution of government contracts during the war, when it was possible to cover up any action on the basis of "war necessity" and silence any criticism with war censorship. We have no doubt that General Somervell and the Army Engineers are vulnerable in many places, as we have occasionally pointed out in the past ourselves. We have a very strong suspicion, however, that the Engineers are not the *only* Federal department which might profitably be subject to investigation.

We believe that the Federal government, with its multiplicity of public relations bureaus, attorneys, and printed and radio outlets, is able to defend itself in any charges which may be wrongfully made against it, or any of its agencies, and will make every effort to do so in the case of the Lewis charges in connection with the Pan-American Highway.

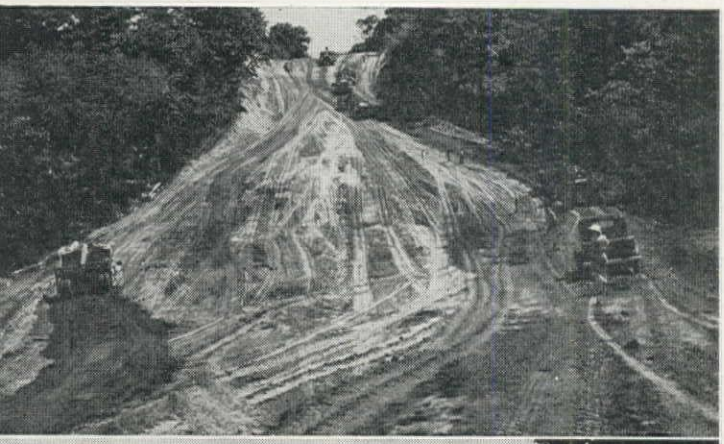
Lewis' plan of attack, however, is one we can hardly approve, however worthwhile may be his ultimate goal. His method was to single out one contract from the several which composed the entire Pan-American Highway Army Engineer project, that held by Swinerton-McClure-Vinnell, a Western firm of high standing, which has been responsible for untold millions of dollars of critical war construction, and criticize every phase of the operation of that single contract. He overlooks the fact that this contract was only one-third of the Pan-American job, and that the whole road is a mere drop in the bucket of war construction.

Using auditors and others who had been on the job to make the essential statements, and reading from documents of record, he alleged that many instances of rank waste of money were involved in the work. At least one of the men who has appeared on the program with him was removed from the Highway job for subversive activities among native laborers and at least one of the documents used was an improper one.

It is to be emphasized that at no time has Lewis charged the contractor with any act of dishonesty or shady dealing. But his method of address has contained such insinuation and innuendo that the great mass of his audience has gained a positive impression that this particular contractor especially, but also all contractors in the United States, have made great fortunes from graft in the war effort. On every hand, in clubs and stores, around the table, walking on the street, people speak of the way



A COMPARISON of earthwork on the northern Nicaragua section (above) constructed by American contractors under attack, and the southern stretch, constructed by the Nicaraguan government. Obviously, methods and costs will vary widely.



the nation has been robbed by dishonest contractors. *Lewis has not said this,* but the people have so understood it.

In order to clear up some of these wrong impressions, *Western Construction News* has checked with the contractor, responsible Army Engineer authorities, and men who were in the field on the job, and hopes to do its share in clearing up the wrong impressions which have resulted from the Lewis broadcasts.

First is a report on the matter from our Washington editor:

Report From Washington

By ARNOLD KRUCKMAN

Washington Editor, Western Construction News

THE MEAD COMMITTEE, formerly the Truman Committee of the Senate, is preparing to hold smashing hearings on the Pan-American Highway revelations brought to light by Fulton Lewis. The committee consists of Senators Connally, Hatch, Wallgren, Kilgore, Tunnell, Brewster, Burton, Ball and Ferguson. The action is presumably moving with the blessing of President Truman.

Sen. Robertson of Wyoming touched off the powder barrel by revealing that Lewis met at luncheon with a dozen or so Senators and showed them batches of photostats which revealed the "staggering amount of machinery and equipment unused and not even uncrated yet charged at high rental prices to the government by authority of the Engineers, charges fantastic beyond description." Robertson pointed out that during the same period Western states could not repair their highways for lack of equipment.

Sen. Ferguson of Michigan spoke in the Senate as did Sen. Brewster of Maine, who charged that those in the Army who were responsible have been promoted and decorated, while witnesses in the Army and Navy are intimidated. He pledged his help to any Army or Navy witness who might be intimidated, and Sen. Johnson of Colorado gave his pledge of protection in writing to Fulton Lewis to be transmitted to any witness who might fear to testify or give information.

Gen. Brehon B. Somervell told Congress in a letter that the Army would investigate all charges. No other comment has thus far come from the War Department. Congress particularly wishes to know who caused Bert Mitchell Anderson, civilian War Department employee, who brought evidence from South America, to be beaten up in Long Beach, and also who it was that stole some of his papers.

After this discussion was started in the Senate, Sen. Aiken of Vermont told of five reports submitted by the Comptroller General to Congress about irregularities in the U. S. Maritime Commission, four of which have never seen the light of day and are utterly unknown to members of Congress. Aiken called the Pan-American revelations small time stuff when compared to the Comptroller's unpublished Maritime reports. For instance, according to Aiken, five ships were sold by the government for $356,000. After they had deteriorated in value by $202,000 they were bought back by the government for $3,294,000. More will probably be heard along these lines.

Fulton Lewis says no illegal actions have been uncovered in connection with the Pan-American Highway work, but says they are grossly immoral. He charges that when a line of action is open to question, the regulations are amended to bring the action within the regulations. He places responsibility upon minor or subordinate officers, and does not claim to have uncovered any graft.

He praises the Public Roads Administration for its clean, business-like, professional integrity and fine road building in this country and elsewhere, and holds a similar opinion of the Federal Works Administration.

The Nicaraguan stretch supervised by the Corps of Engineers is classified by Lewis as merely the work presently under the magnifying glass, and by no means the only piece of construction which might be examined. Lewis apparently mostly blames the system, and not so much the individuals involved. He generally praises the contractors, especially Swinnerton. He appears to think the contractor generally plays the game as the rules are fixed, and thinks the soft spot is in the Engineers.

So, apparently, does Congress, and unless the present proceedings are violently chloroformed there will be more light.

Checking the Record

In building his case, Lewis started with minor graft supposed to have been practiced by the contractor's employees, all charges being made not by Lewis, but by others, and repeated by Lewis.

1. *A superintendent, his air associate said, had built a "hacienda" at government expense, and built an 8-mi. access road to it, also with government money.* Authorities on the ground tell us that this was a native hut purchased by the superintendent, and altered with lumber valued at $300, for which receipts are in hand, showing purchase out of his own pocket. The shack "hacienda" was located on an *existing* access road, over which all lumber and equipment for the job was hauled.

2. *The auditors on Lewis' program claimed access to the job was denied them on occasion, and that they therefore presumed some dishonest work must be afoot.* Army officers, under whom these auditors worked, deny that such was the case. *Western Construction News* notes that if these auditors approved payments without adequate examination of the work, they themselves are guilty of malfeasance of office.

3. *The auditors told Lewis that over $2,000,000 of claims were presented without adequate supporting vouchers.* Again it is noted that the auditors nevertheless approved them. However, in the same broadcast, the $2,000,000 figure was a few minutes later scaled down to $50,000. Army officials admit this, and say that a special force of Army auditors was assigned and eventually ran down and checked every item of that expense.

Some phases of the construction itself were attacked in the broadcast series:

4. *It was stated that the road in northern Nicaragua was of approximately the same length and through similar terrain as another section in southern Nicaragua built under contract by the government of Nicaragua, yet the northern stretch cost $8,000,000, while the southern section cost only $2,000,000.*

Western Construction News' informants point out a number of essential differences:

(a) The northern route was 90 mi. long, the southern 67 mi.

(b) The northern route was almost entirely through a mountainous region, requiring heavy rock excavation, while the southern traversed plains or rolling hills with little excavation and that of dirt.

(c) Bridges on the southern road were either already existing or built by the Public Roads Administration, while in the mountainous northern section, they were included in the contract.

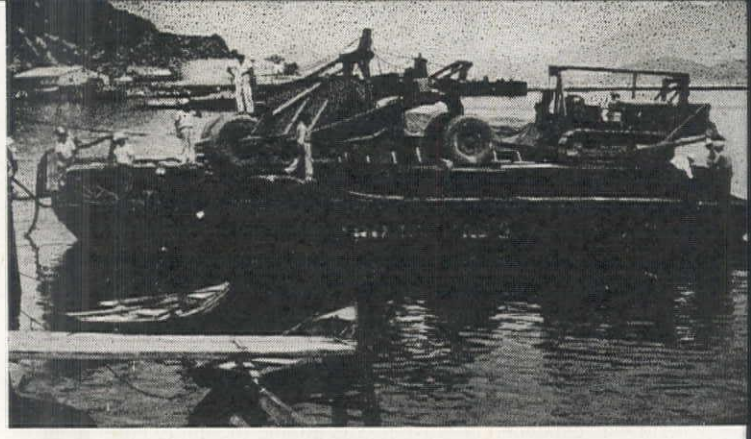
(d) The southern section was built with virtually all native labor and machines owned by the Nicaraguan government. In the north, labor and machinery imported from the United States were employed.

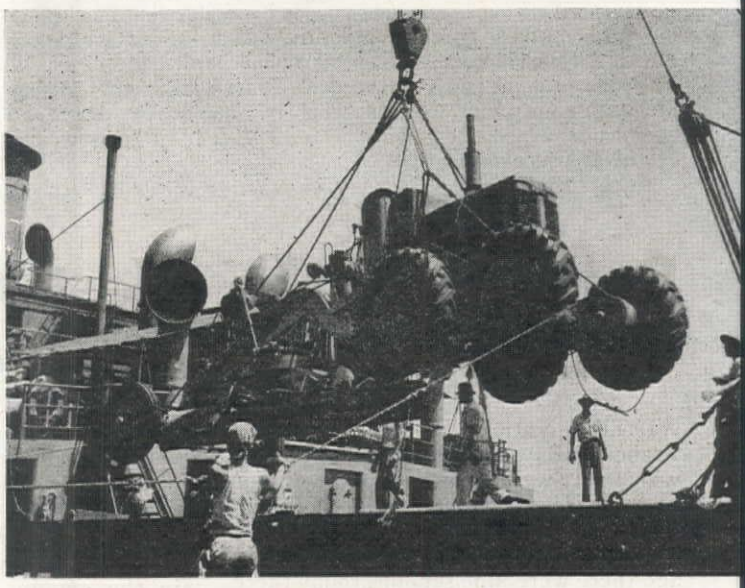
5. *The broadcaster stated that the northern route was detoured through a region of expensive mountain construction (a contradiction of the former statement) for the benefit of wealthy coffee plantation owners, whereas a route along the lowlands near the sea would have been cheaper and shorter.* This statement is partially correct, but our informants point out that a long section of the route adopted was already constructed (Managua-Sebaco), whereas none of the suggested route south of Lake Managua was in existence, and further that the route had been laid out years previously by the Public Roads Administration. In any event, it is not and has never been the contractor's responsibility to lay out the route, and no discredit can attach to him if it is poorly designed. That work is always the job of the engineer. The contractor merely builds it where he's told.

Lewis' principal object of attack was rental prices paid for construction equipment by the Army Engineers:

6. *One of the auditors read sample equipment rental rates from the contract entered into, then calculated the number of months in which the entire cost would be repaid. Lewis called these figures "fabulous."* In no observed cases were the rentals paid in excess of OPA ceilings established long before these contracts began. They were published, for instance, in the May and December, 1942, issues of *Western Construction News,* and elsewhere. If they are too high (we are not debating that point at the moment) it is not the contractor's fault, nor even the fault of the Corps of Engineers. OPA set the prices.

7. *Lewis was concerned with the cost prices shown in the contract for various pieces of equipment.* A reference to the





AMERICAN EQUIPMENT for roadbuilding has played a large part in the series of radio broadcasts about the Pan-American Highway. Difficulties of shipping equipment to the site are illustrated above. Some came by ship from Wilmington, Calif., while other items went by rail and were moved across Golfo de Fonseca on flat-bottomed barges. Below, illustrations of the concentrated use made of the equipment once it reached the site of operations. Rent was paid on equipment at OPA rates during shipment and use, a proper procedure.

prices demanded and secured for second-hand passenger autos during the war is suggested.

8. *He pointed out that rent was paid for equipment while it sat on the dock awaiting shipment, and whether or not working on the job.* This is right and fair. If the contractor's equipment is tied up so that he cannot be using it on other work, he is entitled to remuneration at whatever rate is agreed upon.

9. *Another interviewee on the radio alleged that some of the equipment was in poor condition, that it had to be laid up for repair, that parts were sometimes taken from one machine to repair another.* All equipment was examined and approved by the engineers in Los Angeles before being shipped to Central America. In fact, the contract originally awarded to an eastern firm was cancelled because it was unable to supply equipment in good operating repair. It is of course inevitable that machinery operating in hard rock and practically 24 hr. a day will break down. All contractors have forces of mechanics and extensive field shops for just such occurrences. Transferring parts to keep at least one machine working when two are broken down is a commendable practice employed long before the Pan-American Highway was ever heard of.

In this short space *Western Construction News* has striven to correct impressions left with the American people by the Lewis broadcasts concerning the contractors on the Pan-American Highway. The work on the road was discussed in feature articles (the first published in any engineering journal) in the April and June, 1943, issues of *Western Construction News,* and it is evident that the job accomplished was an outstanding one from the Mexico-Guatemala border, where the road connected with Mexican railways, to Panama. As is the case of the Canol project, the Alaska Highway, and other controversial construction, the contractors and their employees did magnificent work under the most trying conditions of climate, access and working conditions, in country wholly foreign to them, often undertaking the project against their better judgment as experienced constructors.

Lewis may well be right in asserting that vast sums of money have been wasted on ill advised and poorly planned construction. If he finds dishonesty and cheating on the part of any contractor, we will support him in denouncing it. But let him be sure that he crucifies the people responsible, and not, either by direct accusation or implied impression, men who have given highly creditable performances in what they were told was a furtherance of the war effort!

Builders of the West Aiding Vallejo on Postwar Planning

AT THE NORTHERN END of San Francisco Bay is a California community which may well become a guinea-pig for postwar development. In 1940 Vallejo had a population of 38,000 people, a few months ago there were 88,300. Five years ago there were nine schools, today there are 18. Then, there were 5,000 students, today there are 11,100. The city is a typical one-enterprise town. It is the home of the Mare Island Navy Yard. At the peak of the last war, the Navy employed about 9,000 people there. The ceiling now is 47,000. More than 39,000 people are working at Mare Island and the commanding officer is still appealing for 7,000 more workers. The city officials, the Navy leadership, business organizations and labor unions are cooperating to do the war job at Mare Island and all these people realize that to maintain post V-E day morale, it is necessary to give assurance that Vallejo will not become a ghost town in the years after the war.

The City Planning Commission has entered into an agreement with Builders of the West, Inc., in an effort to obtain expert consulting service for the development of its extensive postwar plan for the city of Vallejo. Rex Nicholson, managing director of Builders of the West, Inc., has made a portion of his time available to the Vallejo planners, to serve as a special consultant in the preparation of the city's comprehensive plan.

Major issues relating directly to Vallejo's postwar future are being carefully analyzed. Four outstanding points of the Commission's plan are:

1. A careful study of the population of Vallejo and vicinity to determine what portion of the new population plan to stay in this area after the war.

2. A complete financial analysis of the city's potential sources of revenue, in order to determine the amount of funds that can reasonably be counted upon for the construction and development of much needed community facilities, also what financial assistance can be expected from the state and federal government in this connection.

3. An exhaustive commercial and industrial analysis will be made to ascertain the amount of employment that business and industry plan to furnish the people of this community during the first two years following the war.

4. A special survey of all possible commercial and industrial sites will be made.

The results of this research will enable the Planning Commission to determine what kind of industry and business to seek, and the amount necessary to maintain a balanced and prosperous local economy after the war.

Later will come the actual blueprinting and developing of the remedies and solution. Included in the last step of this plan will be a suitable domestic water supply, sanitation, sewage disposal and storm drains, street improvements, municipal buildings, fire stations and fire fighting facilities, schools, etc., along with the development of industrial sites for new industries.

Reclamation Bureau Adopts Use of Radio to Contact Remote Reservoirs

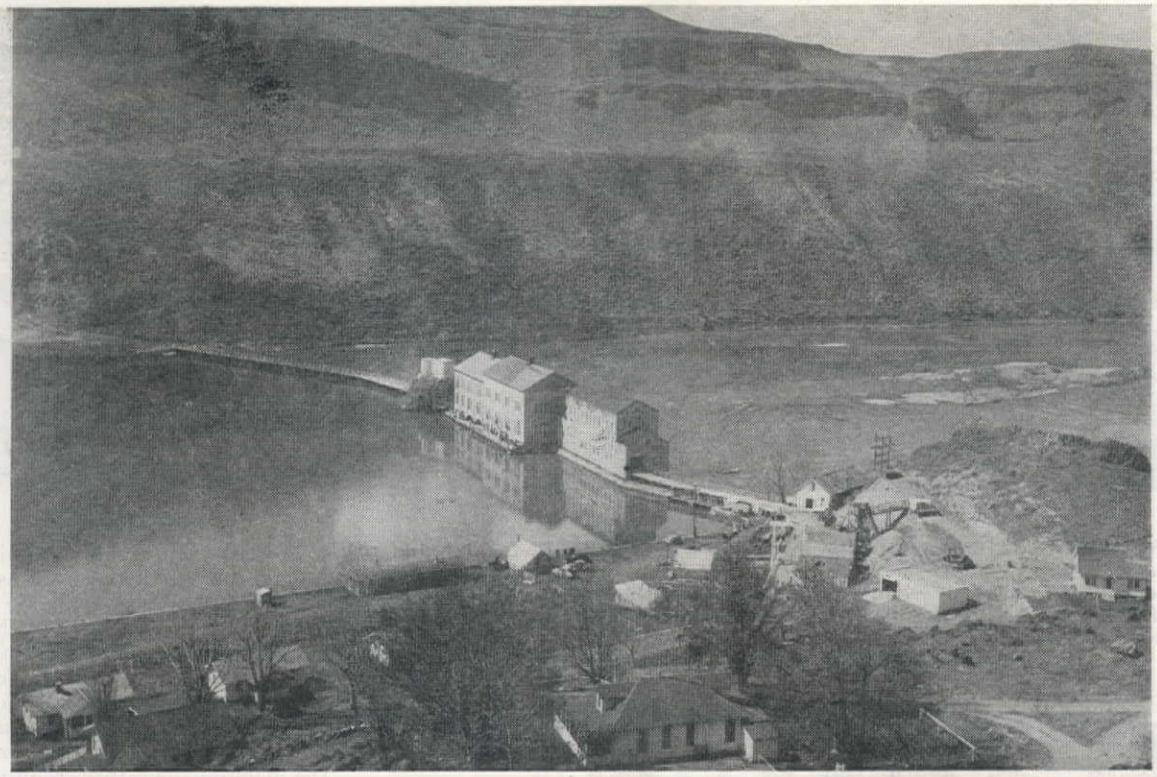
THE BUREAU OF RECLAMATION is adopting short-wave radio equipment for emergency and operational communication between remote, inaccessible storage reservoirs in the headwater regions of the far-flung Minidoka and Snake River irrigation developments.

Five radio-telephone sets will be purchased as a substitute for undependable, non-commercial phone systems in isolated areas. They will be installed at project headquarters in Burley, Ida.; at the American Falls Reservoir, 40 mi. east of Burley; at Island Park Reservoir, 20 mi. north of Ashton, Ida.; and at Grassy Lake and Jackson Lake Reservoirs, near the southern boundary of Yellowstone National Park in Wyoming. Similar equipment will be operated at the Palisades Reservoir, near Idaho Falls in southeastern Idaho, when that project has been completed.

The distance between Burley and the farthest station will be approximately 185 mi. over mountainous country, including the Teton Range which has elevations up to 13,000 ft. Two of the reservoirs, Jackson Lake and Grassy Lake, are situated at an elevation of approximately 7,000 ft. above sea level. Present telephone lines, which are strung on trees in this back country, are most vulnerable to winter storms and cannot be maintained without frequent interruptions of service.

Construction and operation of the system has been approved by the U. S. Interdepartment Radio Advisory Committee, and a frequency of 2822 kilocycles has been assigned. Operations will be restricted, except in case of emergency, to the period between the local sunrise and local sunset.

The system will be used during the irrigation season for the daily exchange of storage and other reports between the reservoir attendants and the project office, and during the winter for transmitting periodic data concerning weather and snow conditions. Dependable means of communication are vital to irrigation operations, as the project superintendent must take into consideration the availability of water storage supplies in determining the daily releases of water for downstream irrigation needs. During the winter months, the snow depth and precipitation reports from the source of supply are important in determining the probable spring storage conditions.



SWAN FALLS power plant, showing draft tube form in process of construction behind main personnel living quarters. This plant was in operation prior to 1903, when it was power source for Trade Dollar Mine, Silver City, Idaho. Recent construction will modernize this plant with the installation of two vertical shaft turbines.

Idaho Power Plants Improved

Serving a highly electrified rural area this southern Idaho public utility has obtained approval for the rehabilitation of two Snake River plants — Malad flume section replaced and new turbines are installed at Swan Falls power house

BECAUSE SOUTHERN IDAHO is one of the most highly electrified farm regions in the country and because its food products are of prime importance to the nation's war effort, the Idaho Power Co. has secured permission to proceed to rehabilitate two of its power generation plants on the Snake river. These are the Swan Falls plant about 40 mi. from Boise and the Malad plant.

The company operates a total of sixteen plants, supplying electrical energy to all of southern Idaho from the Oregon border to Wyoming and from the Salmon river to the Utah-Nevada state line.

The Malad plant was built about 1907. The water used for power generation is taken from the turbulent Malad river (known as the shortest river of its size in the world) and is carried through a wooden flume 15 ft. wide and 12 ft. high, a distance of 4,100 ft. from the diversion dam to the penstocks of the plant. The total capacity of the conduit is 900 cu. ft. per sec. A portion of this capacity, however, is shared with the King Hill Irrigation District farther down on the Snake.

Timber flume replaced

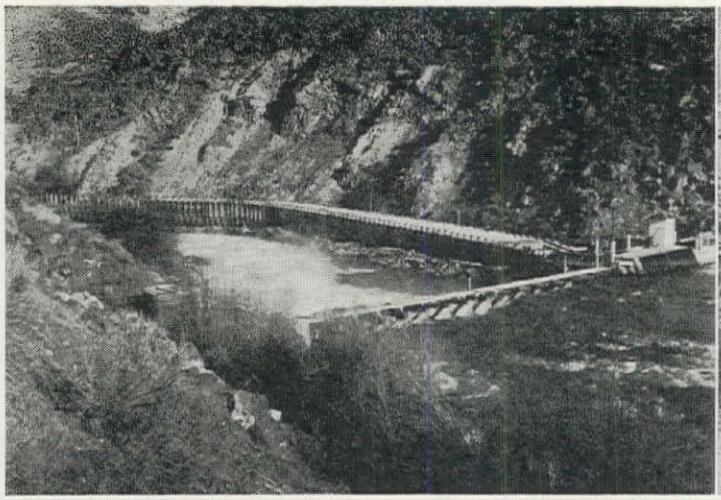
Due to the scouring action of the swiftly flowing water and the deteriorating effects of marine insects and algae, this timber flume requires replacement every six or seven years. In order to cut the power plant's outage time to a minimum, a cycle of replacement has been devised by the company, and 650-ft. sections are replaced every year. The work this year was carried out by Morrison-Knudsen Co., Inc., of Boise, Ida., with Tom McCorkle as superintendent. Assisting him as foreman was Harry Lentz. The flume was closed for only twenty days.

This construction marks completion of the third cycle of replacement for the flume. E. A. Woodhead, power plant superintendent for the Idaho Power Co., is now treating the timber used in the flume in the hope that the effective life will be prolonged four or five years in each cycle. Chemical weed killers so far tested have not proved satisfactory. In addition, where possible, the flume is being shaded, with the expectation that removal of sunlight will kill weeds and grass.

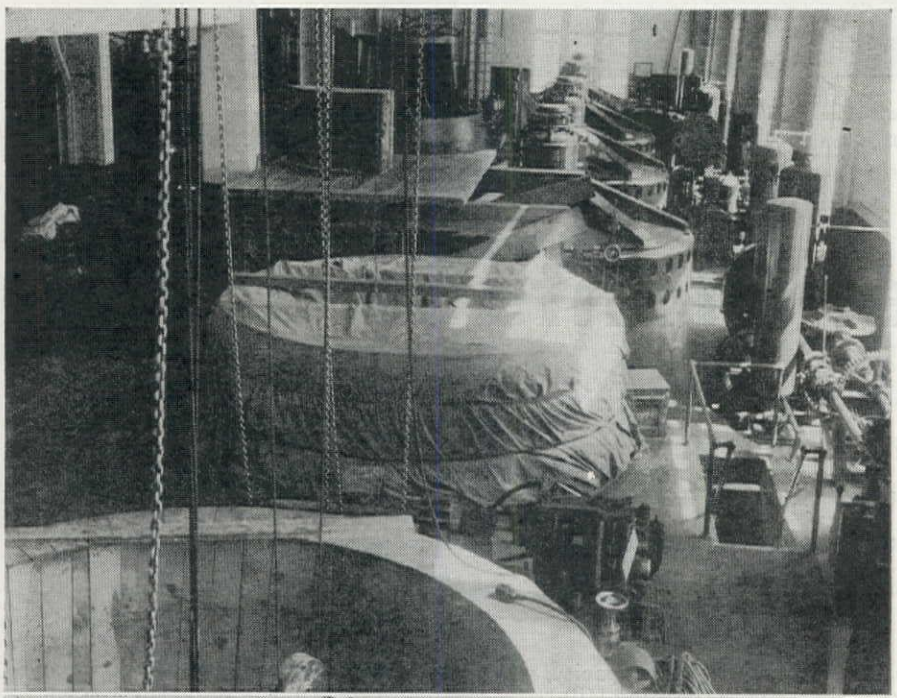
In this spring's work 160,000 bd. ft. of select fir timber were required. The floor sills were 20 ft. long and studs were 12 ft. long, 6 x 12-in. timber being employed for these members. Flooring was of 4 x 14-in. material and had a maximum length of 32 ft. Chamfer strips were of 8 x 12-in. timber and all lumber was splined to make the joints impervious. The various members were secured together with diagonal 1¼-in. bolts, each 40 in. long. Since these were valued at $1.75 each when new and the possibility of securing new ones was limited, the old ones were salvaged and straightened for re-use in the Boise shops of the contractor.

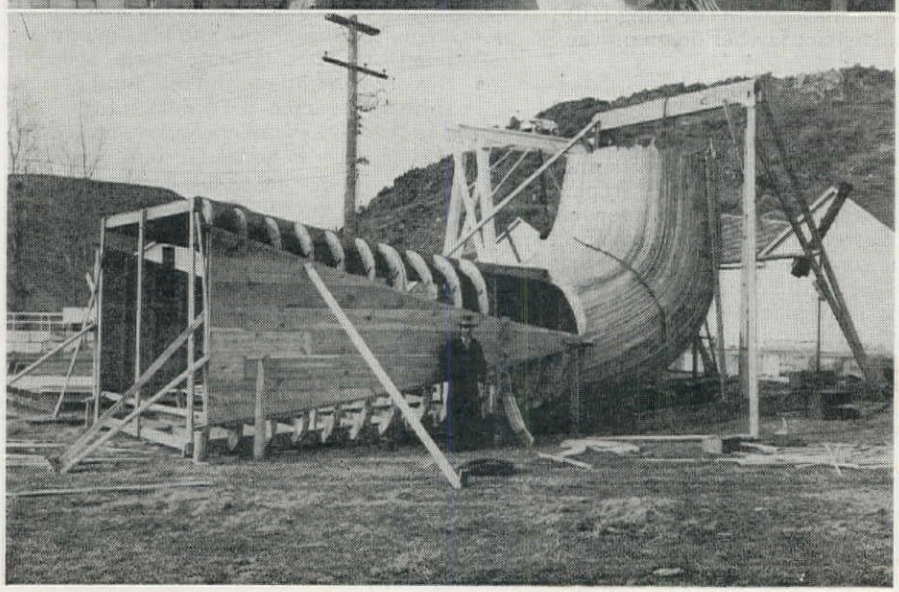
The order of construction was, to first remove the old side walls and then the original floor in small sections. Replacement of the flooring followed close behind so that the area of demolition was always within reach of the equipment.

Because the flume closely follows the contour of the precipitous canyon slope the first operation was construction of a strong hand-rail at the river's edge below the floor of the flume in order to



MALAD DIVERSION dam, above left. The flume is 15 ft. wide by 12 ft. high and capable of carying 900 cu. ft. per sec. Right, deteriorated timbers removed from the Malad flume. Below, interior of Swan Falls power plant, showing construction of foundation for new generators. Bottom, draft tube form was constructed in yard and later dismantled to move pieces through a narrow space for underground reassembly.





protect any workman who might be dislodged during the operations. Since no working space was available for equipment except on the floor of the flume itself, a winch truck was employed for practically all mechanical operations. It pulled out old timber, steadied the new sills being set, hauled new lumber to the point of replacement and performed all the machine operations required by a 20-man crew.

Turbines at Swan Falls

The work at the Swan Falls dam and powerhouse was considerably greater and more complicated than at the Malad job. The Swan Falls plant had been in operation prior to 1903, having originally been constructed to furnish power to the old Trade Dollar Mine at Silver City. In 1903 it was turned over to the Swan Falls Power Co., and the Idaho-Oregon Power Co., one of the predecessors of the present operating firm, took it over in 1910.

At that time it was partially reconstructed in line with more modern ideas, two vertical units being installed. However, with the passage of time these units have also become obsolete and are at present being replaced by modern vertical shaft, single runner, Francis type turbines.

In addition to being outmoded, the concrete in the old draft tubes had become porous and a heavy seepage was tending to undermine the foundation of the dam and the powerhouse which rests directly upon the dam near the middle of the river.

The removal of existing concrete was the first phase of this job and since blasting was impracticable because of the location adjacent to eight other turbines of the plant and the attached machinery, it was necessary to employ jackhammers and pavement breakers in very close quarters. The broken material was hoisted 70 ft. in a skip operated by electric power and hauled away in wheelbarrows. Between 75 and 100 cu. yd. of this broken concrete was so handled.

New draft tubes

The design of the new draft tubes was completely different from those installed for the old turbines and it was therefore

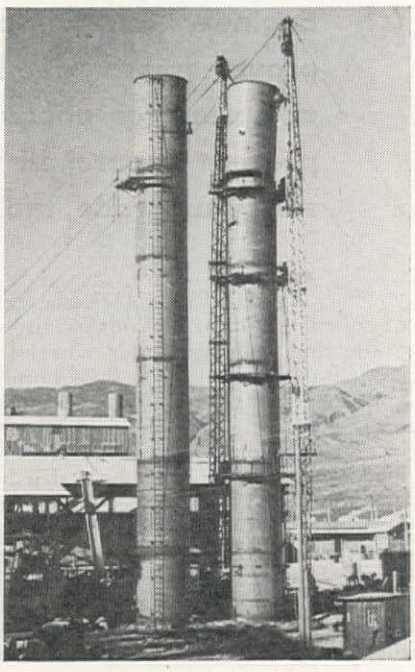
necessary to excavate additional material from the main structure of the dam on one side and to fill a considerable section on the other side. New concrete was bonded to the old by dowels grouted into holes in the dam structure. The excavation in the dam was kept dry by sealing the upper control gates with a sand mixture and erecting wooden cofferdams at the downstream exit of the tubes.

Forms for the new draft tubes were constructed on the surface, then were knocked down and reassembled in the excavation. They were approximately 60 ft. long, being circular at the upper end and rectangular at the lower, the discharge section being 11 x 17 ft. The forms were lowered in place in 26 sections through an 8-ft. opening.

L. E. Garlinghouse is superintendent for the power company at the Swan Falls plant. Superintendent for Morrison-Knudsen Co. at this job was Lou E. Steelman, and Raymond Murphy was Steelman's assistant. The Swan Falls operations were concluded on June 1.

Soda Ash Production Improved With New Steel Brine Towers

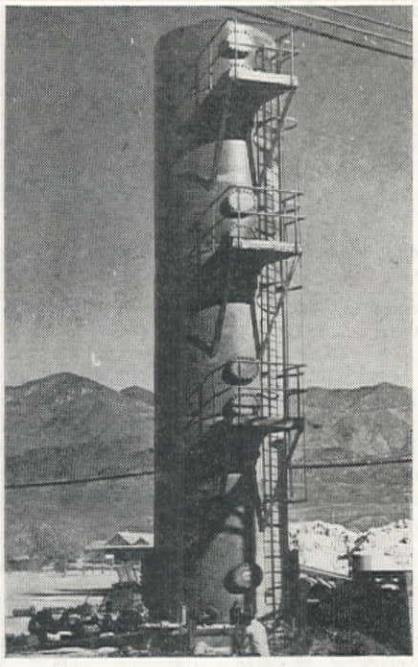
Exploiting the natural concentration of water soluble alkali salts in the Owens Lake Basin of California, the Keeler plant adds new facilities to extract increasing amounts of salt and soda from desert deposit

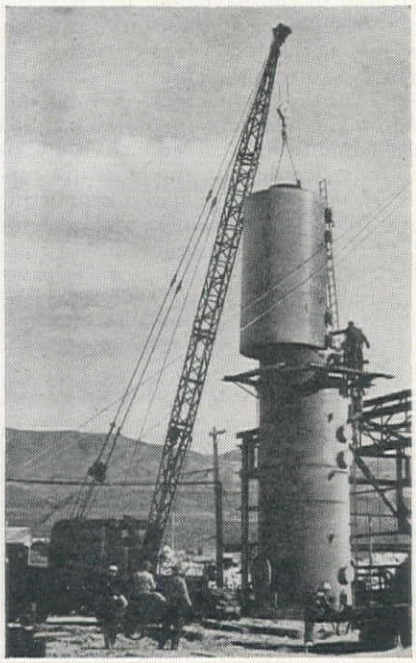


NATURAL SODA PRODUCTS Company plant is situated at Keeler, on the east side of Owens Lake in eastern California, and lies at the foot of Mt. Whitney. For more than 35 years this plant has been producing sodium carbonate (soda ash).

In May of this year, a new unit was completed and put into service at the plant. It was designed to increase the daily production of sodium carbonate to 60-65 tons per day. The wooden brine towers, previously used, have been replaced by welded steel towers, considerably larger in size and equipped with a large number of new mushroom type baffles on the inside. The equipment that has been supplied for the increased production, consists of two 9-ft. 5½-in. diam. by 97-ft. 7-in. brine towers, a 9-ft. diam. by 41-ft. 3-in. scrubber tower, a 5-ft. diam. by 15-ft. draw box and a 3-ft. diam. by 7-ft. 6-in. control tank.

Owens Lake is a dry lake, covered by a thick layer of various types of salts, deposited there by the evaporation of untold billions of gallons of water throughout the ages. According to the U. S. Bureau of Mines, these porous salts contain tremendous volumes of brine, and are capable of producing enough salts for several hundred years at least. A continuous stream of this brine is pumped from 8 ft. below the surface of the dry lake bed into large clay vats about 1,000 ft. square and 10 ft. deep. The salt content of the brine is highly intensified by the constant evaporation that takes place in the open vats. Sodium chloride (table salt), sodium sulphate and sodium carbonate are the principal chemicals that make up the brine solution. Brine is pumped steadily through heat exchangers into the tops of the two brine towers. Velocity of the stream is slowed and the brine "broken up" as it works its way downward over the baffles inside the towers.





HOISTING TOP SECTION of 9 ft. by 41¼-ft. scrubber tower into place, left. Center, completed scrubber tower. Right, placing the last section of the brine towers, in which the soda precipitates. Sixty tons of sodium carbonate will be produced daily by use of these new towers.

Chemical process

Layers of crushed lime rock deposited in the scrubber tower remove the impurities present in the flue gasses as they pass from the boiler plant through the scrubber. After the gas is purified, it is compressed and fed into the bottom sections of the brine towers. The sodium carbonate is then transformed into sesqui carbonate crystals as the compressed gas permeates upward, and is absorbed by the descending brine.

From the lower portion of the towers, the brine flows into a filter where the crystals are removed and the remaining brine discharged. By putting the crystals through a rotary furnace, the waters of crystallization and flue gasses are driven off, leaving the finished sodium carbonate product. Principal uses of this soda ash, when released for market distribution, are in the making of glass, silicate of soda, soap, insulation, cleaning compound, in mining processes and for water treatment.

The brine towers and scrubber tower were fabricated in sections at the Birmingham, Ala., plant of Chicago Bridge & Iron Co., and shipped to Keeler. There, special rigging procedure was used in erecting them. Foremen W. J. Lawson and H. L. Murphy were in charge of this portion of the work. Designs for the new unit were prepared by the Stone and Webster Engineering Corp.

Runway Load Test—
Base and Pavement Design Checked

Extensive accelerated traffic test run by Army Engineers on Santa Maria Air Base runways prove necessity of effective subgrade compaction and need for adequate subsurface drainage to prevent a perched water table saturating the sandy subgrade, thus creating a 'quick' condition

TO DETERMINE the extent of consolidation of the loose sandy subgrade and subsoils under wheel loads comparable to those of B-24 bombers, and the type and extent of deformation of the existing flexible pavement and base that would develop under such loads, an accelerated traffic test using a heavily loaded carry-all was undertaken on a section of one of the runways at the Army Air Base, Santa Maria, Calif., by the Pacific Division Engineer Office, San Francisco. Valuable information for the design and construction of pavements on sandy soils was obtained as a result of this test.

General conditions

Three runways and an extensive taxiway system were paved during the construction of the Air Base in July-December, 1942, by the District Engineer, Los Angeles, Calif. The runways are 150 ft. wide with 75-ft. paved shoulders, and the taxiways are 50 ft. wide. The pavements consist of an average thickness of 3 in. of field mix bituminous pavement on a 6-in. average thickness of emulsion treated native soil base. Substantially all of the pavements were in good condition at the time the test was initiated. The native soil as it exists on the site is a loose, well graded silty coarse sand extending to depths of from one to thirteen feet where a relatively impervious stratum is encountered. During a moderately prolonged rainy season a perched water table develops, as free subsurface water cannot drain through or along the relatively impervious substratum as fast as it is absorbed by the loose sandy soil, which becomes "quick" or unstable when saturated. The natural ground water table is from 20 to 50 ft. below the surface.

The pavements consist of imported gravel and cutback liquid asphalt mixed in place by a traveling mixing plant. Except for a few scattered soft areas, a dense well graded mix was obtained. The thickness varies from 2 to 4 in., an average thickness of 3 in. obtaining over most of the paved areas.

The base was constructed by mixing emulsified asphalt with the native sandy soil in the traveling mixing plant. The mixed material was, in general, placed in three separate 2-in. layers; the total thickness varying from 4 to 10 in. due to subgrade irregularities. The thickness of base in the area tested varied from 5 to 6 in.

Subgrade soils

The results of mechanical analysis and Atterberg limit tests on the subgrade and subsoils show the soil to be a well graded silty coarse sand with non-plastic fines having liquid limits varying from 13 to 18. The results of the mechanical analysis are summarized below:

	% smaller than				
Millimeters	4.76	2.00	0.25	.05	.005
Sieve size	#4	#10	#60	#270	Clay
Range	98-100	96-100	28-56	11-26	1-7
Average	100	100	42	19	3

Field density tests in the upper portion of the subgrade showed a wide variation in density, the percentage of relative compaction ranging from 84 to 100 per cent of the optimum density determined by the Modified A.A.S.H.O. Method. The results of these tests are summarized below:

	Optimum		"In Place"	
	Density	Moisture	Density	Moisture
Range	124-127	6-8%	106-126	3-11%
Average	126	7%	114	5%

California Bearing Ratio tests on specimens of the subgrade soils compacted at optimum moisture with a 2,000 lb./sq. in. static load, and then soaked, gave an average CBR value of 40 per cent. These results indicated the sandy soil, when adequately compacted, to be highly stable when subjected to saturation and capable of providing an excellent pavement foundation.

Plate bearing tests were also made, and from results obtained, it is evident that the soil has a very high bearing value when compacted at maximum density to an adequate depth.

Ground water conditions

The relatively impervious substratum, varying from a cemented sand to a dense sand-clay mixture, caused the formation of a perched water table. During the 1942-43 rainy season, roadways within the Air Base, which were constructed with a 6-in. emulsion stabilized base similar to that used for the airfield pavements, failed when the perched water table was near the surface. The pavement on one of the taxiways settled about 2½ in. under a B-24 bomber when parked for about two hours. The soils data in the immediate area showed that the impervious stratum was less than five feet below the surface of the pavement, and that the relative compaction of the upper portion of the subgrade was only 86 per cent of optimum density.

During the 1943-44 rainy season, local areas of the runway and taxiway pavements failed completely both under construction equipment and a relatively few repetitions of 17,000 gross load planes. These failures occurred in areas where loosely compacted sands in the subgrade and subsoil became saturated when the perched water table was within one or two feet of the surface.

Signs of imminent failure were observed along another taxiway after a short period of use by P-38 planes. Longitudinal cracks had developed, and weaving of the pavement under traffic was reported. This condition, together with objectionable differential settlements of two or three inches in several local areas along the taxiway, necessitated its abandonment early in the season.

Exploration of the cracked area one month after the end of the rainy season showed the perched water table to be at a depth of three feet, causing a saturated condition of the loose upper subsoil sand. Cracking of the pavement under traffic due to the "quick" condition of the subsoil had permitted water to enter and partially saturate the emulsion stabilized base. That the compacted 6-in. sand subgrade layer had remained stable under these conditions, was indicated by its near optimum density and moisture content. It was evident that the supporting power of the 9-in. pavement and base and the 6-in. compacted subgrade was not sufficient to prevent failure of the pavement under an 8,000 to 9,000-lb. wheel load when the loose upper subsoils became saturated.

Accelerated traffic test

A study of the soils data indicated that, at moisture contents prevailing after the perched water table had receded, consolidation of the loose sand subgrade would occur under heavy wheel load traffic resulting in differential settlement of the pavement. The development of a considerably higher carrying capacity in the pavements as a result of such subgrade consolidation could be anticipated.

To obtain the desired information an accelerated traffic test on a representative area of the airfield pavements, using a single-tired carryall loaded to obtain 40,000 lb. on each rear wheel, comparable to a fully loaded B-24 bomber, was considered necessary.

It was determined to test the NW-SE runway since it had carried substantially all of the airfield traffic, and the results of the field and laboratory investigations of June 1943 indicated it to be the weakest of the three runways. It appeared that the southeastern portion of the runway would be representative of the weakest area of the pavements and when tested with heavy loads the results would conclusively indicate the behavior of the pavements under heavy bomber operations. The pavement was in excellent condition, having been subjected to only a relatively few landings of light training planes (25 per day) over a period of six months prior to the traffic test.

A RU LeTourneau carryall loaded to obtain 40,000 lb. on each rear wheel was used in the test. Traffic was staggered over three tire widths, the center tire track passing over the points at which deflection gauge couplings had been installed. The total width of the traffic lane covered by each tire during traffic was approximately 5 ft. A total of 1,800 trips was completed representing 600 repetitions or coverages over each of the three tire tracks in each lane.

The original plan contemplated continuing traffic for 3,000 to 5,000 trips, but the test was stopped sooner because the data clearly indicated action of the pavement under additional traffic, and because the Fourth Air Force required the repairing of the runway for the operation of P-38 planes.

Traffic test results

Analysis of the test data indicated the following results were obtained by consolidation of the subgrade and subsoils under traffic:

a. The non-plastic silty coarse sand subgrade was consolidated to depths of at least 25 in. below the surface of the flexible pavement, resulting in an average increase of 12 per cent in the relative compaction (density) of the upper 16 in. of the subgrade and subsoils. The amount of pavement settlement and the corresponding increase in density were proportional to the original relative compaction of the subgrade.

b. Compaction to a relatively high density was readily obtained with the moisture content of the soil at from 4½ to 9 per cent of its dry weight. A moisture content of 7½ per cent was required to obtain optimum density of 127 lb. per cu. ft. as determined by the Modified A.A.S.H.O. Method. This compaction test indicated that a relative density of at least 95 per cent of optimum could be obtained with moisture contents ranging from 4½ to about 11 per cent. At one location, where water had been introduced through a trench 10 ft. from and parallel with one of the traffic lanes, moisture contents of 11.2 and 12.5 per cent were found at the surface of the impervious layer which was about three feet below the pavement surface. The upper 16-in. subgrade layer showed a high relative compaction at a moisture content of 7 per cent when tested for "in place" density and moisture after traffic. A similar high relative compaction in the lower one foot of subsoil was indicated by the comparative number of blows required to drive a 1-in. Porter sampler through the upper 16-in. layer of this lower subsoil stratum. It appears that the underlying impervious stratum had provided a firm foundation for consolidation of both upper and lower subsoils and that an increase in density was effected to a depth of three feet below the surface of the pavement.

A TOTAL OF 1,800 trips was made over the test section, traffic being staggered over three tire widths, making 600 repetitions over each of the tire tracks.

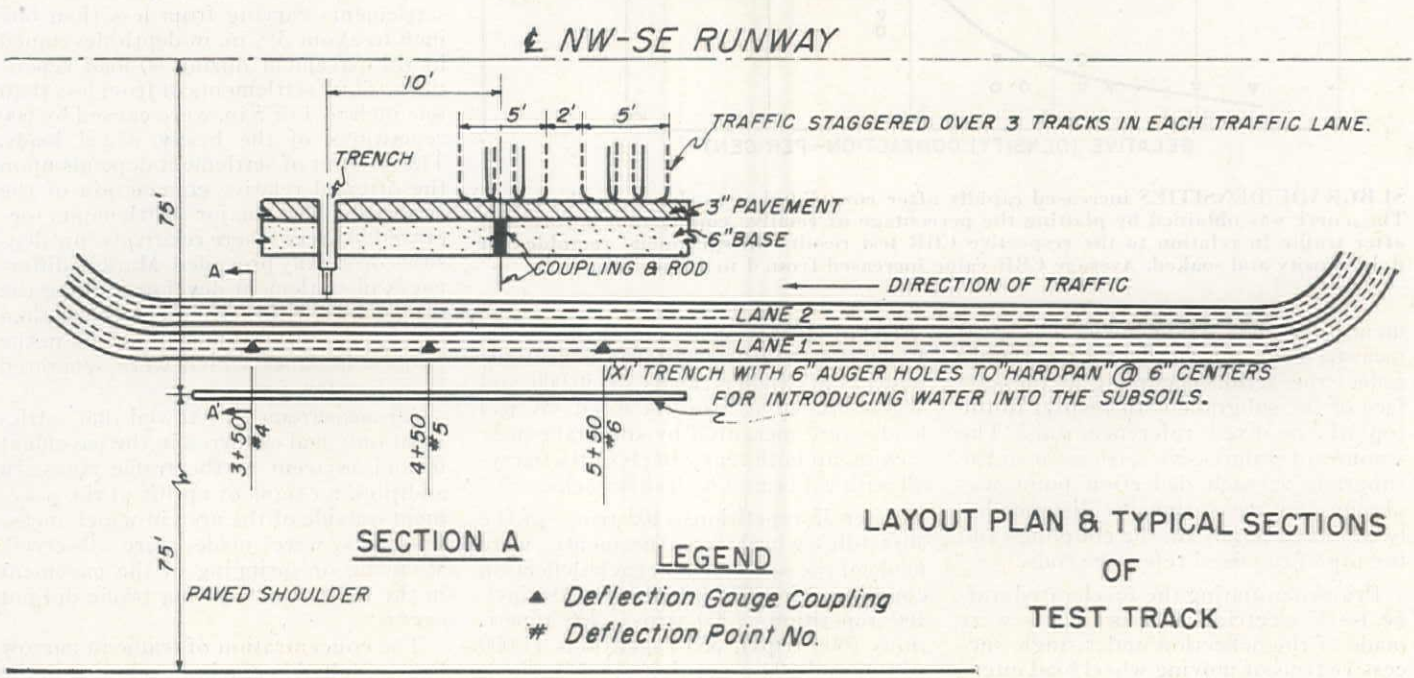
Where a moisture content of 13.7 per cent was found above the impervious stratum at a depth of about 4 or 5 ft., exploration with the 1-in. Porter sampler indicated a relatively loose and saturated subsoil condition, which did not affect appreciably the behavior of the pavement under traffic. However, it appears that the comparatively low percentage of relative compaction measured in the upper subgrade and subsoils at this point after consolidation by traffic was due to the inadequate support afforded by the saturated lower subsoils. When the loosely compacted sandy soils are saturated they become "quick" and unstable, and will not consolidate under traffic.

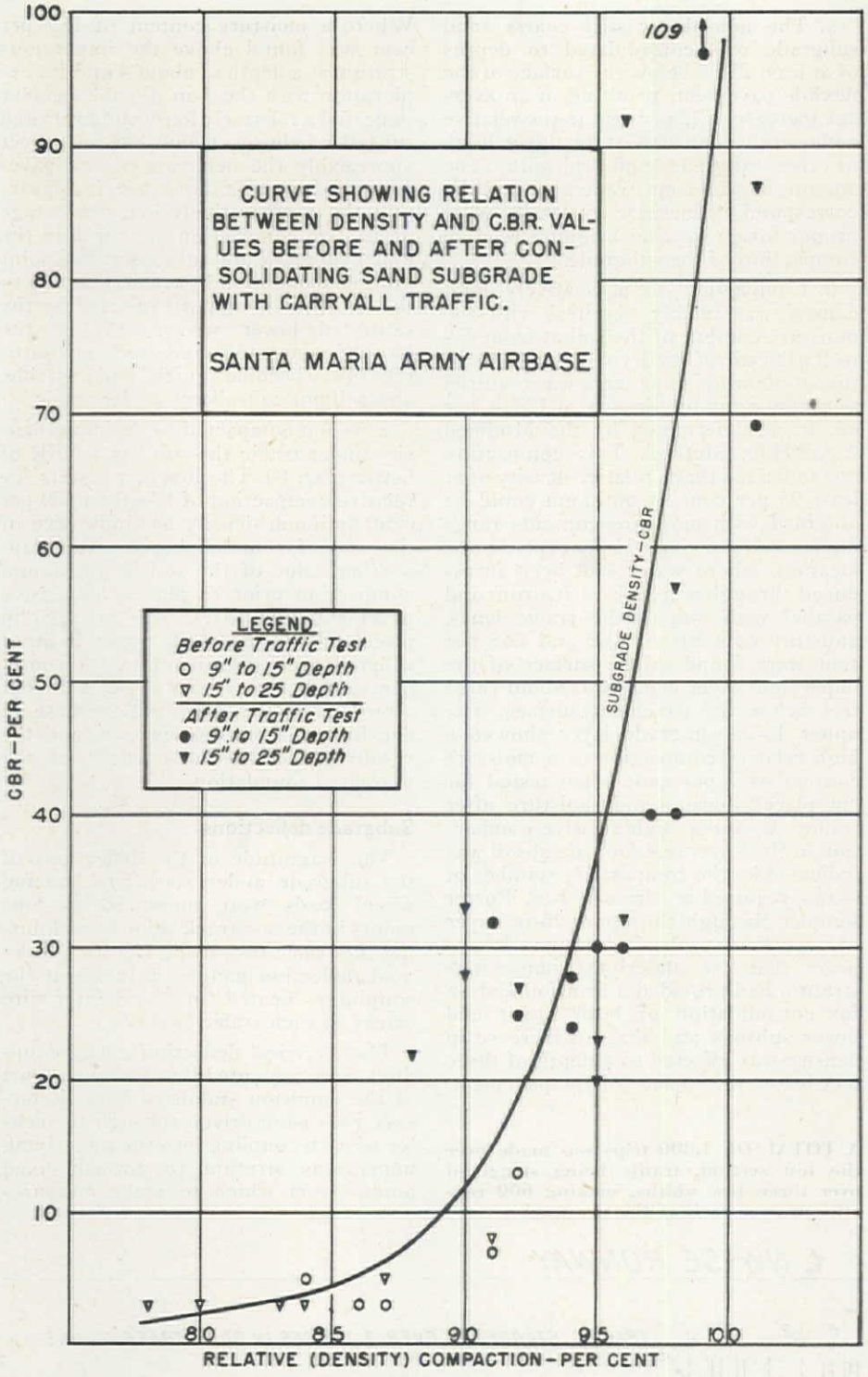
c. When compacted to optimum density under traffic the soil has a CBR of better than 80. The low test results for relative compaction of less than 100 per cent optimum density are indicative of the need for mobilizing the full supporting value of the soil by maximum compaction prior to placing expensive pavements and bases. The average "in place" CBR value of the upper 16 in. of subgrade and subsoil increased from 4 per cent before traffic to 42 per cent after traffic, reflecting the increase in densities due to consolidation, and the resulting increase in strength of the pavement foundation.

Subgrade deflections

The magnitude of the deflections of the subgrade under static and moving wheel loads were measured at nine points in the test track prior to and during the traffic test, using electrical solenoid deflection gauges installed in the couplings located in the center tire tracks of each traffic lane.

The electrical deflection gauge couplings were cemented into the lower part of the emulsion stabilized base. Reference rods were driven through the center of each coupling into the underlying impervious stratum to furnish fixed points from which to make measure-





SUBGRADE DENSITIES increased rapidly after consolidation as shown by the curve. This curve was obtained by platting the percentage of relative compaction before and after traffic in relation to the respective CBR test results on specimens remolded at field density and soaked. Average CBR value increased from 4 to 42 per cent.

ments. By this arrangement, electrical measurements of the deflections would reflect the action occurring at the surface of the subgrade with respect to the top of the fixed reference rods. The amount of progressive settlement of the subgrade at each deflection point was obtained by measuring the distance between fixed points on the couplings and the top of the fixed reference rods.

Prior to initiating the accelerated traffic tests, electrical measurements were made of the deflection under single successive trips of moving wheel load intensities of 10,000, 30,000, and 40,000 lb. Electrical measurements of deflections under static wheel loads of 30,000 and 40,000 lb. were also recorded. Wheel loads were measured by simultaneously jacking up both rear wheels of the carryall with calibrated hydraulic jacks.

After 35 repetitions (105 trips) of the 40,000-lb. wheel, measurements were made of the settlement at each deflection coupling. After 60 repetitions (180 trips), 100 repetitions (300 trips), 200 repetitions (600 trips), 333 repetitions (1,000 trips), and 600 repetitions (1,800 trips), measurements of progressive settlement and electrical measurements of deflections under both static and moving 40,000-lb. wheel loads were recorded for each deflection point.

The settlement measurements and measurements of deflections under both moving and static wheel loads show a progressive decrease in deflections reflecting a gradual increase in stability of the subgrade and subsoils as the degree and depth of compaction increased under traffic. At deflection points where only minor settlement occurred, all deflections either remained at or were reduced to .05 in. At all other deflection points, deflections were reduced from approximately 0.2 in. to between .05 and .06 in., or show a distinct trend toward such a reduction. At all points where appreciable progressive settlement of the subgrade occurred, a simultaneous progressive decrease in deflection and in rate of settlement was recorded. It is apparent from these data that no displacement of the subgrade had occurred during traffic or could be anticipated as a result of a large number of repetitions of the 40,000-lb. wheel load. Until the sandy material is compacted, however, it will become "quick" under the action of traffic and the vibration of airplane motors unless properly drained and protected from a high water table.

Pavement deformation

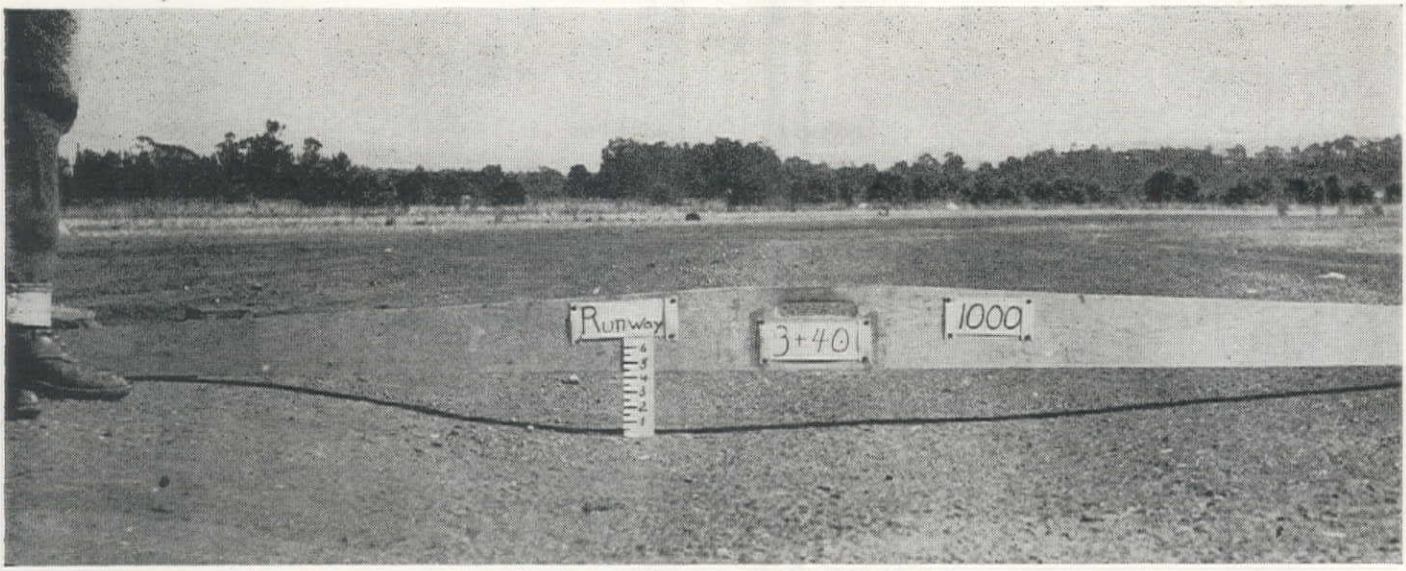
The progressive deformation of the surface of the pavement in and adjacent to the traffic lanes was recorded.

At each deflection point and at intermediate points, a series of nail heads spaced at one foot intervals were set in the pavement so that transverse sections of the test track extending 5 ft. beyond the center line of each traffic lane could be obtained. The original elevation of each nail head was recorded and its change in elevation was measured after 180, 1,000, and 1,800 trips of the 40,000-lb. wheel load.

Profiles show that irregular ruts and settlements varying from less than one inch to about 3½ in. in depth developed in the pavement during 60-load repetitions. Total settlements of from less than one inch to 4 or 5 in. were caused by 600 repetitions of the heavy wheel loads. The amount of settlement depends upon the original relative compaction of the subgrade. The major settlements occurred in areas where relatively low densities originally prevailed. Marked differences in settlement developed along the traffic lanes within distances of less than 50 ft. and between opposite points in the two traffic lanes which were separated by only a few feet.

All measurements showed that settlement only had occurred in the pavement in and adjacent to the traffic lanes. In addition, no signs of up-lift of the pavement outside of the area in which measurements were made were observed. Weaving or springing of the pavement in the traffic lanes during traffic did not occur.

The concentration of traffic in narrow lanes resulted in cracks developing in the



TYPICAL DEFLECTION of the traffic lanes after 1,000 repetitions of the load. There was no bulging or uplift outside the edges of the lane, all compression being absorbed in the subgrade.

pavement along the edges of the lanes. Their development along the outer edges of loosely compacted subgrade areas when material differences in relative compaction exist can be anticipated. The lack of any signs of uplift or bulging of the pavement along the edges of the traffic lanes shows that horizontal displacement or shear failure of the subgrade did not occur. However, the excessive differential settlement caused sufficient roughening and cracking of the pavement to require a leveling course and resurfacing to make the test track area safe for aircraft operations.

No signs of displacement of the emulsion stabilized base were observed. Separation into two inch layers, reflecting the method used in construction, occurred during removal of the base at each test hole.

Summary

It is evident from the traffic test results that, with moisture contents ranging from 50 to 100 per cent of optimum, consolidation of the loose sandy subgrade and subsoils to depths of at least two or three feet below the surface of the pavement occurred due to the 40,000-lb. wheel load traffic. The pavement foundation became stronger as the degree and depth of compaction increased. This strengthening of the subgrade and subsoils, when not saturated, is conclusively proved by the simultaneous progressive decrease in deflection and in rate of settlement under traffic, and by the marked increase in CBR value of the upper 16 in. of the subgrade and subsoils to 80 per cent or better, resulting from the increase in density due to traffic consolidation.

The lack of supporting power of the saturated loose subsoils is clearly indicated by the actual behavior of the pavement under such conditions. This instability of the loose subsoils and the development of a "quick" condition due to saturation is reflected in the low 4 per cent average CBR value obtained on soaked specimens remolded at the "in place" densities existing prior to consolidation by traffic.

Conclusions

It is believed that the results of this study justify the following conclusions regarding the design and construction of flexible pavements on sandy soils which are sufficiently pervious to readily consolidate under traffic.

a. It is necessary to compact granular base materials and subgrade and subsoils to maximum density to a depth of at least 3 ft. below the top of the pavement for 20,000 to 40,000-lb. wheel loads and to greater depths for heavier wheel loads in order to:

(1) Prevent excessive differential settlement and rutting of the pavement under traffic.

(2) Eliminate expensive resurfacing or high maintenance costs.

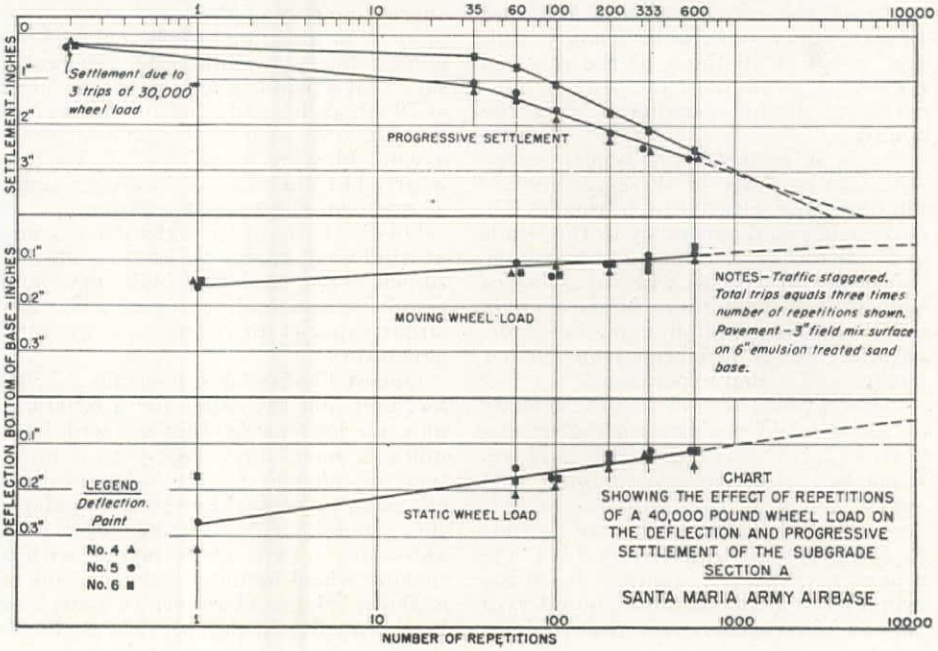
(3) Avoid the development of a "quick" condition and complete failure of the pavement in the event saturation occurs before the foundation is thoroughly consolidated by traffic.

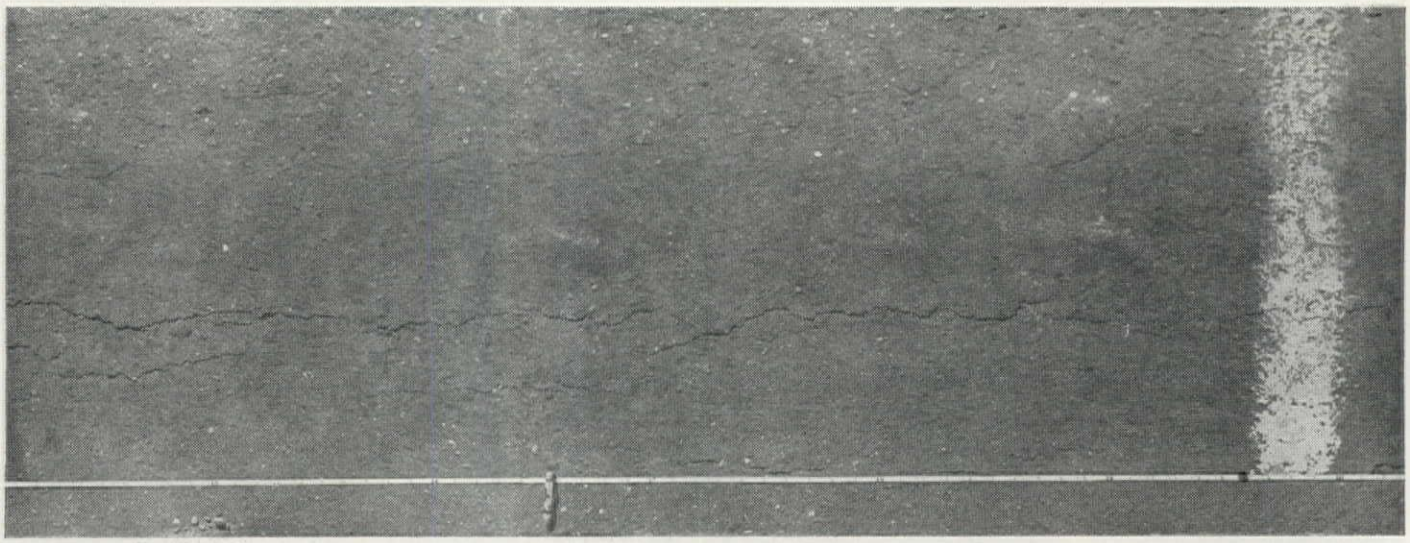
(4) Reduce the number and depth of subdrains required for adequate stability where high ground water levels or perched water tables may occur.

(5) Develop the full supporting power of the natural foundation materials and thus reduce the required thickness of high cost pavement and base course to the minimum.

b. Use of heavily loaded carryalls or heavier special rubber-tired rollers is necessary to economically and fully compact the foundation with wheel loads comparable to those of the airplanes which they must support. This procedure will, in effect, pretest the base

PROGRESSIVE EFFECT of repetitions of the 40,000-lb. wheel load from 3 to 600, on the deflections and progressive settlement of the pavement subgrade along one series of deflection points. Curves have been projected on this semi-logarithmic chart to indicate the probable results for additional traffic up to 10,000 movements.





LONGITUDINAL CRACKS in the pavement along the outside edge of the test load track. This type of crack occurred throughout the test track. They indicate, however, only settlement under the load, as no bulging took place beyond the edge of the traffic lanes.

and subgrade for adequacy and uniformity prior to placing the pavement. Similar compaction methods should be used before resurfacing or reinforcing existing pavements.

c. Sands and other previous granular materials which rapidly consolidate under traffic should be tested for CBR at the maximum density which will develop under traffic prior to saturation. Present data indicate that the test should be made on specimens compacted to 100 per cent Modified A.A.S.H.O. density and that these high values should be used for economical and correct design where the subgrade is well drained and protected against saturation. The low CBR values obtained on sands at less than optimum density indicate that additional compaction should be obtained and that the supporting value of the material will be greatly reduced if saturation develops prior to complete consolidation of the subgrade and subsoils.

d. It is evident from the high CBR of about 80 and the reduction in subgrade deflections to less than 0.1 in. due to consolidation under the 40,000-lb. wheel load traffic, that the sandy soil when fully compacted to an adequate depth will support very heavy wheel loads on minimum thickness of pavement and base.

Survey of Power Generation By Wind Told in FPC Report

THE FEDERAL POWER Commission has issued a staff report, prepared by Percy H. Thomas, presenting the preliminary results of a survey undertaken to determine the potentialities of the wind as a source of electric energy. A limited supply of the 74-page report is available for public distribution.

The investigation was based on a study of the records of the Weather Bureau, which show wind-velocity readings taken at all times of the day and night and throughout the year at hundreds of stations scattered over the country.

"It is submitted," the report states, "that the evidence of these various exhibits points clearly to a remarkable consistency and constancy in the winds as far as monthly, annual and long-time values are concerned. The suitability of such a supply for utility work is strongly indicated. Reservation must be made, naturally, for confirmation from further studies and actual experience."

The studies also show that the velocity of the wind increases with higher elevations above the earth's surface. While no consistent and complete data appear to exist from which a reliable determination of the relation of altitude to wind velocity can be obtained, the report says that it appears from the average of a considerable number of balloon observations that the wind velocity 500 ft. from the surface will in a general way have a value from 1.35 to 1.45 times the velocity within 40 ft. of the surface.

Another factor brought out in the report is the controlling importance in wind-turbine operations of the "law of the cube." This is a mathematical conclusion or formula which states that the energy content of the wind at any one point is proportional to the cube of the wind velocity. To illustrate, the report says that a wind blowing for one hour at 20 mi. an hr. and calm for the second hour has the same average velocity as a wind blowing 10 mi. an hr. for two hours, but the former has four times as great an energy as the latter.

On the basis of his exhaustive study of wind characteristics, Thomas has designed wind turbines with new and novel features and having considerably larger capacity than any existing wind generators.

One of Thomas' designs is for a 7,500-kw. unit and the other for a 6,500-kw. unit. He has designed for use with both units a novel and highly-economical type of supporting tower, adapted to an elevation of several hundred feet above the ground. The 7,500-kw. unit provides for a twin-wheel layout with a turbine wheel mounted on each end of a 200-ft. bridge. There are two airplane type propeller blades per wheel. These require unusual bracing because of their great length, 100 ft., and the enormous aerodynamic bending stress, which is estimated at 42 tons per blade.

The 6,500-kw. unit design utilizes the same tower and has the same diameter wheel, but has three blades per wheel instead of two. In this design the braces are placed on the windward side of the blades and are given appropriate cross sections and prescribed blade angles so that they may act to develop power.

One of the most interesting features of the Thomas designs is that the blade units are fixed. Feathering, as in certain types of airplane propellers, has been omitted. The necessary control of the turbine speed to fit it to the existing wind velocity is secured by a differential device, operating, through a relay, on the field strength of the generator, acting to adjust continuously the load on the unit to that appropriate for the wind velocity of the moment.

The Thomas designs for larger units appear to solve one of the most perplexing problems involved in the generation of electric energy by the wind, that of generating electricity from a wheel that revolves at varying speeds and sending it into a transmission system at standard and unvarying frequency. This is done by first-stage generation of direct current, which has no frequency, and converting it to alternating current of the desired frequency. Although the amount of energy available for any one wind turbine may vary from hour to hour, the frequency of the energy will not.

Light Aggregate From Volcanic Rock

Nevada firm develops a process to transform obsidian into a light weight aggregate and insulating material by sintering the rock until the occluded vapors expand the siliceous base to a strong cellular building material

CONCRETE, BRICK, and tile into which nails can be driven as into lumber; a saving of over one ton in weight for every hundred yards of sound-proof durable insulating plaster that can be mixed by simply adding water. These are the things promised for postwar manufacture by Fluftrok Corporation, which recently signed a twenty-five year contract with mining interests in Yerington, Nevada.

Fluftrok will manufacture from a form of obsidian abundant in Nevada and other western states, building materials that it is asserted will bring new features in the design of postwar buildings. Obsidian is a hard volcanic glass and this particular variety contains minute particles of occluded water which explode when heated, giving the "fluff" to the product.

The manufacturing plant is being set up within trucking distance of the mining operations. The present workings are fifty-four miles from Yerington, on Bodie Creek near Fletcher. The plant is under construction three miles from Yerington and one-half mile from Mason, Nev. It is located so that direct contact with the railroad makes shipping facilities readily available.

The raw product is a pale gray, highly crystallized form which must first be pulverized by a jaw crusher, and then run through a hammer mill which reduces the particles so as to pass a one-quarter inch screen.

The rock then goes into a rotary kiln by means of a gravity feed. Here it is subjected to high temperature treatment until proper fusion occurs. The heat and length of time for this process depend on the type of finished product being manufactured. After cooling, the Fluftrok is mixed with gypsum mined from the John Regan deposit 9 miles from Yerington. It is then classified by screening as follows:

1. LIGHT WEIGHT CONCRETE AGGREGATES: Fluftrok will produce a light weight insulating concrete with a compressive strength of 1,000 lb. per sq. in., and a weight of less than 40 lb. per cu. ft. This material is practically waterproof, having an absorption rate of only six per cent. It floats indefinitely on water, and can also be made into nail-crete which takes nails and screws.

2. FILL INSULATION: The coarser grade of Fluftrok is used for fill insulation and compares favorably with the best insulating materials on the market, having about the same weight, and a .30 K value. It may be either placed by hand or blown in mechanically.

3. PLASTER: Fluftrok can be used in place of sand for making a durable, sound proof insulating plaster with regular hard wall gypsum plaster or Keene cement plaster. Plaster made with Fluftrok has less tendency to crack and check because it does not react noticeably to heat and cold.

Of special interest in the construction of multi-story buildings is the saving of over one ton in weight for every hundred square yards of plaster. Limited quantities of this product are now being produced.

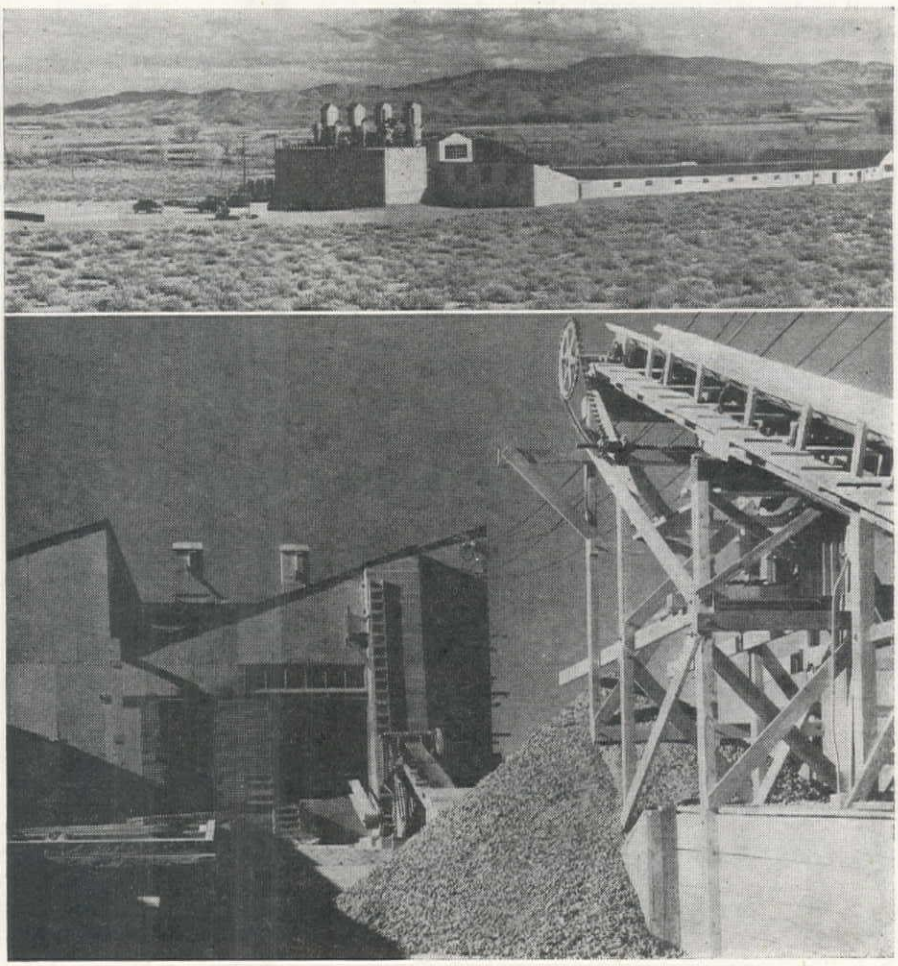
When wartime restrictions are lifted, it is the intention of Fluftrok to begin immediate manufacture of a product that will only require the addition of water before being applied. This will eliminate the necessity for using sand, and the quality of plaster produced will be uniform wherever used.

4. WALL BOARD: Fluftrok wallboard is made in all the various sizes and thicknesses now available in other types. It is similar in appearance to the standard gypsum board, but differs from it in weight. Being composed largely of the Fluftrok itself, with only a small amount of binder, it weighs about half as much as common gypsum board. Its insulating value is equal to that of other similar products, and it has the added advantage of being smooth surfaced like plaster board. Fluftrok wallboard is waterproof.

5. PIPE COVERINGS: Experiments have shown that Fluftrok makes an excellent pipe covering because it is waterproof and has a higher insulating value than standard magnesium or asbestos pipe coverings. This product will be available for general distribution in about one year.

Fluftrok concrete aggregates make a brick and tile that are about one-sixth the weight of the usual building brick or tile. The Fluftrok product has a very high insulation value with approximately six per cent water absorption. Being so light in weight, it will float in water. There is a special advantage in that nails may be driven into it with an ordinary carpenter's hammer. The bricks have a compressive strength of 1,000 lb. per sq. in.

Perry G. Means is president of the corporation and supervises mining and manufacturing operations. Neil Helmick is mill superintendent. The organization has a capital of $200,000 and is registered in Reno, Nev.



TREATMENT PLANT in Mason Valley where the crude volcanic glass is processed, first by crushing and then by roasting in a rotary kiln, right above. Intermediate product before elevating to furnace feeder.

Pontoon Span Trestle Design

Washington iron plant rushes the fabrication of transom approach for M-4 all-aluminum pontoon bridge used by Army Engineers — New type of construction uses versatile trestle design to facilitate the rapid assembly of this bridge unit in difficult terrain

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

THE MARINE DIVISION of the Bellingham Iron Works, Bellingham, Wash., is constructing 190 trestle bents to serve as the shore ends of the new M-4 floating bridge designed by the U. S. Army Engineers to support 50-ton vehicular loads in combat zones.

On a contract placed by the Ohio River Division, U. S. Army Engineers, with production inspected and expedited by the Seattle Engineer District, the Bellingham Iron Works is manufacturing the 190 trestle bents on a contract for approximately $513,000.

Importance and versatility of the trestle bents is to be seen from a description of the M-4 bridge in which they are an important component. According to Major E. H. Rausch, Jr., Supply Officer, Seattle Engineer District, this new type bridge, designated M-4, has been rushed from tests into production. The trestles support the approaches to the all-aluminum floating pontoon bridge, which is lighter, wider and capable of faster construction than any other pontoon bridge now in use. The versatile trestle design allows rapid erection of the shore end of the pontoon bridge regardless of terrain or location.

The deck of the new bridge is 150 inches wide between curbs, nearly two feet wider than other military bridges. Designed and tested to carry with safety a 50-ton vehicular load in a current as swift as ten feet per second, the bridge can carry even greater loads in slower currents. Hollow aluminum deck balks forming the road surface are laid longitudinally across the trestle bents and then over half pontoons.

Other elements of the bridge

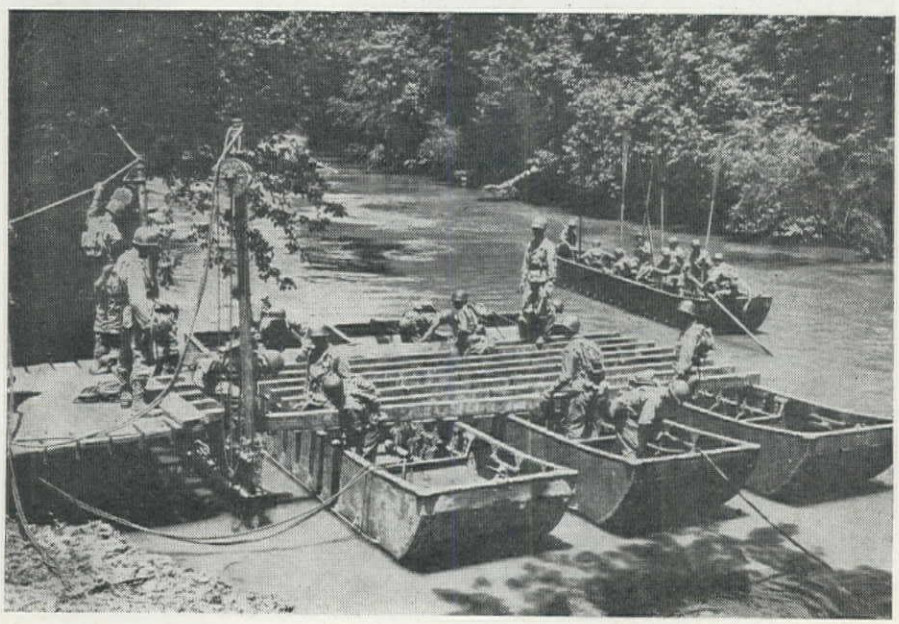
Two half-pontoons, each 30 ft. long and weighing only 1,700 lbs., are locked stern to stern with connector pins to form a complete pontoon which alone will support safely 26 tons. The bow of each half-pontoon has been designed to an ideal curve to enable it to ride swift currents.

Removable gunwales attached to each pontoon provide a foundation for the deck balk which is fixed in place with lugs and pins.

The hollow aluminum deck balk, replacing both balk stringers and chess floorings in the older type wooden-decked bridges, is in itself an innovation in bridge engineering. It is 15 ft. long, 9 x 9 in. in cross section and weighs 215 lb. It is easily carried by four men and afloat it will support a 300-lb. load. Placed parallel to the flow of traffic, the balk are staggered to distribute the load, making the entire deck a continuous beam. Top surface of the balk is ribbed to prevent skidding of vehicles. Disabled pontoons may be unfastened from the deck with ease, towed out and replaced. The decking itself is so buoyant that if every pontoon were sunk the deck alone could still support a loaded truck.

HEAVY ALUMINUM tubing 16 ft. long are centered in the lathe fixture, and inside and outside surfaces machined by a rotating tool held secure in chuck.

U. S. ARMY ENGINEERS demonstrate use of the new trestle approach for the M-4 all-aluminum pontoon bridge. The deck is composed of hollow aluminum balks, which are in turn secured to the pontoons by an eccentric locking device.



One M-4 bridge set will provide approximately 436 ft. of floating bridge and 180 ft. of fixed bridge, or a total of 616 ft. A set is carried in 69 trucks and trailers, with each of the 64 two and one-half ton trucks carrying sufficient equipment to build 15 feet of bridge. Two six-ton trucks with semi-trailers transport D-7 tractors while three 4-ton trucks carry twin-screw power boats. In addition, five cranes accompany each bridge set.

Trestle bents

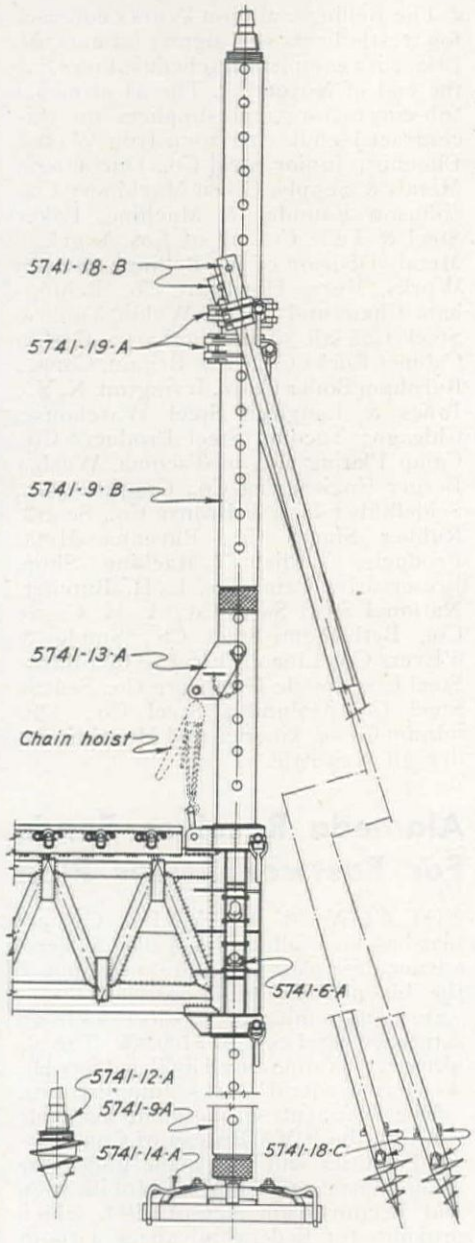
The trestle bent design is best understood by examining the assembly drawing.

Seven main subassemblies comprise the complete unit: (1) two supporting aluminum columns, (2) two fabricated steel footings, (3) one adjustable truss or transom of steel tubing, (4) four steel tube bracing struts with screw points, (5) two hoisting chain brackets that fit on the aluminum columns, (6) four aluminum half-columns or anchor posts with screw points, and (7) eight swivel pipe clamps of bronze. In addition, two

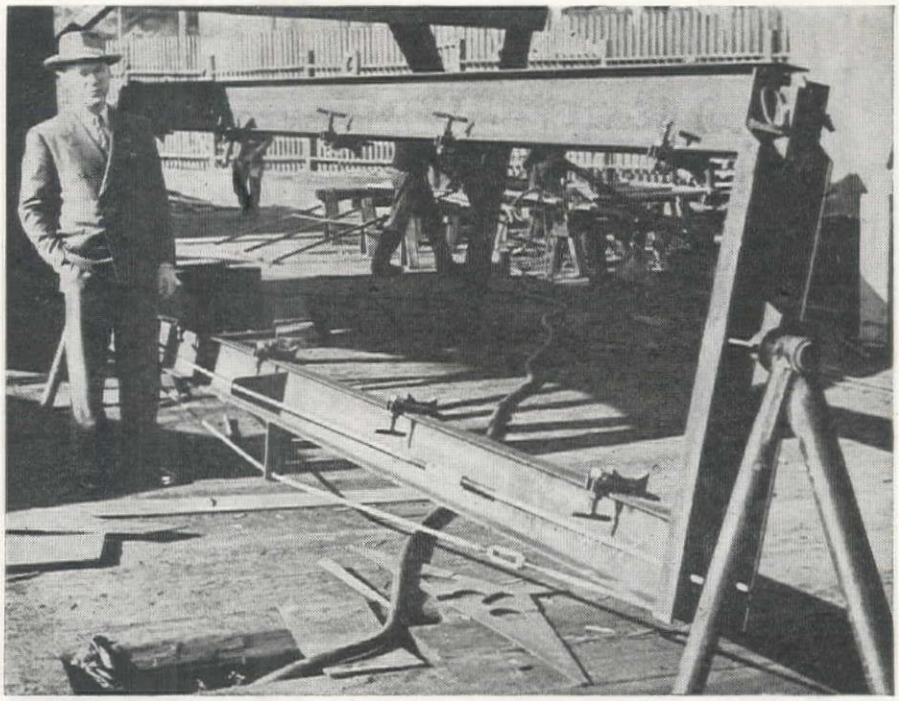
steel spanner wrenches of unique design are included with each trestle bent.

The trestle is built to machine tolerances in spite of being a static structural bent and not a moving mechanical device. One of the machinists at Bellingham, upon viewing the 932 individual pieces that make up one bent, described the trestle as a large size "erecto" set. The contract for 190 units means production of 177,080 individual pieces of steel, bronze and aluminum.

ONE SIDE of the 50-ton trestle, showing column assembly and part of the fabricated transom assembly composed of steel tubing.



Dwg. No.	Description	No. Required
5741-2	Transom Assembly	1
5741-9-A	Full Column Assembly	2
5741-9-B	Half Column Assembly	4
5741-14-A	Trestle Shoe Assembly	2
5741-15-2	Trestle Shoe Coupling	2
5741-6-A	Transom Pin	2
5741-13-A	Chain Hoist Supporting Bracket Assembly	2
5741-10-3	Spanner Wrench	2
5741-19-A	Trestle Bracing Clamp Assy.	8
5741-18-B	Trestle Brace Strut	4
5741-18-A	Trestle Bracing Screw Point	4
5741-18-C	Screw Point Pin	8
5741-8-A	Adapter Pin Assembly	22
5741-8-3	Adapter Pin Spring	22
5741-12-A	Anchor Post Screw Point Assy.	4



A SPECIAL WELDING jig used in the fabrication of 18-ft. transom assembly, minimizes distortion by securing the pieces with chain pipe vise clamps. By rotating the jig on its horizontal trunnions both vertical and overhead welding is eliminated.

The columns, two of full length and four of half-length, are extruded aluminum tubing made from alloy AL-14 conforming to Army-Navy aeronautical specification No. AN-A-8. The columns are made in two lengths of approximately 8 and 16 ft., with a 7-in. outside diameter and a ⅝-in. wall thickness. Into each end of these columns are fitted and doweled, high-tensile strength castings that allow coupling together into any column length desired. Holes at 6-in. centers are drilled through the column along the longitudinal axis to take the tool steel pin which fastens the transom to the columns. These closely spaced holes permit adjustments in increments of three inches in the elevation of the transom regardless of any unevenness of ground surface at the foot of each column. A ball and socket universal joint between the bottom of the column and the fabricated steel footing permits plumbing the column, even though terrain under the footing may be sloping.

Drilling 1-25/32-in. holes at six-inch intervals along the column center line was done accurately by means of a jig. A cast iron "vee" block was placed on the table of a drill press to position the aluminum column as it was pushed under the drill. Roller steady rests at four-foot centers on each side of the drill press held the 16-foot column horizontal. A tool steel bushed gage that was fitted on the "vee" block under the drill assured accurately spaced holes on all columns. Specifications were rigid on the tolerance of the hole spacing and it was only by means of an accurate jig that the many holes could be kept in line and spaced correctly.

Fabricating the transom

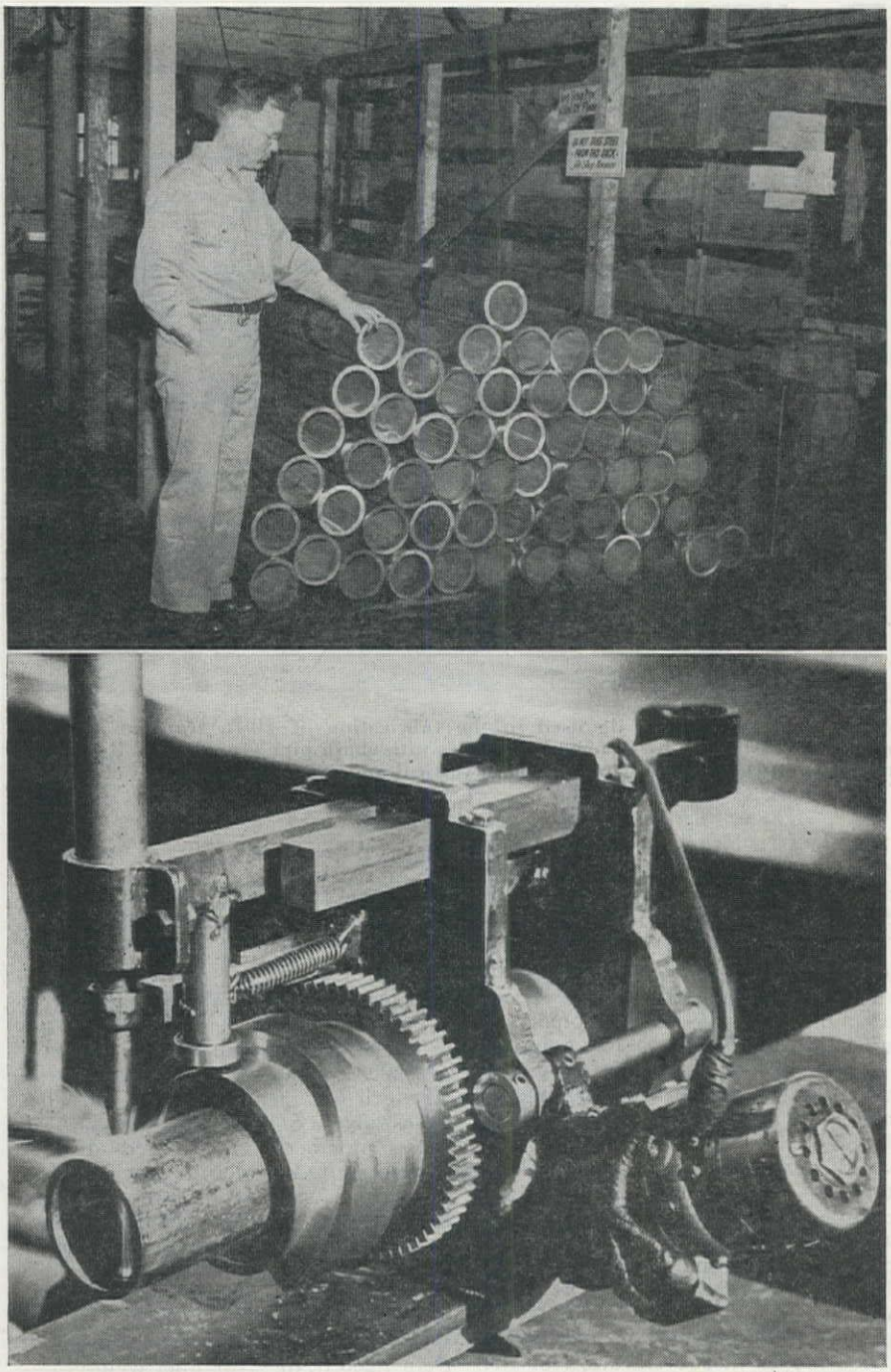
The trussed steel tube transom which spans the 18 ft. between the aluminum columns, part No. 5741-2 on the assembly drawing, offered a challenge to the fabricator.

Upper and lower chords of the transom are 5-in. O.D. cold drawn steel tubes, having an ultimate tensile strength of 75,000 lbs. per square inch and a yield strength of 55,000 lb. per sq. in. These tubes have a 5/16-in. wall thickness. To these members are welded diagonal three-inch O.D. steel tubes with a 3/16-in. wall. A steel binding strap of bent flat-bar, ¼x2¼ in., is welded to all members at the panel points. In addition, the top chord is fitted with a balk adapter skip-welded to the five-inch O.D. tube for the entire 18-ft. length of the transom span. In each transom, there is more than 1,200 ft. of ¼-in. fillet weld.

Using a jig and a single drill press, holes 15/16 in. in diameter were drilled through 3½-in. O.D. tubes that had the wall thickness of 3/16 in. This was difficult work on the cold drawn, finish annealed class A steel tubing.

Distortion from electric arc welding on the cold drawn steel tubing with the thin wall was anticipated and a special heavy jig was devised. Two steel pipe tripods are set up at each end of the transom and secured in place on a large steel base plate. The top of each tripod is fitted with a trunnion bearing. Between the tripods and supported in them by trunnion pins, is a rectangular frame made of 8-in. steel channels and 8-in. wide flange sections. The top member of the frame is removable, since it is only pinned in place.

The inside dimensions of this steel frame are the exact outside dimensions of the transom to be fabricated. Semi-circular steel saddles at 3 ft. intervals



ALUMINUM TUBING used in the fabrication of the trestle columns is cut from extruded stock with 5/8-in. walls, upper. A cam operated cutting torch was designed to cut both ends of the diagonal members of the transom assembly tubing simultaneously. Only one torch is in action, but the tool was designed to carry two torches.

along the top and bottom frame members accurately position the transom chord members with respect to each other. The end channels of the frame allow no distortion in a longitudinal direction.

Chain pipe clamps hold the transom chords in the saddle regardless of the position into which the frame is rotated. By rotating the jig and welding from the center out toward the ends with teams of welders observing every known precaution against distortion, it is possible to weld completely all tubes in place in two hours for each unit, without any manifest winding, shrinking or creeping.

Perhaps the most ingenious device or improvisation set up by the Bellingham Iron Works for any phase of the trestle bent fabrication was the two-torch cutter for handling the diagonal tubing used in the transom.

Since the three-inch O.D. diagonal tubings in the transom butt against each other and also against the five-inch O.D. horizontal tubes, they must be cut along a contour. To save time consumed in various experimented methods, the Bellingham Iron Works designed and built a tube-cutting machine utilizing two torches. The tube is merely inserted into the machine, clamped into place, torches lit and the handle cranked. The tube can be removed with both ends cut simultaneously in one operation to the proper shape. This shape is obtained by means of two cams which rotate along with the tube and on which the torches ride. All "centerline" troubles are avoided on this machine because the operator cannot cut one end differently from the other end, once the cams are properly set. Although considerable time was spent in eliminating the "bugs" from this machine before it was used in production, the entire cost including design was less than five hundred dollars.

Sub-contractors

The Bellingham Iron Works contract for trestle bents was signed January 20, 1945, with completion scheduled now for the end of November. The 34 principal sub-contractors and suppliers on this contract include: Arizona Iron Works, Phoenix; Junior Steel Co., Ducommon Metals & Supply, Given Machinery Co., Johnson Foundry & Machine, Baker Steel & Tube Co., all of Los Angeles; Metals Division of the Bellingham Iron Works, Morse Hardware Co., Bellingham Chain and Forge, Weldit Tank & Steel Co., all of Bellingham; Corbin Cabinet Locks Co., New Britain, Conn.; Burnham Boiler Corp., Irvington, N. Y.; Jones & Laughlin Steel Warehouse, Chicago; Tacoma Steel Products Co., Camp Plating Co., of Tacoma, Wash.; Berger Engineering Co., Cragin & Co., Seidelhuber Iron & Bronze Co., Seattle Rubber Stamp Co., Ravenna Metal Products, Williams' Machine Shop, Preservative Paint Co., L. H. Butcher, National Steel Sales Co., A. M. Castle Co., Bethlehem Steel Co., Sunde & d'Evers Co., Lincoln Electric Co., Barde Steel Co., Seattle Hardware Co., Seattle Steel Co., Columbia Steel Co., Aluminum Co. of America and Morel Foundry, all of Seattle.

Alameda Receives Funds For Postwar Sewer Plan

THE CITY OF ALAMEDA, California, has been allotted a $6,000 Federal advance for plan preparation to finance the blueprinting of a postwar sewer, water and sanitation project with an estimated total cost of $160,000. The allotment was announced by Baird Snyder, Assistant Federal Works Administrator.

The allotment will be made available through the FWA Bureau of Community Facilities and was made under the authorization of the War Mobilization and Reconversion Act of 1944, which provides for Federal advances without interest to states, cities, and political subdivisions to finance the preparation of plans for postwar public works. Congress appropriated $17,500,000 for such advances. The advances are to be repaid when funds become available to the applicant to construct the specific public works for which the advances were made.

The project consists of a sewer system for the Bay Farm Island section of the city, including lateral and intercepting sewers, two pumping plants, pressure pipe line, submarine pipe line under the channel, a trunk line sewer to the existing pumping plant and additional pumping equipment in the present plant.

Sacramento Deep Channel Reviewed

U. S. Army Engineers report on the proposed deep water navigation channel from Rio Vista to Washington Lake turning basin—Additional facilities will include a barge canal connecting this basin with Sacramento River at the Capital City

A REPORT has been prepared by Colonel Lester F. Rhodes, C. E., District Engineer of the U. S. Engineer Department, Sacramento, California, District, entitled "Review of Navigation Reports on Sacramento River (Deep Water Channel from Sacramento to Suisun Bay), California" and has been forwarded to the Division Engineer in San Francisco for review. This office has in turn submitted it to the Board of Engineers for Rivers and Harbors and the Chief of Engineers, whence it will finally go to Congress, which ordered the study.

Plan of improvement

The navigation improvements below Sacramento, as covered by this report, consist of a deep water ship channel, 30 ft. deep (at mean lower low water), and from 200 to 300 ft. wide, in and adjacent to the Sacramento River, extending from deep water near Collinsville to and including a harbor and turning basin at Washington Lake, west of Sacramento, with a shallow draft or barge canal connecting the harbor and Sacramento River at Sacramento, a total distance of 44 mi. A brief description of the deep water ship channel and appurtenant works follow:

Beginning near Collinsville, where a short stretch of deep water affords direct connection with the existing San Joaquin 30 ft. channel to Stockton, the courses of the Sacramento River and Cache Slough are followed to river mile 18. The channel then extends generally northward along the westerly side of the east levee of the Yolo Bypass floodway to mile 40, thence northeasterly about 2.5 mi. to Washington Lake in which a harbor and turning basin 1,000 ft. wide and 1,200 ft. long is proposed. From Collinsville to mile 18.5 the channel would have a depth of 30 ft. and a bottom width of 300 ft. Above that point there will be a depth of 30 ft. and a bottom width of 200 ft. in the straight channel reaches and 300 ft. width on all curves. The barge canal between the proposed harbor and the Sacramento River, about 1.5 mi. long, would be 11 ft. deep and have 120-ft. bottom width, and would include a navigation lock with chamber width and length of 60 ft. and 425 ft. respectively. A drainage culvert, designed for a capacity of 3,000 cu. ft. per sec. and with controllable head gates, located at mile 40.3 would permit flows from the borrow pit of the Yolo Bypass easterly levee to pass under the spoil bank into the ship channel. A culvert 4 ft. in diameter would be placed in the levee embankment at mile 23.1 to permit flow of water between Miner Slough and the proposed ship channel.

Quantity figures

The biggest physical feature is excavation of about 67,482,000 cu. yd. of material as follows:

Barge canal: 1,430,000 cu. yd.

Harbor: 3,500,000 cu. yd.

Flood intercepting works: 1,666,000 cu. yd.

Ship channel and toe trenches: 60,886,000 cu. yd.

Excavation would be accomplished chiefly by hydraulic dredging.

LOCATION OF the Sacramento ship channel will run northward from deep water near Collinsville through the delta area, thence along the westerly side of east levee of the Yolo Bypass floodway to Mile 40 where the channel continues northeast to the harbor area. The project is estimated to require 3 years for completion.

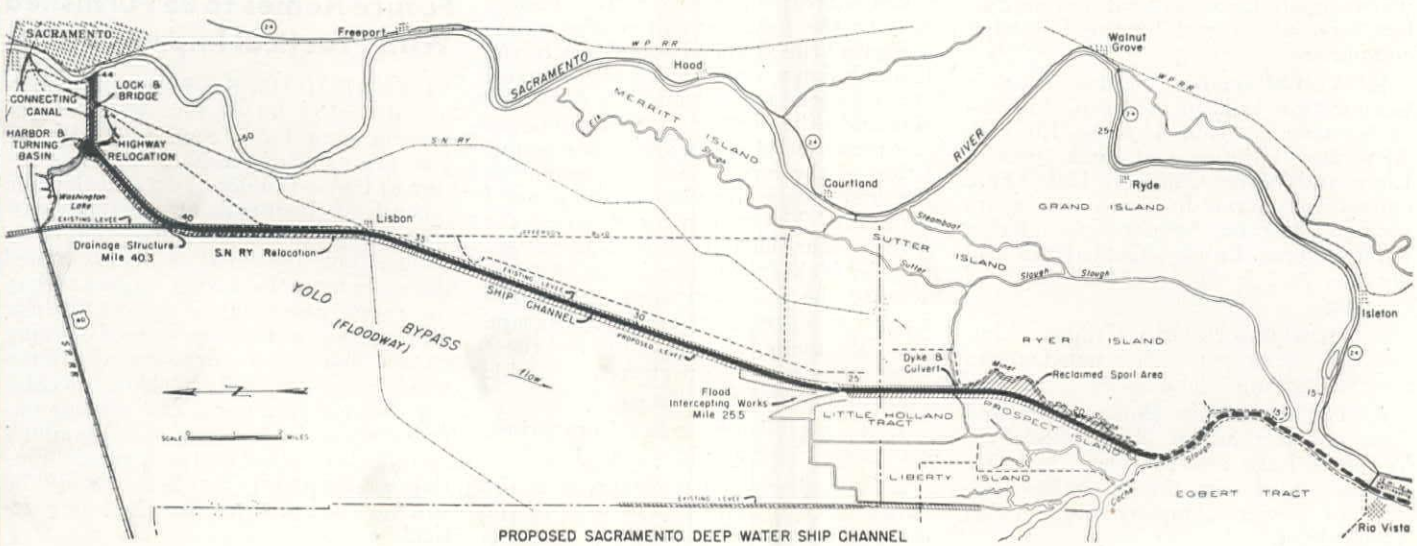
Additional data

The barge canal lock is required because of the differential water stage between the Sacramento River and the proposed harbor. Present river traffic that does not have intermediate stops between the Bay Area and Sacramento may be expected to use the deep water channel simply because it is shorter and small craft navigation above Sacramento is expected to return with regulated release of Shasta dam water. Therefore, the proposed barge canal will give the small craft a direct tie up to deep water or off-shore traffic.

In the lock itself, the chamber would be of trapezoidal section, paved with riprap and provided with timber trestle walkways and buffers on the clearance lines. Guide walls 400 ft. in length would likewise be of timber construction. Sector lock gates would be installed and would obviate the need of filling valves. A single leaf, bascule type bridge would be supported on the lock wall masonry to reduce costs of foundations and also provide for a more economical operation, since one operator would handle both the bridge and the lock. The bridge would carry two lanes of highway traffic and a single track electric railway (Holland Branch, Sacramento Northern Railway). The lock would be supplemented with auxiliary facilities to provide for the movement of fish in the barge canal from the ship channel to the Sacramento River.

Harbor facilities

The proposed terminal and harbor facilities (to be built and be maintained



PROPOSED SACRAMENTO DEEP WATER SHIP CHANNEL

by local interests) would consist of a wharf, two transit sheds, two storage warehouses with platform space, together with appurtenant paving, railroad trackage, water supply, sewerage and fire protection equipment, and rights-of-way. Details on this were submitted by local interests directly to the Board of Engineers for Rivers and Harbors when this work was first proposed in 1936.

The construction period required for the whole job is estimated at approximately three years. On and off site labor would amount to about 5,500,000 man-hours, of which about 3,750,000 man-hours would be required at the site of the work. Peak construction employment is estimated at 750 men on the jobsite.

General

The report further covers all aspects and problems involved in the construction of such an extensive project, and only after a thorough review of all factors from geology to economics have the district and division offices approved the plan. Accurate cost estimates are not available but private estimates indicate a figure between twelve and sixteen million dollars.

The report provides that local interests will furnish free of cost to the government all necessary rights of way, including utility changes and modifications, and will absorb any increased annual maintenance and operation costs which might result from these changes; that local interests will agree to provide, maintain and operate adequate terminal facilities at Washington Lake; that if after construction the new ship channel should detrimentally affect salinity conditions in the river delta the local interests will assume all responsibility and meet the costs of such works that may be necessary to compensate for or eliminate such conditions.

The report has not yet been distributed publicly but may be examined in either the office of the Sacramento District Engineer or the Division Engineer in San Francisco.

British Columbia Power Taken Over by Commission

PREMIER JOHN HART of British Columbia has announced that the British Columbia Power Commission will, on or about August first, take over the operation of three power companies in the province, with all their subsidiaries. Notice of the intended acquisition has already been served on these companies. The properties to be taken over by the government will cost several million dollars, and the Commission plans to negotiate for a supply of power from the companies to carry on until such time as government development can be placed in operation. In addition, there are indications that the government will immediately start to develop 50,000 h.p. on Vancouver Island, and it is probable that this development will take place at the Campbell River Falls.

The properties to be taken over will, it is estimated, cost several million dollars, and are owned by the following companies:

1. West Canadian Hydro Electric Corporation Ltd., including its subsidiaries, namely, Hope Utilities Limited, Alert Bay Utilities Ltd., and Quesnel Light and Water Company Ltd. These companies operate in North Okanagan, including Vernon, Armstrong, Enderby, Salmon Arm, Lumby, Coldstream and Oyama, and in Hope, Alert Bay and Quesnel.

2. Nanaimo - Duncan Utilities Limited, operating in the Nanaimo-Duncan and Salt Spring Island areas.

3. The Columbia Power Company Ltd., serving Golden, Nakusp, Sechelt, Williams Lake and Smithers, together with its subsidiary, the Columbia-Vanderhoof Power Company Ltd. serving Vanderhoof.

Coincidental with the approval of acquisition of these three companies, Premier Hart announced that in all probability official approval of the development of Campbell River as a power site would be given within the next 30 days. Final recommendation of the Commission merely awaits the report with plans and specifications to be submitted by H. B. Acres and Company of Niagara Falls, one of Canada's leading engineering firms, engaged by the Commission to survey the power resources of the island.

The recommendations already approved by the government form part of a comprehensive program submitted to the government by the Commission, in which it outlines its policy for the entire province. The report, in dealing with its initial program now undertaken, states in part that: "It is important to the future credit of the enterprise that the financial soundness of the Commission's undertaking be demonstrated at the earliest possible date. For this and other reasons the Commission has recommended the immediate acquisition of the larger company groups as the first step in developing the general program." The reason for choosing the three companies named as its initial enterprise is that the Commission will thus acquire the necessary technical organization to develop its general program. Thus the immediate acquisition of these three groups of properties will enable the Commission:

1. To establish its general operations on a sound business basis.

2. To take into its organization the experienced operation personnel of the companies.

3. To investigate thoroughly the rates and conditions of service with a view to revision of the same.

4. To fit the properties into the general program.

5. To make the necessary services and reconstructions required for extensions to adjacent rural areas.

The report accompanying the Commission's observations in respect to the development of Campbell River as a power site states in part:

"The Commission is now engaged upon an examination of the Campbell River power site. There are strong indications that this will be the site recommended for Vancouver Island. It is, in fact, the only feasible one with sufficient potential capacity to supply the requirements of the island under a progressive sales and distribution policy. The general program envisages a complete electrical development for Vancouver Island, with all privately-owned distribution systems north of Victoria eventually owned and operated by the Commission and supplied from a single hydro electric plant. The proposed initial development will be of the order of 50,000 hp."

With the acquisition of the Nanaimo-Duncan distribution system, the Commission can negotiate with the Vancouver Island Power Company for a supply of power to carry on until its own development can be placed in operation.

The West Canadian Hydro Electric Corporation Ltd. and its subsidiary or controlled electric utilities own the Shuswap hydro electric plant of 6,500-kva. capacity, in two units. A third unit will be required in about two years. The company owns 102 mi. of 33,000 and 66,000-volt transmission lines; 183 mi. of distribution lines serving 4,200 connected customers in North Okanagan.

"In the territory of this company," the Commission's report and recommendations say, "there are upwards of 1,000 potential rural customers who can be served by reconditioning and expanding the existing distribution networks. This is one of the best areas in the province for a rural electrification development."

Future Homes to Be Furnished With Practical Improvements

FUTURE HOMES will not be embellished with a lot of fantastic gadgets, according to L. C. Simms, Northwest vice president of the National Association of Home Builders. In a speech made recently in Portland, Ore., Simms discounted these imaginative improvements, but indicated many practical innovations if the owner wishes to pay for them. Such improvements include more glass in the house, self-opening garage doors, non-corrosive aluminum window sash, stainless steel kitchen cabinets, deep freeze units, and various improvements in heating and plumbing systems. The other fantastic suggestions that are frequently mentioned would be so expensive as to render them impractical.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD EDITOR'S NOTEBOOK

Manholes Extended by Simple Adapter Placed Above Frame

L. F. SAYLES, inventor of the manhole adapter, checks placement of one of the devices before blacktop resurfacing is placed on a Portland street.

A SIMPLIFIED ADAPTER for raising and extending sewer and other utility manholes in city streets has been invented by L. F. Sayles of Portland, Ore.

Whereas in the past, when resurfacing or repairing made it necessary that manholes be raised, the contractor was obliged to tear up a considerable section of paving around the manhole and raise the whole frame, the new adapter can simply be dropped into place on the old collar and the cover will be at proper grade when the resurfacing is completed.

No barricading is required while the job progresses, and it is completed in but a few minutes, as compared with several hours or days of work by the old system.

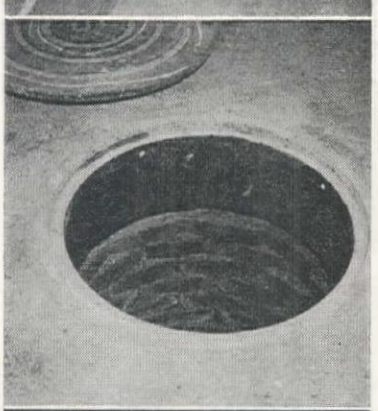
The adapter, illustrated herewith, can be made in any desired shape or thickness, raising the manhole to any required height. At the present time, they are being manufactured by the Phoenix Iron Works of Portland.

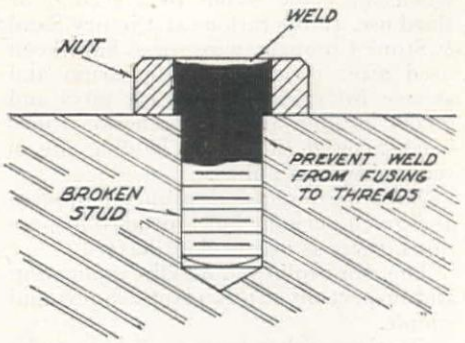
The City of Portland is using the adapters in its street resurfacing program, and has found them satisfactory. The accompanying photographs are of adapters used in the Portland program.

Because of the simplicity of this device, merely dropping it into place before the new blacktop is applied and rolled, costs are cut to about one-half.

Several different types of anchoring are possible, either to the pavement or to the existing manhole frame. Sayles has applied for patents on the different shapes and anchoring methods.

DIFFERENT STAGES in applying the manhole adapter. It is simply placed on the collar of the existing manhole; as it appears after being anchored, and new paving placed.





Two Easy Ways to Remove Broken Stud

THE REMOVAL OF a broken stud or drill from castings and parts is always a nasty job. John J. Morris, of Seattle, Wash., has found that the method illustrated above is one satisfactory way of accomplishing the result and also suggests a second system for quickly getting the broken part out without injuring the casting in which it is imbedded.

In the method illustrated above, he paints the inside threads remaining above the broken stud with heavy oil, grease, or commercial preparation for the purpose, to prevent the weld metal from adhering. He then builds up the stud with metal of low heat qualities.

The next step is to place a nut over the built-up surface, using a nut somewhat larger than the broken stud to be removed. The center is then also filled with weld metal and the whole can be removed while hot. The threads can be loosened by tapping the nut several times.

The second method Morris suggests for the same difficult operation is the use of a copper tube. This may either be the same size as the threads, in which case it can be threaded and inserted down to the broken stud, or it can be smaller and simply fit inside the threads of the casting. The broken part is then built up inside the tube. After a cooling period, a somewhat larger nut is then welded to the outside of the tube, and the whole built-up stud is backed out while hot, as before.

The second method is more satisfactory where large castings and studs of over ¾-in. diameter are involved. With very little care, almost any broken stud or bolt can be removed. Even broken drills and reamers can be taken out without damage to threads or to the walls of the drilled hole.

These suggestions were printed in the "Stabilizer," a booklet published periodically by Lincoln Electric Co., and edited by A. F. Davis.

Properly Applied Cable Clips Give Safe and Cheap Service

By JOE ROE
Superintendent, Victory Sand & Stone Company, Topeka, Kansas

THE BIG DIFFERENCE in the method of clip application shows up when the cable is put to a second or third use. In operations at Victory Sand & Stone Company wire ropes have been used after retirement from drum and sheave for control work, for guys and guard railing and for general utility work around the plant. Double life is secured by this policy.

With steel clips, if properly applied and given periodic but thorough inspections, there is no accident hazard.

The rules followed on clip application and inspection at this plant are few and simple.

Starting with a section of rope to be used and a galvanized thimble, about 30 times the diameter of the rope is allowed for the bend back. For instance, when using an inch cable, 30 in. from the center of the thimble to the short end is allowed; on a ¾-in. rope, about 23 in. A thimble is always employed unless the cable is to be used around a post or strut large enough in diameter to prevent a sharp bend.

It is not necessary to seize the ends of the rope before it is to be cut if preformed is used, but if non-preformed is used the ends must first be seized before they become ends in order not to have the strands and wires unwind.

The number of clips to use depends upon the size of the rope and also upon the condition under which it is to be used. For average use, a half inch rope requires two clips, a three-quarter inch rope, two or three clips; and an inch rope, four clips. No cable larger than one inch is used at Victory.

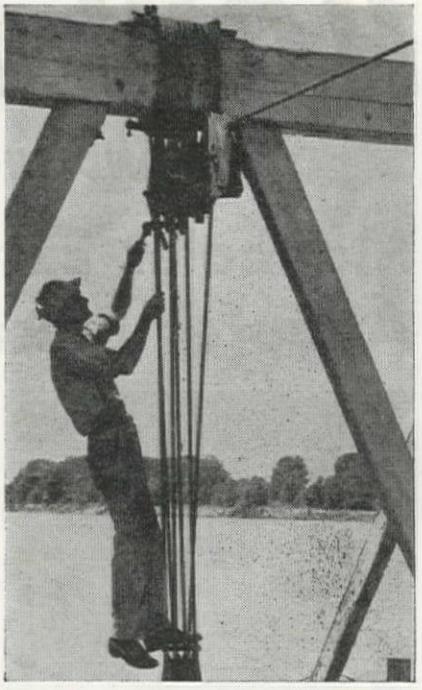
The clip farthest from the loop or thimble should be put on first and at a distance of about four inches from the end of the rope. It should be turned up tight when it is first put on. The next clip to put on, if more than two are used, is the clip next to the loop. Care should be taken to see that the clip is not so close to the thimble as to cause strain and thus damage the rope, but the loop clip must be placed near enough to the thimble to keep it from falling out. If a third clip is to be used, it should be put on last and midway between the other two. Before tightening the last two clips it is well to place some stress on the rope. This method seems to equalize the tension on all clips.

In putting on clips the U-bolt is always placed on the short section of rope and clips are never staggered by alternating the position of the clip base and the U-bolt. The broad bearing surface of the base of the clip is always set on the long section of the rope, and it should be a rule to tighten the nuts uniformly.

When the rope goes into operation the stress will tend to reduce the diameter. For this reason it is important to make regular clip inspections as well as regular rope inspections. After a rope has been used the clips require tightening and after so long a period, another tightening. A safe rule to follow is to check all clips every time the rope is inspected. When making clip inspections, look first at the clip farthest from the loop or thimble. If there is any rope damage it will show at this point first because of the vibration.

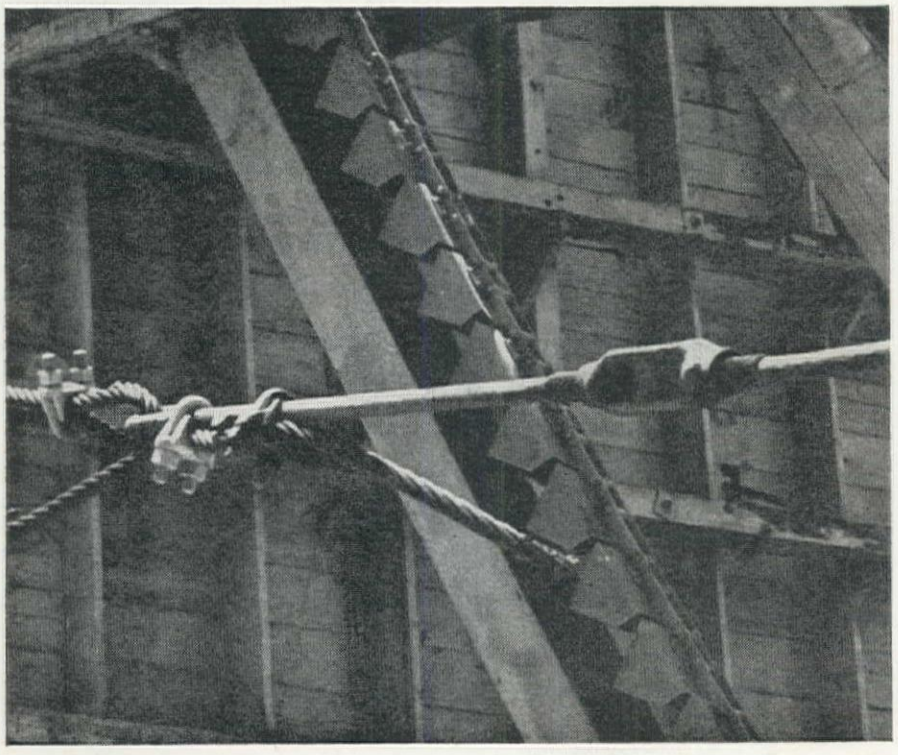
If steel clips are used and applied properly, they can be used over and over again. It is not always safe to use cast clips a second time.

By following the above method of clip application and inspection, the safe life of cables at Victory has been greatly extended.



REGULAR CLIP inspection should be made and clips tightened to prevent damage to rope and assure safe rigging.

WHEN APPLYING clips to a wire rope the U-bolt should be against the short end of the cable, except when the cable end is secured to a steel rod. The clip nearest the end of the cable should be put on first, after which a light tension should be applied to cause even stresses between the two lines before the remaining clips are applied.



Properly Made Clip Attachments

Rope Diameter Inches	Number Clips for Each Connection General Use	Spacing Between Clips General Use Inches
3/16	2	1¼
¼	2	1½
5/16	2	2
⅜	2	2¼
7/16	3	2½
½	3	3
⅝	3	4
¾	4	4½
⅞	4	5¼
1	4	6
1⅛	4	7
1¼	5	8
1⅜	5	9
1½	5	10
1⅝	6	10
1¾	6	11
1⅞	7	12
2	7	12
2¼	8	14
2½	8	15

NEWS OF WESTERN CONSTRUCTION

JULY, 1945

Colorado Highway Engineer's Job Embroiled in Red Tape

THE POSITION of state highway engineer of Colorado has been vacant since the death last January of Charles D. Vail. Since that time it has been filled on an "acting" basis by A. F. Hewitt, formerly Vail's chief deputy. A civil service examination was held, in which the first rating was won by Mark U. Watrous, construction contractor of Pueblo. Hewitt was third in the rankings, but in the actual test, was ahead of Watrous, whose leading position was assured by the addition of certain points regularly granted by the commission to veterans.

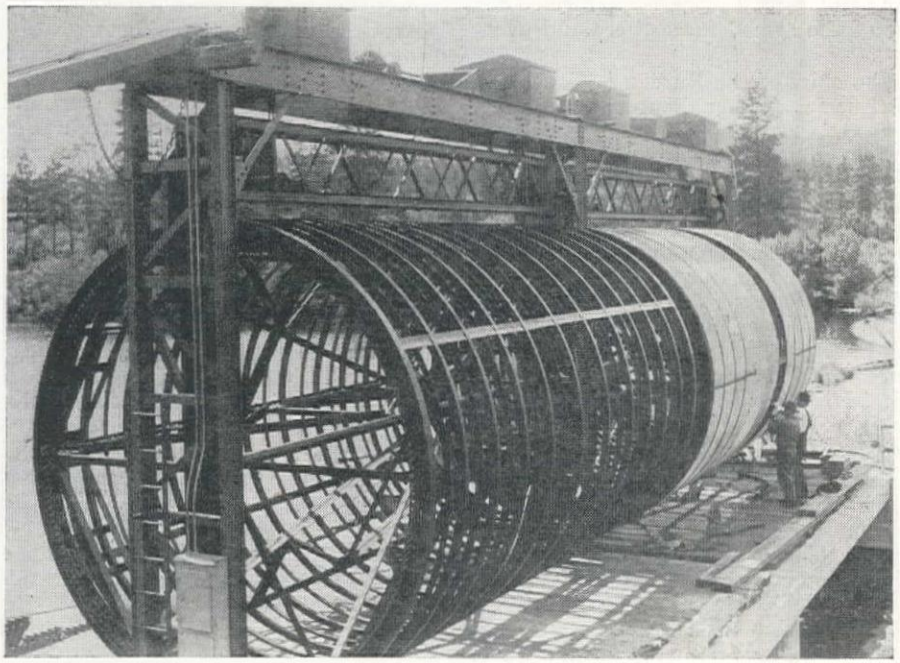
On June 21, the thirty days during which an appointment from the eligible list may be made by the Governor, elapsed. The commission urged the Governor to take action by appointing Watrous, but since Hewitt had challenged the appointment in the courts, Gov. Vivian declined to do so on the assumption that he might be in contempt of court by doing so. The Colorado law differs from that in most other states, in that the appointment of the first name on the list is mandatory. In most places, the appointing officer may select any one of the first three in the list.

Hewitt has brought suit to have the examination invalidated. On June 9th Judge Lindsley of Denver granted Watrous a petition for permission to intervene in this suit, which had been filed by Hewitt against the Colorado Civil Service Commission. Two days later the Colorado Civil Service Commission filed a motion in the Denver District Court asking for dismissal of the suit by Hewitt on the grounds that the suit failed to state a cause for action upon which relief could be granted. At a later hearing before Judge Lindsley, Hewitt was given ten days in which to prepare an answer to the motion of Watrous to intervene in the suit. The hearing on the suit has been reset for the latter part of July, and regardless of the decision which is reached at that time, the case will probably be taken to the State Supreme Court, and the controversy not finally settled until late in the fall.

The position pays a salary of $7,500 annually. It continues to be filled by Hewitt, until such time as the confused situation is untangled.

BUREAU OF RECLAMATION INSTALLS A 15-FT. DIAM. FISH SCREEN

THE FISH SCREEN at the intake of the Deschutes Irrigation Canal near Bend, Oregon, will be put into service soon when the Bureau of Reclamation begins puddling and priming the upper 26 miles of this 65-mi. canal. It will again be in use later this year when the initial water is supplied to 5,000 of the 50,000 acres in the North Unit. The screen is motor-driven with a circumference speed of 10 ft. per min.



Craftsmen Needed For Navy Repairs

A JOINT STATEMENT issued by officials at Mare Island Navy Yard, Hunters Point Naval Drydocks and the U. S. Civil Service Commission states that a serious manpower bottleneck exists at these two largest of all naval repair facilities because of the shortage of electricians, machinists and sheetmetal workers. According to Capt. G. C. Klein, Industrial Manager, Mare Island Navy Yard, these yards have been undermanned in these critical trades for months, and recruiting on a nationwide basis has not proved sufficiently helpful in obtaining men with these special skills.

To alleviate the critical shortage and to funnel men into those needed trades, both Navy yards are launching a new type of training program—an "out of necessity" program. Starting immediately, men who have had two years of experience in a less critical trade as a blacksmith, boatbuilder, flange turner, joiner, machine operator, pipefitter, plumber, or shipfitter will be hired at up to $1.21 an hour and given intensive classroom instruction, work aboard ship and in the shops as electricians, machinists and sheetmetal workers. Qualified veterans are urged to apply for this training.

As Capt. Klein points out, "At present we can accept into our piers and drydocks only as many ships as can be

worked upon by the present force of electricians, machinists and sheetmetal workers. It would be pointless to overbalance the trade scales by hiring men in other trades or crafts who could not be put to work until more men in the three critical trades are secured."

Placement of the men in the training courses and in definite positions after training as electricians, machinists or sheetmetal workers will be the responsibility of the training officers at Mare Island and at Hunters Point. Lt. Commander Ellery C. Covey, USNR, heads the training division at Mare Island Navy Yard and Lt. William Vestnys is the training officer at Hunters Point Naval Drydocks.

According to navy yard officials the naval establishments are permanent and offer long service employment opportunities. As evidence of the "long service" phase of employment at the yards at present over 275 men employed at the Navy Yard, Mare Island, have 31 years or more of service to their credit. Also cited is the fact that Mare Island Navy Yard did not reach its peak of employment after World War I until 1923, five years after hostilities had ceased.

Half of Anderson Ranch Dam Fill Now in Place

THE FOUR MILLIONTH cubic yard of earth and rock of the 8,650,000 which will comprise the huge Anderson Ranch Dam on the South Fork of the Boise River has been placed, R. J. Newell, Acting Regional Director for the Bureau of Reclamation at Boise, Ida., has announced.

The massive structure, which will tower 456 ft. above lowest bedrock when completed, will be the highest earth-fill dam in the world. Its present height is approximately 250 ft.

The Bureau of Reclamation and its contractor, the Morrison-Shea-Twaits-Winston Company, are rushing construction in an effort to have 5,600,000 cu. yds. of material in place by the end of the working season in the fall so that 45,000 ac. ft. of water can be stored in the reservoir next spring to supplement the inadequate supply for the 340,000-ac. Boise Project. Ultimately the man-made lake will hold 500,000 ac. ft.

During May, 200,000 cu. yd. of material, including sand, gravel, clay, and rock, were added to the structure. Progress reports show that, in addition to the material in place, the following percentages of work had been completed by June 1: spillway excavation, 88 percent; outlet and diversion works, 72 percent; reservoir roads, 58 percent; and clearing of the reservoir area, 36 percent.

Construction of the dam was started in August 1941. When the War Production Board stopped work in the fall of 1942, about 32 percent of the project had been completed. Work was resumed with WPB approval in the fall of 1943 under the War Food Program. Completion is scheduled for the winter of 1947-48.

Federal Power Engineering Activities Centered in New Washington Bureau

IN THE INTERESTS of economy and efficiency, the Federal Power Commission has consolidated its engineering activities in a single bureau known as the Bureau of Power, with headquarters in Washington, D. C., and field offices at New York, Atlanta, Fort Worth, San Francisco and Chicago. Those engineering activities formerly handled from Baltimore are being transferred to Atlanta, New York and Chicago.

The Bureau's activities include all engineering work required by Parts I, II and III of the Federal Power Act; those parts of the Flood Control and Rivers and Harbors Acts relating to the Federal Power Commission; Fort Peck, Bonneville and certain other specific acts; and special executive orders and presidential directives. This work embraces the engineering aspects of the licensing of hydroelectric power projects and supervision under the act of their construction, operation and maintenance. Studies and reports are made for the comprehensive development of river basins for the development of hydroelectric power in connection with flood control and other beneficial purposes. Studies and reports are made on power markets, adequacy of power supply and interconnection and coordination between existing systems to meet normal and existing conditions. Investigations and reports are made on the engineering features of applications for approval of consolidations and mergers in connection with utilities subject to the jurisdition of the Commission. Analyses and reports are made on power and transmission systems and operating data for systems throughout the country and of capital and operating costs of hydro and fuel generating and transmission facilities. Assistance is given in carrying out wartime directives regarding the operation and protection of utility systems and special work is performed for use of the armed forces here and overseas.

The chief of the Bureau is E. Robert de Luccia, former lieutenant colonel, Corps of Engineers. Francis L. Adams, former regional administrator at Fort Worth, has been appointed assistant chief of the Bureau, with special responsibility of coordinating the work of the field offices. Heading the principal divisions of the Bureau are: Frank L. Weaver, former associate chief, Bureau of Water Power, River Basin Division; C. E. Bennett, former acting chief, Bureau of Electrical Engineering, Electrical Division; W. R. Farley, Licensed Projects Division; and Eugene Logan, Projects Cost Division.

In order to give emphasis to the engineering character of the regional offices, former regional administrators have been replaced by regional engineers. The following are in charge of the respective field offices: D. J. Wait, New York; Marion F. Hetherington (acting), Atlanta; Wilbur F. Fairlamb (acting), Fort Worth; Benjamin H. Greene (acting), Chicago; and John C. Beebe (acting), San Francisco, in addition to other duties as special assistant to the Commission.

Senator Sees Need For 100,000 New Contractors

MORE THAN 100,000 new small business enterprises will be needed in contract construction after the war if the construction industry is to provide its share of full employment for returning veterans and other workers, Sen. James E. Murray, Montana, chairman of the Senate Small Business Committee, stated recently.

"At the present time only some 140,000 builders and contractors are engaged in contract construction work throughout the United States," Sen. Murray said. "There are, in fact, about 50,000 fewer such firms now operating in the industry than in 1933 at the bottom of the depression."

The volume of new construction has dropped from an all-time high of $13.6 billion, reached in 1942, to a level of approximately $3.5 billion anticipated for 1945. As the volume dropped, small construction firms, consisting primarily of special-trade contractors, have been forced out of business and their members and employees taken into the armed forces or diverted to work in war industry.

"The inadequate status of preparations for postwar construction," Sen. Murray continued, "constitutes one of the most pressing and immediate problems of the construction industry." He cautioned against over-optimism as to the capacity of the industry to provide small business opportunity unless work now proposed to be undertaken in the postwar period is as quickly as possible brought to the blueprint stage and made ready for the awarding of contracts. It will take considerable time to get building plans down to the construction stage once restrictions over civilian construction can be relaxed. Moreover, the sites should be selected, and all necessary financing arrangements required for the work attended to ahead of time.

The Senate Small Business Committee is completing a preliminary survey of the basic problems of the construction industry and hopes to commence hearings next month on the most immediate problems. Chairman Murray has instructed Dewey Anderson, executive secretary to the committee, to launch a series of studies aimed at removing the obstacles which stand in the way of full utilization of the construction industry's capacity to provide employment. These studies are being coordinated by a full-time consultant, Frank Piovia, economist on leave from The Producers' Council, Inc.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—Cabinet changes considered imminent are led by Ickes, whose place is expected to be filled by Sen. O'Mahoney of Wyoming, and Morgenthau, who is expected to be replaced by John Snyder, present head of RFC. Several top bracket Navy officials are expected to leave soon, to be succeeded by at least one man from the West coast. Commissioner Abner H. Ferguson of Federal Housing Administration is leaving and Raymond H. Cahill, some time from the Coast, has urged himself upon Truman for the job. Secretary Wallace also is expected to go, but no reasonable suggestions have been publicly made about his successor. However, the trend of Cabinet jobs is definitely "Westward Ho."

A check for $8,000,000 was handed by the Metropolitan Water District of Los Angeles to the Federal Government late in May as **an advance payment** of the District's pro rata share of the cost of the generating machinery installed at Boulder Dam.

This payment unequivocally gives the people of Southern California a substantial proprietorship in the Boulder Dam power and water system.

The word on Capitol Hill is that the organization from California which failed to defeat the Mexican Water Treaty is in process of complete reorganization.

Water treaty not yet law

The Mexican Congress meets in September. Representatives of the public interests affected by the pending Mexican Water Treaty will informally, as American citizens, be visitors in the Mexican Capital. There seems to be some question about the sentiment of the Mexican Congress concerning the water treaty as it was approved by the United States Senate. The treaty does not become effective until it is approved by the Mexican Congress.

There has been much discussion in the House of Representatives, legislatively raising a doubt about the constitutionality of the Mexican Water Treaty. The doubtful constitutionality suggested by Congressman Carl Hinshaw, and others, was studied by the group from Southern California.

The Metropolitan Water District, and other California contributors to the expense of maintaining and operating Boulder Dam and its plants, would be in the position of non-State Government interests which might join in any legal challenge of the validity of the treaty. It might be sound law for any of the 48 States to attack the constitutionality of an action by the Federal Government. Such action would immediately go before the U. S. Supreme Court for hearing, as was the case recently in a suit successfully waged by the Governor of Georgia. But it is conceivable it might be highly embarrassing for the Federal Government if one of the 48 States, as the principal, questioned a contract the Federal Government had made with another nation.

It would be natural and logical for a quasi-public or quasi-private agency, representing citizens whose rights presumably have been invaded, to raise a constitutional issue against the Federal Government. The issue would be a difference between specific groups of citizens and their Federal Government. An adverse ruling would make it less awkward for the Federal Government to rectify any flaws.

During the discussions about the Mexican water treaty before the Senate Foreign Relations Committee some of the witnesses suggested that approval of the treaty might lead to water fights; and they pointed out that litigation over water rights in the arid regions of the West often froze developments for as much as a quarter century.

Authority bill delayed

It is doubtful whether or not the Missouri Valley Authority bill will be examined by the Senate Irrigation and Reclamation Committee until late in Fall, and it is possible it may be shelved indefinitely. The beginning of the hearing was set for the first days of June. The opponents gathered in the Capital to testify. It then developed Sen. Murray, sponsor of the bill, was engaged in an election campaign in Montana. He requested the hearings be postponed. Sen. Overton, Chairman of the Subcommittee, as is usual, accorded his colleague the consistent Senatorial courtesy. Sen. Murray then requested the hearings be set to begin on June 18. In the meantime, Reclamation Commissioner Harry W. Bashore had arranged the schedule of an extended tour of the Reclamation projects in the West, to start in June. The schedule involved hearings and conferences in which important taxpayers of the West had arranged to participate, and it was found that any material adjustment and delay would be seriously disconcerting to the citizens.

The opposition is mainly led by the union of water conservationists whose affairs are handled in the Capital by Floyd O. Hagie, Secretary-Manager of the National Reclamation Association. It is generally believed the influence of this nationwide combination may put the MVA on ice for a protracted period, probably cause it to be forgotten. The longer the proposed MVA hearing is delayed, the less apt is the likelihood of any serious consideration. Other measures of more urgent national need will intervene, and various moves to supply a substitute for the MVA will be put into action. One of these has already been announced.

Late in May the War Department announced the organization of the Missouri Basin Inter-Agency Committee, authorized in the Flood Control Act of last year. The Committee consists of field representatives of the Corps of Engineers, the Bureau of Reclamation, the Department of Agriculture, and the Federal Power Commission. Two representatives of the Governors of the Missouri Valley states will attend the meetings as counselors and observers. Other interested Federal, State and local agencies have been invited to cooperate. The purpose of the committee obviously is to coordinate activities, and to make unnecessary the machinery of an Authority.

In a perfunctory way, the President, a Missourian, while in the Senate, favored the proposed MVA. The St. Louis Post-Dispatch is generally regarded as the animating force in the Missouri Valley which has maintained the steam behind the drive for the MVA. The President's newly installed press secretary was the Washington correspondent of the St. Louis Post-Dispatch. The former correspondent as well as the newspaper are notable independent Democrats. Whether or not this concatenation of circumstances will make the President an active champion of the proposed MVA remains to be seen. If he definitely supports the measure, the fact will be revealed by an early hearing of the Murray bill, S.555, either before the end of this session, or immediately after the summer recess.

Sec. Ickes, whose tenure as head of the Department of the Interior is still foggy, continues to fight actively for his idea that the Valley Authorities, wherever they may be, should be subordinate to the Department of the Interior. He argues the President cannot be burdened directly with the active over-all supervision; and that is such supervision is absent the regional Valley Authorities will chiefly become political footballs under the influence of the members of Congress and their lieutenants in the regions. The Secretary does not mention it, but it would seem likely, in the event of the establishment of a number of regional Authorities, with responsibilities for practically all natural resources in the regions, there would not be much left for the Department of the Interior to boss. In a sense the Secretary is on the horns of dilemma because he expects shortly the Bureau of Reclamation will tell in detail about the 14 great Valley Authorities it has already proposed.

The Central Valley

Early in June the Senate decided to restore all the items in the Interior Appropriation bill which the House had cut out, and had even added a total of $2,000,000 to several items in the Reclamation program. There was strong opposition to any appropriation for the Delta steam power plant, in the Central Valley, as well as for the transmission lines to carry the power in the Valley. The opposition naturally came mainly from the P. G. & E., and not so naturally from Roland Curran, who registers from

Fresno and from Bakersfield, as the representative of the landowners in the Central Valley.

Curran, speaking broadly, appears to be the chain on the wheels of many potential actions connected with the Central Valley. He is regarded here as the champion of the viewpoint of the large landowners. The 160-ac. limitation on landholdings obtaining water from Federal Government reservoirs does not enter this appropriation fight; but when the issue eventually comes up, Curran undoubtedly will fight for the modification of the restriction, while Congressman Elliott of the San Joaquin Valley will again lead the fight in Congress. The position of the Bureau of Reclamation is rather bewildering. Officially, when it takes any position, it insists upon the 160-ac. limitation because the old historic land settlement law definitely prohibits holdings under the grace of the Federal Government of more than 160 ac. The law came into being in the era of less scientific farming, when it was the object to induce many farmers to develop the vast open spaces and form many farming communities. In those days the farmer did not have the facilities which now make larger ranches and farms almost inevitable in many places. Nor did he have the utilities of transportation, improved highways, automobiles, electricity, and many other conveniences which have transformed labor and life.

But in these days there are many types of farming which cannot be conducted successfully on 160 ac. Commissioner Bashore and his associates tacitly admit the fact by their ostrich-like attitude towards the water users in a number of Federal projects. In these areas the landowners often have holdings considerably in excess of the legal limits, and they have used the water provided under Federal Government regulation without a single word of opposition or restraint from the Bureau of Reclamation. The noisy fight to maintain the 160-ac. formula in the Central Valley makes the Commissioner and his Bureau appear ridiculous. It is not that they ignore the facts, because they admit them where the practice has been legalized. They simply look the other way where it seems politic. The fact is that there are two schools of thought in the Department of Interior, for and against the 160-ac. formula; and the Commissioner and his more realistic associates are in a cleft stick because they apparently do not wish to assume the responsibility to face the situation and insist upon a revision of an outmoded law. The situation creates a hardship for some areas, and for some landowners. The showdown is near at hand.

Coming construction

The Navy budget provided by the House Appropriations has listed projects at various places on the Pacific Coast. In the course of the hearings several substantial cuts were made. The Budget provides sums which aggregate a large total and may be spent for projects at the discretion of the Navy bureaus. This means that **the Navy can determine where the money is to be spent.** The Navy officers have been careful about revealing plans and specific amounts for the usual reason of military security. But apparently their chief reason for not saying much in the general news reports is to prevent the usual pressure from municipalities and from civic organizations to secure projects that would be worthless to the Navy in some locations. The law provides, for July 1, 1945, to June 30, 1946, a total of $23,600,000,000. For new construction there is provided $1,250,000,000. Out of this sum $228,000,000 will be spent for yards, docks and camp facilities in the continental U. S., most of it presumably on the Pacific Coast. For "advance base construction" there is allocated $786,000,000.

Senate and House both have passed the bill providing $12,000,000 for emergency flood control work. As soon as the bill comes out of conference, it will go to the President.

Lineweaver

Goodrich W. Lineweaver, one of the best beloved members of the staff of the Bureau of Reclamation, has been appointed formally to the job he has been doing for some months: Director of the Branch of Operations and Maintenance. He succeeds John S. Moore who was the head of the Branch when it was located at Denver, last fall. The headquarters now are in Washington. Moore has been appointed assistant regional director at Boise, Idaho.

In effect, if not in rank, Lineweaver's job comes next in importance to Commissioner Bashore's. It is reported that either the Secretary of the Interior or the Undersecretary of the Interior described Lineweaver's job by saying he is the man in Reclamation who has a realistic business responsibility for 44,000,000 acres of Western farm land, and for the biggest power system in the world; and that he will be responsible for settling 200,000 people on the new farm lands in the West.

Lineweaver came into the official family of the Bureau of Reclamation by way of the National Reclamation Association. He was once the statistician of the Association. Lineweaver has been through the Reclamation mill in Washington and elsewhere. At one time he was a part of the public relations set-up. He has extraordinary drive, a sweeping largeness and directness, is steady as a rock, has the ability to reduce the terms of problems to few words, and is instinctively a sound man of business. He came originally from Harrisonburg, in the Shenandoah Valley of Virginia. He will have as assistant directors E. D. Eaton and Alfred R. Golze.

War-time construction

The relaxation of Order L-41 does not permit any major construction projects unless they can be justified as essential. Dwellings costing up to $5,000 to be spent within one year, may be built without specific WPB permission. Irrigation or drainage systems still may not involve more than $1,000. Office and business construction is limited to $5,000. Institutional structures and public buildings, as well as a canal, storm sewer, dam, levee, jetty, or retaining wall may be built at a cost not exceeding $10,000. Factories, bridges, over and underpasses, tunnels, docks, piers, commercial airports, bus terminals, railroad or street railway buildings, laboratories, and pilot plants, may be constructed at a cost as high as $25,000. Earth-moving operations involving no lumber or building materials are permitted without WPB sanction. Industrial plant construction, designed for reconversion from war to civilian manufacture, if the construction does not interfere with war work, may be authorized by WPB if the usual application on Form WPB-617 is approved. Upon approval the applicant receives a CMP allotment symbol, and an AA-3 priority rating.

Chas. Upham, manager of the American Road Builders Association, has asked Chairman Robinson, Utah, of the House Roads Committee, to initiate proceedings to make available quickly some funds from the Highway Act of 1944 to start construction work in regions where unemployment may be growing. Success of the appeal is doubtful, however, because of the imminent Congressional recess, and the attitude of WPB on control of materials.

LATE WIRE

Construction of first 5.6 mi. of Friant-Kern Canal approved by WPB "without priority assistance." This section will extend six miles from the dam to Little Dry Creek crossing in Fresno County. Excavation of entire 160 mi. authorized... Senate restored all reclamation items eliminated by the House, including the funds of the planning of the Delta steam plant and the transmission lines. Senate and House conferees have not been able to agree upon the terms acceptable to both. Recess expected early in July. H.R.-3127 increases from $20,000,000 to $45,000,000 funds authorized for the Pan-American Highway... WMC McNutt announces between 15,000 and 20,000 skilled and semi-skilled workers must be shipped to San Francisco Bay area and Puget Sound to repair battle damaged ships, also calls for women as mechanic-learners in Puget Sound yards.... President approved $12,000,000 appropriation for emergency flood control.... H.R.-3386 will permit Bureau of Reclamation to pay school districts compensation for educating children of Federal employees on Federal property.... Corps of Engineers celebrated its 170th birthday June 16; starting in 1775 with three men it now has a force of 700,000 specially trained men, 500,000 overseas. Sen. Murray warns over 600,000 men in armed service have become experienced construction workers and will look for jobs.... Little actual relaxation in sight to speed civilian construction.

Largest Road Jobs Awarded Canada

CAMPBELL CONSTRUCTION COMPANY LTD. of Toronto and New Westminster, and Fred Mannix & Company, Calgary, have been awarded two of the largest road contracts let by the British Columbia government for many years. The contracts involve the building of the long-sought 151-mi. stretch of Pine Pass Highway, which will connect the British Columbia Peace River Block with Prince George.

The project has been divided into two sections, and contractors were invited to bid on the job in these two divisions. Section A, for which the contract has been placed with the Campbell Construction Co. Ltd. on a bid of $1,823,555, covers the road from Summit Lake to Azouzetta Lake, a stretch of 94 mi. Other companies bidding on this section were W. C. Arnett and Co., Vancouver, $2,275,626; General Construction Co., Vancouver, $1,897,506.50.

Fred Mannix and Co., Calgary, received the contract for Section B, which covers 57 mi. of road from Azouzetta Lake to Commotion Creek. This job was awarded on a tender of $1,308,940. Other firms submitting bids on this section of the job were W. C. Arnett and Co., $2,383,120; Western Construction and Lumber Co., Edmonton, $2,137,080; Dawson Wade and Co., Vancouver, $1,945,762, and Emil Anderson, Fort William, $1,604,046.

Watching the opening of the tenders were Premier John Hart and 30 representatives of construction firms, as well as other members of the Public Works Department staff. The specifications call for a 24-ft. roadway on a 32-ft. bed.

In addition to serving the Peace River Block, the new road will provide a direct link through the Peace River to the present Alaska Highway. Work is expected to start on the project immediately, although it may not advance far beyond the stage of field organization and establishment of road camps this year. The contractors will have until Dec. 31, 1947, to complete the work. The contracts do not include the cost of three bridges over the Pine River and one bridge over the Parsnip River, on which separate bid calls will be invited.

First Trains Use Navy's New Washington Railway

ON JUNE 20, the first passenger train in history rolled into the city of Bremerton, Wash. It came in over the new railroad built by the Navy to serve naval ammunition depots being built at Bangor and elsewhere in the vicinity of Bremerton. Previously the city was accessible only by highway and by ferry from Seattle. The new line is about 45 miles in total length, and connects at Shelton with the Grays Harbor line of the Northern Pacific Railroad. Including sidetracks, about 84.5 mi. of track was laid by the contractors who have been on the job for 13 months. Total cost of the project was $41,500,000, including the railroad facilities and the ammunition storage areas. Handling of ammunition at the waterfronts of Tacoma and Seattle is eliminated by the railroad. The first train of ammunition cars moved into Bangor early in June. The construction work on the railroad was described in *Western Construction News* for December, 1944.

Los Angeles Delayed in Building Outfall Sewer

SEWER CONSTRUCTION for the new outfall system contemplated by the city of Los Angeles is temporarily delayed, pending negotiations for the balance of the money required for the project. Early this year, the voters of the city approved a bond issue of $10,000,000, a little less than half of the total estimated cost, and as reported in *Western Construction News* for May, it was anticipated that work would start immediately on a new ocean outfall, first step of the new project. Meanwhile, the city attorney has ruled that it is not possible to construct only a portion of the project, that the money must be in hand for the entire job before any portion may be initiated.

A bill in the state legislature which would have appropriated a considerable fund for aid to cities for sewer construction, was viewed hopefully by city officials, but the legislature adjourned without making the bill into law. The additional funds may be raised by a second bond issue, or by a sewer use tax.

Washington Plans 29-mi. Tunnel at Stevens Pass

A VEHICULAR TUNNEL has been proposed to eliminate the Stevens Pass section of the Washington State east-west highway, and facilitate the passage of traffic between the eastern and western parts of the state on a low gradient, with a great saving in time and vast improvement in safety. The State Legislature has appropriated $100,000 to finance a thorough survey of the proposition. It is estimated that the 29-mi. tunnel would cost between $35,000,000 and $40,000,000. Present plans call for air conditioning, electric lighting, and constant patrolling by employees of the Washington Toll Bridge Authority, under whose jurisdiction it would be constructed. Further advantages enumerated include the reduction of heavy freight rates, and elimination of the expense of snow removal in keeping the high Pass road open during the winter.

The Editor's Mail...

Mexico, D. F.
June 19, 1945

My dear Mr. Server:

I am very pleased at your kindness in sending me the editorial page of your well-known magazine.

Since you were kind enough to ask my comments, I am giving them herewith, hoping that you will pardon the frankness in which I am giving them.

1. I think that your good faith has been exploited by the persons who wrote the article in question, or who gave you the necessary information for writing it. The article instead of promoting good feeling between the two countries seems to me to have more the object of sowing doubts and suspicion in the mind of the Mexican public and of its legislators, with the object in view, if possible by this means that our Senate would not ratify the treaty and achieve by this means the object of certain California elements who presented their case when the treaty was discussed in the American Senate. I feel the article does not defend Mexican interests, but rather certain personal economic interests.

2. I consider the treaty to be just and equitable for the two countries, and does not hurt, and will not hurt the interests of either of them, nor the interests of any groups within either country.

3. The allusion made to the quality of the water of the Colorado river to be given to Mexico is unjust, because the treaty, like any treaty of this nature, does not obligate Mexico to receive waters which are unusable. The treaty does not contain a single phrase or word which can be interpreted in the foregoing sense, but instead there are numerous phases which demonstrate that the object of the treaty is to designate the waters to one or the other country for their beneficial use, as will be demonstrated to the Mexican Senate.

I hope, Mr. Server, that for the love you have toward our country, if there is time that you will not publish this article. On the other hand, I would be very pleased if you would publish this letter.

Appreciating again the kindness which you have shown me in sending the article and asking my frank comments on it, I take this opportunity of wishing you good health. I remain

Your good friend and devoted servant
ING. ADOLFO ORIVE ALBA
Executive Commissioner
Mexican Commission of Irrigation

(Translated from the Spanish.)

* * *

Dear Sir:

Mr. Buck has been in the SeaBees as Chief Petty Officer since June, 1943. He is now on Guam, and has been there since the invasion of that island.

The Navy Mothers' Club here in Boulder City sponsor a gift box, which drew his name, and that was his desired gift, a subscription to *Western Construction News*. As he thought he might be coming back to the States he had it sent to his home address. However, it develops he will be there for an indefinite time.

Sincerely,
MRS. E. H. BUCK.

Control of Construction by Utility Companies Relaxed by WPB Amendment

REVOCATION of virtually all controls on installation of facilities by electric, gas, water and communications utilities has been announced by Edward Falck, director of the War Production Board's Office of War Utilities.

The new policy will permit utilities to make any addition to plant on an unrated basis, except construction of buildings with a materials cost in excess of $25,000, without obtaining prior authorization from Washington. Building projects costing less than $25,000 worth of materials also will be permitted on an unrated basis without authorization.

Utilities Order U-1, the basic wartime regulation covering electric, gas and water utilities, has been amended to incorporate this "open-ending" of construction. Utilities Order U-3, regulating telephone companies, and Utilities U-4, which applies to the telegraph companies, will be similarly amended.

Removal of construction controls on utilities, it is estimated, will result in utility expenditures for plant expansion next year approximately twice the total volume of expenditures during 1943 and 1944. The OWU estimated that utility expenditures will be at least $1,630,000,000 in 1946, compared to $815,000,000 in 1943 and $787,000,000 in 1944. Because of the long time required in manufacture of most utility facilities, additional expenditures during the remainder of 1945 as a result of "open-ending" probably will not exceed $40,000,000.

The "open-ending" of utility expansion brings to an end nearly four years of "bare bones" policy in considering utility project applications during which period the Office of War Utilities has frequently substituted its own engineering judgment for that of utility operators as to what expansion was required to meet war needs. New facilities have been approved only where they were essential to prevent shortages that would have interfered with the war. Old, obsolete, inefficient facilities have been kept in service and, particularly in the power and gas fields, no individual system has been permitted expansion if the needed supply could be secured from a neighboring utility, without regard to ownership.

"The time has now come," Falck said, "when this stringent programming of utility expansion by OWU is no longer either necessary or desirable. Since V-E Day, it has become clear that the types of materials required in the installation of utility facilities are no longer in short supply for the most part. Manufacturers of specialized power equipment, such as turbines and boilers, now have open shop capacity, as a result of military cutbacks, sufficient to take care of all utilities requirements with margin to spare. Permitting utilities to place orders for such materials on an unrated basis, therefore, creates no important competition with essential war production or construction."

NEW BOOKS...

PRINCIPLES AND PRACTICE OF SURVEYING. Volume 1. Elementary Surveying — By Charles B. Breed and George L. Hosmer. Published by John Wiley & Sons, Inc., New York, N. Y. 704 pages, 5x7. Price $4.00.

This revised eighth edition will be welcomed by instructors and engineers familiar with this standard text book. The chapter on Public Lands Surveys has been completely rewritten to conform to present practice, and the isogonic chart in Chapter II, together with the astronomical tables in Chapter VIII, have been brought up to date. The field engineer will find this pocket size book useful with the easy-to-read tables including logarithmic and natural trigonometric functions, lengths of circular arcs, stadia reductions, and tables of mean refraction in declination. The practical instrumentmen will appreciate the explanation of the care and adjustment of various surveying instruments including late models.

* * *

PLASTICS — SCIENTIFIC AND TECHNOLOGICAL—By A. Ronald Fleck, M. Sc., F. I. C. Published by Chemical Publishing Company, Inc., Brooklyn, N. Y. 325 pages, 5½ x 8½. Price $6.50.

Plastics—Scientific and Technological has been written to present basically sound facts and scientific data on the interesting maze of material which is loosely termed "plastics." The author has prepared—to use his own words—"a critical survey of the literature and a correlation of scattered data . . . of value both to the chemists in the industry and to those whose professional duties necessitate a knowledge of the science of plastics." A. Ronald Fleck is an English scientist working in a country which is in close contact with both American and European developments. The foreword and revision of the chapter on chemical, physical and electrical testing of plastics has been prepared by Carl M. Massopust, consulting engineer.

Reno Fences Ditches To Reduce Drowning Hazard

THE CITY OF RENO, NEV., is borrowing $75,000 for the purpose of constructing fences along the borders of the numerous ditches and canals which traverse the city. The need for such action was cited by the Washoe County grand jury in March, when it called attention to the number of deaths among children who had fallen into the water and drowned. The fence will be of 2-in. mesh, 4½ ft. high, with three strands of barbed wire on an angle iron at the top. About 16,000 lin. ft. of such fencing will be required. It has not been considered that fencing is the entire solution to the problem, city officials believe it will act as a deterrent to children intent on playing in the water, and will save some lives. Fencing of culverts ends, and complete covering of the canals is regarded as a more positive measure, but considerably more expensive.

OBITUARIES...

Clarence Hickey, Director of Highways of the State of Washington, died suddenly in Olympia on June 20, at the age of 56. He had headed the highway department since January 1, 1945, prior to which he had been county engineer of Snohomish County for over fifteen years, and at one time had been chief deputy in the State Engineer's office. He was a member of the American Road Builders Association, Northwest Highway Engineers Association, Puget Sound Flood Control Council, and a past president of the Washington State Association of County Engineers.

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W. E. Whittier, retired civil engineer and a resident of southern California for 45 years, died in Los Angeles on May 26. He was a former division engineer for the Metropolitan Water District and later was chief engineer for the McNeil Construction Co. in building the Basic Magnesium, Inc., plant near Las Vegas, Nev. He was 66 years of age.

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Comdr. Harry LeG. Hilton, USN, executive assistant to the Public Works Officer of the Eleventh Naval District, died in San Diego, Calif., on May 20, following an illness of several days. He was a member of the American Society of Civil Engineers, and a past president of the San Diego Chapter. He was 69 years old.

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David C. Rees, member of a well known family in the Northwest, where he had been a contractor and builder in Portland, in eastern Washington and in Idaho, died in Twin Falls on May 23 at the age of 90.

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Charles L. Whitcomb, contractor of Seattle, Wash., died at his home in that city on May 31 at the age of 75. He was born in Hayden, Ind., and moved to Seattle over 40 years ago.

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John C. Lipsett, 84, pioneer building contractor of western Canada, died at his home in Calgary recently. He was employed in the construction of the first C. P. R. hotel in Banff.

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G. M. Stoughton, 49, prominent structural engineer of the intermountain west died May 21 at Ann Arbor, Mich., of complications following an operation.

PERSONALLY SPEAKING

Under the Board of Awards program of the Department of the Interior four awards for improved service suggestions were presented on May 14 at a ceremony in the U. S. Bureau of Reclamation offices in Denver, Colo. Those receiving recognition were **Frank Snyder,** laboratory aide, Award of Merit and a cash award for his suggestion of the installation of a self-feed hopper for sand rolls in the laboratory at Denver; **Ralph W. Burkhardt,** engineer, honorable mention and a cash award for the suggestion that estimated weights be added to field instrument drawings; **Louis W. Maxey,** engineer, honorable mention and a cash award for his suggestion of a curve sheet for use in hydraulic studies; and **Ira E. Allen,** laboratory aide, honorable mention for his device of a dashed line stencil.

* * *

Nolan B. Yates, formerly with the engineering division of the Colorado State Highway Department and later with the Broderick and Gordon Construction Co. of Denver, is now located in Hawaii. Yates is affiliated with the Central Pacific Base Command in the capacity of engineer, and is in charge of all paving construction in the North Sector, Island of Oahu.

* * *

J. D. Long of Tacoma, Wash., is the first Pacific Northwest man to attain to the post of president of the American Society of Agricultural Engineers. With engineering degrees both from Iowa State College and the University of California, for the past five years he has been identified with the plywood industry and at the present time is chief of the research department of Douglas Fir Plywood Association with headquarters at Tacoma, Wash. He assumes his new duties on July 1.

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Frank H. Prouty of Denver, a consulting engineer, was elected president of the Colorado State Board of Engineer Examiners at the annual reorganization meeting. He succeeds the late **Herbert S. Sands,** who was president of the examining board for twenty years. **M. C. Hinderlider,** Colorado State Engineer; **Clarence L. Eckel,** Dean of the Engineering School of the University of Colorado at Boulder; **Dr. James Underhill** of Idaho Springs, Colo., mining engineer consultant, and **R. B. Bonney** of Denver are the other members of the examining board.

* * *

Burton F. Miller has been named Managing Director of the Highway Contractors' Division of the American Road Builders' Association. Identified with the construction industry since 1933, Miller has been with the A.R.B.A. for nine years, and since 1940 has been an executive assistant to **Charles M. Upham,** engineer-director. In this capacity he gained a broad and intimate knowledge of the activities and objectives of the contractors' division.

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David N. Rogers and **Roy Boothe,** two old-time forest supervisors of the U. S. Forest Service in California, have recently retired from active service. Rogers has been in charge of the Plumas National Forest at Quincy for a continuous period of over

J. D. LONG

35 years. Boothe has been a member of the Forest Service since 1907 and since 1926 has been supervisor at Inyo National Forest, Bishop. **Carl A. Gustafson,** supervisor of the Klamath National Forest at Yreka, succeeds Rogers at Quincy. **Floyd Iverson** of Bieber, ranger of the Warner Mountains district, Modoc National Forest, becomes supervisor of Inyo National Forest, succeeding Boothe.

* * *

Goodrich W. Lineweaver, recently named director of the Branch of Operation and Maintenance of the Bureau of Reclamation, is widely known in the West. His knowledge and wide experience in Reclamation equip him to head the Operation

GOODRICH W. LINEWEAVER

and Maintenance Branch, which is responsible for the development and coordination of irrigation systems providing water to over 4 million acres of western land.

* * *

Representatives from Oregon, Washington, Idaho, Montana and Wyoming have organized to form the Pacific Northwest Development Association in opposition to the Columbia River Valley Authority bill, it has recently been announced. The following officers have been elected: President, **J. C. Compton,** McMinnville, Ore.; Vice-presidents, **Dean Johnson,** Portland, Ore.; **Tom Potwin,** Yakima, Wash.; **J. L. Driscoll,** Boise, Idaho; **L. A. Colby,** Missoula, Mont., and **Clifford Hansen,** Jackson, Wyo.; Secretary, **A. L. Atherton** of Seattle, Wash. The association has as its aim the effective cooperation of federal, state and local agencies as opposed to authority programs.

* * *

At the 11th annual meeting of the Colorado Construction League, which was held June 21st in Denver, the following officers were elected for the ensuing year: President, **James B. Kenney,** Denver contractor; **Raymond Harry Ervin,** architect, vice-president; directors—**Wm. E. Gear,** engineer for the Midwest Steel and Iron Works; **Joseph E. McNevin,** of the Colorado Heating Company, and **Roland Linder,** Denver architect and past president of the League.

* * *

L. M. Huggins, formerly District Acting Engineer for the Public Roads Administration, with offices in Ogden, Utah, has been transferred to Boise, Ida., to head a new district office being set up in that city for PRA. **F. W. Smith,** who has been assistant with the Bureau of Public Roads and the PRA since 1919, has been appointed District Engineer for Utah with offices in Ogden.

* * *

Royce J. Tipton and Associates, consulting engineers of Denver, have recently secured a contract from the city of Laramie, Wyoming, for the furnishing of designs and plans on a water diversion project. This project when completed will divert waters from the Laramie River through the Pioneer Canal and Sodergreen Lake via pipe line to the city of Laramie.

* * *

Charles S. Rippon is engineer for the U. S. Bureau of Reclamation, supervising concrete construction in connection with the spillway tunnel improvement at Boulder City, Nev., as part of the tunnel and river channel improvements, contract for which was recently awarded to Guy F. Atkinson Co., San Francisco contractor.

* * *

With the closing of the office of the Bureau of Reclamation at Hunt, Idaho, the resident engineer, **W. E. Wheeler,** left to become associated with the Bureau's preconstruction work at Hungry Horse Dam in Montana. The Bureau offices at Hunt had been in operation since the start of the Minidoka relocation center project in August of 1942.

* * *

Jesse Epstein of Seattle, Wash., has been

ENGINEERS OF THE BUREAU of Reclamation wore skis and snowshoes in making surveys in the late spring for Hungry Horse dam on the south fork of the Flathead River in northwestern Montana. Shown here, are, left to right, PAUL A. JONES, project engineer; CHARLES L. LEFEBER and W. E. WHEELER, engineers. Hungry Horse dam, a unit of the Bureau's huge postwar inventory of projects, will be multiple-purpose in scope, including irrigation, power production and flood control.

appointed director of Region 7 of the Federal Public Housing Authority covering FPHA operations in Idaho, Montana, Washington, Oregon, Wyoming and Alaska. He succeeds **Frank M. Crutsinger**, who was named director of the foreign shelter division in the Washington office of FPHA.

* * *

Charles B. Faraday, for many years state senator from Elmore County, Idaho, has been named by Governor Charles C. Gossett as chief personnel coordinator for the State Bureau of Highways. **E. T. Spencer**, former Pocatello newspaperman, has been appointed public relations director for the Bureau. He formerly held this post in the Department of Law Enforcement.

Otto Lunn, resident engineer for construction of the Bangor naval magazines in the state of Washington, and former designer and field supervisor for Bonneville, has been named chief engineer of the McNary (Umatilla) dam under supervision of the Portland, Ore., District Office of the U. S. Engineers. Work on other dams on the lower Snake river will also come under Lunn's supervision.

* * *

Kenneth B. Aldrich, chief of the transmission development unit of the Bonneville Power Administration, has been loaned to the power division of the Department of the Interior. He will conduct power market and transmission studies in connection with all generating plants authorized for the eastern section of the country under the rivers and harbors bill and the flood control bill.

* * *

Harold Conkling, Deputy California State Engineer, Division of Water Resources, has submitted his resignation to enter private practice as a consulting engineer in Los Angeles, having been with the Division and its predecessors for 24 years. He has been in charge of the administration of the state water rights code since 1927 and in recent years has directed underground water investigations and water right determinations in Southern California.

* * *

Champ C. Magruder, formerly with the Bureau of Yards & Docks in Washington, D. C., left the United States for South America on June 8, to head a party of workers in the employ of the Ambursen Engineering Corp. of New York City who hold highway construction contracts at Guayaquil, Ecuador.

* * *

Dr. James E. Church, meteorologist of the University of Nevada agricultural experiment station and originator of snow surveying, was one of a group of distinguished American scientists who attended the 200th anniversary of the Russian Academy of Science in Moscow on June 15.

* * *

V. E. Larson, associated with the Bureau of Reclamation for the past 15 years on construction and project planning, is now in Arizona where he is project planning engineer, investigating irrigation and power developments for the Bureau. He makes his headquarters at Phoenix.

* * *

Wayne E. Thompson has been appointed city manager of Richmond, Calif., succeeding **J. A. McVittie**, deceased. Prior to his appointment as assistant city manager a year ago, he was coordinator of naval security at the Richmond shipyards.

* * *

Glenn Huntington, Denver engineer and architect, has recently resigned from the Colorado division of the F. H. A. to open his own consulting practice in Denver.

RECENT PROMOTIONS in the Department of Water and Power of the City of Los Angeles, Calif., include, left to right: LAURANCE E. GOIT, named chief engineer of water works, advanced from assistant chief, and an employee of the department since 1924; CHARLES P. GARMAN, employed since 1920, as chief electrical engineer, also advanced from assistant chief; WILLIAM S. PETERSON, assistant chief electrical engineer, from the post of head of the design and construction division; and BURTON S. GRANT, assistant chief of water works, from the position of head of the aqueduct division, being the youngest executive in the department, with which he has been employed since 1925.

SUPERVISING THE JOBS

Jack W. Brem, general contractor of San Diego, Calif., is now occupying his new quarters at 5069 Anna St. The new plant covers several acres, and in addition to his regular contracting business, Brem intends to manufacture concrete brick, and equipment for that purpose is now being installed in the plant.

* * *

Howard W. Osborn, formerly assistant engineer of Municipal Division of Panama Canal, is now a 1st Lieutenant in the U. S. Marine Corps. He is Camp Construction and Maintenance Officer with a Marine air group somewhere in the Pacific.

* * *

G. W. Colby is resident engineer for the East Bay Municipal Utility District on the FWA pumping plant project at Bixler in Contra Costa County, Calif., designed to supply additional water to the residents on the eastern shores of San Francisco Bay.

* * *

Charles C. Smartwood has been named city engineer of Centralia, Wash., succeeding **Roy A. Welsh.** Simultaneously has come the announcement of the appointment of **George H. Brown** as city engineer of Kelso, Wash.

* * *

A. L. Brinckman, office engineer for Spencer & Morris, materials-handling equipment dealers, is back from Honolulu, and headquartered at 580 Market St., San Francisco, Calif.

* * *

After twenty-three years of service, **Ernest R. Childs,** Surveyor-Road Commissioner of San Diego County, Calif., retired from public office on July 1.

* * *

Kenneth B. Grimm, Jr., until recently USED office engineer at the Davis Monthan Army Airfield at Tucson, Ariz., is in the Navy, attending radio technical school at San Diego, Calif.

* * *

J. A. Paquette is now associated with W. D. Peugh and Associates, architects and engineers, located at 333 Montgomery St., in San Francisco, Calif.

* * *

A new shop at 7711 So. Alameda St. in Los Angeles, Calif., known as General Hoist and Body Works, has been opened. The owners are **J. (Lefty) Buchler** and **Ned Potz,** formerly with Standard Auto Body Works.

* * *

B. B. Brown is representing the Caterpillar Tractor Co. on special applications and study of irrigation and drainage at Portland, Ore.

* * *

Joe W. Tiner, formerly a key man on construction in the Southwest, has opened a shop under the name of Industrial Equipment Service, located at 1661 Cota Ave., Long Beach, Calif. He is specializing in repair of construction and oil field equipment.

* * *

Utility Trailer Sales Co. of Los Angeles has opened a new branch in San Diego, Calif., located at 1950 Main St. **C. E. Nettleton** is manager, **Leslie Acker** is in charge of shop, and **Frank Munson** is sales manager.

George R. Nethery, general superintendent for Scherer and Prichard, Riverside, Calif., is in charge of two recent contracts awarded these contractors. One is a $265,649 job of erecting a 2-story addition to the Dana Junior High School at Point Loma, Calif. The other is at the Marine Corps Air Depot in Miramar, Calif., where a $80,759 contract was awarded for the construction of additional women's barracks. **Jack Loveday,** as superintendent, and **Marion Hauser,** foreman, are working on the Point Loma job, while **Tom Loveday** is job superintendent at Miramar.

* * *

O. H. Tucker, who has supervised many jobs for Macco Construction Co., is project manager for this company and Morrison-Knudsen Co., Inc., on two contracts amounting to $939,635 recently awarded to these contractors by U.S.E.D., covering paving, lighting and drainage at Mills Field, San Francisco. Other key men on the job are **Joe Seabury,** superintendent; **Andy Cathey** and **O. M. Paul,** grade foremen; **Lex Hobson,** master mechanic; **Eugene Hargraves,** office manager.

* * *

Dave Doering is project manager and **E. W. Lindstrom** is general superintendent for L. H. Hoffman Construction Co. of Portland, Ore., who have the contract for redecking with steel grating the Hawthorne bridge over the Willamette river in Oregon. Other key men are **Charles Hering, J. T. Bolen** and **Carl R. Hart. "Shorty" Howell** is superintendent and **H. H. Brown** is foreman for John G. Lundstrom Co. who are subcontractors on the job.

* * *

C. G. Clapp has been appointed superintendent on the important contract recently awarded W. E. Callahan Construction Co., and Gunther and Shirley of Los Angeles, Calif., for construction of Poway, Fire Hill and San Vicente tunnels, first work on the San Diego Aqueduct Project. **Joseph Mayne** is in charge of purchasing. This is a $878,536 contract.

* * *

Seth Hudgins, formerly associated with the Wm. P. Neil Construction Co. on the Seal Beach navy project in California, is now superintending the $294,314 building conversion contract at Barstow, Calif., for M. A. Imhoff and Associates, San Gabriel, Calif. Managing the work for his company is **M. A. Imhoff. Geo. A. Caldwell** is carpenter superintendent, and purchasing is in charge of **Paul V. Birnbaum.**

* * *

E. T. Roach, superintendent, **Tennyson Flora,** foreman, and **John B. Townsend,** office manager, are among the key men for the Northwestern Engineering Co., Rapid City, S. Dak., on this contractor's $110,395 job at the Rathdrum Prairie Project near Coeur d'Alene, Idaho. The construction is on the Post Falls unit, and embraces earthwork, concrete lining, pipe lines and structures and canal lateral system.

Assisting **Carl E. Larson** and **H. B. Rightmire** on the Naval Redistribution Center contract at Torrance, Calif., are **Robert Gewe,** project engineer; **Les Brasher,** general carpenter foreman; **Fred Stover,** carpenter foreman, and **Rudy Watje,** labor foreman. **Robert Barnes** is auditor. **Joe Walters** is superintendent for C. G. Willis & Son who have the grading contract. Johnson & Washer hold the plumbing contract, and Stetson Electric Co. has the electrical work. Track work is in the hands of Sharp and Fellows.

* * *

A. R. Stuckey is superintendent of construction on a power line for the Southern California Edison Co., extending from Hayfield Reservoir to Chino Substation in southern California. **O. C. Hansen** is assistant superintendent and **Rex Mesny** superintendent of foundations. Stone & Webster Engineering Corp of Los Angeles, Calif., hold the contract, the operations for which are being handled from offices in Redlands, Calif.

* * *

T. S. Brown is superintendent on the construction of 76 war dwelling units and a community building being erected at Santa Barbara, Calif., by Ellis G. Martin, Santa Monica contractor, who was awarded the contract on a low bid of $181,988. Among the key men on the job are **C. P. Cox,** foreman of the concrete work, and **Joseph S. Waugh,** office manager.

* * *

Upton Bickford, project manager, assisted by **Al Parent** as general superintendent and **Ernest Cullison** as foreman, is supervising the construction of a concrete police station building for the city of Portland, Ore. W. C. Smith, Inc., of Portland, holds the contract, and Jones and Marsh are the architects.

* * *

L. V. Mulherron, at one time superintendent for the Tavares Construction Co., and until recently with Shannahan Brothers at their San Diego headquarters, is now in business for himself as a general contractor, specializing in buildings, grading, excavating and engineering. His headquarters are at 2360 Shields St., La Crescenta, Calif.

* * *

C. N. Jones, superintendent for C. L. Browning, Jr., contractor of San Antonio, Texas, is directing the construction of hospital mess halls and elevators at the Brooke General Hospital Annex, Fort Sam Houston, Tex. Foreman of the carpenter work is **Thornton Miller.** Contract was awarded on a bid of $299,425.

* * *

Maurice R. McClure, who has superintended a number of installations for Stolte, Inc., of Oakland, Calif., has been named superintendent on the company's $150,440 contract for construction of an interceptor and outfall sewer in South Vallejo, Calif.

E. K. Ferguson is utilities manager, and **James S. Butler,** engineer.

* * *

I. L. Waring is in charge of grading, draining and construction of embankment for Parker Schram of Portland, Ore., who was recently awarded the contract at $156,297 for the performance of this work from Kalama to Kalama River in Washington. Assisting Waring as foremen are **Joe Casciato** and **Jake Davis.**

* * *

Jack Myers, superintendent for the Austin Co. of Oakland, Calif., is directing construction of the company's $90,000 contract for the erection of a packing plant at 3rd and Islais Creek Channel in San Francisco. Assisting him in the work are Foremen **Jim Tosh, Jack Collison** and **Dale Reger. Ed Welch** is chief clerk on the job.

* * *

J. E. Franklin is job superintendent at the Ashburn General Hospital, McKinney, Tex., on construction of occupational therapy and physiotherapy facilities and a library. Engineer on the job is **George Morris.** T. C. Bateson, contractor of Dallas, Texas, was awarded the contract for this work at $86,000.

* * *

Dan Goodbody is project superintendent for Haddock Engineers, Ltd., on Homojo housing in the San Diego area. Superintending the carpenter work is **Charlie Zimmer,** assisted by foremen **Selma T. Kihle** and **Ed Means.** In charge of underground facilities is **L. C. Hudson. E. M. Newbro** is steel erection foreman.

* * *

Dick Huntington, job superintendent, is directing the building of 17 Homoja huts at the North Bend Naval Air Station in Oregon. Other key men on the work are **Harold Prosser,** general superintendent, **John Reiff,** project manager and engineer, and **E. D. Davis,** timekeeper. Donald M. Drake Co., Portland, Ore., holds this $69,020 contract.

* * *

A. M. Jackson is directing the work of A. Farnell Blair of Los Angeles, Calif., at the U. S. Naval Hospital, San Diego, Calif. This job was recently awarded to Blair on a low bid of $104,026. Other key personnel on the job are **L. T. Potts,** reinforcing foreman, and **Lucy Thompson,** office manager.

* * *

T. G. Rowland is supervising the construction of an underpass and approach road near Ogden, Utah. **Fred Neuber** is carpenter foreman and **George Provstgard** is also employed in a foreman capacity. Victor Newman of Salt Lake City, Utah, was recently awarded this contract on a bid of $191,756.

* * *

Leroy Larson, superintendent for Alfred J. Hopper, contractor of San Francisco, Calif., is working at Vallejo, Calif., where a one-story reinforced concrete branch jail building is being erected at a cost of $92,948. Purchasing agent is **Tom Tillman,** and **Alice Hansen** is acting as expediter.

* * *

Tomei Construction Co., Van Nuys, Calif., with **Julio Tomei** supervising, is doing the sewer construction as subcontractors on the Naval Redistribution Center at Torrance, Calif. **Perry Tomei** is superintendent, **Ed Tomei** machinery superintendent, **Frank Mosso** foreman, and **Stanley W. James** operator.

* * *

Lyman Leahy is superintendent for W. H. Noel Co., Jamestown, N. Dak., who was recently awarded a contract for grading, gravel and incidental improvements on various State Highways in North Dakota. **A. W. Arton** is his assistant. This is a $113,843 contract.

* * *

Roy E. Ramseier is project manager for the Underground Construction Co., Oakland, Calif., on the gasoline pipeline contract at Hamilton Field, Calif., recently awarded this company on a bid of $117,687. **Louis Cima** is superintendent on the job.

* * *

W. R. Pierson is job superintendent and **C. A. Budnik** is field superintendent on the over $6,000,000 contract for the expansion of the Naval Ammunition Depot at Hastings, Neb. Maxon Construction Co., Inc., of Dayton, Ohio, holds the contract.

* * *

H. D. Carlson, formerly project manager for the Los Angeles contracting firm of Ford J. Twaits Co., is now general manager of the Stockton Ship Works, Stockton, Calif., specializing in general ship repairs for the Army, Navy and War Shipping Administration.

* * *

Harold Kincade is one of the key men for the Harris Construction Co. of Fresno, Calif., on this company's contract at the Hammond General Hospital, Modesto, Calif. **Q. A. Bales,** assisted by **Wilbur Purdin,** is supervising construction.

* * *

Harry Nelson as job superintendent, assisted by **Harold Prosser** as general superintendent, and **John Reiff,** engineer, is supervising the erection of a cold storage warehouse at Van Horn, Ore. Donald M. Drake Co., Portland contractor, received the contract on a low bid of $81,000.

* * *

Charles W. Champion is superintendent in charge of construction of a housing project at 98th Ave. and San Leandro St. in Oakland, Calif. The contract covering 40 Pacific huts was recently awarded to Stolte, Inc., of Oakland, Calif., at a cost of $192,744.

* * *

Pat O'Bar is district master mechanic for Guy F. Atkinson Co., with headquarters at the company's new shop on Santa Fe Ave. in Long Beach, Calif. The name of the contracting firm was given as Ralph Atkinson Co., in the May issue of *Western Construction News.* This was an error.

* * *

Stanley P. Brown was appointed superintendent by W. E. Beggs of Seattle, Wash., on this contractor's $63,716 contract for the installation of an additional automatic sprinkler system in five buildings at the Army Air Depot in Spokane, Wash.

* * *

Cal Powers, who has been foreman on many excavation jobs for John C. Gist and A. Teichert & Son of Sacramento, Calif., during his more than 25 years in the construction industry, is daily operating the P&H shovels for this contractor.

B. C. Glanville, superintendent, and **C. H. Stillman,** project manager, are in charge of the rehabilitation of 76 cottages and miscellaneous improvements at Helper, Utah, contract for which was recently awarded to Mark B. Garff of Salt Lake City on a bid of $250,000.

* * *

Willard A. (Bert) Harber is carpenter foreman for Macco Construction Co. on completion work on Sweetwater Falls dam in San Diego County, Calif. He has been operating in a key capacity on this project from the beginning of the contract.

* * *

Martin Carlson, project superintendent for the Austin Co., Seattle, Wash., is in charge of preconstruction work on a food processing and freezing plant in Oregon, contract for which was recently awarded Austin at $90,000.

* * *

Fletcher T. Horn, superintendent for R. J. Daum of Inglewood, Calif., is supervising the construction of additions to the main telephone building at San Diego, Calif. This is a $140,000 contract.

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H. Hammond is general superintendent for M. A. Sommers, Los Angeles contractor, on a new addition of 28 homes in the Bixby Knolls section of Long Beach, Calif. The company has just completed 471 homes.

* * *

R. Miller, for two and a half years in a key capacity for Wm. T. Moran Co., Alhambra, Calif., is now job superintendent for this company on a factory building in Los Angeles for Durachrome, Inc.

* * *

Edward Sward is superintendent for MacRae Brothers of Seattle, Wash., on a $41,589 contract for the erection of a reinforced concrete girder bridge and grading and surfacing bridge approaches at Jackman Creek, Wash.

* * *

Bryon A. (Red) Babel is general superintendent for the Bakker Construction Co. of San Bernardino, Calif., on a $90,000 winery building for Ellena Bros. at Etiwanda, Calif.

* * *

Walter Spoon is superintendent for the contracting firm of Close & Lewis of Hayward, Calif., on their $83,634 contract for the erection of 32 war dwelling units at San Luis Obispo, Calif.

* * *

A. M. (Speck) Willis is superintendent on dirt moving for Kiewit-Johnson-Everist, contractors at March Field, Calif. **Nathan A. Osmer** is paving foreman. **A. H. Thomas** is shop superintendent for Everist and **Ed Kindig** mechanic.

* * *

Chas. Lindquist is foreman for Guy F. Atkinson Co., San Francisco contractor, on work connected with the new mole at the Navy dry docks, Terminal Island, Calif.

* * *

Charles V. Stone is working as a rigger for the Belyea Truck Co. at Camp Kohler, Calif. This work involves the handling of defense materials.

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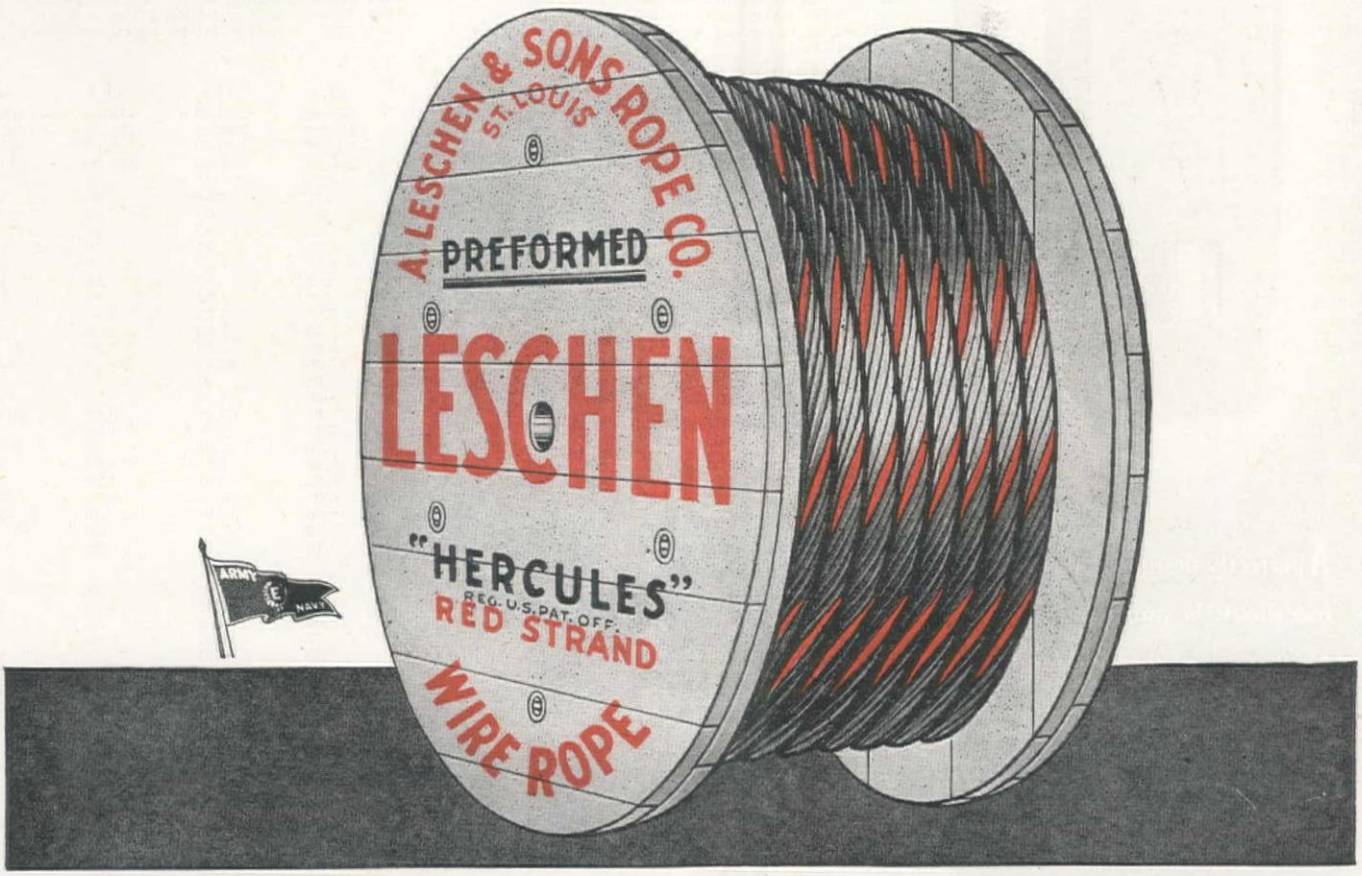

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UNIT BID SUMMARY

Irrigation . . .

Montana—Missoula County—Bureau of Reclamation—Structures

Otis Williams & Co. submitted the low bid of $129,951 to the Bureau of Reclamation for the construction of the Missoula Valley project consisting of earthwork and structures for the Big Flat Canal and laterals, specification No. 1096. The following is a summary of the unit bids received:

(A) Otis Williams & Co. $129,951
(B) Nilson, Smith Construction Co. 130,330
(C) Robertson & Cave 136,696
(D) Barnard Curtis Co. 142,023
(E) Peter Kiewit Sons Co. $180,978
(F) Union Construction Co. 185,115
(G) James Construction Co. 192,240

SCHEDULE No. 1

(1) 3.5 acres clearing between Sta. 98 and 148
(2) 18.7 acres clearing between Sta. 212 and 308
(3) 3.5 acres grubbing between Sta. 98 and 148
(4) 18.7 acres grubbing between Sta. 212 and 308
(5) 100,700 cu. yd. excavation, common, for canal
(6) 5,300 cu. yd. excavation, rock, for canal
(7) 10,000 sta. cu. yd. overhaul
(8) 2,000 cu. yd. compacting embankments
(9) 1,000 cu. yd. excav., common, for drainage channels and dikes
(10) 100 cu. yd. excav., rock, for drainage channels and dikes
(11) 1,300 cu. yd. earth lining of canal
(12) 12,000 cu. yd. excav., common, for structs.
(13) 1,000 cu. yd. excav., rock, for structs.
(14) 5,500 cu. yd. backfill
(15) 2,300 cu. yd. compacting backfill
(16) 1,200 cu. yd. concrete in structs.
(17) 125,000 pounds placing reinf. bars
(18) 200 sq. yd. dry-rock paving
(19) 23 M.F.B.M. erecting timber in structs.
(20) 9 sq. ft. placing elastic joint-filler material
(21) 320 pounds placing metal water stops in joints
(22) 12 lin. ft. laying 18-inch dia. conc. pipe
(23) 256 lin. ft. laying 24-inch dia. conc. pipe
(24) 98 lin. ft. laying 48-inch dia. conc. pipe
(25) 42 lin. ft. jacking 48-inch dia. conc. pipe under railroad
(26) 2,600 pounds installing gates and gate hoists
(27) 5,000 pounds installing miscel. metalwork

SCHEDULE No. 2

(28) 30,000 cu. yd. excav., common, for canal
(29) 100 cu. yd. excav., rock, for canal
(30) 15,000 sta. cu. yd. overhaul
(31) 13,500 cu. yd. compacting embankments
(32) 300 cu. yd. excav., common, for drainage channels and dikes
(33) 10 cu. yd. excav., rock, for drainage channels and dikes
(34) 1,100 cu. yd. earth lining of canal
(35) 650 cu. yd. excav., common, for structs.
(36) 10 cu. yd. excav., rock, for structs.
(37) 1,000 cu. yd. backfill
(38) 600 cu. yd. compacting backfill
(39) 210 cu. yd. concrete in structs.
(40) 17,000 pounds placing reinf. bars
(41) 340 sq. yd. dry-rock paving
(42) 1 M.F.B.M. erecting timber in structs.
(43) 70 lin. ft. laying 15-in. dia. conc. pipe
(44) 153 lin. ft. laying 18-in. dia. conc. pipe
(45) 54 lin. ft. laying 30-in. dia. conc. pipe
(46) 56 lin. ft. laying 36-in. dia. conc. pipe
(47) 32 lin. ft. laying 42-in. dia. conc. pipe
(48) 5,500 pounds installing gates
(49) 2,200 pounds installing miscl. metalwork

SCHEDULE No. 1

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
(1)	85.00	175.00	60.00	150.00	200.00	450.00	400.00
(2)	85.00	175.00	60.00	150.00	300.00	450.00	585.00
(3)	85.00	175.00	23.65	200.00	100.00	300.00	375.00
(4)	85.00	80.00	23.65	200.00	200.00	300.00	585.00
(5)	.30	.23	.2875	.25	.37	.38	.35
(6)	1.50	.75	1.45	.75	1.05	2.00	1.52
(7)	.05	.06	.0233	.03	.02	.05	.015
(8)	.40	.40	.23	.25	.37	.60	.10
(9)	.30	.50	.29	.45	.71	.50	1.25
(10)	.30	1.50	1.45	1.50	1.25	3.00	4.80
(11)	.30	.50	.46	.45	.52	.60	1.00
(12)	.75	.75	.80	.95	.93	.80	1.25
(13)	2.50	1.00	1.45	1.90	3.15	2.00	5.25
(14)	.25	.20	.29	.35	1.00	.50	.50
(15)	.50	.75	1.10	1.05	2.75	1.50	.50
(16)	30.00	35.00	37.00	37.00	38.42	36.25	44.00
(17)	.04	.05	.0475	.05	.05	.10	.025
(18)	3.00	4.00	4.73	3.00	4.00	3.00	3.85
(19)	40.00	70.00	56.79	75.00	60.00	70.00	108.00
(20)	1.00	2.00	1.44	1.00	1.00	1.00	.20
(21)	.10	.20	.36	.50	1.00	.10	.18
(22)	1.00	1.50	1.38	1.00	1.50	1.50	1.20
(23)	1.50	1.60	1.90	1.50	2.00	1.50	1.50
(24)	2.25	6.00	8.97	6.00	6.00	6.00	4.84
(25)	20.00	15.00	27.74	45.00	30.00	20.00	37.00
(26)	.10	.20	.12	.10	.15	.20	.28
(27)	.10	.20	.18	.10	.15	.20	.28

SCHEDULE No. 2

(28)	.30	.25	.23	.35	.53	.38	.34
(29)	1.00	1.50	1.45	1.00	1.05	3.00	2.34
(30)	.05	.06	.0233	.04	.02	.05	.015
(31)	.40	.40	.23	.25	.37	.60	.10
(32)	.30	.50	.29	.35	.71	.38	1.25
(33)	.30	2.00	1.45	1.00	1.25	3.00	4.80
(34)	.30	.40	.46	.45	.52	.60	1.00
(35)	1.00	.75	.80	2.00	2.83	.80	1.25
(36)	1.00	2.00	1.45	5.00	3.15	3.00	5.25
(37)	.25	.20	.29	.35	1.00	.50	.50
(38)	.50	.75	1.10	1.00	2.75	1.50	.50
(39)	35.00	35.00	38.70	37.00	47.00	40.00	63.00
(40)	.04	.05	.0475	.05	.05	.10	.025
(41)	3.00	4.00	4.73	3.00	4.00	3.00	3.85
(42)	40.00	70.00	56.79	75.00	60.00	70.00	108.00
(43)	1.00	1.50	1.38	.75	1.40	1.50	1.00
(44)	1.00	1.50	1.38	1.50	1.50	1.50	1.20
(45)	1.50	3.00	1.73	2.00	3.00	3.00	1.75
(46)	1.50	4.00	1.84	3.50	4.00	3.50	2.50
(47)	2.00	5.00	2.30	4.50	5.00	6.00	3.50
(48)	.10	.20	.12	.10	.15	.20	.28
(49)	.10	.20	.18	.10	.15	.20	.28

Dam . . .

California—San Diego—U. S. Navy—Aqueduct

W. E. Callahan Construction Co., Los Angeles, Calif., submitted the low bid of $816,262 for schedules 1 to 3, $868,536 for schedules 4 to 6, and $908,428 for schedules 7 to 9, to the U. S. Navy, Public Works Office, 11th Naval District, San Diego, Calif., for the construction of Poway, Firehill, and San Vicente tunnels as listed in specification No. 16,254, NOY 11,993. The following bids were taken on three alternate plans for each tunnel, including a bore diameter of 4 ft. 8 in., 6 ft., and 7 ft. The work is part of the proposed

(Continued on next page)

5 Lorain WINNERS

for Profitable Performance

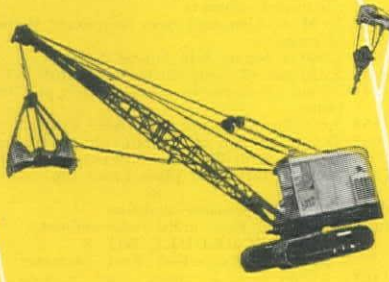
You have a wide choice to pick the right machine for the right job in the Thew-Lorain line of power shovels and cranes.

There are heavy-duty rock shovels, big producers and tough as they come; there are general purpose "high production" shovels that can really swing dirt; there are rubber-tired Moto-cranes that hustle along at 39 M.P.H. to serve varied and widely scattered jobs; there are self-propelled cranes, powered by one engine, operated by one man, to serve jobs requiring localized rubber-tired mobility. In addition, there are cranes that can be used with 15 or more attachments for lifting anything you have; clamshells for digging and material handling jobs; draglines for drainage and irrigation.

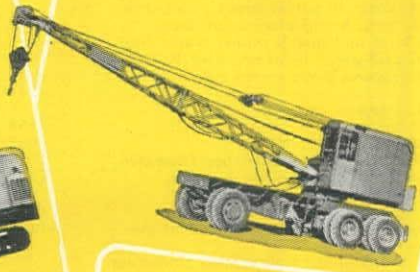
Call on your Lorain distributor for information today.

MOTO-CRANES

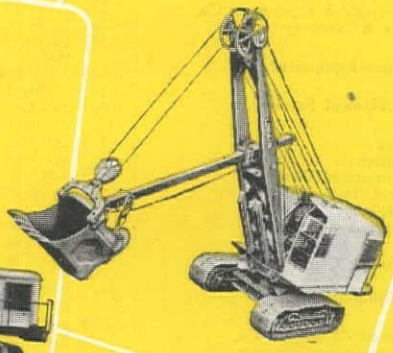
CLAMSHELLS



CRANES



SHOVELS



DRAGLINES

See Your thew-Lorain Dealer

Le Roi-Rix Machinery Co., Los Angeles 11
Cate Equipment Co., Salt Lake City 4
Liberty Trucks & Parts Co., Denver 1
Coast Equipment Company, San Francisco 1
A. H. Cox & Co., Seattle 4, Wash.
Bunting Tractor Co., LaGrande, Ore., Boise and Twin Falls, Ida.
Connelly Machinery Company, Billings and Great Falls, Mont.
Sanford Tractor & Equipment Co., Reno, Nev.
The Mountain Tractor Co., Missoula, Mont.
The Tractor & Equipment Co., Sidney, Mont.
P. L. Crooks & Co., Portland 10, Oregon

71.5-mi. aqueduct to be constructed between the west portal of San Jacinto tunnel in Riverside County to San Vicente reservoir of the City of San Diego. The Poway tunnel will be 3,180 ft. in length, Firehill 5,700 ft., and San Vicente will extend 2,400 ft. The following is a summary of the unit bids submitted for the different schedules for each tunnel:

Contractors submitting bids:

(A) W. E. Callahan Construction Co. (all or none)
(B) Case-Connolly
(C) United Concrete Pipe Corp. (all or none)
(D) Bressi-Bevanda Constructors, Inc.
(E) Morrison-Knudsen Co.
(F) L. E. Dixon Co.
(G) Teichert & Gist
(H) J. F. Shea Co.
(I) Johnson & Everist and Peter Kiewit Sons Co.
(J) Steifel Construction Co.

Total bids for the 9 schedules are as follows:

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(A)	$174,981	$507,732	$133,548	$179,138	$539,840	$149,558	$178,424	$574,865	$155,139	$10,000
(B)	.....	.....	.....	.....	.....	.....	.....	.....	168,658	8,000
(C)	274,345	500.976	184,371	272,424	504,552	185,307	281,077	518,770	192,222	6,000
(D)	.....	.....	.....	.....	.....	.....	345,715	621,660	250,160	4,500
(E)	.....	.....	.....	323,535	607,028	223,655	335,607	627,475	232,260	3,500
(F)	.....	.....	.....	375,929	685,890	261,970	413,929	718,642	290,375	6,000
(G)	.....	.....	.....	.....	.....	.....	373,907	671,715	260,510	6,500
(H)	.....	.....	.....	.....	.....	.....	436,803	783,515	310,138	5,800
(I)	.....	.....	.....	424,667	780,951	285,443	449,589	822,059	302,960	5,000
(J)	497,963	889,919	345,879	518,457	925,720	360,952	471,975	832,845	332,131	20,000

SCHEDULE NO. 1
Poway Tunnel—4 Feet, 8 Inches Diameter

(1) 3,000 cu. yd. common excav. in open cut
(2) 6,200 cu yd. rock excav. in open cut
(3) 3,800 cu. yd. excav., all classes, in tunnel
(4) 80,000 lbs. furnish and install permanent steel rib tunnel supports
(5) 32 M. ft. furnish and erect permanent timber in tunnel
(6) 1,600 lin. ft. constr. 6-in. tunnel drain
(7) 1,550 cu. yd. conc. in tunnel lining
(8) 12 cu. yd. conc. in portal struc. and transitions
(9) 1,500 lbs. furnish and place reinf. bars
(10) 34 lin. ft. furn. and install rubber water stops
(11) 200 lin. ft. drill grout holes not over 10 ft.
(12) 200 lbs. furn. and place grout pipe
(13) 400 cu. ft. pressure grouting
(14) 2,340 bbls. furn. and handle cement

SCHEDULE NO. 2
Fire Hill Tunnel—4 Feet, 8 Inches Diameter

(15) 4,300 cu. yd. common excav. in open cut
(16) 9,000 cu. yd. rock excav. in open cut
(17) 6,500 cu. yd. excav., all classes, in tunnel
(18) 2,000 cu. yd. backfill
(19) 210,000 lbs. furn. and install permanent steel-rib tunnel supports
(20) 80 M. ft. furn. and erect permanent timbering in tunnel
(21) 3,000 lin. ft. constr. 6-in. tunnel drain
(22) 2,950 cu. yd. conc. in tunnel lining
(23) 200 cu. yd. conc. in portal struct., transitions
(24) 35,000 lbs. furnish and place reinf. bars
(25) 47 lin. ft. furn. and install rubber water stops
(26) 200 lin. ft. drill grout holes not over 10 ft.
(27) 200 lbs. furn. and place grout pipe and connections
(28) 400 cu. ft. pressure grouting
(29) 4,725 bbls. furnish and handle cement

SCHEDULE NO. 3
San Vicente Tunnel—4 Feet, 8 Inches Diameter

(30) 350 cu. yd. common excav. in open cut
(31) 5,000 cu. yd. rock excav. in open cut
(32) 2700 cu. yd. excav., all classes, in tunnel
(33) 30,000 lbs. furn. and install permanent steel-rib tunnel supports
(34) 10 M. ft. furn. and erect permanent timbering in tunnel
(35) 1,200 lin. ft. constr. 6-in. tunnel drain
(36) 1,050 cu. yd. conc. in tunnel lining
(37) 12 cu. yd. conc. in portal structs. and transitions
(38) 1,500 lbs. furn. and place reinforcing bars
(39) 17 lin. ft. furn. and install rubber water stops
(40) 200 lin. ft. drill grout holes not more than 10 ft. deep
(41) 200 lbs. furn. and place grout pipe and connections
(42) 400 cu. ft. pressure grouting
(43) 1,590 bbls. furn. and handle cement

SCHEDULE NO. 4
Poway Tunnel—6 Feet Diameter

(44) 3,100 cu. yd. common excav. in open cut
(45) 7,200 cu. yd. rock excav. in open cut
(46) 5,500 cu. yd. excav., all classes, in tunnel
(47) 100,000 lbs. furn. and install permanent steel-rib tunnel supports
(48) 40 M. ft. furn. and erect permanent timbering in tunnel
(49) 1,600 lin. ft. constr. 6-in. tunnel drain
(50) 2,000 cu. yd. conc. in tunnel lining
(51) 16 cu. yd. conc. in portal structures
(52) 2,000 lb. furn. and place reinf. bars
(53) 41 lin. ft. furn. and install rubber water stops
(54) 200 lin. ft. drill grout holes not over 10 ft.
(55) 200 lbs. furn. and place grout pipe and connections
(56) 400 cu. ft. pressure grouting
(57) 3,025 bbls. furnish and handle cement

SCHEDULE NO. 5
Fire Hill Tunnel—6 Feet Diameter

(58) 4,500 cu. yd. common excav. in open cut
(59) 10,000 cu. yd. rock excav. in open cut
(60) 9,500 cu. yd. excav., all classes, in tunnel
(61) 2,200 cu. yd. backfill
(62) 250,000 lbs. furn. and install permanent steel-rib tunnel supports
(63) 100 M. ft. furn. and erect permanent timbering in tunnel
(64) 3,000 lin. ft. constr. 6-in. tunnel drain
(65) 3,700 cu. yd. conc. in tunnel lining
(66) 260 cu. yd. conc. in portal struct., transitions
(67) 47,000 lb. furn. and place reinf. bars
(68) 375 lin. ft. furn. and install rubber water stops
(69) 200 lin. ft. drill grout holes not more than 10 ft. deep
(70) 200 lbs. furn. and place grout pipe
(71) 400 cu. ft. pressure grouting
(72) 5,940 bbls. furn. and handle cement

SCHEDULE NO. 6
San Vicente Tunnel—6 Feet Diameter

(73) 400 cu. yd. common excav. in open cut
(74) 5,500 cu. yd. rock excav. in open cut
(75) 4,000 cu. yd. excav., all classes, in tunnel
(76) 35,000 lb. furn. and install permanent steel-rib tunnel supports
(77) 12 M. ft. furn. and erect permanent timbering in tunnel
(78) 1,200 lin. ft. constr. 6-in. tunnel drain
(79) 1,350 cu. yd. conc. in tunnel lining
(80) 16 cu. yd. conc. in portal structures
(81) 2,000 lbs. furn. and place reinf. bars
(82) 21 lin. ft. furn. and install rubber water stops
(83) 200 lin. ft. drill grout holes not over 10 ft.
(84) 200 lb. furn. and place grout pipe and con.
(85) 400 cu. ft. pressure grouting
(86) 2,050 bbl. furn. and handle cement

SCHEDULE NO. 7
Poway Tunnel—7 Feet Diameter

(87) 3,200 cu. yd. common excav. in open cut
(88) 7,400 cu. yd. rock excav. in open cut
(89) 7,200 cu. yd. excav., all classes, in tunnel
(90) 120,000 lb. furn. and install permanent steel-rib tunnel supports
(91) 50 M. ft. furn. and erect permanent timbering in tunnel
(92) 1,600 ft. constr. 6-in. tunnel drain
(93) 2,350 cu. yd. conc. in tunnel lining
(94) 22 cu. yd. conc. in portal struct. and transitions
(95) 3,000 lbs. furn. and place reinf. bars
(96) 47 lin. ft. furn. and install rubber water stops
(97) 200 lin. ft. drill grout holes not over 10 ft.
(98) 200 lbs. furn. and place grout pipe and connections
(99) 400 cu. ft. pressure grouting
(100) 3,560 bbl. furn. and handle cement

SCHEDULE NO. 8
Fire Hill Tunnel—7 Feet Diameter

(101) 4,600 cu. yd. common excav. in open cut
(102) 10,500 cu. yd. rock excav. in open cut
(103) 12,300 cu. yd. excav., all classes, in tunnel
(104) 2,400 cu. yd. backfill
(105) 290,000 lb. furn. and install permanent steel-rib tunnel support
(106) 120 M. ft. furn. and erect permanent timbering in tunnel
(107) 3,000 lin. ft. const. 6-in. tunnel drain
(108) 4,300 cu. yd. conc. in tunnel lining
(109) 300 cu. yd. conc. in portal structs.
(110) 55,000 lbs. furn. and place reinf. bars
(111) 430 lin. ft. furn. and install rubber water stops
(112) 200 lin. ft. drill grout holes not more than 10 ft. deep
(113) 200 lbs. furn. and place grout pipe and connections
(114) 400 cu. ft. pressure grouting
(115) 6,900 bbl. furn. and handle cement

SCHEDULE NO. 9
San Vicente Tunnel—7 Feet Diameter

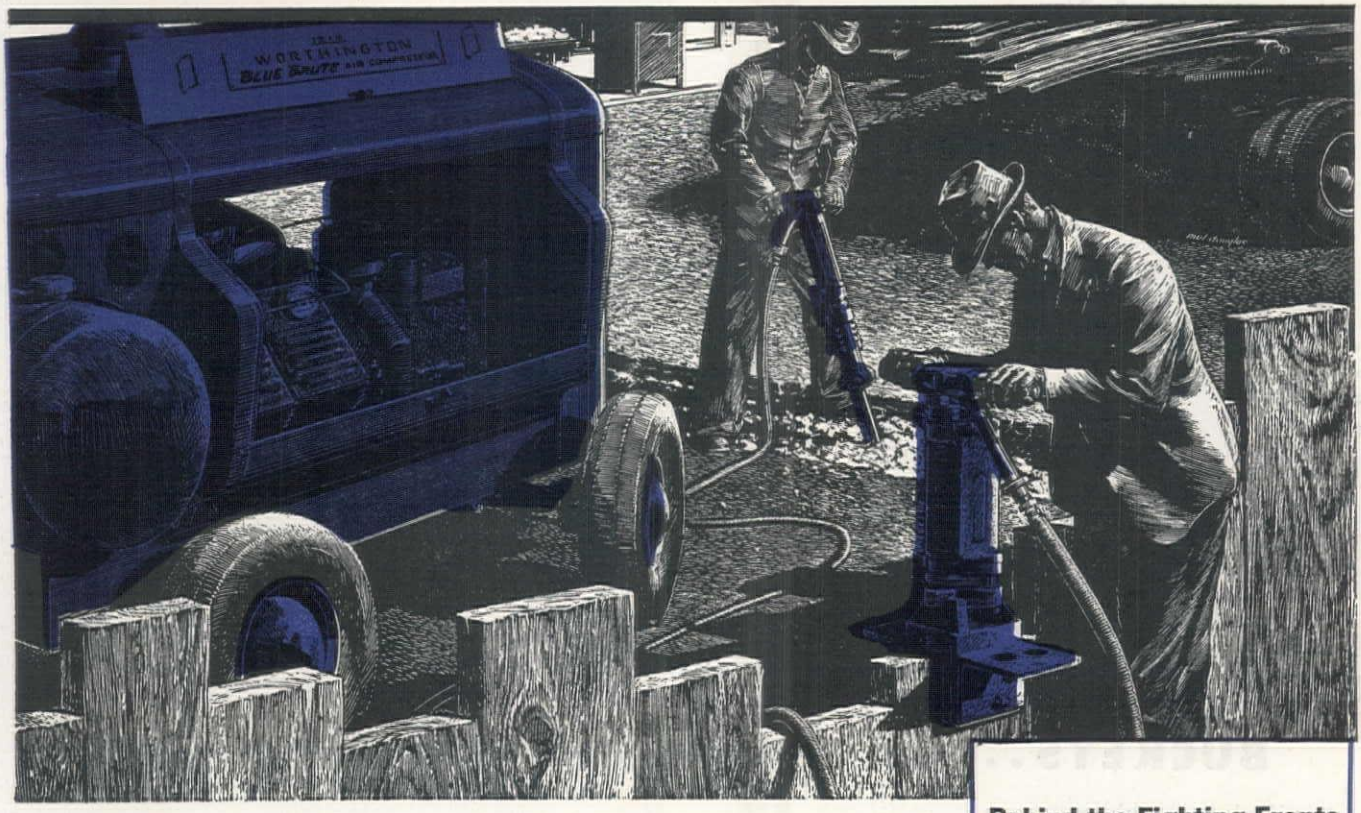
(116) 450 cu. yd. common excav. in open cut
(117) 5,700 cu. yd. rock excav. in open cut
(118) 5,300 cu. yd. excav., all classes, in tunnel
(119) 40,000 lbs. furn. and install permanent steel-rib tunnel supports
(120) 15 M. ft. furn. and erect permanent timbering in tunnel
(121) 1,200 lin. ft. constr. 6-in. tunnel drain
(122) 1,600 cu. yd. conc. in tunnel lining
(123) 22 cu. yd. conc. in portal struct. and transitions
(124) 3,000 lbs. furn. and place reinf. bars
(125) 24 lin. ft. furn. and install rubber water stops
(126) 200 lin. ft. drill grout holes not more than 10 ft. deep
(127) 200 lbs. furn. and place grout pipe and connections
(128) 400 cu. ft. pressure grouting
(129) 2,430 bbl. furn. and handle cement

SCHEDULE NO. 10

(130) Lump sum price for the construction of the Division Field Office, including water, septic tank, electrical and telephone services, in the vicinity of Poway.

(Continued on next page)

DOLLARS DOWN TO EARTH



BUDGET-SAVERS—these Blue Brutes! When postwar construction plans come down to earth, they'll keep down costs on jobs like this:

> *Pittsburgh's $36,000,000 public works program including $4,719,550 for water mains, $9,142,500 for streets, $3,494,000 for sewers.*

Other cities, too, have made substantial plans. Blue Brute air-power teams will back your effort then — and they'll help you, right now, on those jobs that call for sure power, free from time-wasting trouble.

Compressors, like the 210′ model shown above . . . Diesel, gasoline or electric driven . . . all have Feather* Valves — strongest, lightest, tightest, *proved* good for a lifetime — 3-point suspension of engine and compressor for rigid alignment — full force feed lubrication — and other trouble-savers.

Air tools — clay diggers, sheeting drivers, paving breakers — tools for *every* construction purpose — are better designed for sturdier, smoother action, easier handling!

Look 'em over now; plan now to get more worth from air with Worthington. Your nearest Blue Brute distributor is listed on page 122.

*Reg. U. S. Pat. Off.

H5-3

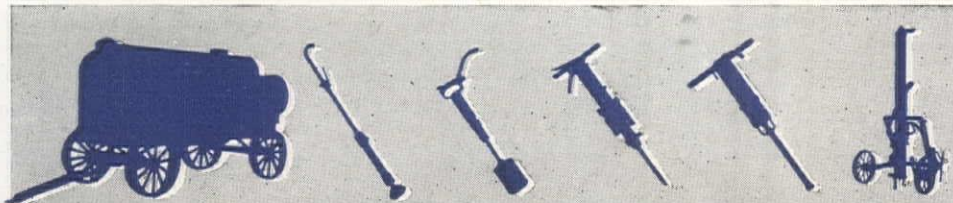
Behind the Fighting Fronts with

BLUE BRUTES

Essential LST's for amphibious war are speeded through production in a famous shipyard with the help of round-the-clock Blue Brute air-power. Also at work in hundreds of Army camps, Navy yards, air bases . . . here at home and on fighting fronts.

Get more WORTH from air with WORTHINGTON

BUY BLUE BRUTES



Compressors from 60 to 500 cu. ft. capacity in mountings to suit all jobs. Rock Drills and Air Tools that have always set the pace for easy operation — available in a wide range of weights and sizes.

WORTHINGTON

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

The unit bids were:

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	1.75	.....	3.30	.....	.....	.....	.....	.....	.....	2.00
(2)	1.75	.....	3.30	.....	.....	.....	.....	.....	.....	8.00
(3)	25.00	.....	42.00	.....	.....	.....	.....	.....	.....	75.00
(4)	.08	.....	.11	.....	.....	.....	.....	.....	.....	.12
(5)	100.00	.....	180.00	.....	.....	.....	.....	.....	.....	200.00
(6)	2.50	.....	1.50	.....	.....	.....	.....	.....	.....	5.00
(7)	26.50	.....	37.00	.....	.....	.....	.....	.....	.....	80.00
(8)	45.00	.....	60.00	.....	.....	.....	.....	.....	.....	50.00
(9)	.12	.....	.11	.....	.....	.....	.....	.....	.....	.05
(10)	10.00	.....	2.00	.....	.....	.....	.....	.....	.....	2.00
(11)	1.30	.....	2.00	.....	.....	.....	.....	.....	.....	3.00
(12)	.30	.....	1.00	.....	.....	.....	.....	.....	.....	1.00
(13)	2.60	.....	2.00	.....	.....	.....	.....	.....	.....	2.00
(14)	2.90	.....	3.30	.....	.....	.....	.....	.....	.....	3.00
(15)	3.00	.....	3.30	.....	.....	.....	.....	.....	.....	2.00
(16)	3.00	.....	3.30	.....	.....	.....	.....	.....	.....	3.00
(17)	48.00	.....	42.00	.....	.....	.....	.....	.....	.....	75.00
(18)	.20	.....	1.00	.....	.....	.....	.....	.....	.....	1.00
(19)	.08	.....	.11	.....	.....	.....	.....	.....	.....	.12
(20)	100.00	.....	180.00	.....	.....	.....	.....	.....	.....	200.00
(21)	2.50	.....	1.50	.....	.....	.....	.....	.....	.....	5.00
(22)	32.00	.....	37.00	.....	.....	.....	.....	.....	.....	80.00
(23)	45.00	.....	50.00	.....	.....	.....	.....	.....	.....	50.00
(24)	.12	.....	.11	.....	.....	.....	.....	.....	.....	.05
(25)	10.00	.....	2.00	.....	.....	.....	.....	.....	.....	2.00
(26)	1.30	.....	2.00	.....	.....	.....	.....	.....	.....	3.00
(27)	.30	.....	1.00	.....	.....	.....	.....	.....	.....	1.00
(28)	2.60	.....	2.00	.....	.....	.....	.....	.....	.....	2.00
(29)	2.90	.....	3.30	.....	.....	.....	.....	.....	.....	3.00
(30)	1.75	.....	3.30	.....	.....	.....	.....	.....	.....	2.00
(31)	1.75	.....	3.30	.....	.....	.....	.....	.....	.....	8.00
(32)	30.00	.....	42.00	.....	.....	.....	.....	.....	.....	75.00
(33)	.08	.....	.11	.....	.....	.....	.....	.....	.....	.12
(34)	100.00	.....	180.00	.....	.....	.....	.....	.....	.....	200.00
(35)	2.50	.....	1.50	.....	.....	.....	.....	.....	.....	5.00
(36)	28.50	.....	37.00	.....	.....	.....	.....	.....	.....	8.00
(37)	45.00	.....	60.00	.....	.....	.....	.....	.....	.....	50.00
(38)	.12	.....	.11	.....	.....	.....	.....	.....	.....	.05
(39)	10.00	.....	2.00	.....	.....	.....	.....	.....	.....	2.00
(40)	1.30	.....	2.00	.....	.....	.....	.....	.....	.....	3.00
(41)	.30	.....	1.00	.....	.....	.....	.....	.....	.....	1.00
(42)	2.60	.....	2.00	.....	.....	.....	.....	.....	.....	2.00
(43)	2.90	.....	3.30	.....	.....	.....	.....	.....	.....	3.00
(44)	1.75	.....	2.00	.....	1.30	.72	.....	.....	4.16	2.00
(45)	1.75	.....	2.00	.....	1.30	1.94	.....	.....	4.16	8.00
(46)	17.00	.....	30.00	.....	34.00	48.00	.....	.....	45.06	50.00
(47)	.08	.....	.11	.....	.15	.125	.....	.....	.18	.12
(48)	100.00	.....	170.00	.....	230.00	180.00	.....	.....	383.40	200.00
(49)	2.45	.....	1.50	.....	1.85	1.50	.....	.....	562.00	5.00
(50)	20.00	.....	27.00	.....	40.00	30.00	.....	.....	38.16	70.00
(51)	38.00	.....	60.00	.....	47.00	50.00	.....	.....	73.20	50.00
(52)	.12	.....	.10	.....	.10	.08	.....	.....	.10	.05
(53)	10.00	.....	2.00	.....	3.50	2.00	.....	.....	4.40	2.00
(54)	1.30	.....	2.00	.....	2.30	3.00	.....	.....	3.00	3.00
(55)	.30	.....	1.00	.....	1.00	1.00	.....	.....	.75	1.00
(56)	2.60	.....	2.00	.....	2.30	3.00	.....	.....	2.35	2.00
(57)	3.00	.....	3.30	.....	4.40	3.50	.....	.....	4.00	3.00
(58)	3.00	.....	2.00	.....	1.30	.72	.....	.....	4.16	2.00
(59)	3.00	.....	2.00	.....	1.30	1.94	.....	.....	4.16	8.00
(60)	33.90	.....	30.00	.....	34.00	48.00	.....	.....	45.06	50.00
(61)	.20	.....	1.00	.....	2.00	1.00	.....	.....	1.60	1.00
(62)	.08	.....	.11	.....	.15	.125	.....	.....	.18	.12
(63)	100.00	.....	170.00	.....	230.00	180.00	.....	.....	383.40	200.00
(64)	2.45	.....	1.50	.....	1.85	1.50	.....	.....	562.00	5.00
(65)	26.50	.....	27.00	.....	40.00	30.00	.....	.....	38.26	70.00
(66)	38.00	.....	50.00	.....	50.00	50.00	.....	.....	57.25	50.00
(67)	.12	.....	.10	.....	.10	.08	.....	.....	.10	.05
(68)	10.00	.....	2.00	.....	3.50	2.00	.....	.....	4.40	2.00
(69)	1.30	.....	2.00	.....	2.30	3.00	.....	.....	3.00	3.00
(70)	.30	.....	1.00	.....	1.00	1.00	.....	.....	.75	1.00
(71)	2.60	.....	2.00	.....	2.30	3.00	.....	.....	2.35	2.00
(72)	3.00	.....	3.30	.....	4.40	3.50	.....	.....	4.10	3.00
(73)	1.75	.....	2.00	.....	2.00	.72	.....	.....	4.16	2.00
(74)	1.75	.....	2.00	.....	2.00	1.94	.....	.....	4.16	8.00
(75)	23.00	.....	30.00	.....	34.00	48.00	.....	.....	45.06	50.00
(76)	.08	.....	.11	.....	.15	.125	.....	.....	.18	.12
(77)	100.00	.....	170.00	.....	230.00	180.00	.....	.....	383.40	200.00
(78)	2.45	.....	1.50	.....	1.85	1.50	.....	.....	5.62	5.00
(79)	23.50	.....	27.00	.....	40.00	30.00	.....	.....	38.26	70.00
(80)	38.00	.....	60.00	.....	47.00	50.00	.....	.....	73.85	50.00
(81)	.12	.....	.10	.....	.10	.08	.....	.....	.10	.05
(82)	10.00	.....	2.00	.....	3.50	2.00	.....	.....	4.40	2.00
(83)	1.30	.....	2.00	.....	2.30	3.00	.....	.....	3.00	3.00
(84)	.30	.....	1.00	.....	1.00	1.00	.....	.....	.75	1.00
(85)	2.60	.....	2.00	.....	2.30	3.00	.....	.....	2.35	2.00
(86)	3.00	.....	3.00	.....	4.40	3.50	.....	.....	4.00	3.00
(87)	1.75	.....	1.90	1.50	1.30	.72	3.00	1.20	4.16	2.00
(88)	1.75	.....	1.90	2.50	1.30	1.94	3.00	3.80	4.16	5.00
(89)	12.00	.....	23.00	30.00	26.00	40.00	34.00	42.90	36.06	40.00
(90)	.08	.....	.10	.10	.15	.125	.08	.074	.18	.087
(91)	100.00	.....	170.00	150.00	230.00	180.00	120.00	150.00	383.40	130.00
(92)	2.40	.....	1.50	1.50	1.85	1.50	1.00	1.50	5.79	4.00
(93)	18.00	.....	24.50	30.00	35.50	28.50	28.00	26.00	333.20	45.00
(94)	37.00	.....	60.00	100.00	47.00	50.00	55.00	60.00	71.00	30.00
(95)	1.00	.....	.10	.08	.10	.08	.10	.07	.10	.045
(96)	10.00	.....	2.00	5.00	3.50	2.00	2.50	2.50	4.25	2.00
(97)	1.30	.....	2.00	1.00	2.30	3.00	2.00	2.50	2.90	3.00
(98)	.30	.....	1.00	.30	1.00	1.00	1.00	.60	.75	.70
(99)	2.60	.....	2.00	1.00	2.30	3.00	3.50	2.50	2.30	1.50
(100)	2.75	.....	3.30	3.00	4.40	3.50	3.00	3.60	4.00	2.60
(101)	3.00	.....	1.90	1.50	1.30	.72	3.00	1.20	4.16	2.00
(102)	3.00	.....	1.90	2.50	1.30	1.94	3.00	3.80	4.16	5.00
(103)	28.00	.....	23.00	30.00	26.00	39.50	34.00	42.90	36.06	40.00
(104)	.20	.....	1.00	.25	2.00	1.00	.60	2.20	1.55	.50
(105)	.08	.....	.10	.10	.15	.125	.08	.074	.18	.087
(106)	100.00	.....	170.00	150.00	230.00	180.00	120.00	150.00	383.40	130.00
(107)	2.40	.....	150.00	1.50	1.85	1.50	1.00	1.50	5.70	4.00
(108)	23.50	.....	24.50	30.00	35.50	28.50	28.00	26.00	33.20	45.00
(109)	37.00	.....	50.00	35.00	50.00	50.00	55.00	60.00	55.50	30.00
(110)	.10	.....	.10	.08	.10	.08	.10	.07	.10	.045
(111)	10.00	.....	2.00	5.00	3.50	2.00	2.50	2.50	4.25	2.00
(112)	1.30	.....	2.00	1.00	2.30	3.00	2.00	2.50	2.90	3.00
(113)	.30	.....	1.00	.30	1.00	1.00	1.00	.60	.75	.70
(114)	2.60	.....	2.00	1.00	2.30	3.00	3.50	2.50	2.30	1.50

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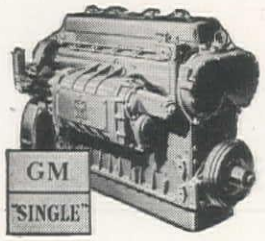
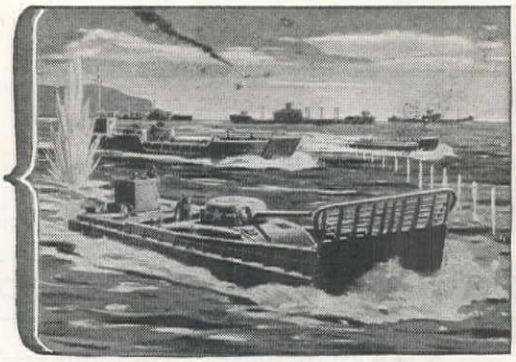
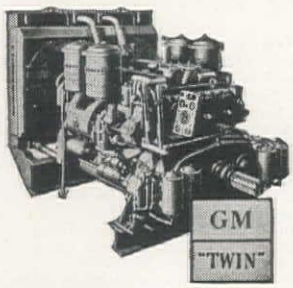
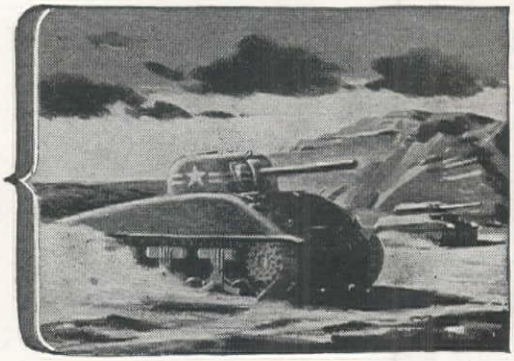
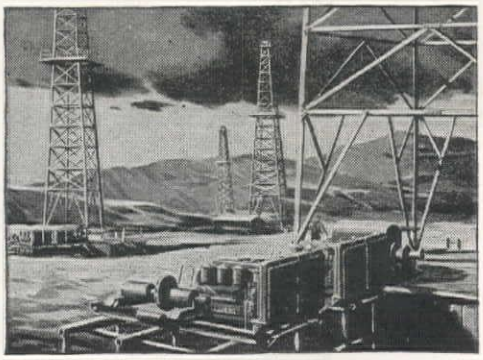
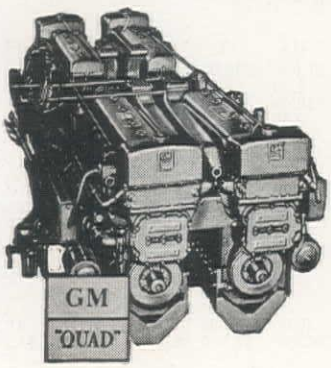


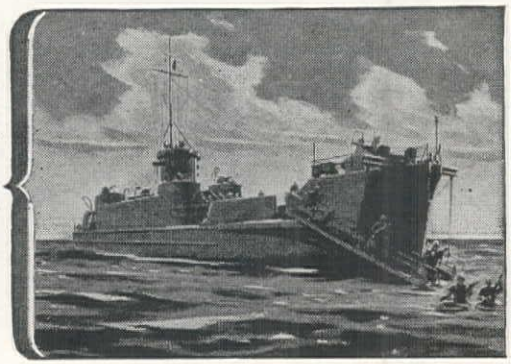


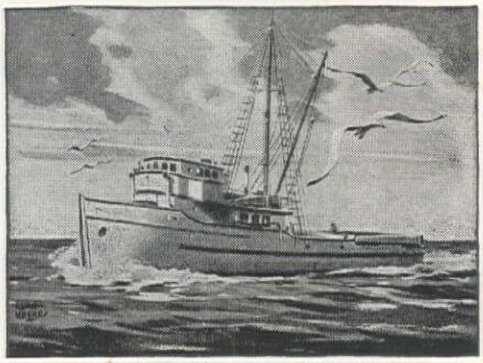












"SINGLE", "TWIN" OR "QUAD"

This is the story of how one basic engine, a favorite everywhere it runs, has become a winner even in applications which demand two to four times its power.

The engine is the General Motors series 71 Diesel which, back in peaceful days, showed the world what dependable low-cost Diesel power could do on farms, highways and on scores of construction projects where developments in progress were quick to recognize the advantages of packing more power into less weight and space.

It's busy now all over the world powering landing craft and machinery that is building landing strips and leveling jungles.

Where double the power is needed and space is cramped, two engines are joined side by side. Such "Twins" are used in M-3 and M-4 tanks and M-10 destroyers.

In its third form, two "Twins" are joined end to end, forming a "Quad." It is two of these "Quads" that drive the twin screws of the famous LCI's (landing craft infantry), fastest of all landing craft.

But whether "Single," "Twin" or "Quad" these GM series 71 engines are promising many advantages for power users on big jobs and little. With a range of horsepower to fit almost every need, the GM Diesel will be a good bet for everyone who wants dependable power at low cost.

KEEP AMERICA STRONG
BUY MORE WAR BONDS

GM
GENERAL MOTORS
DIESEL POWER

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

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

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

(115)	2.75	.....	3.30	3.00	4.40	3.50	3.00	3.60	4.10	2.60
(116)	1.75	2.00	1.90	4.00	2.00	.72	3.00	1.20	4.16	2.00
(117)	1.75	2.00	1.90	4.00	2.00	1.94	3.00	3.80	4.16	5.00
(118)	18.00	17.00	23.00	30.00	26.00	40.00	34.00	42.90	36.06	40.00
(119)	.08	.10	.10	.10	.15	.125	.08	.074	.18	.087
(120)	100.00	100.00	170.00	150.00	230.00	180.00	120.00	150.00	383.40	130.00
(121)	2.40	2.00	1.50	1.50	1.85	1.50	1.00	1.50	5.70	4.00
(122)	20.00	30.00	24.50	30.00	35.50	28.50	28.00	26.00	33.20	45.00
(123)	37.00	60.00	60.00	100.00	47.00	50.00	55.00	60.00	71.60	30.00
(124)	.10	.10	.10	.08	.10	.08	.10	.07	.10	.045
(125)	10.00	2.00	2.00	5.00	3.50	2.00	2.50	2.50	4.25	2.00
(126)	1.30	2.00	2.00	1.00	2.30	3.00	2.00	2.50	2.90	3.00
(127)	.30	1.00	1.00	.30	1.00	1.00	1.00	.60	.75	.70
(128)	2.60	2.00	2.00	1.00	2.30	3.00	3.50	2.50	2.30	1.50
(129)	2.75	3.00	3.30	3.00	4.40	3.50	3.00	3.60	4.00	2.60

Bridge and Grade Separation . . .

Washington—Skagit County—State—Concrete

MacRae Brothers, Seattle, made a low bid of $41,589 to the Washington Department of Highways, Olympia, for the construction of the Jackman Creek Bridge on Highway No. 17-A, Lyman to Marblemount route. The following is a list of the unit bids submitted:

(A) MacRae Brothers $41,589
(B) R. L. Moss & Co. 41,754
(C) Gaasland Construction Co. 43,647
(D) M. P. Munter Co. 45,997
(E) Rumsey & Company 46,572
(F) David Nygren 47,320
(G) Axel Osberg $47,674
(H) Scheumann & Johnson 47,847
(I) Hawkins & Armstrong 49,411
(J) A. W. Stevens 51,462
(K) M. P. Butler 53,426
(L) Beal & Roberts 58,977

(1) Lump sum, clearing and grubbing
(2) 380 cu. yd. unclass. excav., including haul
(3) 3.5 stas. (100 ft.) finishing roadway
(4) 540 cu. yd. selected roadwy. borrow, incl. haul
(5) 170 cu. yd. cr. stone surf. top course on roadway from stockpile
(6) 25 cu. yd. sand filler, including haul
(7) 2 only, reflector units complete in place
(8) 1 only, constr. and removing temp. lane detour bridge
(9) 600 cu. yd. structure excavation
(10) 390 cu. yd. conc. (Class A) in place
(11) 60 cu. yd. conc. (Class B) in place
(12) 110 cu. yd. conc. (Class D) in place
(13) 409 lin. ft. reinf. conc. bridge railing
(14) 112,500 lbs. steel reinf. bars in place
(15) 3,500 lbs. struc. steel in place
(16) 4 only, bridge drains complete in place
(17) Lump sum, removing existing structure

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)	(K)	(L)
(1)	786.00	$1,000	400.00	150.00	250.00	$1,500	$1,200	$1,000	500.00	800.00	500.00	$2,500
(2)	.50	.50	1.20	.46	1.00	1.00	1.50	1.00	1.00	.65	2.00	.50
(3)	20.00	25.00	15.00	18.00	30.00	20.00	25.00	30.00	25.00	20.00	30.00	20.00
(4)	1.70	1.00	2.50	.83	1.50	2.00	2.75	2.50	1.25	1.25	3.00	1.50
(5)	2.00	.50	2.50	.75	1.50	2.00	.75	1.50	1.00	.65	2.00	.50
(6)	4.00	3.00	2.50	3.50	2.50	2.00	4.00	2.00	4.00	1.25	5.00	.75
(7)	10.00	20.00	15.00	17.00	10.00	10.00	75.00	30.00	10.00	25.00	15.00	12.50
(8)	$3,124	$2,500	$2,600	$4,000	$4,000	$4,000	$4.000	$4,200	$5.000	$6,000	$3,500	$5,865
(9)	7.00	5.00	3.70	11.25	10.00	10.00	8.00	12.00	10.00	12.00	16.00	20.00
(10)	38.50	37.75	40.00	48.00	45.00	40.00	40.00	45.00	41.00	40.00	44.00	51.25
(11)	38.50	37.00	40.00	25.50	36.00	40.00	40.00	30.00	41.00	40.00	44.00	28.60
(12)	38.50	37.00	41.00	22.50	30.00	40.00	40.00	20.00	41.00	35.00	44.00	22.70
(13)	4.50	5.50	6.00	5.50	5.00	5.00	6.00	5.00	6.00	6.00	6.00	5.50
(14)	.055	.07	.075	.063	.06	.06	.07	.059	.06	.07	.065	.06
(15)	.30	.40	.30	.36	.35	.15	.35	.30	.45	.40	.20	.30
(16)	40.00	50.00	35.00	60.00	40.00	40.00	50.00	30.00	60.00	50.00	60.00	41.00
(17)	$1,043	$1,500	$1,460	600.00	$1,500	$2,000	$1,000	$1,845	$2,500	$2,500	$1,500	$3,000

Highway and Street . . .

California—Marin County—State—Grade and Pave

A. G. Raisch Co., San Francisco, Calif., presented the low bid to the California Division of Highways of $41,768, for the grading and paving with Portland cement concrete pavement and asphalt concrete pavement, 0.3 of a mile of highway at the entrance of Hamilton Field. The following is a summary of the unit bid submitted:

(A) A. G. Raisch Co. $41,768
(B) Chas. L. Harney 49,605
(C) Fredrickson & Watson Const. Co. 51,929
(D) Peter Sorensen 55,242
(E) Lee J. Immel $55,561
(F) J. Henry Harris 62,790
(G) Fredrickson Bros. 68,595
(H) C. M. Syar 84,781

(1) 1 cu. yd. removing concrete
(2) 7 each removing trees, size 1
(3) 8 each removing trees, size 2
(4) 32 each removing trees, size 3
(5) 16,000 cu. yd. roadway excav.
(6) 370 cu. yd. structure excav.
(7) 470 cu. yd. ditch and channel excav.
(8) 15,000 mi. yd. overhaul
(9) 5,000 sq. yd. preparing subgrade
(10) Lump sum, devel. water sup. and furn. watering equip.
(11) 450 M. gals. applying water
(12) 17 sta. finishing roadway
(13) 1,600 T. crusher run base
(14) 15 T. liquid asph., MC-1 (pr. coat & pen. tr.)
(15) 3 T. asph. emul. (paint binder & emuls. seal)
(16) 1,020 T. asph. conc. (leveling course)
(17) 500 T. asph. conc. (Type "B" surface course)
(18) 710 cu. yd. Class "B" P.C.C. (pavement)
(19) 220 ea. pavement dowels
(20) 15 cu. yd. Class "A" P.C.C. (structures)
(21) 70 cu. yd. Class "B" P.C.C. (curbs)
(22) 230 ea. curb dowels
(23) 14 ea. monuments
(24) 4 ea. culvert markers
(25) 140 lin. ft. 12-in. R.C.P. (std. strength)
(26) 140 lin. ft. 24-in. R.C.P. (std. strength)
(27) 180 lin. ft. salvaging exist. pipe culverts
(28) 1 ea. adjusting manhole to grade
(29) 380 lin. ft. asph. conc. raised bars
(30) 24 ea. anchor bolts for lamp bases
(31) 2,000 lbs. bar reinf. steel (pave. and struc.)
(32) 4 ea. redwood covers

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	5.00	10.00	5.80	15.00	17.00	8.60	13.00	10.00
(2)	30.00	26.40	11.65	35.00	70.00	25.00	10.00	60.00
(3)	50.00	42.00	30.00	70.00	80.00	60.00	47.00	85.00
(4)	60.00	72.00	44.50	130.00	90.00	135.00	360.00	240.00
(5)	.55	.60	.85	.70	1.00	1.26	.90	1.90
(6)	3.50	3.00	2.30	2.50	3.00	3.10	4.50	3.40
(7)	.55	.60	1.45	1.50	1.50	1.90	.80	1.75
(8)	.10	.18	.17	.10	.10	.20	.28	.15
(9)	.10	.18	.14	.20	.15	.10	.10	.27
(10)	100.00	260.00	300.00	500.00	250.00	150.00	520.00	500.00
(11)	1.75	2.00	2.35	2.00	2.00	2.00	2.30	2.00
(12)	12.00	16.00	17.50	10.00	5.00	12.00	10.00	20.00
(13)	2.64	3.15	2.85	2.75	3.00	2.86	2.90	3.00
(14)	24.00	22.50	24.00	30.00	21.00	23.00	26.00	32.00

(Continued on next page)

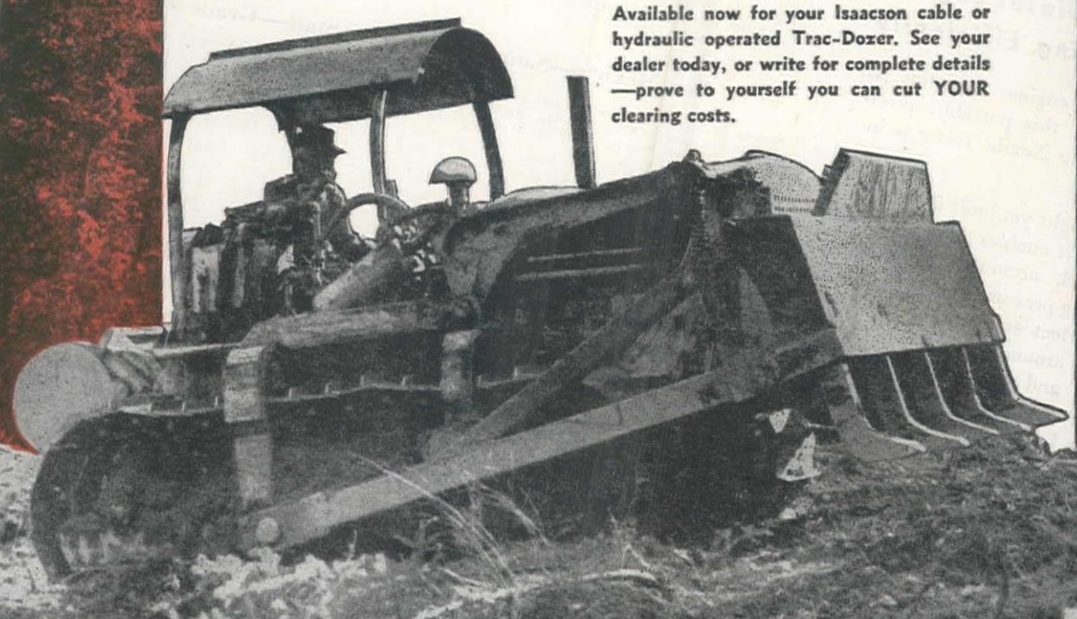
Clear Land at Lower Cost —Increase Tractor Income!

PACIFIC NORTHWEST land clearing costs have actually been cut from 50 to 75 per cent by Isaacson Klearing Blades. This may seem like an over statement, but the fact remains they are doing it for others and will do it for you.

First developed as a means of making logged-off stump land usable, these blades have since been adopted by many users for removing quickly and easily, trees, brush, stumps, roots and rock. These users particularly admire the way they comb out roots and other obstructions to a depth of 21 inches below the ground top, leaving the valuable top soil intact, ready for plowing. They like, too, the manner in which the blade piles the material, dirt free, ready for burning.

The specially designed teeth, adjustable to three positions, are shaped for maximum penetration and lifting power. The blade fits into the positions of your regular blade in a few minutes.

Available now for your Isaacson cable or hydraulic operated Trac-Dozer. See your dealer today, or write for complete details —prove to yourself you can cut YOUR clearing costs.



ISAACSON

Tractor Equipment

A PRODUCT OF THE ISAACSON IRON WORKS • SEATTLE

(15)	30.00	40.00	30.00	30.00	25.00	34.50	35.00	50.00
(16)	5.30	5.40	5.60	6.00	5.50	5.22	5.55	7.00
(17)	5.50	5.30	5.85	6.00	6.00	5.52	5.80	7.00
(18)	10.50	16.00	15.00	20.00	15.00	16.00	16.10	20.00
(19)	.40	.29	.45	.50	.50	.50	.60	.90
(20)	35.00	40.00	29.00	35.00	50.00	44.00	65.00	50.00
(21)	45.00	45.00	35.00	34.00	40.00	38.50	78.00	60.00
(22)	.50	.26	.70	1.00	1.00	.50	1.10	.90
(23)	5.00	6.50	4.00	7.50	4.00	5.00	5.00	4.00
(24)	5.00	6.50	7.00	5.00	4.00	5.00	5.00	4.00
(25)	2.00	1.80	3.75	1.75	2.00	4.00	1.90	3.00
(26)	3.50	4.00	5.50	3.00	3.00	5.75	4.25	5.25
(27)	.50	.80	1.75	1.50	1.00	2.85	1.05	2.00
(28)	25.00	65.00	60.00	15.00	60.00	50.00	26.00	25.00
(29)	1.00	1.00	1.20	1.00	1.00	1.05	.45	1.00
(30)	2.50	1.30	.90	.50	1.00	1.00	1.50	.60
(31)	.05	.07	.17	.08	.10	.11	.10	.15
(32)	10.00	7.00	11.50	5.00	10.00	5.75	12.00	25.00

Idaho—Idaho County—State—Resurface and Stockpile

F. H. DeAtley, Lewiston, submitted the low bid of $27,121 to the Idaho Bureau of Highways, for resurfacing with crushed rock the Harster Hill Section, 4.6 mi., of SR No. 13, and stockpiling maintenance material near Fenn on U. S. No. 95. Unit bids received are as follows:

(1) F. H. DeAtley $27,121
(2) Materne Bros. 29,914
(3) Roy L. Bair 31,381
(4) F. R. Hewett 32,417
(5) R. B. Johnson $34,171
(6) D. A. Sullivan 34,371
(7) Northwestern Engineering Co. 35,021
(8) Engineer's estimate 32,071

		(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
207	M. gal. watering base and surf. crse.	3.00	2.00	3.00	2.50	3.00	3.00	3.00	3.00
9,000	T. cr. rock surf. crse., ¾-in. max.	1.10	1.35	1.50	1.30	1.45	1.75	1.60	1.50
2,000	T. cr rock, ¾-in max. in stockpile	1.00	1.15	1.30	1.25	1.45	1.25	1.40	1.25
5,000	T. cr. rock, ¾-in. max. in stockpile	1.10	1.35	1.50	1.60	1.70	1.50	1.40	1.40
4,000	T. cover coat matl., Type "A", in stockpile	2.20	2.00	1.70	2.20	2.20	1.85	2.40	2.00
3,000	T. haul on rejects	.10	.10	.12	.15	.10	.20	.20	.15

California—Imperial County—State—Maintenance Repair

Norman I. Fadel, No. Hollywood, Calif., was low bidder to the State Division of Highways, Sacramento, with $115,650 for the repair of 13.4 mi. of road between Route 26 north of Calexico and Calipatria, with imported base materials and road-mixed surfacing. A summary of the unit bids follows:

(1) Norman I. Fadel $115,650
(2) The Tanner Construction Co. 128,375
(3) Basich Bros. Construction Co. $131,937
(4) Dimmitt & Taylor 190,715

		(1)	(2)	(3)	(4)
20,500	cu. yd. imported base material	2.20	2.75	2.00	4.85
550	M. gal. furnishing and applying water	4.00	2.00	4.25	2.00
11,000	cu. yd. mineral aggregate (R.M.S.)	2.50	2.75	3.50	4.30
1,250	T. liq. asph., MC-3 or 4 (R.M.S., Pr. Ct. and Sl. Ct.)	20.00	19.00	26.00	20.00
13.4	miles mixing and compacting R.M.S.	$1,000	$1,000	$1,000	$1,100
700	cu. yd. sand (seal coat)	3.50	5.00	6.00	4.50

New Mexico—Santa Fe County—State—Grade and Pave

Walter L. Denison, Albuquerque, submitted the lower bid of $23,690 to the New Mexico State Department of Highways, and he was awarded the contract to grade and resurface 4.3 mi. of U. S. Highway 85 at the Santa Fe Airport. Summary of the unit bids received follows:

(1) Walter L. Denison $23,690
(2) A. O. Peabody 24,145
(3) M. M. Sundt Construction Co. 24,617
(4) Skousen Construction Co. $26,317
(5) Henry Thygesen & Co. 31,305

		(1)	(2)	(3)	(4)	(5)
1,000	cu. yd. excavation, unclassified	.60	1.00	.60	.50	1.00
160	hr. rolling, steel tired roller	5.00	5.00	5.00	5.00	5.00
14	M. gal. watering	5.00	5.00	5.00	10.00	5.00
6	cu. yd. Class "A" concrete, curb	50.00	30.00	50.00	30.00	50.00
4.353	mi. preparation of base	400.00	400.00	400.00	250.00	700.00
4,200	T. top course, surfacing	.75	.75	.81	.98	1.20
2,250	bbl. cutback asph., Type MC-3	4.25	4.40	4.60	5.00	4.50
380	bbl. 200-300 penetration asph.	5.50	4.40	4.75	5.00	4.50
4.353	mi. mixing oil and aggregate	500.00	600.00	500.00	700.00	$1,000
530	T. cover material	4.00	4.00	4.00	4.00	6.00
1,200	T. base course surf.	.90	.75	.95	.98	1.40

Washington—Various Counties—State—Surf.

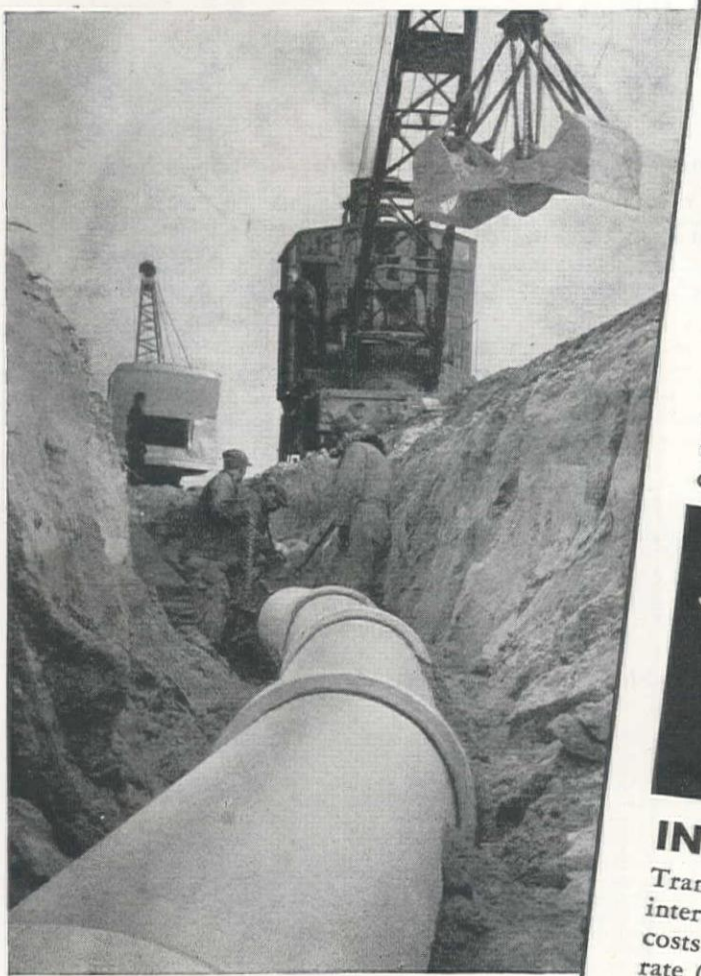
F. R. Hewett Co. was low bidder with $58,628 to the Washington Department of Highways, Olympia, for the resurfacing of 44.9 mi. of the Clayton to Loon Lake highway. The following is a summary of the unit bids:

(1) F. R. Hewett Company $58,628
(2) Standard Asphalt Paving Co., Inc. 59,430
(3) McAtee & Heathe 70,867
(4) J. C. Compton Co. $72,327
(5) Diesel Oil Sales Co. 74,856
(6) Peter Kiewit Sons Co. 92,571

		(1)	(2)	(3)	(4)	(5)	(6)
1,200	cu. yd. shoulder material in place	.85	.75	1.00	.85	.68	1.25
5.9	mi. preparation and finishing roadway	50.00	150.00	100.00	100.00	200.00	260.00
362	tons bituminous cement (MC-2) in place	24.00	21.00	26.00	24.00	26.00	27.00
5.9	miles mixing	300.00	600.00	580.00	650.00	650.00	770.00
4,960	cu. yd. min. aggreg. in place from stockpiles	.75	.63	.70	.85	.65	1.25
500	cu. yd. shoulder material in place	1.00	.75	1.00	1.20	.90	1.25
2.8	miles preparation and finishing roadway	50.00	150.00	100.00	100.00	200.00	260.00
202	tons bituminous cement (MC-2) in place	24.00	21.00	26.00	24.00	27.50	27.00
2.8	miles mixing	300.00	600.00	800.00	700.00	650.00	800.00
2,500	cu. yd. min. aggreg. in place from stockpiles	.75	.63	.75	1.00	.95	1.25
8.6	miles preparation of roadway	50.00	45.00	100.00	50.00	90.00	165.00
41	tons bituminous cement (MC-2) in place	28.00	25.00	32.00	28.00	32.00	35.00
340	cu. yd. min. aggreg. in place from stockpiles	1.50	1.15	1.60	1.40	1.56	1.95
104	tons bituminous cement (RC-5) in place	24.00	25.00	28.00	28.00	30.00	36.50
1,610	cu. yd. min. aggreg. in place from stockpiles	1.00	1.10	1.40	1.40	1.30	1.50
4.5	miles preparation and finishing roadway	50.00	150.00	100.00	100.00	200.00	260.00
275	tons bituminous cement (MC-2) in place	24.00	21.00	26.00	24.00	26.25	26.00
4.5	miles mixing	300.00	600.00	580.00	650.00	600.00	770.00
4,150	cu. yd. min. aggreg. in place from stockpiles	.75	.63	.75	1.10	.72	1.25
51	tons bituminous cement (RC-4) in place	24.00	25.00	28.00	28.00	29.00	35.00
600	cu. yd. min. aggreg. in place from stockpiles	1.00	1.10	1.84	2.00	1.38	2.70
5.0	miles preparation of roadway	50.00	45.00	100.00	100.00	110.00	165.00
25	tons bituminous cement (MC-2) in place	28.00	25.00	32.00	28.00	29.00	35.00

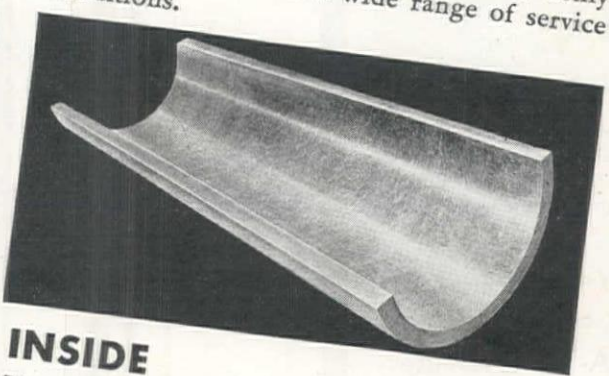
(Continued on next page)

IT RESISTS CORROSION



OUTSIDE

Transite Pipe is stubbornly resistant to soil corrosion. Thousands of successful installations, many of them in highly corrosive soils, testify to its stability under a wide range of service conditions.



INSIDE

Transite Pipe cannot tuberculate. This costly internal corrosion that increases maintenance costs can never choke off its initial high flow rate (C=140). As a result, pumping costs stay low, pressures high.

and ALL THE WAY THROUGH

Transite Pipe resists destructive attack. Made of asbestos and cement bonded together under great pressure, its ability to provide efficient, economical water transportation has been proved in thousands of installations.

EASY HANDLING is an additional advantage of Transite Pipe. Its light weight means more footage carried per truck load, fewer men required for handling, lower transportation costs. And in the trench, the Simplex Coupling assures quick, easy assembly, even with inexperienced crews.

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Johns-Manville TRANSITE PIPE

FOR EFFICIENT, ECONOMICAL WATER TRANSPORTATION

200 cu. yd. min. aggreg. in place from stockpiles	1.50	1.15	1.75	2.30	2.30	3.60
63 tons bituminous cement (RC-5) in place	24.00	25.00	28.00	28.00	30.00	37.00
990 cu. yd. min. aggreg. in place from stockpiles	1.00	1.10	1.55	2.30	2.30	3.10
8.7 miles preparation of roadway	50.00	45.00	100.00	50.00	140.00	165.00
42 tons bituminous cement (MC-2) in place	28.00	25.00	32.00	28.00	30.00	34.00
350 cu. yd. min. aggreg. in place from stockpiles	1.50	1.15	1.37	1.35	1.53	2.00
110 tons bituminous cement (RC-5) in place	24.00	25.00	28.00	28.00	31.00	36.00
1,730 cu. yd. min. aggreg. in place from stockpiles	1.00	1.10	1.17	1.35	1.46	1.50
4.7 miles preparation of roadway	50.00	45.00	100.00	50.00	90.00	175.00
24 tons bituminous cement (MC-2) in place	28.00	25.00	32.00	28.00	31.00	36.50
190 cu. yd. min. aggreg. in place from stockpiles	1.50	1.15	1.37	1.35	1.40	2.10
60 tons bituminous cement (RC-5) in place	24.00	25.00	28.00	28.00	31.00	39.00
940 cu. yd. min. aggreg. in place from stockpiles	1.00	1.10	1.17	1.35	1.40	1.60
1.7 miles preparation of roadway	100.00	45.00	100.00	100.00	180.00	215.00
10 tons bituminous cement (MC-2) in place	30.00	25.00	32.00	30.00	33.00	45.00
70 cu. yd. min. aggreg. in place from stockpiles	2.00	1.15	1.75	2.00	1.80	2.60
22 tons bituminous cement (RC-5) in place	26.00	25.00	28.00	30.00	33.00	47.50
410 cu. yd. min. aggreg. in place from stockpiles	1.50	1.10	1.55	2.00	1.80	2.00

California—Shasta and Lassen Counties—State—Surf.

M. J. Ruddy & Sons, Modesto, Calif., submitted the low bid of $195,169 to the Division of Highways for applying a seal coat to portions of 30.2 mi. of road and repairing other portions with plant mix surfacing. The following is a summary of the unit bids received:

(1) M. J. Ruddy & Sons $195,169
(2) E. B. Bishop 239,194
(3) Frank B. Marks & Sons 246,430
(4) Harms Bros. $269,052
(5) Mercer Fraser Co. 283,184

LOCATION 1	(1)	(2)	(3)	(4)	(5)
175 T. liquid asphalt MC-5 (seal coat)	26.75	27.00	30.00	30.00	40.00
1,700 T. screenings (seal coat)	6.10	5.00	7.00	7.00	6.00
200 T. screenings (stockpile)	5.00	4.00	6.00	6.50	5.00
500 T. mineral aggr. (P.M.S. stockpile)	4.20	4.70	4.45	6.00	5.50
38 T. liquid asph. MC-3 (P.M.S. stockpile)	21.00	23.00	22.00	24.00	27.00
LOCATION 2					
Lump sum, dev. water supply and furn. watering equip.	300.00	900.00	500.00	500.00	$2,000
1,300 M. gals. applying water	2.00	2.00	2.50	4.00	3.00
151,000 sq. yd. cement treated base	.11	.23	.29	.30	.27
9,440 bbls. portland cement (cement treated base)	3.75	4.00	4.05	4.50	4.70
140 T. asph. emulsion (curing seal and paint binder)	31.00	40.00	40.00	60.00	50.00
150 T. liquid asph. MC-5 (seal coat)	26.75	27.00	28.00	30.00	49.00
1,450 T. screenings (seal coat)	6.25	5.00	6.45	6.50	6.00
3,550 T. mineral aggr. (P.M.S. Type A)	3.90	5.30	4.90	5.50	6.00
16,200 T. mineral aggr. (P.M.S. Type B)	4.25	5.30	4.90	5.50	6.00
1,060 T. paving asph. (P.M.S. Types A and B)	20.00	23.00	22.00	21.00	27.00

Montana—Flathead and Lincoln County—State—Surf.

Nilson-Smith Construction Co., Great Falls, Mont., submitted the low bid of $52,135 to the Montana State Highway Commission, Helena, for the maintenance construction of 22.4 mi. of the Kalispell-Libby highway. The unit bids as submitted are as follows:

(1) Nilson-Smith Construction Co. $52,135
(2) Chas. Shannon & Son 58,882
(3) Union Construction Co. 58,960
(4) McLaughlin, Inc. $60,985
(5) Big Horn Construction Co. 61,842
(6) Engineer's Estimate 57,115

	(1)	(2)	(3)	(4)	(5)
500 cu. yd. unclassified excavation	.60	.70	.60	1.00	.35
19,100 cu. yd. selected borrow base crse	.60	.70	.60	.60	.58
2,200 cu. yd. Grade A top course surf.	1.05	1.50	1.20	1.75	1.22
10,000 gals. prime coat oiling (MC-2)	.14	.15	.12	.14	.16
118,000 gals. seal coat oiling (emul. asph.)	.14	.15	.14	.15	.18
1,825 cu. yd. ½-in. stone chips	3.60	4.50	5.00	5.00	5.00
1,750 cu. yd. placing st. furn. stone chips	1.50	2.50	2.50	2.00	2.60
250 M. gal. watering	3.00	1.50	2.00	3.00	3.00
140 hrs. rolling	5.00	5.00	6.00	5.00	6.00
10,000 cu. yd. stock piled Grade A top course	.95	.90	1.20	1.20	.98

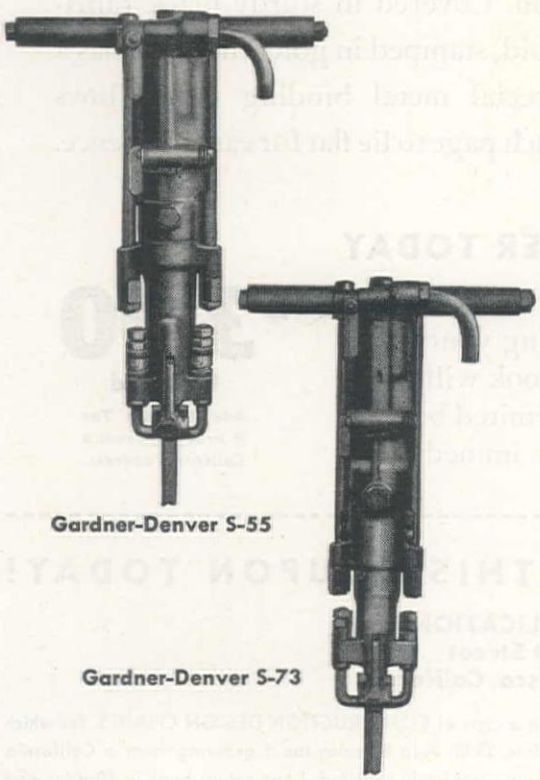
California—Humboldt County—State—Repair

Mercer Fraser Company, Eureka, Calif., submitted the low bid of $170,953 to the Division of Highways for the paving of 7.5 mi. of highway between Loleta and Patricks Point. The following is a summary of the unit bids:

(1) Mercer Fraser Co. $170,953
(2) N. M. Ball Sons $179,668

	(1)	(2)
Lump sum, developing water supply and furn. watering equip.	$1,000	$1,000
LOCATION 1		
850 M. gal. applying water	2.00	2.50
10,300 cu. yd. imported base material (Type A)	2.35	2.40
13,400 cu. yd. imported base material (Type B)	1.90	2.40
50 T. liquid asphalt, MC-2 (Prime Coat)	30.00	30.00
230 cu. yd. sand (Prime Coat)	2.00	6.00
15 T. asphaltic paint binder	50.00	40.00
3,760 T. mineral aggregate (P.M.S.)	4.35	4.65
188 T. paving asphalt (P.M.S.)	22.00	20.00
60 ea. removing and resetting permanent road signs, etc.	3.00	6.00
LOCATION 2		
91 sta. removing existing side forms	3.00	2.00
50 M. gal. applying water	2.00	2.50
1,350 cu. yd. imported base material (Type A)	1.80	2.40
11 T. liquid asphalt, MC-2 (Prime Coat)	30.00	30.00
50 cu. yd. sand (Prime Coat)	2.00	6.00
28 T. asphaltic paint binder	50.00	40.00
3,190 T. mineral aggregate (P.M.S.)	3.70	4.05
160 T. paving asphalt (P.M.S.)	22.00	20.00
57 ea. removing and resetting permanent road signs, etc.	5.00	6.00
LOCATION 3		
161 sta. scarifying and reshaping existing roadbed	15.00	25.00
450 M. gal. applying water	2.00	2.50
12,550 cu. yd. imported base material (Type A)	3.55	3.10
50 T. liquid asphalt, MC-2 (Prime Coat)	35.00	35.00
230 cu. yd. sand (Prime Coat)	3.00	6.00
17 T. asphaltic paint binder	50.00	45.00
4,330 T. mineral aggregate (P.M.S.)	4.35	4.65
217 T. paving asphalt (P.M.S.)	22.00	20.00
66 ea. removing and resetting permanent road signs, etc.	3.00	6.00

CLEAN



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Gardner-Denver S-73

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CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $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 . . .

Warren Northwest, Inc., Portland, Ore., received a $454,824 contract for construction of the South Unit of Steiwer Hill-Albany Section of the Pacific Highway East in Oregon, by State Highway Commission, Salem, Ore.

C. J. Montag & Son, Portland, Ore., have been awarded a $545,923 contract for construction of a concrete bridge over Santiam River and 10 composite type pile trestles on Steiwer Hill-Albany Section of Pacific Highway East in Oregon, by State Highway Commission, Salem, Ore.

Big Horn Construction Co., Sheridan, Wyo., were awarded a $344,419 contract for constructing highway improvements in Sheridan County, Wyo., by State Highway Commission, Cheyenne, Wyo.

Johnson-Everist and **Peter Kiewit Sons' Co.,** San Francisco, Calif., received a $936,031 contract for the construction of taxiways, apron and necessary facilities at Moffett Field, Calif., by Bureau of Yards and Docks, Washington, D. C.

Morrison-Knudsen Co., Inc., Boise, Ida., received a contract estimated at $19,000,000 for construction of hangars, sewers, runways, and other items at Fairfield-Suisun Air Base, Calif., by U. S. Engineer Office, Sacramento, Calif.

Harmon Construction Co., Oklahoma City, Okla., were awarded a $1,032,214 contract for the construction of Bluff Creek filtration plant and pumping station at Oklahoma City, Okla., by City Council, Oklahoma City, Okla.

E. B. Bishop, Orland, Calif., received a $333,803 contract to extend the main canal north of the tunnels on the Deschutes Project in Oregon, by Bureau of Reclamation, Boise, Ida.

M. W. Kellogg Co., Los Angeles, Calif., have been awarded a $5,000,000 contract for the construction of a delayed recycle coking plant at the Torrance, Calif., refinery, by General Petroleum Corp, Torrance, Calif.

C. L. Peck, Los Angeles, Calif., were awarded a $1,500,000 contract for the construction of a reinforced concrete, 3-story and basement department store building at Los Angeles, Calif., by Broadway Department Store, Los Angeles, Calif.

Johnson, Drake and Piper, Inc., Oakland, Calif., received a $1,099,900 contract for the construction of low cost housing at the Naval Ammunition Depot, Hawthorne, Nev., by Bureau of Yards and Docks, Washington, D. C.

E. I. du Pont de Nemours Co., Inc., Wilmington, Del., are constructing a $22,000,000 nylon salt plant at Orange, Tex., for Defense Plant Corporation.

A. F. Mowat Construction Co. and **J. H. Sellen Construction Co.,** Seattle, Wash., have been awarded a $1,147,491 contract for the construction of an experimental flight test hangar at Boeing Field, Seattle, Wash., by U. S. Engineer Office, Seattle, Wash.

Lease and Leigland, Seattle, Wash., have been awarded a $620,750 contract to construct a structural steel and concrete block aviation storehouse and a salvage scrap yard with a spur track leading into the warehouse at Sand Point, Wash., by Bureau of Yards and Docks, Washington, D. C.

Sound Construction and Engineering Co. and **Peter Kiewit,** Seattle, Wash., received a $2,726,970 contract for the construction of additional magazines at the U. S. Naval Magazine,

Bangor, Wash., by Bureau of Yards and Docks, Washington, D. C.

MacDonald Building Co., Tacoma, Wash., were awarded a $1,403,435 contract for two permanent buildings, and additions to two other buildings at the American Lake Veterans' Hospital, near Tacoma, Wash., by Veterans' Administration, Washington, D. C.

Bennett and White Construction Company, Ltd., Vancouver, British Columbia, received a $3,000,000 contract for 600 permanent homes to be erected in British Columbia and released to discharged members of the armed forces, by War Department, Ottawa, Canada.

Ford J. Twaits, Morrison-Knudsen Company, Inc., and **Ben C. Gerwick,** San Francisco, Calif., have a $1,146,254 contract for filling, concrete work, mechanical and electrical services, track work, paving and fender system at the Naval Drydocks, Hunters Point, San Francisco, Calif., by Bureau of Yards and Docks, Washington, D. C.

Johnson-Kiewit-Everist, San Francisco, Calif., received a $4,700,000 contract for six new transit sheds, eight storehouses, steel storage area, roads and railroads at the Naval Supply Depot, Rough and Ready Island, near Stockton, Calif., by Bureau of Yards and Docks, Washington, D. C.

Construction Summary

Highway and Street...

California

ALAMEDA CO.—**A. S. Jones,** Box 3067, Brown's Valley Rd., Napa — $45,188 for about 2.4 mi. repairing with crusher run base and plantmix surf. betw. Mission San Jose and Warm Springs—by State Division of Highways, Sacramento. 5-28

ALAMEDA CO.—**A. S. Jones,** Box 3067, Brown's Valley Rd., Napa — $105,040 for about 6 mi. repairing with crusher run base on portions and with plantmix surf. on existing roadbed and on new crusher run base between Warm Springs and Centerville—by State Division of Highways, Sacramento. 5-31

BUTTE CO.—**E. B. Bishop,** Orland—$26,261 for reinf. conc. cribbing and restoring a portion of the roadbed about 2.5 mi. east of Jarboe Pass—by Division of Highways, Sacramento. 5-16

CONTRA COSTA CO. — **Fredrickson Brothers,** 1259 65th St., Emeryville—$84,640 for about 4.2 mi. repairing with crusher run base and plantmix surf. betw. Brentwood and 4 mi. southeasterly—by State Division of Highways, Sacramento. 5-31

CONTRA COSTA CO.—**A. G. Raisch,** 2048 Market St., San Francisco—$148,000 for paving drum storage areas at naval fueling station, Point Molate—by Bureau of Yards and Docks, Washington, D. C.

HUMBOLDT CO. — **Mercer-Fraser Co.,** 2nd and Commercial Sts., Eureka—$170,953 for about 7.5 mi. repairing by placing plantmix surf. on imported base material and applying seal coat to the plantmix surf. and prime coat on the shoulders between Loleta and Patricks Point—by State Division of Highways, Sacramento. 5-22

IMPERIAL CO.—**Norman I. Fadel,** 7101 Radford Ave., North Hollywood—$115,650 for about 13.4 mi. net length repairing portions of hwy. with imported base material and roadmix surf. between Rte. 26 north of Calexico and Calipatria—by State Division of Highways, Sacramento. 5-22

KERN CO.—**Griffith Co.,** 1060 So. Broadway, Los Angeles—$30,481 for about 2.2 mi. repairing with plantmix surf. betw. 1.2 mi. south and 1.0 mi. north of Famoso—by State Division of Highways, Sacramento. 6-14

KERN CO.—**Arthur A. Johnson,** 421 Pearl St., Laguna Beach—$68,582 for highway improvements betw. Rte. 145, near Rademacher and Inyokern-Trona Rd., about 8.2 mi. in length to be graded and bitum. surf. treatment applied—by State Division of Highways, Sacramento. 5-18

LASSEN AND SHASTA COS. — **M. J. Ruddy and Son,** Box 1122, Modesto—$195,169 for a highway between Fall River Mills and 8.3 mi. east of Bieber, about 30.2 mi. in length, seal coat to be applied and other portion to be repaired with plantmix—by State Division of Highways, Sacramento. 5-18

LOS ANGELES CO. — **Ansco Construction Co.,** 2725 Atlantic Ave., Long Beach—$28,678 for gutters in the San Antonio Heights district, Long Beach — by City Council, Long Beach. 6-1

LOS ANGELES CO. — **Griffith Co.,** 502 Los Angeles Railway Bldg., Los Angeles —$44,032 for the construction of improvements along Washington Blvd., a distance of approx. 4,900 lin. ft.—by Los Angeles County Board of Supervisors, Los Angeles. 6-4

LOS ANGELES CO.—**Vido Kovacevich,** 5300 Imperial Highway, South Gate—$65,628 for the construction of improvements along Cerritos Ave., and Clard Ave., in the

vicinity of Bellflower — by Los Angeles County Board of Supervisors. 5-18

LOS ANGELES CO.—**Malcolm Paving Co.,** 14,145 Oxnard St., Van Nuys—$11,775 for asphaltic concrete yard surf. at the Mt. Vernon Jr. High School, Los Angeles—by Los Angeles Board of Education. 5-18

MARIN CO.—**Fredrickson Brothers,** 1259 65th St., Emeryville—$97,440 for grading and drainage at California Point Housing Project — by U. S. Engineer Office, San Francisco. 6-5

MARIN CO.—**A. J. Raisch,** 900 W. San Carlos, San Jose—$41,768 for highway improvements at the entrance to Hamilton Field, about 0.3 mi. in length, to be graded and surf. with Portland cement conc.—by State Division of Highways, Sacramento. 5-18

MENDOCINO CO.—**A. R. McEwen,** Box 1017, Sacramento—$42,337 for net length of 2.9 mi. of imported base and armor coat betw. Longvale and Laytonville—by State Division of Highways, Sacramento. 6-7

MONTEREY CO.—**Granite Construction Co.,** Box 900, Watsonville—$12,799 for 1.6 mi. net distance repairing portions of highway with plantmix surfacing between two miles east of Monterey and El Toro Creek —by State Division of Highways, Sacramento. 5-22

NEVADA CO.—**Harms Bros.,** Rte. 4, Box 2220, Sacramento—$46,035 for 3.4 mi. of plantmix surf. and stockpiling crusher run base and plantmix material betw. Truckee and Farad—by State Division of Highways, Sacramento. 6-7

RIVERSIDE CO.— **Arthur A. Johnson,** 421 Pearl St., Laguna Beach—$109,581 for highway improvements on State Hwy. Rte. 146, with imported base material and road-mix surfacing—by State Division of Highways, Sacramento. 6-8

SACRAMENTO CO.—**Sheldon Oil Co.,** Main St., Suisun—$41,733 for about 8.5 mi. net length repairing portions of highway with plantmix surfacing, between Isleton and Sacramento — by State Division of Highways, Sacramento. 6-5

SACRAMENTO and YOLO COS.—**A. Teichert & Co.,** Box 1113, Sacramento—$81,635 for net length of 4.8 mi. of plantmix repair east of North Sacramento and east of Davis—by State Division of Highways, Sacramento. 6-7

SAN BERNARDINO CO.—**George Herz and Co.,** San Bernardino—$33,943 for about 3.1 mi. grading and surf. with plantmix on imported base material roads within grounds of Calif. Institution for Men at Chino — by State Division of Highways, Sacramento. 5-29

SAN FRANCISCO CO. — **Pacific Pavements Co., Ltd.,** 85 Barstow, San Francisco—$34,103 for repair of streets or sidewalk openings where paving has been removed for the water dept. — by Public Utilities Commission, San Francisco. 6-16

SAN JOAQUIN CO.—**George French, Jr.,** Box 307, Stockton—$73,960 for paving at the Lathrop Holding and Reconsignment Point—by U. S. Engineer Office, Sacramento. 6-15

SAN LUIS OBISPO CO.—**Brown, Doko & Baun,** Dolliver St., Pismo Beach—$21,840 for highway improvements between 0.8 mi. west of Pennington Creek and junction Rte. 125, portions only, about 2.9 mi. in length to be repaired by placing plantmix surf. over existing pave. and borders—by State Division of Highways, Sacramento. 5-18

SAN MATEO CO.—**R. G. Clifford,** Box 168, South San Francisco—$10,774 for construction of sidewalks on Hudson and Clinton Sts., Redwood City—by City Council, Redwod City. 5-23

SISKIYOU CO.—**W. C. Thompson,** 2801 3rd St., San Francisco—$19,187 for 14.8 mi. of sealcoat betw. 4 mi. north of Weed and Oregon line—by State Division of Highways, Sacramento. 6-7

SOLANO CO.—**A. G. Raisch,** 2048 Market St., San Francisco — $12,054 for improvement of Georgia St., Vallejo, from Santa Clara St. to Mare Island channel—by City Council, Vallejo. 5-28

SOLANO CO. — **Parish Brothers,** Box 1019, Benicia—$19,469 for resurf. artillery yard at Benicia Arsenal—by U. S. Engineer Office, San Francisco. 5-21

SONOMA CO.—**Louis Biasotti and Son,** 40 W. Clay St., Stockton—$81,585 for about 3 mi. net length repairing portions of highway by reshaping existing surfacing and base, constructing crusher run base and placing plantmix surf. bet. Beltane and Agua Caliente—by State Division of Highways, Sacramento. 6-7

SUTTER and YUBA COS. — **Lester L. Rice,** 605 14th St., Marysville—$94,690 for about 12.3 mi. net length of plantmix repairing on existing roadbed on four different locations—by State Division of Highways, Sacramento. 6-7

TULARE CO.—**Brown, Doko & Baun,**

Dolliver St., Pismo Beach — $21,115 for highway improvements betw. 6.5 mi. and 9.5 mi. north of Goshen, to be repaired by placing plantmix surf. and applying sealcoat thereto—by State Division of Highways, Sacramento. 5-18

VENTURA CO.—**Oswald Brothers,** 266 E. 58th St., Los Angeles—$35,400 for about 2.1 mi. net length repairing portions of highway with plantmix material between the City of Ventura and Ojai—by State Division of Highways, Sacramento. 6-4

YOLO CO.—**N. M. Ball Sons,** Box 430, Berkeley—$117,926 for plantmix surf. on 8.1 mi. of existing road in three locations, all repair work—by State Division of Highways, Sacramento. 6-7

YOLO CO.—**Ross A. Westbrook,** 1331 C St., Sacramento—$28,890 for 9.4 mi. of repairing with gravel base and penetration oil betw. Madison and Dunnigan — by State Division of Highways, Sacramento. 6-7

Colorado

EL PASO CO.—**Brown Construction Co.,** 1530 E. Abriendo, Pueblo—$167,803 for 4.1 mi. of gravel surf. betw. Colorado Springs and Penrose on State Hwy. No. 115—by State Highway Dept., Denver. 5-11

Idaho

ADA AND PAYETTE COS.—**Tony Marrazzo,** Box 876, Boise—$29,500 for stockpiling of gravel adjacent to state highways —by Commissioner of Public Works, Boise. 5-19

ADAMS AND IDAHO COS. — **A. D. Stanley,** Boise — $16,435 for sealcoating county roads—by Commissioner of Public Works, Boise. 6-5

CANYON AND PAYETTE COS.—**J. C. Compton,** McMinnville, Ore.—$62,037 for a sealcoating project on county roads — by Commissioner of Public Works, Boise. 6-5

CLARK AND JEFFERSON COS.—**Western Construction Co.,** Pocatello—$12,400 for crushed gravel stockpiling adjacent to U. S. Hwy. No. 95—by Commissioner of Public Works, Boise. 5-18

GEM AND PAYETTE COS.—**Triangle Construction Co.,** Boise—$11,930 for sealcoating county roads—by Commissioner of Public Works, Boise. 6-5

IDAHO CO.—**F. H. Deatley,** Lewiston—$27,121 for resurf. with crushed rock, Harpster Hill section, 4.6 mi. of State Rt. No. 13 and stockpiling material near Fenn on U. S. Highway No. 95 — by Commissioner of Public Works, Boise. 5-18

LEMHI CO. — **Duffy Reed Construction Co.,** Twin Falls—$30,136 for sealing 9.4 mi. of state road No. 28, between Salmon and Baker and 25.3 mi., including 2 mi. of bitum. resurf. of U. S. Hwy. 93 between Salmon and McKim Creek—by Commissioner of Public Works, Boise. 5-24

Kansas

CHEYENNE CO.—**D. G. Hansen,** Logan —$14,443 for applying 16.1 mi. of bitum. sealing on state roads—by State Highway Commission, Topeka. 6-6

DECATUR CO.—**D. G. Hansen,** Logan—$10,308 for applying bitum. sealing to 12.9 mi. of state highways—by State Highway Commission, Topeka. 6-6

DECATUR CO.—**Broce Construction Co.,** Dodge City, Kansas—$53,735 for 12.7 mi. of bitum. mat surf. on state highways—by State Highway Commission, Topeka. 6-6

GRAHAM CO.—**D. G. Hansen,** Logan—$13,592 for 17.1 mi. of bitum. sealing to state highways—by State Highway Commission, Topeka. 6-6

NORTON CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha, Neb.—$15,651 for applying bitum. sealing to 15.7 mi. of state roads—by State Highway Commission, Topeka. 6-6

PHILLIPS CO.—**D. G. Hansen,** Logan—$11,466 for bitum. sealcoating on 13.3 mi. of state roads—by State Highway Commission, Topeka. 6-6

PHILLIPS CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha, Neb.—$19,050 for applying 19.1 mi. of bitum. sealing to state roadways — by State Highway Commission, Topeka. 6-6

ROOKS CO.—**D. G. Hansen,** Logan—$18,380 to apply bitum. seal coating on 21.5 mi. of state roads—by State Highway Commission, Topeka. 6-6

SHERIDAN CO.—**D. G. Hansen,** Logan —$11,996 for applying bitum. sealing to 15 mi. of state highways—by State Highway Commission, Topeka. 6-6

THOMAS CO. — **San-Ore Construction Co.,** McPherson—$14,180 for 19.7 mi. bitum. sealing on state highways—by State Highway Commission, Topeka. 6-6

WALLACE CO.—**D. G. Hansen,** Logan—$16,769 for applying 5.0 mi. bitum. mat surf. to state roads—by State Highway Commission, Topeka. 6-6

WALLACE CO.—**D. G. Hansen,** Logan—$10,469 for applying bitum. sealing to 13.5

FACTORY AND GENERAL OFFICES
LOS ANGELES, CALIF. BRANCHES:
SAN FRANCISCO HOUSTON PORTLAND

mi. of state roads—by State Highway Commission, Topeka. 6-6

Montana

FLATHEAD AND LINCOLN COS.—**Nilson-Smith Construction Co.**, Box 1147, Great Falls—$52,135 for highway improvements—by State Highway Commission, Helena. 6-7

GLACIER CO.—**S. Birch & Sons Construction Co.**, 314 Ford Bldg., Great Falls—$23,280 for highway improvements—by State Highway Commission, Helena. 6-7

VARIOUS COS.—**Nolan Bros.**, Minneapolis, Minn.—$69,654 for improvements to highways in five Montana counties—by State Highway Commission, Helena. 6-7

Nevada

CHURCHILL AND MINERAL COS.—**Silver State Construction Co.**, Fallon—$19,250 for 31.7 mi. access road from the Nev. Scheelite Mill to U. S. Rte. No. 50 near Frenchman's Station—by State Department of Highways, Carson City. 5-29

ESMERALDA, MINERAL AND NYE COS.—**Dodge Construction Co., Inc.**, Fallon—$57,112 for 70.8 mi. resurf. from Calif.-Nev. state line 4 mi. west of Millers and from 2 mi. south of Beatty to ¾ mi. north of Springdale—by State Department of Highways, Carson City. 5-29

New Mexico

McKINLEY CO.—**J. E. Skousen**, Gallup—$322,458 for grading, minor drainage struct., 3 multiple span conc. box culverts, leveling course, black top surf. and misc. construction on state highways—by State Highway Dept., Santa Fe. 5-22

Oregon

COLUMBIA CO.—**C. T. Malcolm**, 2336 N. E. 30th St., Portland—$24,743 for an inspection pit, road, earth barricade and set-out track at the Beaver Ammunition terminal near Clatskanie—by U. S. Engineer Office, Portland. 6-4

COOS CO.—**Oscar E. Joelson**, Eugene—$23,974 for supplying approx. 10,000 cu. yds. of crushed rock or crushed gravel in stock piles for the Hoffman Bridge Rock Production Project on the Coos Bay-Roseburg and Rowers highways—by Oregon State Highway Commission, Portland. 5-15

COOS & CURRY COS.—**John A. Logan**, Portland—$32,982 for 0.4 mi. of grade widening to Myrtle Point-Elbow Point and Cape Sebastian Sections of the Coos Bay-Roseburg and Oregon Coast Hwys.—by State Highway Commission, Portland. 5-15

DESCHUTES CO.—**T. W. Thomas**, Portland—$19,810 to supply approx. 10,000 cu. yd. crushed gravel in stock piles at Youngs Raneh-Brothers Rock Production project on the Central Ore. Hwy.—by State Hwy. Commission, Portland. 5-29

JOSEPHINE CO.—**McNutt Brothers**, 351½ E. Broadway, Eugene—$601,501 for 4.4 mi. grading and bitum.-macadam surf., two concrete bridges and four concrete box culverts, two timber bridges, and also furnishing crushed gravel in stock piles on the Coyote Creek-Grave Creek Section of the Pacific Highway—by State Highway Commission, Portland. 5-15

KLAMATH CO.—**Babler Brothers**, Portland—$70,694 for 5 mi. grading, 4.4 mi. of surf. and 0.5 mi. of oiling on Crater Lake-Fort Klamath Timber Access Road Project, on Forest Service and county roads.

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COSTS ARE OFTEN CUT 50%, WITH THE SEAMAN

If the material on your present highway shoulders is suitable for soil-cement, bituminous or other types of stabilization, — use the SEAMAN to mix the binder directly in-place. For example, — in bituminous shoulder construction, instead of trenching-out the existing soil, replacing with new aggregate and mixing it with binder, — an excellent 2-inch mat can be constructed by shooting the existing shoulder material with approximately 40% of the total oil, following immediately with the SEAMAN to mix it in. Surprisingly few passes will be needed as additional oil is added to bring the mix up to specifications; — in fact, generally, — the amount of oil saved by this method is a substantial factor, — and handling, haulage and equipment costs thus eliminated will show a gratifying profit. Total equipment required: One rubber-tired tractor; one SEAMAN MIXER and one compaction roller.

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Less mixing time, — fewer passes to attain specified standards, less labor and a superior mix . . . Those are the elements that mean savings so substantial that the original investment in your SEAMAN MIXER is often repaid within a few weeks of the time it starts to work. And just as one benefit of many — in a bituminous mix, — there's nothing like the SEAMAN to eliminate troublesome rich and lean spots and to put fines in position, for the "carry" from one area to another of completely mixed materials within the hood of the machine, — produces an immediate, unvarying average and a stronger test.

SEAMAN MOTORS

Milwaukee 3, Wisconsin

C-109

and on two state highways—by State Highway Commission, Portland. 5-29

LINN CO.—**Warren Northwest, Inc.,** Box 5072, Portland—$454,824 for construction of the South Unit of Steiwer Hill-Albany Section of the Pacific Highway East, incl. 6 mi. of grading and paving, concrete box culverts—by State Highway Commission, Portland. 5-29

LINN AND MARION COS.—**R. A. Heintz Construction Co.,** 8101 N. E. Union, Portland — $372,873 for clearing, grading and culverts on both the north and south units of the 9.9 mi. of highway of the Steiwer Hill-Albany section of the Pacific Highway East—by State Highway Commission, Portland. 6-15

MARION CO.—**Warren Northwest, Inc.,** Box 5072, Portland—$322,900 for the North Unit of the Steiwer Hill-Albany Section of the Pacific Highway East to include 4 mi. grading and paving, conc. box culverts—by State Highway Commission, Portland. 5-29

YAMHILL CO.—**J. C. Compton Co.,** McMinnville—$44,902 for paving 33 blocks of the city streets at McMinnville—by City Council, McMinnville. 6-2

Texas

ANDREWS CO.—**Ernest Loyd,** 3901 Stadium St., Fort Worth—$216,343 for 14.7 mi. of grading, culverts, flexible base and asph. surf. treatment on F. M. Hwy. 27—by State Highway Dept., Austin. 5-24

BEXAR CO.—**Dean Word,** Box 330, New Braumfels—$159,417 for reconstruction of roads and sidewalks at Brooke Convalescent Hospital—by U. S. Engineer Office, San Antonio. 5-22

BROWN CO.—**Thomas and Ratliff,** Rogers—$17,085 for 11.8 mi. of widening base and asph. conc. pave. on U. S. Hwys. 67, 84, and 283—by State Highway Dept., Austin. 5-17

CAMERON AND HIDALGO COS.—**Tulsa Rig & Reel Mfg. Co.** and **Drake Construction Co.,** Muskogee, Okla. — $120,132 for 14.3 mi. of reconstructing and widening flexible base and asph. conc. pave. on U. S. 281—by State Hwy. Dept., Austin. 5-17

CAMERON, HIDALGO & WILLACY COS.—**E. B. Darby & Co.,** Pharr—$233,302 for widening 33.5 mi. of conc. pave.—by State Hwy. Dept., Austin. 5-17

CORYELL CO.—**Ned B. Hoffman,** Mid-Continent Bldg., Fort Worth—$35,984 for 24.1 mi. of single asph. surf. treatment, from Copperas Cove to U. S. 84—by State Highway Dept., Austin. 5-17

DALLAS CO.—**Uvalde Construction Co.,** 2400 Uvalde St., Dallas — $13,785 for approx. 15 mi. asph. surf. on streets in all sections of Dallas—by City Council, Dallas. 5-24

EASTLAND CO. — **A. L. Bucy Co.,** Brownwood — $63,420 for widening base and asph. conc. pave. on 9.8 mi. of U. S. Hwys. 80 and 283 — by State Highway Dept., Austin. 5-17

HUNT CO. — **Ned Hoffman,** Mid-Continent Bldg., Fort Worth—$35,984 for 9.0 mi. of asph. conc. pave. on county roads—by State Highway Dept., Austin. 5-17

MEDINA CO.—**Colglazier and Hoff,** 326 Seguin Rd., San Antonio—$59,778 for 8.4 mi. of grading and structures on Highway 173—by State Highway Dept., Austin. 5-24

NUECES CO.—**Holland Page,** Box 1181, Austin—$33,887 for 14.8 mi. of cold mix blended rock asph. pave. from Corpus Christi to Nueces River at Calallen on Hwy. No. 9 — by State Highway Dept., Austin. 5-17

STEPHENS CO.—**Gaylord Construction Co.,** Box 6157, Houston—$73,165 for 19.4 mi. of asph. conc. pave. on U. S. 180 and State 67—by State Highway Dept., Austin. 5-17

TARRANT CO. — **Texas Bitulithic Co.,** Box 5297, Dallas — $161,249 for 14.5 mi. asph. conc. pave. from Virginia St. in Fort Worth to Dallas County Line—by State Highway Dept., Austin. 5-17

Washington

ASOTIN CO.—**R. B. Johnson,** Lewiston, Ida.—$27,829 for surf. and stockpiling on Primary State Highway No. 3—by Director of Highways, Olympia. 6-8

ASOTIN CO.—**Nyberg Construction Co.,** Yardley—$24,708 for stockpiling matl. for county road surf.—by County Commissioners, Asotin. 6-8

CLALLAM CO.—**Peter Kiewit and Sons Co.,** 1403 W. 45th St., Seattle—$70,104 for grading, surf. light bitum. surf. treatment, and other work on a portion of Secondary State Hwy. No. 9-B and Quaillayute Naval Air Station Access Road—by Director of Highways, Olympia. 5-18

CLARK CO. — **L. Romano Engineering Corp.,** Arctic Bldg., Seattle — $88,852 for ballasting, surf. and stockpiling on 5.3 mi. of secondary state highway No. 1-S, Chelatchie to Fargher Lake—by Director of Highways, Olympia. 5-28

KING CO. — **N. Fiorito, Inc.,** 844 W. 48th St., Seattle—$24,011 for paving work

Construction Plant and Equipment From Shasta Dam, California

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CABLEWAYS AND HOISTS

3—Lidgerwood, 3-drum electric hoists with 500 H.P. G.E. Motors. Ward Leonard control, complete with controls and all electric equipment.

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1—American pillar crane. Cap. 5 T. at 48½ ft. and 15 T. at 25 ft. radius.

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1—1790 ft. pcs. of 3" dia. locked coil cable, new.

12,000 lin. ft. of used 3" dia. locked coil cable in length from 500 to 2600 lin. ft.

Misc. lot of sheaves, jewels, blocks, etc.

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1—Dual #265 Fuller Fluxo cement pump, duplex type complete with gravity feed and automatic control equipment. 400 bbls. per hr. capacity. Pumping distance 3300 ft.

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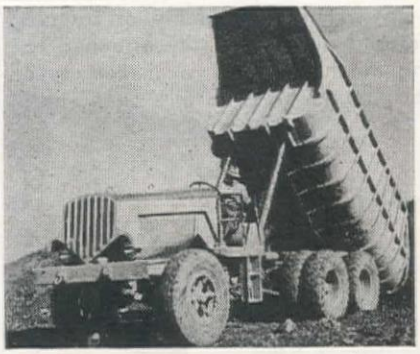
66—Motor operated gates for sand and gravel up to 6" cobble with 1-h.p. Allis-Chalmers gear motor.

2—Complete sets, including 42" tandem drive pulleys, 42" head pulleys, 36" tail pulleys.

3—150 h.p. Westinghouse gear motors, 144 r.p.m., 2300 volts, 3-phase, 60 cycle.



16—White Dump Trucks Model 1580-691, 24 cu. yd. capacity in good condition.

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2—Mod. 315 I-R portable compressors, gas driven.

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10—8 cu. yd. steel hoppers including gates and air rams.

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2—Wallace & Tiernan Chlorinators.

1—9500 bbl. all welded water tank, 48' dia., 30' high.

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1—200 bbl. steel water tank.

10—Sandblast tanks 24" x 96" with hoppers and fittings.

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3—Bingham type SVD submersible pumps.

1—Byron-Jackson 150 h.p. 10 in. deepwell.

2—Byron Jackson 200 h.p., 5 K-H type 8Q1 deep well turbine pumps.

1—Gardner-Denver grout pump model FD-FS, 10" x 2½" x 10", with case-hardened liners and Calmex pistons and rods, 1,000 lb. pressure at 90 lb. air.

10—I-R #25 Sump Pumps.

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1—3000 cy. bin with 5 compartments for aggregates, 2 compartments cement, incl. turnhead, gates.

1—Complete set C. S. Johnson fully automatic batching equipment for 5 aggregates, cement and water for 4 cy. batchers.

5—4 cy. Koehring Concentric zone mixers, incl. batchmeters, timers, consistency meters.

1—100-ton steel bin.

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1—30" x 7' Bodinson reciprocating feeder.

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New and used rubber hose ¾" to 4".

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on Island Dr., Seattle—by Board of Public Works, Seattle. 6-1

KING CO.—**Washington Asphalt Co.,** 309 W. 39th St., Seattle—$30,903 for the construction of paving and storm drainage system around vehicle processing shop at Seattle Port of Embarkation—by U. S. Engineer Office, Seattle. 5-31

KITSAP CO.—**N. Fiorito, Inc.,** 844 W. 48th St., Seattle—$177,451 for grading, draining, surfacing and oiling on 7.4 mi. of county roads and Bangor Naval Installation Access Road—by Director of Highways, Olympia. 5-18

KITSAP AND PIERCE COS. — **L. J. Birbeck,** Bremerton—$40,070 for manufacturing and stockpiling crushed stone surfacing and mineral aggregates on Primary State Highways Nos. 14 and 21 and Secondary State Highways Nos. 21-A and 21-B, Port Orchard to Gig Harbor — by State Director of Highways, Olympia. 6-8

KLICKITAT CO.—**C. E. O'Neal,** Ellensburg—$31,644 for grading and reinforced concrete and steel girder bridge on about 0.5 mi. of Primary State Highway No. 8, in the vicinity of Rock Creek—by State Director of Highways, Olympia. 6-8

MASON CO.—**L. Coluccio,** 512 21st Ave., So., Seattle—$55,209 for manufacturing and stockpiling crushed stone surfacing and mineral aggregate on primary state hwys. Nos. 9, 14, and 21—by State Director of Highways, Olympia. 5-28

SKAGIT CO.—**MacRae Brothers,** 2733 4th Ave. So., Seattle—$41,588 for construction of a reinforced girder bridge and grading and surfacing bridge approaches on secondary state highway east of Concrete—by State Director of Highways, Olympia. 5-23

WHITMAN CO.—**Harold T. Mast,** Colfax—$22,500 for the construction of a road to the top of Steptoe Butte, at Steptoe—by Director of State Parks, Olympia. 5-22

Wyoming

NATRONA CO. — **Taggart Construction Co.,** Cody—$24,916 for stone chip, seal coat and misc. work on 16.2 mi. of the Casper-Shoshone Rd. and crushing and stockpiling stone chips for maintenance purposes near Casper — by State Highway Commission, Cheyenne. 5-29

SHERIDAN CO. — **Big Horn Construction Co.,** Sheridan—$344,419 for highway improvements in the county — by State Highway Commission, Cheyenne. 5-31

Bridge . . .

Oregon

COOS CO.—**Watson & Morris,** 4317 Dunsmuir Ave., Oakland, Calif. — $27,500 to clean and paint all steel above the tops of the sidewalks on Coos Bay Bridge, located on the Ore. Coast Hwy. at North Bend—by State Highway Commission, Portland. 5-15

LINCOLN CO.—**Watson & Morris,** 4317 Dunsmuir Ave., Oakland, Calif.—$22,500 to paint Yaquina Bay Bridge on the Oregon Coast Highway at Newport — by State Highway Commission, Portland. 5-15

LINN CO. — **Lindstrom Brothers,** Portland—$64,160 for construction of a 395-lin. ft. concrete bridge over Southern Pacific Railroad at Jefferson Junction overcrossing on Pacific Highway East—by State Highway Commission, Portland. 5-29

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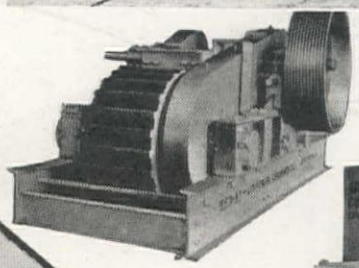
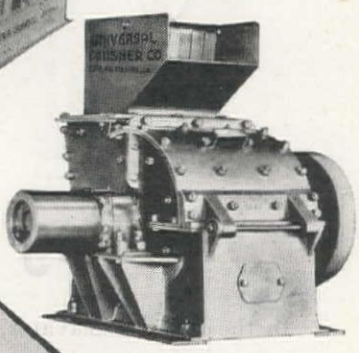
Will serve Californians with the "old reliable" UNIVERSAL LINE

The Universal line of overhead eccentric jaw crushers, roll crushers, pulverizers, screens, bins, conveyors, and complete stationary and portable rock and gravel crushing plants has been well known and widely used all over the state for forty years.





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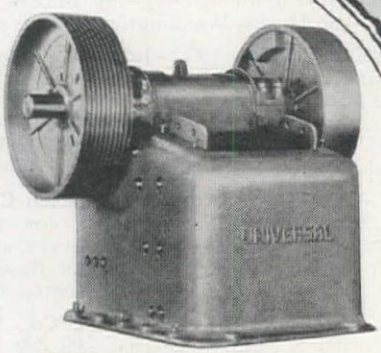

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LINN & MARION COS.—**C. J. Montag & Son,** 201 Couch Bldg., Portland—$545,923 for construction of a 810-ft. conc. bridge over Santiam River and 10 composite type pile trestles on Steiwer Hill-Albany section of Pacific Highway East—by State Highway Commission, Portland. 5-29

Airport . . .

Arizona

MARICOPA CO.—**Arizona Sand & Rock Co.,** Box 1522, Phoenix—$101,415 for seal coating and patching landing mat at Luke Field, Phoenix—by U. S. Engineer Office, Los Angeles, Calif. 5-18

California

LOS ANGELES CO.—**Guerin Brothers,** 208 So. Linden Ave., So. San Francisco—$400,747 for the construction of runway and taxiways at the Santa Monica Municipal Airport, Santa Monica—by U. S. Engineer Office, Los Angeles. 5-17

LOS ANGELES CO.—**T. M. Page,** 1556 Pueblo Dr., Glendale—$125,000 approx., for runways, parking strips, and grading and drainage work in connection with the establishment of a civilian airport at San Fernando—by Marvin E. Whiteman, San Fernando. 6-14

SAN DIEGO CO.—**C. D. Draucker,** 2700 San Fernando Rd., Los Angeles—$58,981 for the installation of permanent field lighting at Brown Field, Otay—by Bureau of Yards and Docks, Washington, D. C. 6-1

SANTA CLARA CO.—**Johnson & Everist** and **Peter Kiewit Sons' Co.,** 202 Atlas Bldg., San Francisco—$936,031 for taxiways, apron and necessary facils. at Moffett Field—by Bureau of Yards and Docks, Washington, D. C. 6-7

SOLANO CO.—**Morrison-Knudsen Co., Inc.,** Boise, Ida.—$19,000,000 (est.) for construction of hangars, sewers, runways, and other items at Fairfield-Suisun Air Base—by U. S. Engineer Office, Sacramento. 6-7

SONOMA CO.—**Union Paving Co.,** 310 California St., San Francisco—$86,290 for a safety landing strip at Santa Rosa Auxiliary Air Station—by Bureau of Yards and Docks, Washington, D. C. 6-12

Water Supply . . .

California

SACRAMENTO CO.—**Western Well Drilling Co.,** 522 W. Santa Clara St., San Jose—$9,960 for well drilling at Sacramento signal depot—by U. S. Engineer Office, Sacramento. 6-7

SAN DIEGO CO.—**American Pipe and Construction Co.,** 4635 Firestone Blvd., Los Angeles—$35,115 for the construction of the Point Loma water main and appurtenances at San Diego—by City Council, San Diego. 5-21

SAN DIEGO CO.—**Walter Barber,** Box 1523, San Diego—$6,087 for construction work on the Point Loma water main and appurtenances at San Diego—by City Council, San Diego. 5-21

SANTA BARBARA CO.—**Wonderly Construction Co.,** 2694 Lime Ave., Long Beach—$44,264 for the construction of additional water supply facilities at Hoff General Hos-

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pital, Santa Barbara—by U. S. Engineer Office, Los Angeles. 6-6

Oklahoma

OKLAHOMA CO. — **Harmon Construction Co.,** Box 1414, Oklahoma City—$1,032,214 for the construction of Bluff Creek filtration plant and pumping station at Oklahoma City—by City Council, Oklahoma City. 5-17

Oregon

JACKSON CO.—**Adler Construction Co.,** 3416 W. Smith, Seattle, Wash.—$140,800 for a concr. reservoir on Capital Hill, Medford, to have a capacity of 8,200,000 gals.—by City Council, Medford. 6-15

LINN CO.—**Den Herder,** Lebanon—$36,120 for construction of improvements to the water mains in Lebanon — by Mountain States Power Co., Lebanon. 6-1

Texas

BELL CO. — **Taylor Construction Co.,** Taylor — $12,880 for rehabilitation of raw water pump station at Killeen—by U. S. Engineer Office, San Antonio. 5-17

Utah

SALT LAKE CO. — **Young and Smith Construction Co.,** Beason Bldg., Salt Lake City—$10,733 for extension of water mains in the vicinity of 4th Ave. and Sigsbee Ave., Salt Lake City—by City Council, Salt Lake City. 5-31

SALT LAKE CO. — **Barney Todd,** Salt Lake City—$10,305 for the replacement of water lines on the west side of the county from Taylorsville, Bennion and West Jordan—by West Side Water System. 5-24

Sewerage . . .

California

LOS ANGELES CO.—**Ansco Construction Co.,** 2725 Atlantic Ave., Long Beach—$26,678 for gutters in the San Antonio Heights Distr. in Tracts 12854 and 12921, Long Beach—by City Council, Long Beach. 6-4

LOS ANGELES CO.—**Bebek & Brkich,** 238 W. Florence Ave., Los Angeles—$142,347 for the construction of 5.8 mi. of sanitary sewers and appurtenances in Gibson Ave., and other streets in the vicinity of Compton — by County Board of Supervisors, Los Angeles. 6-4

LOS ANGELES CO. — **Frank Chutuk,** 1242 So. Bonnie Beach Pl., Los Angeles—$2,247 for sanitary sewers and resurfacing in Vineland Ave., Los Angeles—by City Board of Public Works, Los Angeles. 6-1

LOS ANGELES CO. — **Oberg & Cook,** 2106 W. 93rd St., Los Angeles—$5,104 for the construction of a central outfall sewer ventilation station at the south screening plant at Hyperion—by City Council, Los Angeles. 6-15

LOS ANGELES CO.—**Sanitary Construction & Engineering Co.,** 439 W. 20th St., Long Beach—$7,888 for reconstruction of a trunk sewer in Eucalyptus Ave., Long Beach—by City Council, Long Beach. 6-8

LOS ANGELES CO.—**V. C. K. Construction Co.,** 629 So. Atlantic Blvd., Los Angeles—$31,998 for sanitary sewers and appurtenances, and rock and oil resurf. in Dacana Rd. and Murietta Ave., Los Angeles — by Board of Public Works. Los Angeles. 5-24

SAN BERNARDINO CO. — **Edward Green,** 3001 Coolidge Ave., Los Angeles—$21,648 for construction and installation of sewers at Needles — by Federal Public Housing Authority, San Francisco. 6-15

SAN FRANCISCO CO. — **Cement Gun Construction Co.,** 24 California St., San Francisco—$48,208 for repair of brick sewers in Army St. from Valencia to Kansas Sts., and in Kansas St., from Army to Marin Sts. — by Department of Public Works, San Francisco. 5-14

SAN FRANCISCO CO.—**Eaton & Smith,** 715 Ocean Ave., San Francisco—$100,000 for construction of the Upper Army St. sewer system, in 27th, Guerrero and Army Sts., from Church St. to San Jose Ave., San Francisco—by Dept. of Public Works, San Francisco. 5-7

SAN FRANCISCO CO.—**Healy-Tibbitts Construction Co.,** 1100 Evans Ave., San Francisco—$79,283 for La Playa sewer in Great Highway betw. Lincoln Way and Lawton St.—by Dept. of Public Works, San Francisco. 6-7

SAN JOAQUIN CO. — **Stockton Construction Co.,** 40 W. Clay St., Stockton—$36,693 for extension of storm sewers in Fremont Channel, Miner's Channel and McLeod Lake, from El Dorado St. to the new easterly harbor line of McLeod Lake —by City Council, Stockton. 5-31

SAN JOAQUIN CO.—**P. & S. Construction Co.,** 410 No. Tenth St., San Jose—$14,880 for the construction of sanitary sewer in Hazelton Ave. from Pilgrim St. to Wilson Way and a sewer in Maine St. to the Richmond-Chase cannery at Stockton—by City Council, Stockton. 5-31

SAN MATEO CO. — **L. C. Smith,** First and Railroad Sts., San Mateo—$52,335 for the construction of sewers, curbs, gutters, etc., in San Mateo Terrace, San Mateo—by City Council, San Mateo. 6-1

SAN MATEO CO.—**Union Paving Co.,** 212 Babcock Bldg., San Francisco—$28,986 for storm and sanitary sewers, curbs, gutters, etc., in College Park, San Mateo—by City Council, San Mateo. 6-1

Texas

DALLAS CO.—**E. H. Reeder Construction Co.,** 4013 Glendora, Dallas — $32,138 for constructing a storm sewer to serve Leland, Pine and Marburg Sts., Dallas—by City Council, Dallas. 6-14

DALLAS CO.—**Ben Sira & Co.,** 3901 Elm St., Dallas—$25,233 for sanitary mains between Hollywod St. and Hampton Rd., south of Tate St., along Hampton Rd. and Sharon St. to Ravina Dr. and along Ravina Dr. to alley north of Sharon St., Dallas—by City Council, Dallas. 5-15

SHERMAN CO.—**R. H. Fulton and Co.,** Lubbock—$76,253 for the construction of a sewer system and disposal plant at Stratford—by City Council, Stratford. 6-8

Washington

KING CO.—**Thorburn and Logozo,** 4608 36th St. S. W., Seattle—$17,628 for the construction of a sewer in 5th Ave. So., Seattle — by Board of Public Works, Seattle. 6-1

Waterway . . .

California

LOS ANGELES CO. — **Ansco Construction Co.,** 2715 Atlantic Blvd., Long Beach —$39,700 for improvements to drum stock

piling area and dock at the Naval Fuel Annex, San Pedro—by Bureau of Yards and Docks, Washington, D. C. 6-4

SAN DIEGO CO. — **Franks Contracting Co.,** 260 California St., San Francisco—$77,650 for dredging for stud pier at the Naval Repair Base, San Diego—by Bureau of Yards and Docks, Washington, D. C. 6-15

SAN DIEGO CO.—**M. H. Golden Construction Co.,** 3485 Noell, San Diego—$94,767 for the reinforcing, strengthening and extension of Seaplane Ramp No. 7 and the construction of a section of a seawall at the Naval Air Station, San Diego — by Bureau of Yards and Docks, Washington, D. C. 5-25

SAN FRANCISCO CO.—**Mercer-Fraser Co.,** 2nd & Commercial Sts., Eureka—$26,500 for repairing fender lines at Pier 34, San Francisco Harbor — by Bd. of State Harbor Commissioners, San Francisco. 6-7

SANTA BARBARA CO.—**Case-American Construction Co.,** Berth 109, San Pedro—$112,700 for dredging at Santa Barbara Harbor and depositing the dredged material along approx. 4,000 ft. of beach—by U. S. Engineer Office, Los Angeles. 5-21

Irrigation . . .

Idaho

KOOTENAI CO.—**M. W. Brown,** Redding, Calif.—$47,444 for leveling, clearing, erosion control, and the construction of farm supply laterals, farm irrigation and drainage structures, drainage ditches, etc., at the Post Falls Project, Coeur d'Alene—by Farm Security Admin., Denver, Colo. 6-4

MISSOULA CO.—**Williams Construction Co.,** Box 1124, Helena—$129,951 for earthwork, canals and laterals at the Big Flat unit of the Missoula Valley Project, near Missoula — by Bureau of Reclamation, Washington, D. C. 5-17

PRAIRIE CO.—**M. G. Long,** Billings—$24,806 for earthwork, pipe lines and structures for Intake Project, Intake pumping plant and laterals, near Terry—by Bureau of Reclamation, Washington, D. C. 5-18

Oregon

DESCHUTES CO. — **E. B. Bishop,** Orland, Calif.—$333,803 to extend the main canal north of the tunnels on the Deschutes Project, for a distance of about 13 mi.—by Bureau of Reclamation, Boise, Ida. 6-4

DESCHUTES CO. — **Chester T. Lackey,** Ontario — $101,790 for processing conc. aggr. to be used on the Deschutes Project, near Bend — by Bureau of Reclamation, Boise, Ida. 6-4

DESCHUTES CO. — **C. J. Montag and Sons,** 201 Couch Bldg., Portland—$122,967 to construct facilities that will permit adding a 1500-kilowatt generator at the Cove plant of the Pacific Power and Light Co. on Crooked River, in connection with the Deschutes Project near Bend—by Bureau of Reclamation, Boise, Ida. 6-4

DESCHUTES CO. — **David A. Richardson,** Santa Cruz, Calif.—$162,406 for constructing a flume to carry the irrigation supply across the deep Crooked River gorge, on the Deschutes Project near Bend —by Bureau of Reclamation, Boise, Ida. 6-4

DESCHUTES CO.—**United Construction Co.,** 1021 Westlake Ave. N., Seattle, Wash. —$36,699 for earthwork and structures on

laterals and sub-laterals of the Deschutes Project near Opal City—Bureau of Reclamation, Boise, Idaho. 6-7

Washington

CHELAN CO.—**Beal and Roberts,** Republic Bldg., Seattle—$28,675 for construction of conc. lined spillway canal at Wenatchee—by Reclamation District, Wenatchee. 5-18

Building . . .

Arizona

MARICOPA CO. — **William Peper Construction Co.,** Box 1564, Phoenix—$43,500 for remodeling roofs and stairs of the administration bldg. and science bldg. at the Phoenix Union High School, Phoenix—by Maricopa Board of Education, Phoenix. 6-13

MARICOPA CO. — **Tanner Construction Co.,** 731 No. 19th Ave., Phoenix—$178,585 for conversion of hangars to PLM and appurtenances at Williams Field, Chandler—by U. S. Engineer Office, Los Angeles, Calif. 5-18

California

ALAMEDA CO. — **Dinwiddie Construction Co.,** Crocker Bldg., Los Angeles — $605,600 for bldg. and accessories for a fleet post office at Alameda—by Bureau of Yards and Docks, Washington, D. C. 6-7

ALAMEDA CO. — **Macco Construction Co.,** Freight and Ferry Sts., Oakland—$77,071 for site preparations and foundation for office bldg. and boiler house at Alameda Intransit Depot, Alameda—by U. S. Engineer Office, San Francisco. 5-29

ALAMEDA CO. — **Matthew A. Little,** 1 Grand View Ave., San Francisco—$115,500 for the construction of 56 family dwelling units at Berkeley—by Federal Public Housing Authority, San Francisco. 5-17

ALAMEDA CO.—**Newson and Bechtel,** 2287 Telegraph Ave., Berkeley — $138,350 for 56 family dwelling units at Oakland—by Federal Public Housing Authority, San Francisco. 5-17

ALAMEDA CO. — **Newson & Bechtel,** 2287 Telegraph Ave., Berkeley — $214,498 for 110 temporary family dwelling units at Berkeley — by Federal Public Housing Authority, San Francisco. 5-29

ALAMEDA CO.—**G. W. Williams Co.,** 10 California Dr., Burlingame — $399,775 for 188 family dwelling units at Pleasanton—by Federal Public Housing Authority, San Francisco. 5-17

CONTRA COSTA CO.—**Barrett & Hilp,** 918 Harrison St., San Francisco—$161,480 for three barracks bldgs. at the tidewater area, Naval Magazine, Port Chicago—by Bureau of Yards and Docks, Washington, D. C. 6-6

CONTRA COSTA CO.—**MacDonald and Kahn,** Financial Center Bldg., San Francisco — $449,944 for 216 family dwelling units at Port Chicago—by Federal Public Housing Authority, San Francisco. 5-17

IMPERIAL CO. — **Shumaker & Evans Construction Co.** and **C. L. Maddox,** 4007 W. 6th St., Los Angeles—$393,199 for 152 family dwelling units at El Centro — by Federal Public Housing Authority, San Francisco. 5-25

IMPERIAL CO. — **Shumaker & Evans Construction Co.** and **C. L. Maddox,** 4007 W. 6th St., Los Angeles—$144,681 for 48 family dwelling units at Holtville — by Federal Public Housing Authority, San Francisco. 5-25

KERN CO.—**Baruch Corp.,** 625 So. Olive St., Los Angeles—$138,094 for warehouses and additional housing for officers at Muroc Flight Test Base, Muroc—by U. S. Engineer Office, Los Angeles. 5-29

KERN CO. — **Clem Anderson,** 2048-A Lincoln, Alameda—$147,358 for one community bldg., 50 portable family dwellings and one portable laundry bldg. at Bakersfield—by Federal Works Housing Agency, San Francisco. 6-15

KERN CO.—**J. F. Cummins,** 245 E. Olive, Burbank — $40,000 for a utility yard and shops and drainage facilities at the Muroc Flight Test Base, Muroc—by U. S. Engineer Office, Los Angeles. 6-15

KERN CO.—**J. N. Harvey,** 1114 Stockton St., Bakersfield—$53,000 for a cold storage plant—by Kern Ice & Cold Storage Co., Bakersfield. 6-12

KERN CO.—**Structon,** 8442 Santa Monica Blvd., Los Angeles—$149,495 for 50 war dwelling units at Bakersfield—by Federal Public Housing Authority, San Francisco. 6-15

LOS ANGELES CO.—**Biltmore Homes,** 1211 W. Wardlow Rd., Long Beach—$450,000 for 86 single family dwellings on scattered lots in Long Beach—by self. 6-15

LOS ANGELES CO.—**California National Builders,** 128 So. La Brea Ave., Los Angeles—$78,000 for eight apartment bldgs. on Atlantic Blvd., Long Beach—by Columbia Investment Co., Long Beach. 6-1

LOS ANGELES CO.—**Central Building Co.,** 707 So. Broadway, Los Angeles—for a dormitory to accommodate approx. 250 women. The bldg. will be one-story, frame construction, 13,000 sq. ft. in area — by USO, Los Angeles. 6-15

LOS ANGELES CO.—**Flick & Waymon,** 6818 Seville Ave., Huntington Park—$75,000 for a warehouse, factory bldg. and an office addition at 5706 Bickett St., Huntington Park — by International Harvester Co. 6-15

LOS ANGELES CO. — **Hunt Brothers,** 157 W. Olive Ave., Burbank—$100,000 for a market and store bldg. on the northeast corner of Verdugo Ave. and Sparks St., Burbank—by Sidney Cole, Burbank. 5-28

LOS ANGELES CO.—**Jackson Brothers,** 3475 W. 8th St., Los Angeles—$95,000 for a drug store bldg. at 4138 W. Viking Way, Lakewood City, to be of reinforced brick and concrete, wood trusses, etc.—by Lakewood City Company. 6-15

LOS ANGELES CO. — **M. W. Kellogg Co.,** 609 So. Grand Ave., Los Angeles—$5,000,000 for the construction of a delayed recycle coking plant at the Torrance Refinery—by General Petroleum Corp., Torrance. 6-8

LOS ANGELES CO. — **Oil Field Construction Co.,** 2650 Cherry Ave., Long Beach—$208,700 for the construction of a complete gas compressor station on the east side of Cherry Ave., north of Artesia St. at Long Beach — by City Gas Dept., Long Beach. 6-13

LOS ANGELES CO.—**Hal McGrew,** 2051 Long Beach Blvd., Long Beach—$66,822 for the construction of a central kitchen

bldg. at 27th and Locust Ave., Long Beach —by Board of Education, Long Beach. 5-22

LOS ANGELES CO.—**Eugene M. Miller,** 1519 Randall St., Glendale—$50,000 for the construction of the new St. Finbars parochial school at Burbank—by Roman Catholic Archbishop of Los Angeles. 6-8

LOS ANGELES CO. — **Myers Brothers,** 3407 San Fernando Rd., Los Angeles—$60,000 for an addition to a warehouse bldg. on E. 55th St., near Alameda St., Vernon—by Pioneer Flintkote Co., Vernon. 5-21

LOS ANGELES CO. — **Myers Brothers,** 3407 San Fernando Rd., Los Angeles — $100,000 for the construction of a personnel center at Fort MacArthur—by U. S. Engineer Office, Los Angeles. 5-24

LOS ANGELES CO.—**C. L. Peck,** 233 H. W. Hellman Bldg., Los Angeles—$1,500,000 for the construction of a reinf. conc. 3-story and basement department store at Los Angeles — by Broadway Dept. Store, Los Angeles. 6-1

LOS ANGELES CO.—**C. L. Peck,** 233 H. W. Hellman Bldg., Los Angeles—$40,000 for construction of a 2-story addition to the mortuary bldg. at 1712 Glendale Ave., Glendale—by Forest Lawn Memorial Park, Glendale. 6-1

LOS ANGELES CO. — **Pozzo Construction Co.,** 2403 Riverside Dr., Los Angeles—$220,079 for a health center bldg. at 49th St. and Avalon Blvd., Los Angeles—by City Council, Los Angeles. 6-8

LOS ANGELES CO. — **William Radkovich Co.,** 4920 E. Washington Blvd., Los Angeles—$73,650 for 200 standard dwelling trailers, 12 utility trailers and all site improvements, at Los Angeles — by Federal Public Housing Authority, San Francisco. 5-22

LOS ANGELES CO.—**Roscoe and Land,** 124 W. 4th St., Los Angeles—$119,468 for the construction of an additional bldg. at the Suva St. School, Montebello—by Montebello Unified School District, Montebello. 6-11

LOS ANGELES CO.—**Royal Bldg. Corp.,** 11,201 Long Beach Blvd., Lynwood—$61,888 for construction of a 16-unit school bldg., to be located at the Western Terrace housing project, San Pedro — by Federal Works Agency, Berkeley. 5-28

LOS ANGELES CO.—**Stivers Brothers,** 1936 Pacific Ave., Long Beach—$44,000 for the construction of three apartment bldgs. at Long Beach—by M. A. Stivers, Long Beach. 6-1

LOS ANGELES CO. — **Ben K. Tanner,** 9340 W. Olympic Blvd., Beverly Hills—$50,000 for a new St. Bellarmine-Jefferson high school at Burbank, to be of reinf. brick and conc.—by Roman Catholic Archbishop of Los Angeles. 6-15

LOS ANGELES CO.—**J. K. Thomas & Beyer Construction Co.,** 611 Chamber of Commerce Bldg., Los Angeles — $401,725 for 192 family dwelling units at Long Beach —by Federal Public Housing Authority, San Francisco. 5-17

LOS ANGELES CO. — **United Building Co. of California,** 6116 Wilshire Blvd., Los Angeles—$137,500 for the construction of 25 six-room, frame and plaster dwellings in the West Los Angeles district—by self. 6-15

LOS ANGELES CO.—**Zoss Construction Co.,** 1037 Cole Ave., Los Angeles—$66,000 for the construction of gymnasium facilities at the Birmingham General Hospital, Van Nuys—by U. S. Engineer Office, Los Angeles. 6-15

ORANGE CO. — **J. A. McNeil,** 714 W. Olympic Blvd., Los Angeles—$65,000 for reinf. brick warehouse in Anaheim — by Southern California Citrus Foods Corp., Anaheim.

RIVERSIDE CO.—**Frank Pinkerton,** 108 Southwest Blvd., Corona—$181,903 for the construction of two medium security disciplinary barracks, 112x122 ft. in area each, and appurtenant facilities at Camp Haan, Riverside—by U. S. Engineer Office, Los Angeles. 5-24

RIVERSIDE CO.—**Paul Spencer,** 832 W. 5th St., Los Angeles—$57,360 for the construction of 25 family dwelling units to be located at Palm Springs—by Federal Public Housing Authority, San Francisco. 5-25

SAN BERNARDINO CO. — **James I. Barnes Construction Co.,** 1119 Montana Ave., Santa Monica—$280,485 for a mess hall and galley addition and additional quarters for married officers at Barstow—by Bureau of Yards and Docks, Washington, D. C. 6-13

SAN BERNARDINO CO.—**A. Harootunian,** 1372 Holmby Ave., West Los Angeles—$325,000 for the construction of 55 three-bedroom dwellings and 10 two-bedroom dwellings at San Bernardino—by San Bernardino Properties, Inc., San Bernardino. 6-1

SAN BERNARDINO CO.—**M. A. Imhoff & Associates,** 7052 Santa Monica Blvd., Los Angeles—$120,600 for 44 family dwelling units at Barstow—by Federal Public Housing Authority, San Francisco. 5-17

SAN BERNARDINO CO.—**M. A. Imhoff and Associates,** 1748 New Ave., San Gabriel

—$294,314 for conversion of Bldg. No. 2 into a shop bldg., at Barstow—by Bureau of Yards and Docks, Washington, D. C. 5-16

SAN FRANCISCO CO.—**Louis C. Dunn,** 799 Monadnock Bldg., San Francisco—$112,707 for 53 portable family dwelling units at Hunters Point—by Federal Public Housing Authority, San Francisco. 5-14

SAN FRANCISCO CO.—**Erbentraut & Summers,** 446 6th St., San Francisco—$198,000 for 104 family dwelling units at San Francisco—by Federal Public Housing Authority, San Francisco. 5-25

SAN FRANCISCO CO.—**Erbentraut & Summers,** 446 6th St., San Francisco—$542,300 for 28 two-story bldgs. providing 224 temporary family dwelling units at Hunters Point—by Board of Supervisors, City and County of San Francisco. 5-24

SAN FRANCISCO CO.—**Claude T. Lindsay Co.,** 564 Market St., San Francisco—$344,587 for 152 family dwelling units at So. San Francisco—by Federal Public Housing Authority, San Francisco. 5-17

SAN FRANCISCO CO.—**Theodore G. Meyer,** 200 Quint St., San Francisco—$494,543 for the construction of 238 family dwelling units at San Francisco—by Federal Public Housing Authority, San Francisco. 5-25

SAN FRANCISCO CO.—**Monson Brothers,** 475 Sixth St., San Francisco—$107,055 for conversion of barracks to field wards at the Letterman General Hospital, San Francisco—by U. S. Engineer Office, San Francisco. 6-8

SAN FRANCISCO CO.—**Moore & Roberts,** 693 Mission St., San Francisco—$191,538 for ten 2-story bldgs. providing 80 temporary family dwelling units at Hunters Point—by Board of Supervisors, City and County of San Francisco. 5-24

SAN FRANCISCO CO.—**J. D. O'Connor Construction Co.,** 391 Sutter St., San Francisco—$76,079 for the conversion of bldgs. at Letterman General Hospital, San Francisco—by U. S. Engineer Office, San Francisco. 5-17

SAN DIEGO CO.—**Anderson & Johnson,** 4745 Hawley Blvd., San Diego—$58,830 for alterations and additions to the USO Club at Oceanside—by United Service Organizations, Inc., San Francisco. 6-1

SAN DIEGO CO.—**A. Farnell Blair,** 7052 Santa Monica Blvd., Los Angeles—$104,026 for additions to bldg. No. 14, X-ray and physical therapy depts., at the U. S. Naval Hospital, San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-14

SAN DIEGO CO.—**Baruch Corporation,** 625 So. Olive St., Los Angeles—$211,900 for 80 family dwelling units at San Diego—by Federal Public Housing Authority, San Francisco. 5-17

SAN DIEGO CO.—**O. L. Carpenter,** 353 Spreckels Bldg., San Diego—$78,978 for an elementary school at Paradise Hill, east of National City, to be of frame and stucco construction, will contain 12,000 sq. ft. of floor space—by Federal Works Agency, Washington, D. C. 5-28

SAN DIEGO CO.—**Dentzel and Whyte,** 825 So. Date Ave., Alhambra—$537,500 for 240 family dwelling units at San Diego—by Federal Public Housing Authority, San Francisco. 5-17

SAN DIEGO CO.—**H. D. Haxton,** 515 Broadway Bldg., San Diego—$211,000 for 96 family dwelling units at San Diego—by

Federal Public Housing Authority, San Francisco. 5-17

SAN DIEGO CO.—**E. A. Kaiser Co.,** 8825 Olympic Blvd., Beverly Hills—$403,095 for 200 family dwelling units at San Diego—by Federal Public Housing Authority, San Francisco. 5-17

SAN DIEGO CO. — **Scherer & Prichard,** 3964 Orange St., Riverside—$59,862 for a chapel at the NAS, San Diego—by Bureau of Yards and Docks, Washington, D. C. 5-18

SAN JOAQUIN CO.—**Claude T. Lindsay Co.,** 564 Market St., San Francisco—$510,224 for the construction of 200 temporary family units, 23 bldgs. to house 76 men, and 50 family trailer units to be located at Stockton—by County Housing Authority, Stockton. 5-22

SAN JOAQUIN CO.—**Thomas C. Buck,** 315 E. Weber Ave., Stockton—$80,852 for the construction of three nose hangars and conversion of barracks and utilities at the Stockton Airfield—by U. S. Engineer Office, Sacramento. 5-18

SAN JOAQUIN CO.—**Claude T. Lindsay Co.,** 564 Market St., San Francisco—$93,387 for 45 bldgs. to house 150 women at Stockton—by Federal Public Housing Authority, San Francisco. 5-22

SAN JOAQUIN CO. — **MacDonald and Kahn, Inc.,** Financial Center Bldg., San Francisco—$101,679 for 36 family dwelling units at Stockton — by Federal Public Housing Authority, San Francisco. 5-17

SANTA BARBARA CO.—**Ellis G. Martin,** 1311 5th St., Santa Monica—$181,988 for 76 family dwelling units at Santa Barbara—by Federal Public Housing Authority, Los Angeles. 5-17

SOLANO CO.—**Biltwell Construction Co.,** 4745 Geary Blvd., San Francisco—$324,377 for 150 prefabricated family dwelling units and alterations to social hall at Benicia—by Housing Authority, Benicia. 6-6

SOLANO CO. — **M. J. King, Inc.,** 231 Franklin St., San Francisco—$404,744 for personnel area bldg. at the U. S. Naval Radio Transmitting Station near Dixon—by Bureau of Yards and Docks, Washington, D. C. 6-13

SOLANO CO.—**H. H. Larsen Co.,** 64 So. Park, San Francisco—$56,838 for proof firing range at Benicia Arsenal—by U. S. Engineer Office, San Francisco. 5-17

SOLANO CO. — **Litchfield Construction Co.,** 221 Union St., San Rafael—$139,653 for a 3-story reinf. conc. jail addition with cell block on two floors to the jail at Fairfield—by County of Solano, Fairfield. 6-5

SOLANO CO.—**Claude T. Lindsay Co.,** 564 Market St., San Francisco—$478,347 for 44 temporary family dwelling units at Vacaville, and 156 temporary family dwelling units at Fairfield—by Housing Authority, Fairfield. 5-16

SOLANO CO. — **Midstate Construction Co.,** 251 Kearny St., San Francisco—$45,317 for five staff cottages at the California Maritime Acad., Carquinez Straits, Vallejo—by State Director of Public Works, Sacramento. 5-18

SOLANO CO. — **Moore & Roberts,** 693 Mission St., San Francisco—$613,100 for 192 family dwelling units at Vallejo—by Federal Public Housing Authority, San Francisco. 5-17

STANISLAUS CO.—**Matthew A. Little,** 1 Grand View Ave., San Francisco—$97,500 for reinf. conc. and frame tuberculosis ward building addition to the Stanislaus County Hospital at Modesto—by County Supervisors, Modesto. 6-13

YOLO CO.—**Charles F. Unger,** 2426 7th Ave., Sacramento—$82,400 for one-story masonry packing warehouse at Winters—by California Fruit Exchange, Sacramento. 6-8

YUBA CO.—**Lawrence Construction Co.,** 3020 V St., Sacramento—$69,598 for alterations to existing mess halls and paving at Camp Beale—by U. S. Engineer Office, Sacramento. 6-12

VENTURA CO.—**M. S. Jepsen,** 1540 So. Robertson Blvd., Los Angeles — $162,313 for 80 family dwelling units at Oxnard—by Federal Public Housing Authority, Los Angeles. 5-17

Colorado

DENVER CO.—**Brown-Schrepferman & Co.,** 240 Washington St., Denver—$400,000 for a new processing plant, reconversion of existing bldgs., dismantling and reerecting 14 bldgs., at Pando, painting and misc. repairs at Fort Logan, Denver—by U. S. Engineer Office, Denver. 6-15

DENVER CO. — **Mead & Mount Construction Co.,** Denver National Bldg., Denver—$109,227 for construction of a permanent type patients' mess bldg., at Fitzsimmons General Hospital, Denver—by U. S. Engineer Office, Denver. 6-8

Idaho

BANNOCK CO.—**J. A. Terteling & Sons-Brennan & Cahoon,** Box 1428, Boise—$89,821 for replacing interior columns with

structural steel at the naval ordnance plant, Pocatello—by Bureau of Yards and Docks, Washington, D. C. 5-24

ELMORE CO. — **Paul Paulsen,** Bennett Bldg., Salt Lake City, Utah—for a 20-room rooming house at Glenns Ferry—by Union Pacific Railroad Co., Omaha, Neb. 6-7

Montana

GALLATIN CO.—**The Edward L. Burton Construction Co.,** 160 So. Main St., Salt Lake City, Utah—$132,000 for an administration bldg. and other improvements at Gallatin Air Field—by County Board of Supervisors, Gallatin. 5-25

MISSOULA CO.—**Charles H. Pew,** Missoula—$138,029 for two solitary and isolation cellblocks at the U. S. disciplinary barracks, Fort Missoula—by U. S. Engineer Office, Seattle, Wash. 5-18

Nevada

MINERAL CO.—**Johnson, Drake & Piper, Inc.,** 1736 Franklin St., Oakland, Calif.—$1,099,800 for the construction of low cost housing at the Naval Ammunition Depot, Hawthorne — by Bureau of Yards and Docks, Washington, D. C. 6-15

New Mexico

McKINLEY CO.—**Brown Brothers,** 3425 No. 4th St., Albuquerque—$138,328 for 27 addtl. storage bldgs. at Fort Wingate, Gallup—by U. S. Engineer Office, Albuquerque. 5-18

McKINLEY CO.—**G. H. Leavitt Co.,** El Paso, Tex.—$294,823 for additional storage facilities at the Fort Wingate Ordnance Depot—by U. S. Engineer Office, Albuquerque. 5-25

Oregon

CLATSOP CO. — **John Helstrom,** 649 Jerome Ave., Astoria—$61,220 for a combined office and warehouse, and a second warehouse at Warrenton — by Bio-Products, Ltd., Astoria. 3-7

CROOK CO.—**Howard Halvorson Construction Co.,** 3818 N. E. Sandy, Portland—$129,400 for the construction of a school bldg. at Prineville — by Prineville School Board, Prineville. 6-4

CROOK CO. — **A. Ruud,** Railway Exchange Bldg., Portland — $120,494 for a one-story elementary school at Prineville —by School Board, Prineville. 5-22

LANE CO.—**K. T. Henderson,** Box 779, Klamath Falls — $116,700 for 50 family dwelling units at Eugene—by Federal Public Housing Authority, Portland. 5-17

LINN CO.—**C & H Construction Co.,** 52nd S. and Brighton, Seattle, Wash.—$100,000 for a cold storage and quick freezing plant at Albany — by Associated Frozen Food Packers, Inc., Seattle. 6-4

MULTNOMAH CO.—**C. M. Corkum Co.,** Portland—$66,000 for initial stage of a new bank bldg.—by First National Bank, Portland. 6-8

MULTNOMAH CO.—**C. M. Corkum Co.,** Weatherly Bldg., Portland — $300,000 for 50 dwellings in Portland, to provide low cost housing for returning war veterans desirous of buying their own homes — by Federal Public Housing Authority, Portland. 5-28

MULTNOMAH CO. — **Waale - Camplan Co.,** 2100 S. W. Jefferson St., Portland—$80,980 for a demountable school at Portsmouth and another at Peninsula—by Federal Works Agency, Seattle, Wash. 6-7

SHERMAN CO.—**Hogenson Construction Co.,** 402 Corn Exchange Bldg., Minneapolis, Minn.—$84,400 for a grain elevator annex at Wasco—by Sherman Cooperative Grain Growers, Wasco. 5-21

YAMHILL CO.—**Austin Co.,** Dexter Horton Bldg., Seattle, Wash.—$90,000 for a reinf. conc. food processing and freezing plant at Dayton — by Alderman Farms, Dayton. 5-28

Texas

BEXAR CO.—**E. H. Conrad,** San Antonio —$103,567 for special service club. bldg., for Brooke General and Convalescent Hospital—by U. S. Engineer Office, San Antonio. 5-22

BEXAR CO.—**R. P. Farnsworth & Co., Inc.,** Box 4187 Houston—$200,387 for guest houses at Brooke General and Convalescent Hospital—by U. S. Engineer Office, San Antonio. 6-1

BEXAR CO.—**F. A. Nunnelly,** San Antonio—$131,797 for personnel center housing facilities at Dodd Field—by U. S. Engineer Office, San Antonio. 5-22

BEXAR CO.—**A. P. Rheiner & Son,** San Antonio—$113,156 for 2 recreational bldgs. at Brooke Hospital Center—by U. S. Engineer Office, San Antonio. 6-13

DALLAS CO.—**Cowdin Brothers,** 411 So. Haskell St., Dallas—$95,000 for a 2-story business bldg. of brick, steel and reinf. conc. at Dallas—by Adleta Show Case & Fixture Manufacturing Co., Dallas. 6-13

DALLAS CO.—**P. D. Kosach,** 2514 Commerce St., Dallas—$50,000 for a two-story school bldg. at Dallas—by Texas County Day School, Dallas. 5-23

LUBBOCK CO.—**John T. Glover,** Lubbock—$71,434 for the construction of a power plant bldg. at Lubbock—by City Council, Lubbock. 6-14

NUECES CO. — **Chamberlain & Strain,** 609 National Bank of Commerce Bldg., San Antonio—$75,000 for a school bldg. of ma-

sonry, structural clay tile, reinf. conc. frame, etc., at Corpus Christi — by Oso West Point Consolidated School Distr., Corpus Christi. 5-15

ORANGE CO. — **E. I. du Pont de Nemours Co., Inc.,** Du Pont Bldg., Wilmington, Del.—$22,000,000 for the construction of a nylon salt plant at Orange—by Defense Plant Corp, Washington, D. C. 5-24

POTTER CO.—**Dolph Construction Co.,** Thomas Bldg., Dallas—$47,300 for a recreation and community bldg. at Amarillo—by National Housing Agency, Washington, D. C. 5-17

TARRANT CO. — **Frank H. Abel,** Construction Bldg., Dallas—$75,000 for a tourist court at Fort Worth — by Century Courts, Inc., Fort Worth. 5-15

TARRANT CO.—**Cain and Cain,** Majestic Bldg., Fort Worth—$50,000 for an addition to All Saints Hospital at Fort Worth—by All Saints Hospital, Fort Worth. 5-14

Utah

SALT LAKE CO. — **R. J. Daum,** 6803 West Blvd., Inglewood, Calif.—$45,220 for repairs to subdepot, including utilities, at the Utah ASF Depot, and for road paving at the same location—by U. S. Engineer Office, Salt Lake City. 5-18

TOOELE CO.—**C. B. Lauch Construction Co.,** 308 Kiesel Bldg., Ogden—$191,374 for 76 family dwelling units, a community bldg., and all site improvements at St. John —by Federal Public Housing Authority, Salt Lake City. 5-18

WEBER CO.—**Morrin & Sons,** 259 Harrisville Rd., Ogden—$43,593 for misc. construction work involving steam plant, engine service room and warehouse heating at Ogden—by U. S. Engineer Office, Salt Lake City. 6-15

Washington

FRANKLIN CO. — **B. H. Sheldon,** W. 1405 1st St., Spokane — $213,000 for 116 family dwelling units at Pasco—by Federal Public Housing Authority, Seattle. 5-25

KING CO. — **A. F. Mowat Construction Co.** and **J. H. Sellen Construction Co.,** 1331 Third Ave. Bldg., Seattle—$1,147,491 for an experimental flight test hangar at Boeing Field, Seattle. The bldg. will be approx. 725x180 ft.—by U. S. Engineer Office, Seattle. 6-6

KING CO.—**American Builders,** 615 Alaska St., Seattle—$58,800 for 24 frame one-story demountable school bldgs. at Seattle —by Seattle School District, Seattle. 6-14

KING CO. — **Nettleton & Baldwin,** 1109 No. 35th St., Seattle—$303,566 for 100 family dwelling units at Seattle—by Federal Public Housing Authority, Seattle. 5-17

KING CO.—**J. C. Boespflug Construction Co.,** 807 Securities Bldg., Seattle—$73,400 for the conversion of Bldg. No. 38 to refrigeration space at the U. S. Naval Station, Seattle—by Bureau of Yards and Docks, Washington, D. C. 6-8

KING CO.—**J. C. Boespflug Construction Co.,** 807 Securities Bldg., Seattle—$259,140 for additional housing at 28th Ave. and Elmore St., Seattle—by Bureau of Yards and Docks, Washington, D. C. 6-12

KING CO.—**J. C. Boespflug Construction Co.,** 807 Securties Bldg., Seattle—$277,500 for the construction of homoja huts in the Magnolia district, Seattle — by Bureau of Yards and Docks, Washington, D. C. 5-28

KING CO.—**Lease and Leigland,** Vance Bldg., Seattle—$620,750 for the construction of a structural steel and conc. block aviation storehouse and a salvage scrap yard and spur track, at Sand Point—by Bureau of Yards and Docks, Washington, D. C. 6-7

KITSAP CO.—**Beal & Roberts,** Republic Bldg., Seattle—$103,471 for additions and extensions to Bremerton navy hospital—by Navy Dept., Washington, D. C. 6-8

KITSAP CO.—**Gaasland Construction Co.,** Central Bldg., Seattle—$56,590 for a frame and masonry recreation bldg. at Sinclair Park housing project in Bremerton — by Federal Public Housing Authority, Seattle. 5-16

KITSAP CO.—**Sound Construction & Engineering Co.** and **Peter Kiewit,** 1403 W. 45th St., Seattle—$2,726,970 for addtl. magazines at the U. S. Naval Magazine, Bangor —by Bureau of Yards and Docks, Washington, D. C. 5-18

PIERCE CO. — **Sam Bergesen,** Box 428, Tacoma—$79,756 for a new petroleum distribution school at Ft. Lewis—by U. S. Engineer Office, Seattle. 5-4

PIERCE CO.—**MacDonald Building Co.,** 1517 So. Tacoma Way, Tacoma—$1,403,435 for two permanent bldgs., and additions to two bldgs. at the American Lake Veterans' Hospital, near Tacoma—by Veterans' Administration, Washington, D. C. 5-22

SPOKANE CO.—**Gus Bouten,** 216 Division, Spokane — $157,000 for two addtl. stories to the present reinf. conc. Sacred Heart Hospital at Spokane — by Sacred Heart Hospital, Spokane. 5-14

YAKIMA CO.—**E. A. Erickson,** Kennewick — $44,231 for a 2-classroom school addition and gymnasium at Broadway Elementary School in Yakima — by Yakima School District No. 3, Yakima. 6-4

Territories

ALASKA—**C. F. Lytle Co., Green Construction Co.** and **Arthur F. Mathis,** Fairbanks—$379,315 for the construction of a hotel, depot, power plant and residence facilities at Healy — by Alaska railroad branch, Department of Interior, Washington, D. C. 5-24

ALASKA — **Morrison-Knudsen Co., Inc.,** Boise, Ida.—$286,500 for 40 family dwelling units at Anchorage — by Federal Public Housing Administration, Seattle, Wash. 6-8

HAWAII—**James W. Glover,** Honolulu—$1,492,391 for 1000 dwelling units on Oahu —by Federal Public Housing Authority, San Francisco. 6-1

HAWAII—**Pacific Construction Co.,** Honolulu — $1,755,281 for 518 dwelling units and a community bldg. on Oahu—by Federal Public Housing Authority, San Francisco. 6-1

Canada

BRITISH COLUMBIA — **G. E. Baynes,** Vancouver—$45,900 for construction of a temporary nurses' home at 10th Ave. between Willow and Heather Sts., Vancouver. The bldg. will be of frame and stucco, with 14,000 sq. ft. of floor space—by Vancouver General Hospital, Vancouver.

BRITISH COLUMBIA — **Bennett & White Construction Company Ltd.,** 510 W. Hastings St., Vancouver — $3,000,000 for 600 permanent homes in British Columbia to be released to discharged members of the armed forces. Locations will be: Greater Vancouver and New Westminster, 310; Ladner, 20; Mission, 25; Chilliwack, 45; Kelowna, 30; Vernon, 20; Kamloops, 30; Victoria, 80; Powell River, 20; Vancouver Island, 20—by War Dept., Ottawa.

BRITISH COLUMBIA—**Commonwealth Construction Co., Ltd.,** Vancouver—$125,000 for the construction of a grain sacking plant at Vancouver—by Vancouver Wheat Pool.

Miscellaneous...

California

ALAMEDA CO.—**MacDonald and Kahn, Inc.,** 200 Financial Center Bldg., San Francisco—$140,700 for sprinkler protection at Oakland Army Base—by U. S. Engineer Office, San Francisco. 6-14

ALAMEDA CO.—**Stolte, Inc.,** 8451 San Leandro St., Oakland—$231,700 for moving motor pool at the Oakland Army Base—by U. S. Engineer Office, San Francisco. 5-14

CONTRA COSTA CO. — **R. W. Reade Co.,** 2019 Blake St., Berkeley—$42,851 for interior painting of 1300 housing units at the Canal housing project, Richmond—by Housing Authority of the City of Richmond. 5-29

KINGS CO.—**Trewhitt-Shields & Fisher,** 1501 Pacific Southwest Bldg., Fresno—$77,053 for development of an emergency seadrome on the north boundary of Tulare Lake at a point about 9 mi. south of Stratford — by Bureau of Yards and Docks, Washington, D. C. 5-21

LOS ANGELES CO. — **Associated Pipe and Engineering Co., Inc.,** 2332 E. 38th St., Los Angeles—$91,800 for air, gas, water and steam lines in connection with the installation of additional repair facilities at Todd Shipyard, San Pedro — by Todd Shipyard Corp., San Pedro. 5-28

LOS ANGELES CO.—**Guy F. Atkinson Co.,** 1103 Heartwell Bldg., Long Beach—$118,891 for installation of storm drains, railroad track, fencing, paving, moving utility bldg., general yard development, etc., at the Todd Shipyard, San Pedro—by Todd Shipyard Corp., San Pedro. 5-28

LOS ANGELES CO.—**Bert Calvert,** 4546 E. Washington Blvd.—$17,102 for Bailey Canyon debris basin at the north end of Lima St., in Sierra Madre—by Los Angeles County Board of Supervisors. 5-7

LOS ANGELES CO.—**Wm. R. Morgan & Co.,** 4862 Santa Monica Blvd., Los Angeles — $50,740 for interior painting at Pueblo del Rio housing project — by City Housing Authority, Los Angeles. 6-8

LOS ANGELES CO. — **Shipyard Construction Co.,** 2659 Cherry Ave., Long Beach—$57,000 for installation of air, gas, water and steam lines at Todd Shipyard Corp., San Pedro — by Todd Shipyard Corp., San Pedro. 5-28

LOS ANGELES CO.—**Harry Wasserman,** 424 No. Crescent Heights Blvd., Los Angeles—$42,280 for interior painting at the Rancho San Pedro housing development at San Pedro—by Housing Authority of Los Angeles. 5-23

LOS ANGELES CO.—**Zoss Construction Co.,** 1037 Cole Ave., Los Angeles—$63,000 for the construction of swimming facilities at Birmingham General Hospital, Van

Nuys—by U. S. Engineer Office, Los Angeles. 6-15

SAN BERNARDINO CO.—**The Blue Diamond Corp., Ceco Steel Corp.,** and **Soulé Steel Corp.,** 1650 So. Alameda St., Los Angeles—$485,967 for furnishing, cutting, bending and placing reinf. steel for the Lytle creek channel—by U. S. Engineer Office, Los Angeles. 5-18

SAN DIEGO CO.—**Associated Pipe and Engineering Co.,** 2332 E. 38th St., Los Angeles—$158,000 for an extension and addition to gasoline distribution system at the Naval Air Station, San Diego—by Bureau of Yards and Docks, Washington, D. C. 6-11

SAN DIEGO CO.—**J. S. Barrett,** 1300 Coast Highway, Newport Beach—$49,956 for addtl. fire protection at naval ammunition depot, Fallbrook—by Bureau of Yards and Docks, Washington, D. C. 6-8

SAN DIEGO CO.—**Del E. Webb Construction Co.,** 302 So. 23rd Ave., Phoenix, Ariz.—$79,543 for a power plant at Mitchell Convalescent Hospital, Camp Lockett—by U. S. Engineer Office, Los Angeles. 6-7

SAN FRANCISCO CO.—**Ford J. Twaits, Morrison-Knudsen Co., Inc.** and **Ben C. Gerwick,** 391 Sutter St., San Francisco—$1,146,254 for filling, concrete work, mechanical and electrical services, trap work, paving and fender system at the Naval Drydocks, Hunters Point, San Francisco—by Bureau of Yards and Docks, Washington, D. C. 5-18

SAN JOAQUIN CO.—**Johnson-Kiewit-Everist,** 442 Post St., San Francisco—$4,700,000 for six new transit sheds, eight storehouses, steel storage area, roads and railroads at the Naval Supply Depot, Rough and Ready Island, near Stockton—by Bureau of Yards and Docks, Washington, D. C. 5-29

SAN JOAQUIN CO.—**MacDonald and Kahn-Pollock-Teichert,** 200 Financial Center Bldg., San Francisco—$767,448 for bachelor officers' quarters, roads, classification trackage, railroads, open storage area, etc., at the Naval Supply Depot, Rough and Ready Island—by Bureau of Yards and Docks, Washington, D. C. 5-18

SAN MATEO CO.—**Richard Delucchi & Co.,** 420 San Mateo Ave., San Bruno—$49,572 for a swimming pool at the Dibble General Hospital, Menlo Park—by U. S. Engineer Office, San Francisco. 5-21

SANTA BARBARA CO.—**John A. Klarquist,** 618 So. Western Ave., Los Angeles—$59,666 for the construction of swimming facilities at Hoff General Hospital, Santa Barbara—by U. S. Engineer Office, Los Angeles. 6-1

Idaho

BANNOCK CO.—**Morrison-Knudsen Co., Inc.,** Box 1518, Boise—$115,000 for track extensions, grading and other work in connection with centralized traffic control system between Pocatello and Glenn's Ferry—by Union Pacific Railroad, Omaha, Neb. 5-25

Montana

CARBON, STILLWATER & SWEET-GRASS COS.—**Bennett & Lewis,** Billings—$77,980 for 82.8 mi. of power lines throughout the counties—by Beartooth Electric Cooperative, Inc., Red Lodge. 5-22

Nevada

NYE CO.—**Fredrickson Brothers,** 1259 65th St., Emeryville, Calif.—$95,381 for sonic bomb scoring targets, consisting of some electrical work, grading work and target bldgs. at Tonopah Army Airfield—by U. S. Engineer Office, Sacramento, Calif. 5-29

New Mexico

EDDY CO.—**Gable Electric Service,** 6713 Snider Plaza, Dallas, Tex.—$58,000 for a bomb scoring installation at Carlsbad—by U. S. Engineer Office, Albuquerque. 6-4

Texas

TARRANT CO.—**Fishback & Moore,** Southland Life Bldg. Annex, Dallas—$119,000 for installing automatic fire pump control at Fort Worth Aircraft Assembly Plant—by U. S. Engineer Office, Denison. 6-14

TAYLOR CO.—**Teague and Goodman,** Sherman—$60,756 for 80 mi. of power line to serve 180 members—by Taylor Electric Cooperative, Inc., Merkel. 6-11

Utah

SALT LAKE CO.—**Industrial Engineering Co.,** Kayville—$66,000 for approx. 25 mi. of 8-in. pipeline betw. Uintah Junction and Salt Lake City—by Utah Oil & Refining Co., Salt Lake City. 6-14

Territories

ALASKA—**Morrison-Knudsen Co., Inc.,** Hoge Bldg., Seattle—$127,000 for conversion of railroad to airport access road at Cordova—by Civil Aeronautics Authority, Anchorage. 5-22

PROPOSED PROJECTS

Highway and Street...

Nevada

WASHOE CO.—A 170,000 sq. ft. street paving program is now under consideration for the city of Sparks, at an estimated cost of $125,138. 6-7

Airport...

California

KERN CO.—Construction is to begin soon on extension of the west end of the E-W runway, taxiway, warm-up pad, and necessary alteration to the night lighting system at the Muroc Army Air Base, Muroc, at an est. cost of $687,500. 5-31

MERCED CO.—Construction of a new runway with necessary taxiways and warm-up pad, parking apron, installation of high intensity approach runway and taxiway lights, alterations to existing hangars, and a new hangar, at Merced Army Air Field has been authorized by the War Department. Est. cost of the project is $2,245,000.

New Mexico

CHAVES CO.—Approval has been granted and work is to begin soon on reconstructing parking apron, installation of apron flood lights, extension of N-S runway and construction of a taxiway with shoulders at the Roswell Army Air Field, Roswell. Est. cost is $950,000. 5-31

Waterway...

California

MARIN CO.—Plans have been authorized for the construction of the Army's Bay Area Shipping Facilities in the vicinity of California Point. The facilities will include two 2-berth piers, storage yards, and barrack type housing. Actual construction of the $13,000,000 project is scheduled to begin immediately. 6-2

NAPA CO.—Approval of a $951,000 Napa river improvement project has been announced by the U. S. Engineers. The project calls for dredging of a 15-ft. channel, 100 ft. wide from Mare Island to Asylum Slough just south of Napa and a 10-ft. channel from the slough to the head of navigation at the Francis Bridge, dredging of a cut across Horseshoe Bend 100-ft. wide and 15-ft. deep, etc. 5-22

Building...

California

HUMBOLDT CO.—Plans are being prepared for the construction of a new high school auditorium bldg. at Arcata. Est. cost is $125,000. 5-28

KERN CO.—Two gayule processing plants will be constructed at Bakersfield by the Firestone Rubber Co. Estimated cost for each structure is from $300,000 to $400,000. 5-21

Idaho

BANNOCK CO.—The Pocatello Housing Authority plans to demolish or dismantle 150 homes in the city, and replace them with 150 low rent single and double family dwellings at an est. cost of $750,000. 6-4

Nevada

CLARK CO.—The First Baptist Church, Las Vegas, plans a new church to seat 500 people, also new parsonage, estimated total cost, $90,000. 6-12

Oregon

MULTNOMAH CO.—Plans are being prepared for the construction of a hospital at Portland, for the University of Oregon. The hospital would be located in Sam Jackson Park, facing the medical school, and contain 200 beds. Est. cost is $750,000. 5-31

Texas

BEXAR CO.—Plans are under way for converting the San Antonio Aviation Cadet Center into Army Air Force Redistribution and Convalescent Center at Fort Sam Houston at an approx. cost of $1,000,000. 6-13

Washington

CHELAN CO.—A new wing, costing $250,000 will be built as an addition to the Deaconess Hospital at Wenatchee. Construction will begin as soon as materials are available. 6-9

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Inaugurating a new service for the contractors of the West, identified as "Combination of Services," the MOORE EQUIPMENT COMPANY of Stockton, have entered the sales, service, rental and transportation of new and used heavy equipment, with the idea of having one organization doing a complete rounded out job in this field.

The distributorship for such lines of equipment as Ingersoll-Rand, Koehring, Kwik-Mix, C. S. Johnson, Parsons, Gorman-Rupp, and Carco have been added to General Motors Diesel Engines, General Motors Trucks, Allis-Chalmers Tractors and Moore Road Machines.

Temporary offices have been opened in San Francisco at 55 Montgomery St. As soon as conditions permit, the firm plans to establish a complete sales and service facilities in San Francisco with adequate showrooms and used equipment department.

Moore's Stockton plant is now engaged in fulfilling contracts with the U. S. Navy in force since 1942 in constructing LCM Invasion Boats, YSD Vessels and 500-ton Barges, and have been awarded the Army-Navy "E" for efficiency and outstanding production.

☆ ☆ ☆

Gus A. Anderson, recently associated with Permanente Cement Co., and before that with the San Francisco Material Co., has opened his own place of business at Palo Alto, Calif., known as PALO ALTO MATERIALS CO., to deal in building and insulating materials.

☆ ☆ ☆

A. F. McGraw, until recently general sales manager for the tractor division of ALLIS-CHALMERS MANUFACTURING CO., has been made director of sales of FOOD MACHINERY CO., San Jose. His headquarters will be in San Jose. He had been with Allis-Chalmers since 1932, when he became that firm's industrial manager at Kansas City. Since 1935, he has been at Milwaukee in various sales activities.

☆ ☆ ☆

Carl E. Lebeck has been named district manager for San Francisco and northern California by SOULE STEEL CO., and will make his headquarters in the company's main office in San Francisco. In his new post he will have charge of sales of reinforcing and merchant steel, steel windows and doors and other products. He was formerly district manager in Minneapolis for TRUSCON STEEL CO.

☆ ☆ ☆

WESTINGHOUSE ELECTRIC SUPPLY CO. has opened new branch headquarters in Oakland, with 23,000 sq. ft. of usable floor space. The office will be in charge of **Henry N. Muller,** branch manager. The firm is the wholesale distributing outlet for products of WESTINGHOUSE ELECTRIC CORP.

☆ ☆ ☆

A new office has been opened by **Edward R. Bacon** at 130 Bush St., San Francisco, to conduct the mainland operations of the EDWARD R. BACON CO. OF HAWAII.

☆ ☆ ☆

GEORGE S. MAY CO., business engineers, has established a Pacific Coast division in San Francisco, with **Harold J. McElhinny,** formerly director of the regional survey department, in charge as manager of operations.

☆ ☆ ☆

Administrative offices of KAISER CO., INC., IRON AND STEEL DIVISION, formerly maintained at Oakland, Calif., have been transferred to the steel plant of the company at Fontana. **A. B. Ordway,** vice-president and general manager, will continue in charge. It is expected this arrangement will be much more satisfac-

tory for peacetime operations of the division.

☆ ☆ ☆

S. I. Harris has resumed his old post as district representative for LaPLANTCHOATE MANUFACTURING CO., INC., for northern California and Nevada, after two years as a major with the armed forces in India and China. He will be at the San Leandro office of the company.

☆ ☆ ☆

Clarence M. Frazier, vice-president of FOOD MACHINERY CO., who for the past 18 months has headed the Peerless Pump division of the firm, is returning to San Jose to assume new work in the management. **Francis E. Fairman, Jr.,** formerly with GENERAL ELECTRIC CO., has also been made a vice-president and will be new head of the Peerless division.

☆ ☆ ☆

DeWitt Page has been announced as general manager of WOOD MANUFACTURING CO., Los Angeles, manufacturers of the Wood Roadmixer, important paving machinery. Page has been with the firm since 1937, except for one year. He will supervise not only design and manufacture, but will also direct Roadmixer sales.

☆ ☆ ☆

PACIFIC NORTHWEST

Ted Isaacson and **Paul Isaacson** have been elected members of the Board of Directors of ISAACSON IRON WORKS, Seattle manufacturers of heavy metal equipment. Ted Isaacson was named a vice-president in addition to the board membership. Paul is also president of YOUNG IRON WORKS of Seattle. Other officers elected by the Isaacson firm are **C. Harold Blomgren** as treasurer, **Harry D. Larson** as manager of the tractor equipment division for sales, service and development, and **George S. Allen** as manager of mechanical engineering.

☆ ☆ ☆

Herbert F. Price of the BETHLEHEM STEEL CO. has been elected president of the Purchasing Agents Association of Washington. He has been with Bethlehem's Seattle office since 1918 and is assistant district purchasing agent.

☆ ☆ ☆

INTERMOUNTAIN

KELITE PRODUCTS, INC., manufacturers of industrial chemicals for cleaning and processing, have completed a new factory at Dallas, Tex., and it was opened on June 23. It has a floor space of 49,000 sq. ft. and will serve the Southwest and Gulf Coast states. **F. L. Alexander** has been appointed assistant national director of Kelite, and will supervise operations of the new Dallas plant. Other new appointments include **Earl Lester,** divisional manager; **Roy South,** plant superintendent; and **F. J. Oxspring,** plant foreman.

☆ ☆ ☆

LANDES ENGINEERING CO., Salt Lake City, Utah, has been appointed by WORTHINGTON PUMP AND MACHINERY CORP. as distributor for its products in the Utah area. COAST EQUIPMENT CO., San Francisco, Calif., has received a similar appointment for the Bay area.

☆ ☆ ☆

NEIL B. McGINNIS CO. is building a 100x160-ft. building at Central Ave. and

PLEASE!

A few weeks ago we sent a questionnaire form to all of our subscribers asking them to indicate their individual position and the principal activity of the firm or department of government with which they were connected.

The sole reason this request was sent to you is because all paid circulation construction papers in the country are now required to have this circulation data available for checking. The information does not leave our office and is never used for any other purpose.

Over 5,000 forms have already been returned to us, properly filled out. If you are one of these 5,000, thank you! To the others, we are now sending out a second request. We'll be deeply grateful for your cooperation.

WESTERN CONSTRUCTION NEWS

Buchanan St., in Phoenix, Ariz., to house its rapidly expanding equipment distribution business and its repair facilities. The building is of reinforced concrete frame design, with brick filler walls and concrete floors, and is completely air-conditioned. It will be ready for occupancy about the middle of July.

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AMONG THE MANUFACTURERS

The Wilmington, Del., research facilities of ATLAS POWDER CO., will be expanded by construction of new units valued at $400,000, the funds having been approved by a recent meeting of the Board of Directors. The plant will be particularly devoted to working out methods of manufacture, prior to large scale fabrication. **Kenneth R. Brown** is director of the department.

☆ ☆ ☆

KIEKHAEFER CORP., Cedarburg, Wis., has been awarded for the fourth time, the Army-Navy "E," for maintaining its fine record of production of engines essential to the war effort.

☆ ☆ ☆

DIAMOND TOOL CO., Chicago, Ill., is proud of a diamond tool dresser, believed to be the largest in the world, which it furnished to Northwest Engineering Co. on Oct. 18, 1940, and which has been continuously in use since then. Originally it weighed 62.5 carats and was mounted on a 24-in. diameter, 3-in. face crank shaft grinder. It has since been reset seven times by the tool company. At its most recent resetting, it still weighed 29.75 carats, after having yielded 8,064 dressings during its lifetime.

☆ ☆ ☆

Recent promotions in the executive organization of CLEVELAND PNEUMATIC TOOL CO. include **Elmer J. Steger,** manager of the pneumatic tool and appliances division, and he has also been appointed manager of the Cleveland rock drill division. He is also executive vice-president and treasurer of the company's Canadian subsidiary. **Charles E. Vanderpool,** formerly assistant manager of the pneumatic tool division, has been made sales manager of that division. **Albert H. Hruby,** recently in charge of contract termination, has become manager of the rock drill division, and **Robert Craig** is now manager of export sales.

☆ ☆ ☆

C. H. Richardson, who has been directing sales, advertising, and exporting for ALLIED STEEL PRODUCTS, INC., and PITTSBURG-CAMBRIA STEEL CO., of Cleveland, Ohio, has resigned to enter the auto ferry and passenger steamship service business.

☆ ☆ ☆

THE DAYTON-DOWD COMPANY of Quincy, Ill., independent pump company, was purchased by FOOD MACHINERY CORPORATION, President **Paul L. Davies** has announced. The firm will become a branch of Peerless Pump division of Food Machinery Corporation. **Clarence M. Frazier** will supervise all branches of the division with **H. J. McKenzie,** who has been Frazier's assistant, transferring to Quincy to direct that branch.

☆ ☆ ☆

AEROIL PRODUCTS CO. is the new name adopted for the firm originally known as Aeroil Burner Co., of West New York, N. J. The firm manufactures heating kettles, weed burners, dip tanks, and a variety of other products.

NEW EQUIPMENT

Sump Pump

Manufacturer: W. R. Carnes Co., Madison, Wis.

Equipment: Sump tank cleaning machine.

Features claimed: New electric driven vacuum operated sump cleaner provides quick, clean removal of sludge chips and coolant or oils from grinders and other machine tools. Known as the model 20-T, this machine will save up to 75 per cent of the cleaning time, and reclaims coolant by the use of filters.

A rotary vacuum pump creates a suction in the main reservoir tank into which the liquids are drawn after passing through a filter basket to remove sludge and chips. Only air passes through the pump, thus saving this mechanism from the wear of abrasive materials. When the receiving tank is full of recovered coolant, a pilot light indicates this fact so the tank can be emptied as well as the sludge basket. A Series D is equipped with a centrifugal sludge basket which helps to separate the solids from the coolant or oils.

The unit comes fully equipped with suction hoses, and mounted on a small dolly easily moved from one machine sump to another.

Mobile Shovel

Manufacturer: Link-Belt Speeder Corp., Chicago, Ill.

Equipment: Wheel-mounted Shovel Crane.

Features claimed: Highly mobile, utility

½ cu. yd. shovel and crane capable of lifting 6 tons. The new model is known as UC-55 Shovel-Crane especially designed to meet the needs of state highway, county, city road departments, and contractors. It can be driven over the highway at speeds up to 10 m.p.h. The overall width of the machine is 8 ft., wheel base 7 ft. 6 in., and

overall weight equipped as a shovel 26,350 lbs. The unit is mounted on dual wheels, with 10.00 x 20 — 12-ply pneumatic tires.

Easy steering is accomplished from the operator's cab by hydraulic power. Other features include automatic hydraulic stabilizers which lock the oscillating front axle in any position and greatly increase stability of machine; equalizing for uneven ground conditions. Power hydraulic brakes lock machine against involuntary movement when digging.

It is easily convertible to all conventional attachments, including a pile driver for repairing bridges and retaining walls.

Protective Welding Film

Manufacturer: Lincoln Electric Co., Cleveland, Ohio.

Equipment: Non-Spatter welding film.

Features claimed: A liquid designed to minimize the adherence of welding spatter to metal and reduce cleaning time. The liquid can be applied with either a brush or air brush, and welding can proceed after application, whether the film is still wet or dry. It is claimed that priming coats of paint may be readily applied over the film. The film is readily removed, if it is desired, by washing with water.

Lincoln non-spatter film is supplied in concentrated form in 5-gallon cans for the convenience of the user. By diluting the concentrated material with three parts of water, 20 gallons of film fluid is obtained.

Cable Lubricant

Manufacturer: American Chain & Cable Co., Bridgeport, Conn.

Equipment: All green-colored lubricant for wire rope.

Features claimed: American Chain & Cable Co. announce the use of an all green-colored lubricant for their highest grade preformed wire rope. Their non-preformed ropes made of improved plow steel will continue to be identified by the single green strand.

That this green lubricant was definitely superior to the ordinary black lubricants has been proved by years of field service. Ropes having the green strand, retired from all manner of service and returned to the mill for inspection and testing, revealed that wires protected with the green lubricant were in far better condition than the wires under the black lubricant in adjacent strands.

American Chain & Cable's Green-Lube has high viscosity and remarkable capacity

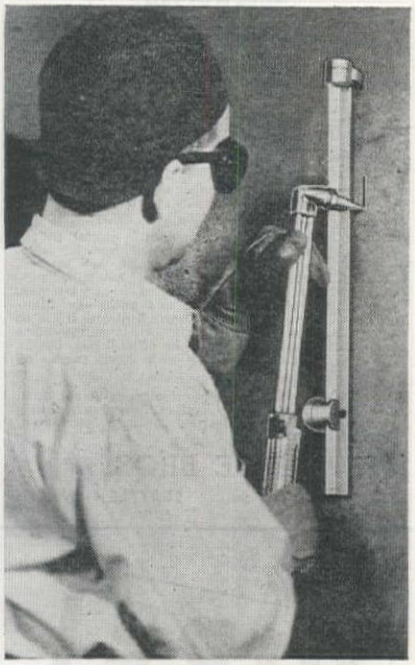
for adhesion to the surface of the wires. It is applied hot in a molten state under pressure which assures complete coverage and a stuffing action of all voids between the wires.

Straight Edge

Manufacturer: B. & W. Company, Los Angeles, Calif.

Equipment: Magnetic Straight Edge for flame-cutting torch.

Features claimed: Vertical and overhead flame-cutting, is greatly facilitated by the new B. & W. Magnetic Straight Edge. An 18-lb. magnetic pull holds the straight edge firmly to the work whether the plate is rusty, oily or painted. Uniformly clean and accurate cuts are assured because the torch



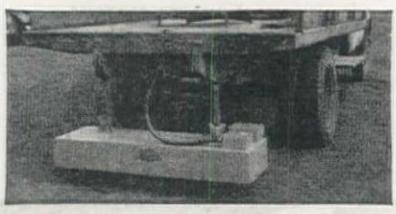
tip is held at the correct distance from the work. The tool is easily adjustable to cut any bevel angle. Made of heat-treated aluminum alloy, rigid as well as light in weight, the straight edge will not warp from heat and is resistant to corrosion. Three models are offered in lengths from 18 to 36 in.

Road Magnetic

Manufacturer: Dings Magnetic Separator Co., Milwaukee, Wis.

Equipment: Electro-magnet to sweep road free of tramp iron.

Features claimed: A rectangular suspension, high intensity, electro-magnet, is now available to clear tramp iron from roads.



The unit is a double gap model with the gaps constant at all points to promote even distribution of magnetic flux over the entire magnet face.

The new model road sweeping magnet operates from a generator set carried on the truck bed and comes in a complete range of sizes to any requirements. Complete units including magnet, generator, and trailer are available.

LITERATURE FROM MANUFACTURERS . . .

Blaw-Knox Co., Blawnox, Pa.—Bulletin 2036 describes in detail such construction necessities as steel street forms, self-aligning steel forms, finishing machines, batching and mixing plants, sheepsfoot tamping rollers, clamshells, etc. This 12-page pamphlet also contains considerable technical information of value to the user of construction equipment. Not only is it a handy reference book for the contractor, but it lists a complete line of equipment manufactured by the company for the concrete paving of roads, streets and airports.

Caterpillar Tractor Co., Peoria, Ill.—In the new 16-page color booklet, "Why the Owner Profits," is stressed the importance of balance between the capabilities of a machine and the requirements of the job, in the design and manufacture of the equipment, between prime and auxiliary equipment, and between cost, length of life, ease of maintenance and availability of parts and service. Graphic action pictures illustrate a wide range of operations throughout the country.

American Manganese Steel Div. of American Brake Shoe Co., Chicago Heights, Ill.—"Non-Magnetic Applications for Amsco Manganese Steel," is the title of a new 32-page illustrated bulletin

recently issued by the company. Presented in Bulletin 1144-NM are studies with illustrations of typical applications where nonmagnetism and the ability to withstand shock and wear were equally vital factors in the selection of manganese steel. The story of manganese steel and the company's research facilities are also covered in the bulletin.

Timber Engineering Co., Washington, D. C.—A new brochure tells the story of wood's usefulness to man, describes its current developments as an engineering medium, as the raw material of plastics and chemicals, and heralds the dawn of a new age for America's greatest, renewable, natural resource. This handsome 36-page booklet, in five colors, covers by means of many pictures and in text such divers wood research projects and developments as plastics from impregnated sawdust, chemical bending and seasoning of wood, molded products, production of ethyl alcohol and other chemicals from "waste" wood, dowels for furniture, and tests of flat timber trusses under long-time loading. The book is published with the aim of stimulating further interest in wood research.

Rock-Tred Corporation, Chicago, Ill.—A new leaflet put out by the company describes "Rock-Tred," a pre-mixed, fire-resistant, quick-setting floor resurfacer, and "Tuff Tred," a low-cost, tight-binding adhesive substance similar to "Rock-Tred," except that some of the necessary aggregates must be added on the job.

Bonney Forge & Tool Works, Allentown, Pa.—"Handbook of Branch Pipe Outlets," just off the press. A handy pocket-size manual for men responsible for piping, this 32-page handbook illustrates and explains the four simple steps in installing full pipe strength outlets by the WeldOlet Method. Also illustrated are the tools needed to make the joint, the three types of WeldOlet fittings available for butt-welded, threaded and socket-welded branch pipes, and typical installations.

Fairbanks, Morse & Co., Pomona, Calif.—Two bulletins have recently been released. One of them deals with the Figure 6920 Oil Lubricated Turbine Pump and is known as Publication AQB400.1. The other is about the company's low-lift, large capacity line of pumps known as Niagara Propeller Pumps. This bulletin is designated as AQB500.1.

Fort Pitt Bridge Works, Pittsburgh, Pa.—A brochure commemorating fifty years of progress in steel fabrication and erection has recently been completed. Graphically portraying the company's growth in industrial America, this new book is abundantly illustrated throughout its fifty-two pages. Pictured are all types of steel construction: movable bridges, railway bridges, concrete and steel bridges, industrial construction, etc. A description of the company's plant facilities, workshops and engineering rooms is also given.

Burrell Technical Supply Co., Pittsburgh, Pa.—The company has recently published a 96-page booklet, divided into two sections. One-half of the book is in the form of a complete catalog (No. 80) of Burrell gas analysis apparatus. Many models of both laboratory and portable types are shown and a complete price list appears. Several pages are devoted to parts and accessories. The second half of the publication is a manual for gas analysts. It is devoted to the volumetric method, and attempts to describe technique and apparatus in sufficient detail to provide the in-

experienced analyst with adequate working knowledge. For additional technical information on gas analysis a bibliography is provided.

The B. F. Goodrich Co., Akron, Ohio.—The new 48-page booklet, "How to Get the Most Service Out of Your Off-the-Road Tires," describes, with text and pictures, each of the off-the-road lines of tires the company manufactures for specific services. Reasons for particular constructions to meet the exacting requirements are explained. Hazards which meet each type of tire are pointed out, and methods to avoid them suggested.

Caterpillar Tractor Co., Peoria, Ill.—A new eight-page color booklet, "Modern Mileage Makers" just released by the company, explains how its products can help when peace comes in the transformation of the roads of America now inadequate for postwar requirements. Pictures include rock crushing, relocating, maintaining, ditch-cleaning, scraping, "blind" corner removal, gravel loading, windrowing, grading, ditch cutting and snow removal operations in various sections of the United States.

B-W Superchargers, Inc., Milwaukee, Wis.—A new booklet titled "Supercharging for Greater Power and Improved Performance" has just been published. It is a well illustrated and instructional booklet, giving something of the history of supercharging, the mechanical principles of the Roots type, positive displacement supercharger, methods of manufacture and applications. The advantages of positive displacement superchargers with a wide range of applications on all types of marine, industrial and automotive engines, are pointed out.

The Jaeger Machine Co., Columbus, Ohio.—Completion of a 50-page catalog (No. JL-5) on the Jaeger Fleet Foot Loader is announced by the company. The new book covers in detail this mobile power unit with all its many interchangeable attachments, i.e., ½-yd. digger bucket, Standard all-purpose bucket, General purpose bucket; 2-yd. cinder, ash and snow bucket; cranes for shop yard and warehouse, for light steel erection, for stevedoring; magnet, blade, and telescopic fork lift attachment; and Prime mover for freight cars and trucks. Photographs and diagrams illustrate the equipment and its various uses. Several pages of specifications are also given.

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