WESTERN CONSTRUCTION NEWS

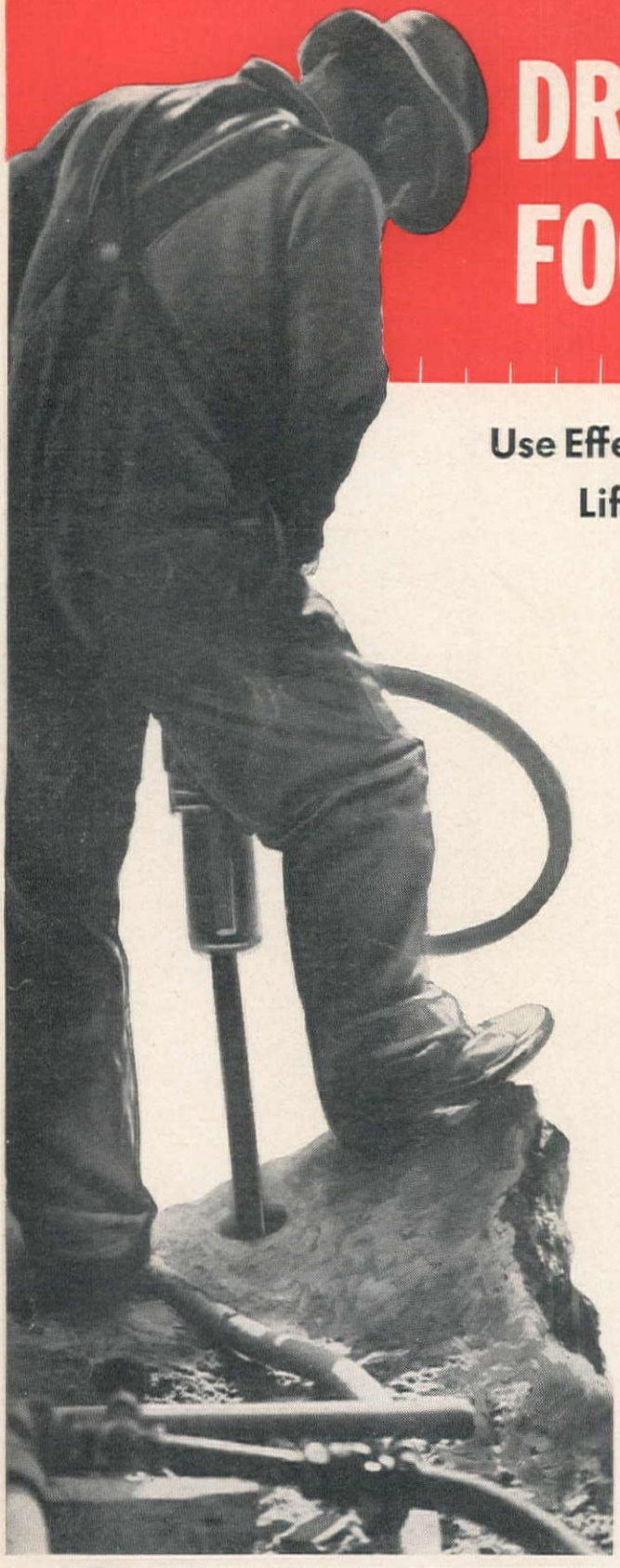
WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXII, No. 4

APRIL • 1947

35 CENTS A COPY
$4.00 PER YEAR

NIGHT SHOT of the Macco-Morrison-Knudsen quarry located in the hills back of the San Francisco airport which is supplying all fill material for the airport's enormous expansion program. For a period of three months, over one million cu. yd. of fill per month was produced here.



DRILL GREATER FOOTAGE at Lower Cost

Use Effective Lubrication to Increase Drill Life and Reduce Maintenance Cost

You can't buy more effective lubrication than Texaco Rock Drill Lubricants (E.P.) — and those letters "E.P." are an important reason why. They mean the oil has Extreme Pressure properties . . . extra high film strength to protect drills under the toughest conditions.

In addition, Texaco Rock Drill Lubricants (E.P.) flow readily at all temperatures, resist oxidation, cling protectively to moving parts and reduce wear. They prevent rust and corrosion whether drills are running or idle.

This all-around protection keeps drills running smoothly and on the job longer, with less downtime for repairs and overhauls. That's why operators and drill doctors everywhere prefer Texaco Rock Drill Lubricants (E.P.) and why leading rock drill manufacturers approve them.

Call on Texaco Lubrication Engineering Service for helpful suggestions on drill operation and maintenance. Contact the nearest of the more than 2300 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

KEEP COMPRESSOR VALVES CLEAN

Here, too, effective lubrication is vital. *Texaco Alcaid, Algol and Ursa Oils* provide effective lubrication, prevent hard carbon formations, keep valves clean and active, rings free, ports open and air lines clear. Your Texaco Lubrication Engineer will recommend the right one to keep your compressors running right — efficiently and economically.

TEXACO

REG. T.M.

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Tune in . . . TEXACO STAR THEATRE presents the NEW TONY MARTIN SHOW every Sunday night. See newspaper for time and station.

It's the TOUGH JOBS that make Northwest Repeat Orders

KUCKENBERG CONSTRUCTION CO. of Portland, Ore., bought their first Northwest seven years ago in 1940.

Since then, they have added steadily to their Northwest fleet. Their work is tough—chunking out on timber access roads for the U. S. Forest Service. That's the kind of work that proves a rock shovel!

It is significant that Kuckenberg have recently added two more Northwests to their fleet.

Find out why one out of every three Northwests sold is a repeat order. Ask Northwes' users.

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

Six NORTHWESTS for Kuckenberg Construction Co. Portland, Oregon

ocal NORTHWEST sales agents

DENVER, COLORADO
The Mine & Smelter Supply Co.

BUTTE, MONTANA
Hall-Perry Machinery Co.

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

CHEYENNE, WYOMING
Wilson Equipment & Supply Co.

PHOENIX, ARIZONA
State Tractor & Equipment Co.

PORTLAND, OREGON
Baizer Machinery Co.

NORTHWEST SALES OFFICES:

LOS ANGELES, CALIFORNIA
3707 Santa Fe Avenue

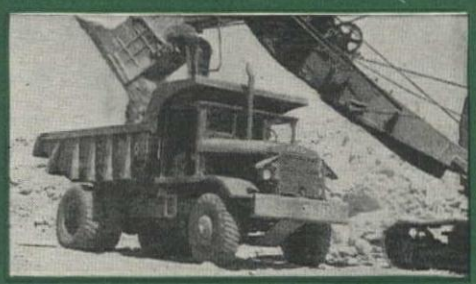
SAN FRANCISCO, CALIFORNIA
255 Tenth Street

SEATTLE, WASHINGTON
1234 Sixth Ave., South

EUCLIDS at work on DAVIS DAM

EASY LOADING—Wide hopper speeds loading, reduces spillage and increases efficiency of the loading unit.

FAST DUMPING—Full length door openings and steep, smooth hopper sides assure quick, clean dumping.



Rugged construction of Rear-Dump Euclids withstands impact of loading heavy excavation by large shovels. High dumping angle and clearance from rear wheels discharges load over edge of the fill.

● About 67 miles below Boulder Dam, on the Colorado River, the U. S. Bureau of Reclamation is building Davis Dam, an earth and rock-fill structure of 4,400,000 cu. yds. Utah Construction Co. has the contract for the major part of this project, which includes 15,000,000 cu. yds. of earth work, and will take four years to complete.

A fleet of 41 Rear-Dump and Bottom-Dump Euclids is hauling this huge yardage of heavy excavation. Working on 'round the clock schedules, the "Eucs" have kept this tough job going in high gear. Their speed and large capacity, combined with rugged staying power, have enabled the contractor to stay ahead of schedule despite a wide range of operating conditions.

Because they are designed and built for efficient and dependable performance in heavy off-the-highway service, Euclids cut hauling costs. Ask your Euclid distributor or representative for complete information on the models best suited to your own hauling equipment needs.

The EUCLID ROAD MACHINERY Co.
CLEVELAND 17, OHIO

EUCLIDS *Move the Earth*

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

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WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Volume 22 APRIL • 1947 Number 4

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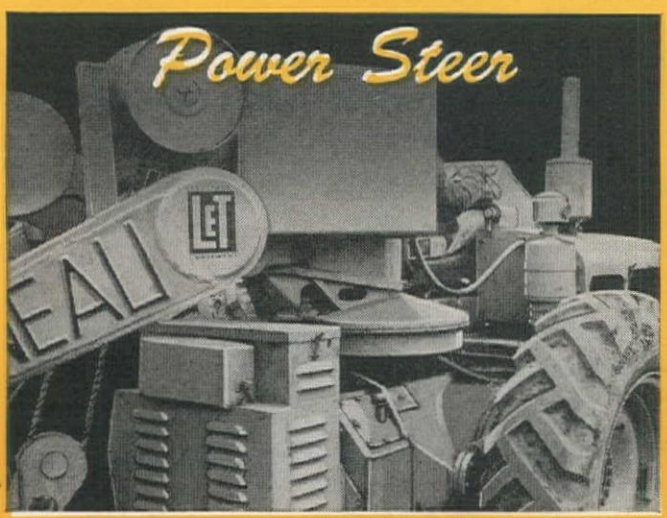
Covering the Western Half of the National Construction Field

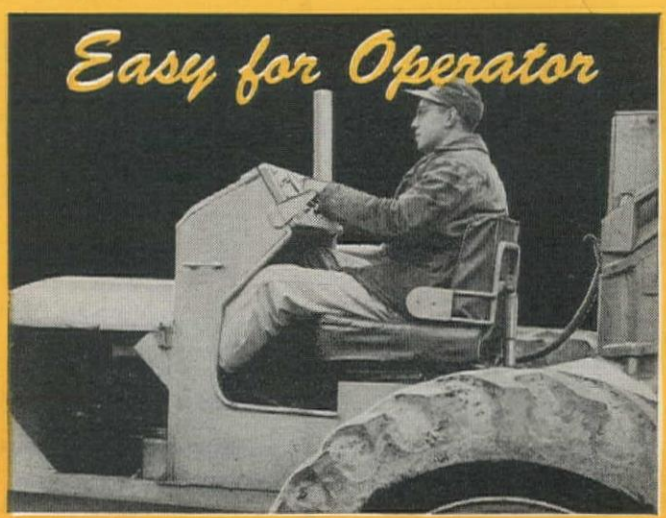
ONE-MAN ... New small

Bowl, apron, tailgate and steering controlled by Tournatorque electric motors. Each operation finger-tip controlled from dashboard. The Tournatorque electric motor is a new type of AC motor with the lugging characteristics of DC motors. Tournatorque electric motors and generators are simpler in operation and maintenance than the electric starter on your car or truck.

This new Tournapull hauls through loose sand, mud, snow or ice that would stall any previous wheeled vehicle. The revolutionary Tournamatic differential is so designed to make one wheel pull 4 times harder than the other before it will slip. Most power is automatically supplied to the wheel on firmest footing.



Electric motor operates a steering gear on the yoke king-pin. This locks Tournapull and Carryall into a single unit and keeps rig traveling in desired direction, regardless of underfoot conditions. Operator merely pushes a button to turn . . . Tournapull continues on same course until operator again pushes control button for right or left turn. Selective 2-speed steering gives positive control.

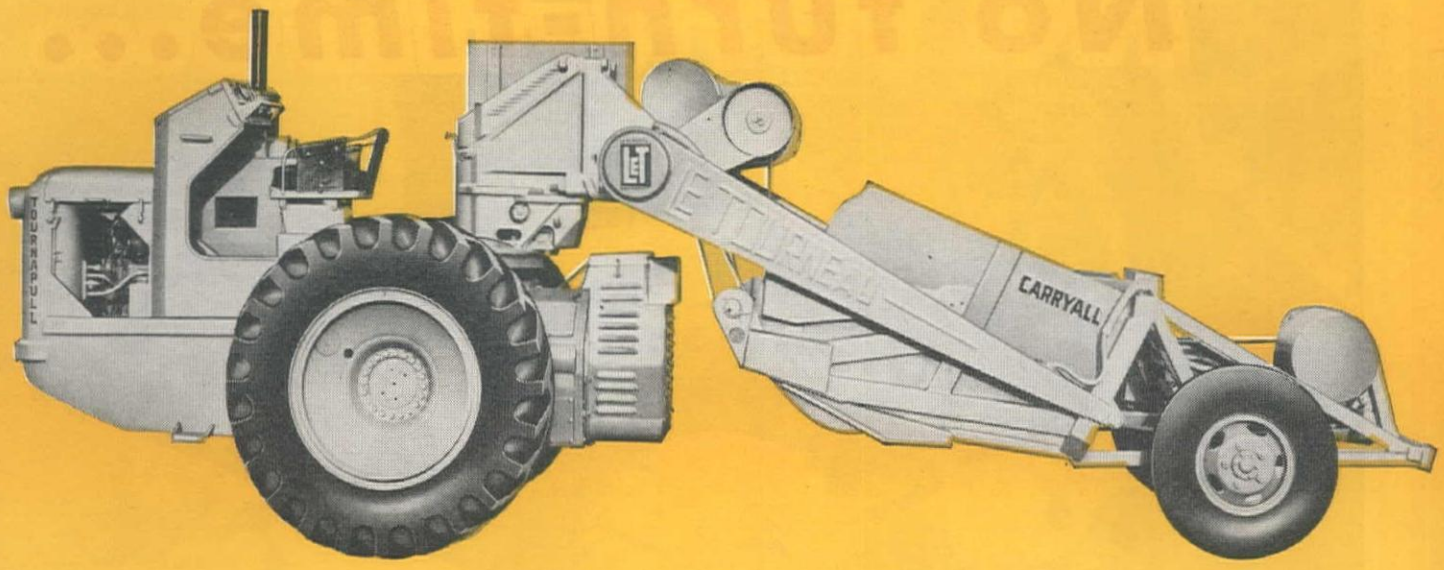


Electric control, power steer, positive traction make the new Tournapulls easy for the operator. Finger-tip controls for steering and all Scraper operation from a single control panel take the labor out of operating . . . reduce operator fatigue. Comfortable spring-cushioned seat, plus shock-absorbing rubber tires are a few more reasons why operators like the new Tournapulls.

LE TOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

DIRTMOVER
TOURNAPULL



CLEARS slides; fills washouts; loads, hauls and spreads surfacing; strips and works gravel pits; digs stockponds; fills lots; levels building sites; grades and surfaces driveways or access roads; builds small dams or levees. Travels on pavements or cross country; no trailer or haul equipment needed. Fills tank at any filling station.

SELF LOADING

3.3 YARDS PAY DIRT

85 H.P. GASOLINE ENGINE

TIRES { 14:00x32 PRIMEMOVER
9:00x16 ON CARRYALL

WEIGHS 7½ TONS EMPTY

Production per hour

One-way haul	Yards per hr.
200'	48
400'	45
600'	42
800'	40
1000'	38
1500'	33
2000'	30
2500'	27
3000'	24
4000'	21
5000'	18

Above production figures based on average type scraper material, fairly level haul, good working conditions. Figures show production for 60-minute hour, one-man operation, no pusher.

LETOURNEAU PEORIA, ILLINOIS — JOB-PROVED Over 5000 Built and Shipped — **TOURNAPULLS**

DUMPTOR

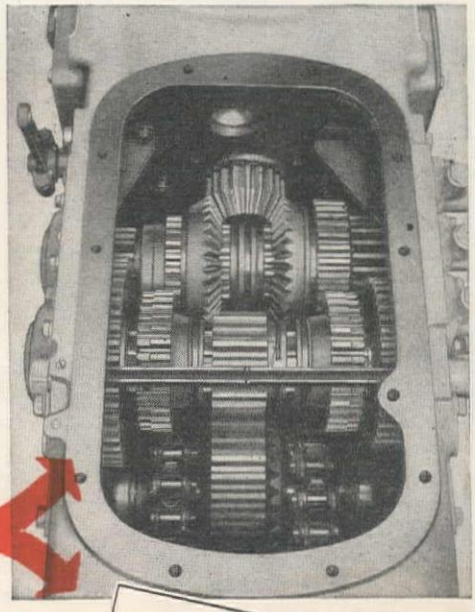
More Haul-time

Dumptor never turns on shuttle hauls, runs backward as fast as forward

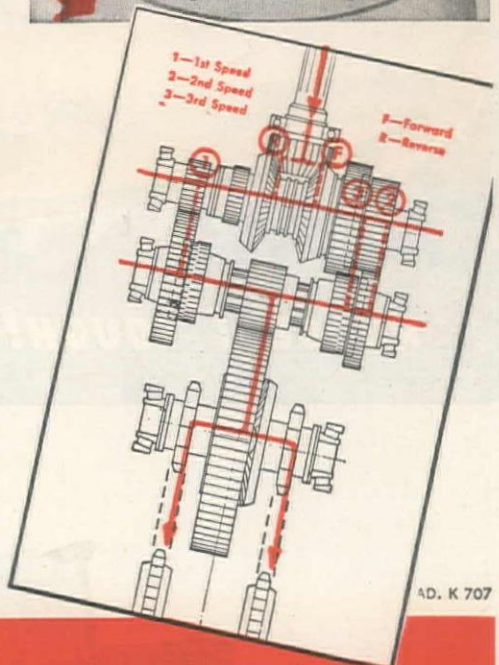
Are slow turns at the shovel, at the dumping point robbing you of important hauling time that could increase your profits? Time your present shuttle haul operation. Find out just how much turning costs you. Then, check Dumptor savings.

Here's How Dumptor Works On Shuttle Hauls: Reverse speeds, three of them, are just as fast as the three forward speeds. On shuttle hauls, you never turn the Dumptor, either at the shovel or at the dumping point. You come in to the shovel, engine first. Loaded, you travel body first; at the dumping point, you're in the right position for instantaneous dumping, without a single turn.

Transmission Built for Shuttle Work: Dumptors, and only Dumptors, can shuttle without asking for transmission trouble. Unlike the conventional truck transmission, the Dumptor transmission is especially designed for this type of work. Gears that produce reverse travel are just as large as the "forward" gears. That's why there's no undue stress, no need for excessive lubrication, no transmission trouble.



Here's how Dumptor Constant Mesh Transmission looks and works.



AD. K 707

High speed travel without turn delays is only one reason why fewer hauling units will do the job if you're using Dumptors. Here are three other reasons:

Instant Dumping — No Body Hoist: Saves 10 to 20 seconds every time it dumps. No waiting for slow-raising body hoist. Dumps fast even in zero weather. Kick-out pan leaves body clean.

Drive Axle Built For Rock Hauling: Four-inch chrome steel drive axles are heat-treated. Heavy steel case protects entire assembly. Steel dump body has 4" channel reenforcements. Steering axle oscillates to absorb frame-twisting shocks of rough haul roads.

Easy to Maintain: Everything accessible. One man can grease Dumptor in 5 minutes. Clutch pulls out in a fraction of usual time because motor is not moved, transmission case is not touched. Every transmission gear is removable through one cover. No body hoist maintenance, because Dumptor has no body hoist.

Experienced Dumptor engineers are ready to survey your shuttle haul problem. Contact your Koehring distributor today.

KOEHRING HEAVY DUTY

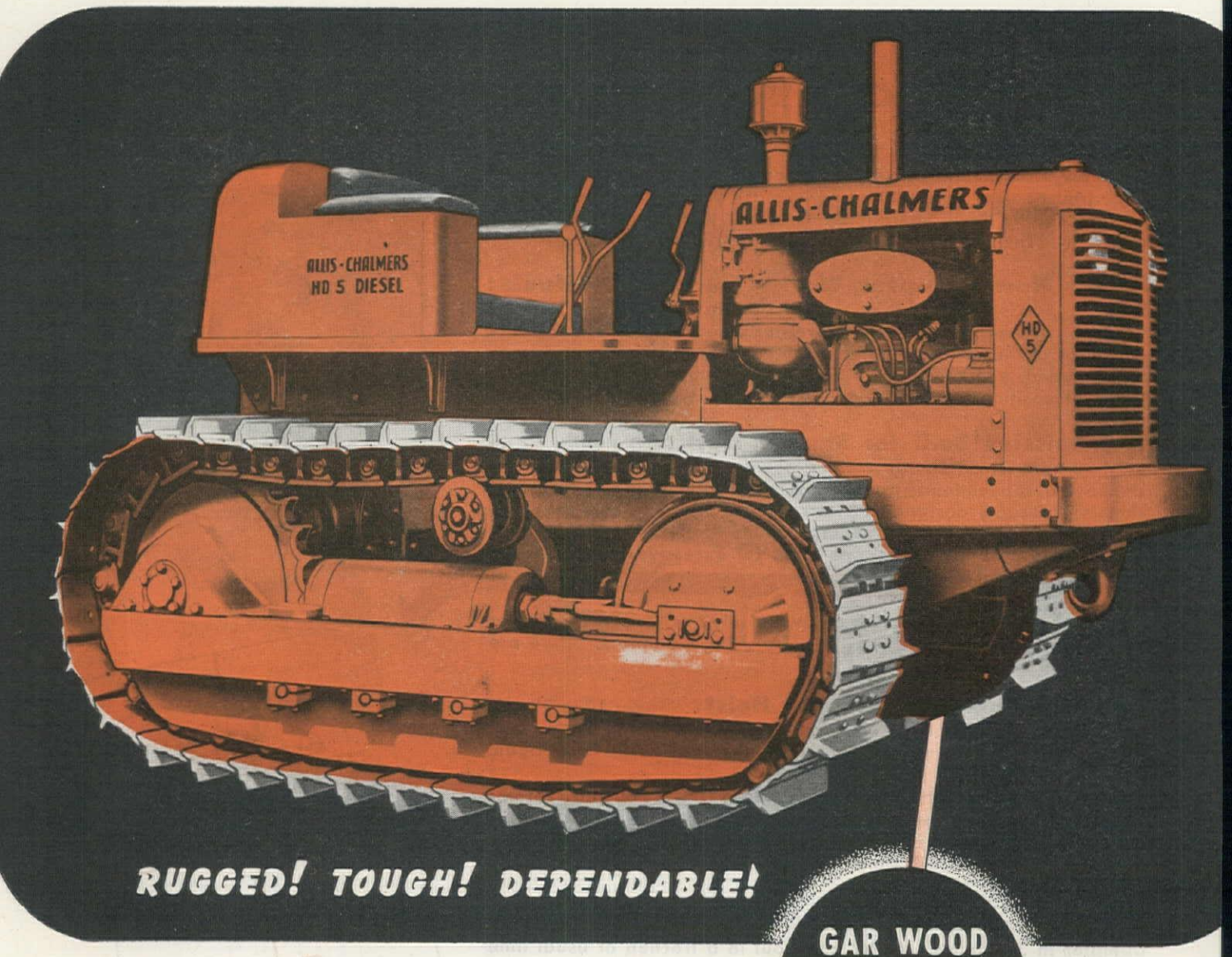
Pacific Hoist & Derrick Co.
Seattle, Wash.
Western Machinery Co.
Spokane, Wash.
Columbia Equipment Co.
Portland, Oregon

Harron, Rickard & McCone Co.
of Southern Calif., Los Angeles, Calif.
Kimball Equip. Co., *Salt Lake City, Utah*
McKelvy Mach. Co., *Denver, Colo.*
Moore Equip. Co., *Stockton, Calif.*

The Harry Cornelius Co.
Albuquerque, N. M.
Neil B. McGinnis Co.
Phoenix, Arizona

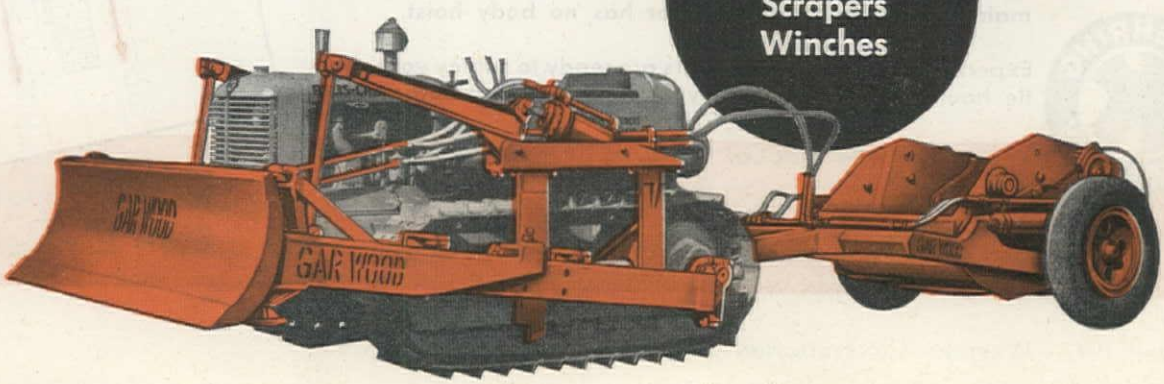
Knowledge Experience Cooperation

BUILT FOR A GREAT TRACTOR



RUGGED! TOUGH! DEPENDABLE!

GAR WOOD
Bulldozers
Scrapers
Winches



A GREAT ALLIED LINE

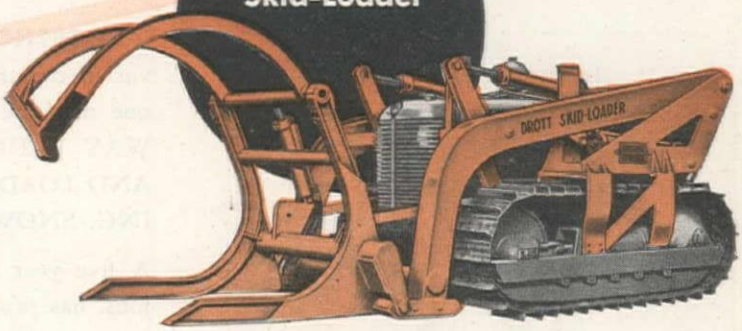
New Allis-Chalmers HD-5 and Its Allied Equipment Match Fully and Completely

- Result of finest kind of cooperation between the various Allied manufacturers and the entire Allis-Chalmers organization, its dealers and users.
- Backed by the knowledge, experience and facilities of each manufacturer . . . each skilled in his own field . . . each firmly established in his own right.
- Specialized design and engineering. Allied equipment was developed and tested along with the HD-5 . . . made to fit exactly and to perform with maximum efficiency.
- Both tractor and equipment sold and serviced by the same organization — exclusively by Allis-Chalmers dealers throughout the country.

Yes, the HD-5 with any Allied unit is a fully matched power package . . . matched for greater output at lower cost.

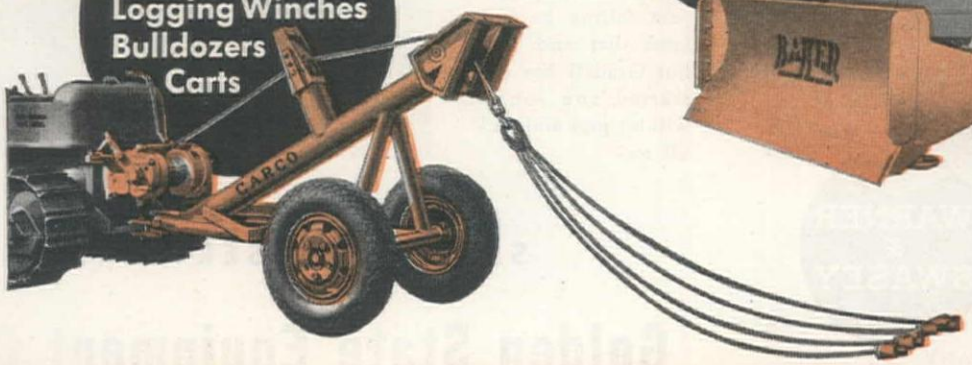
TRACTOMOTIVE
Front-end Shovels

DROTT
Skid-Loader



BAKER
Bulldozers
Snow Plows

PACIFIC CAR AND FOUNDRY
Logging Winches
Bulldozers
Carts



ALLIS-CHALMERS

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

PRECISION. Here's a typical Gradall job — cleaning several thousand feet of neglected road ditches at low cost. Properly pitched ditch bottoms and perfectly graded slopes without costly clean-up labor are a result of Gradall accuracy.

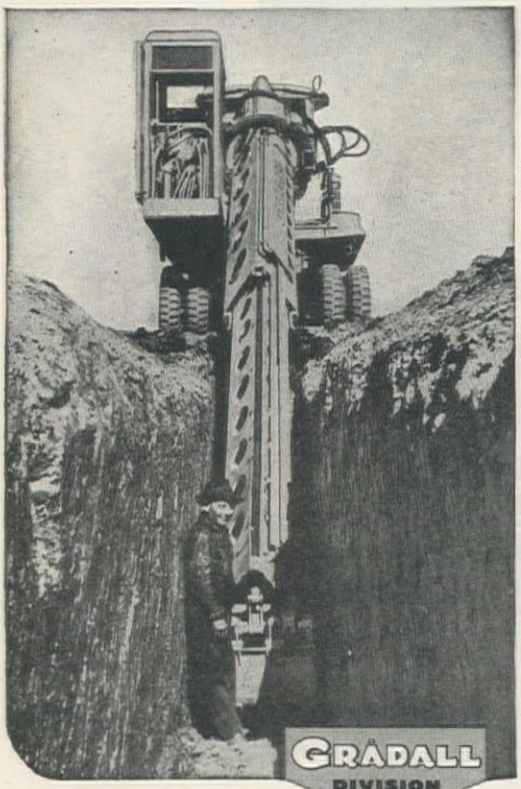
THE *New*

GRADALL

DOES THINGS

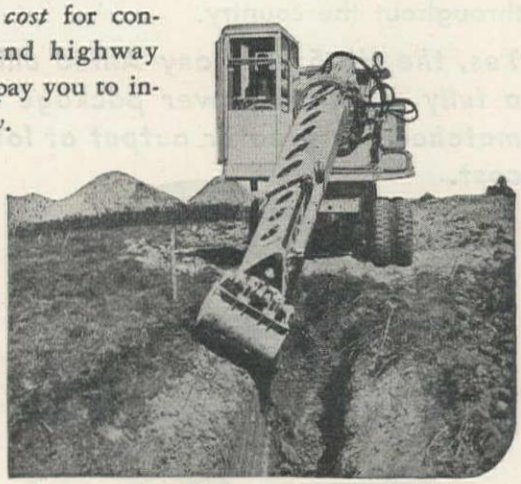
One machine NEVER DID BEFORE!

VERSATILITY. A quick change of attachments (less than 15 minutes to change tools) and Gradall is ready for the next job. This time it's a ten-foot trench with sheer clean-cut sides.



FAST TRENCHING AND DITCHING are only two of many varied construction jobs performed by Gradall. Now, with this one machine, you can do many kinds of work such as: HIGHWAY WIDENING, BASEMENT EXCAVATING, RIPPING AND LOADING OLD PAVEMENT, SLOPING AND GRADING, SNOW REMOVAL AND LOADING.

A five year test program, using pilot models on actual pay jobs, has *proved* Gradall does jobs *better* and at *lower cost* for contractors and street and highway departments. It will pay you to investigate Gradall *now*.



DEXTERITY. Gradall "Arm Action" tilts the tool in chamfering trench corners to prevent falling back of loose dirt and rock. But Gradall has only started the job; it will lay pipe and backfill, too.

GRADALL DIVISION

WARNER & SWASEY *Cleveland*

Gradall Reg. U. S. Pat. Off.

SEND FOR BOOKLET

. . giving complete specifications and facts.

WARNER & SWASEY COMPANY
Cleveland 3, Ohio
Please send the new GRADALL Book to:

Name .....

Address .....

City ..... *State* J-447

SALES AND SERVICE:

Golden State Equipment Co.

4770 Valley Blvd.

Los Angeles 32, California

WHAT you see above is not only a grading job, but a *low-cost* grading job—because that operator is getting maximum traction, minimum slip, from his Goodyear Sure-Grip tires.

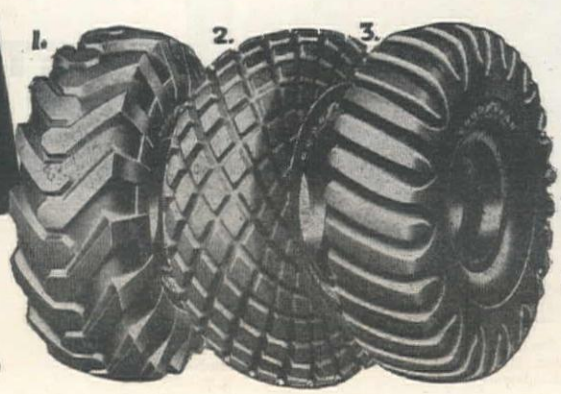
The reason is straight and simple. Sure-Grips give more grip and go because of Goodyear's *open center* tread design. It keeps each lug bar completely separate—gives each lug a bite edge right in the heart of the traction zone. So the *entire* lug can dig in full depth, full length, and *grip*. And with no connected lugs to form mud traps that pack up and cause excess slip, Goodyear *open center* tread is self-cleaning, deep-biting.

On the drive wheels of work units—from road graders to giant earth-movers—Sure-Grips have no equal. Year after year of low-cost, high-hour performance proves *that*. That's why they're *first choice* with veteran contractors everywhere—and why it will pay you to buy and specify Goodyears for your units.

GOODYEAR

BUY and SPECIFY GOODYEAR —it pays!

MORE YARDS ARE MOVED ON GOODYEAR OFF-THE-ROAD TIRES THAN ON ANY OTHER KIND

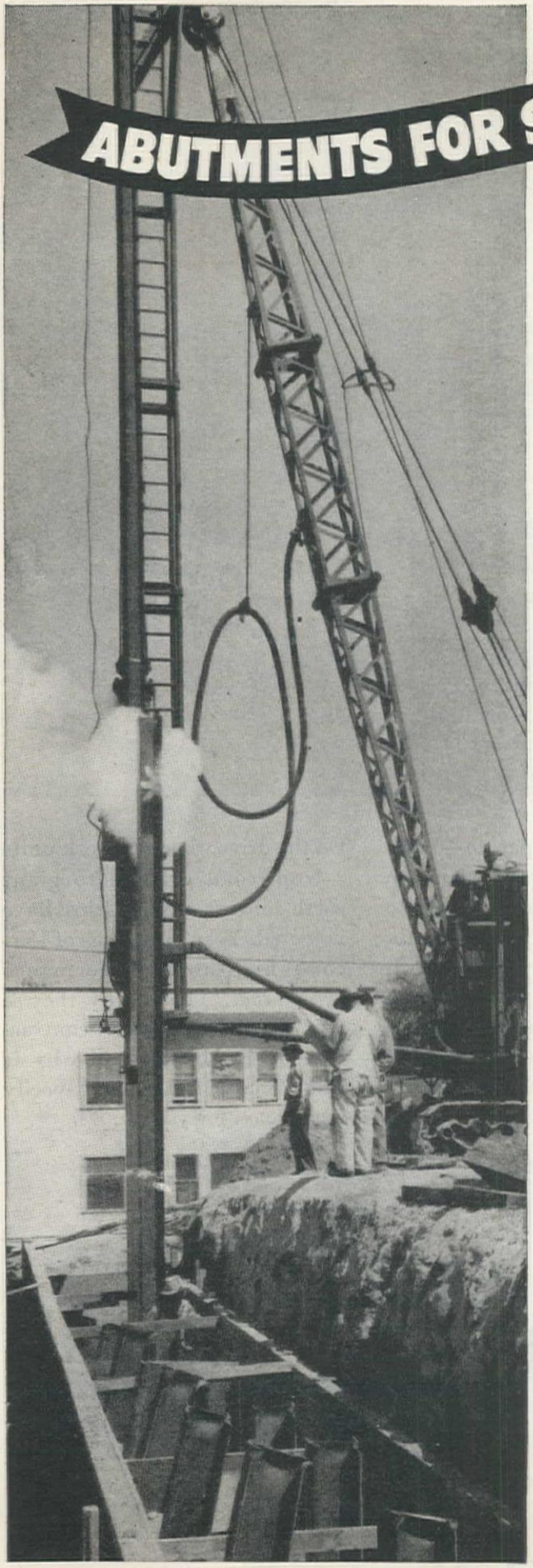


THE RIGHT TIRE FOR EVERY JOB

1. **SURE-GRIP** for maximum traction on drive wheels
2. **ALL-WEATHER** for drawn vehicles and general traction
3. **HARD ROCK LUG** for super-stamina in all rock work

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

ABUTMENTS FOR SANTA ANA FREEWAY



Driving Bethlehem H-piles in Santa Ana Freeway undercrossing project, Los Angeles. General Contractor: Haddock Company, Los Angeles; Sub-Contractor: Macco Corporation, Clearwater, Calif.

Supported on

BETHLEHEM H-PILES

The California State Highway undercrossing at First Street in Los Angeles is one of many interesting engineering projects in the construction of the city's great system of Freeways.

The design for this undercrossing called for four large, reinforced-concrete abutments supported on steel H-piles. Ten-inch Bethlehem H-piles were used for this part of the job. Each of two abutments required eleven vertical-bearing piles and eleven batter piles, all driven to 30-ft penetration through compact clay and decomposed granite. The two remaining abutments each contain thirty-two vertical-bearing piles driven to a penetration of 20 to 25 ft.

Bethlehem H-piles have been used to advantage in many important Pacific Coast viaducts, trestles, bridges, piers, wharves and foundations. These piles develop high bearing value when driven to practical refusal . . . they have high column strength . . . they displace little soil . . . they are simple to splice . . . they are immune to marine borers and termites . . . they cost little to drive.

For information on test data and details of typical H-pile installations write or phone for Booklet 99-B.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

General Offices: San Francisco

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

Steel Plants: South San Francisco, Los Angeles, Seattle

BETHLEHEM PACIFIC

★ BETHLEHEM STEEL ★

EFFICIENCY BRIGADE

"Caterpillar" builds the units you need to zone equipment for lowest costs on earth

1 Track-type tractors for "push"-distance earthmoving.

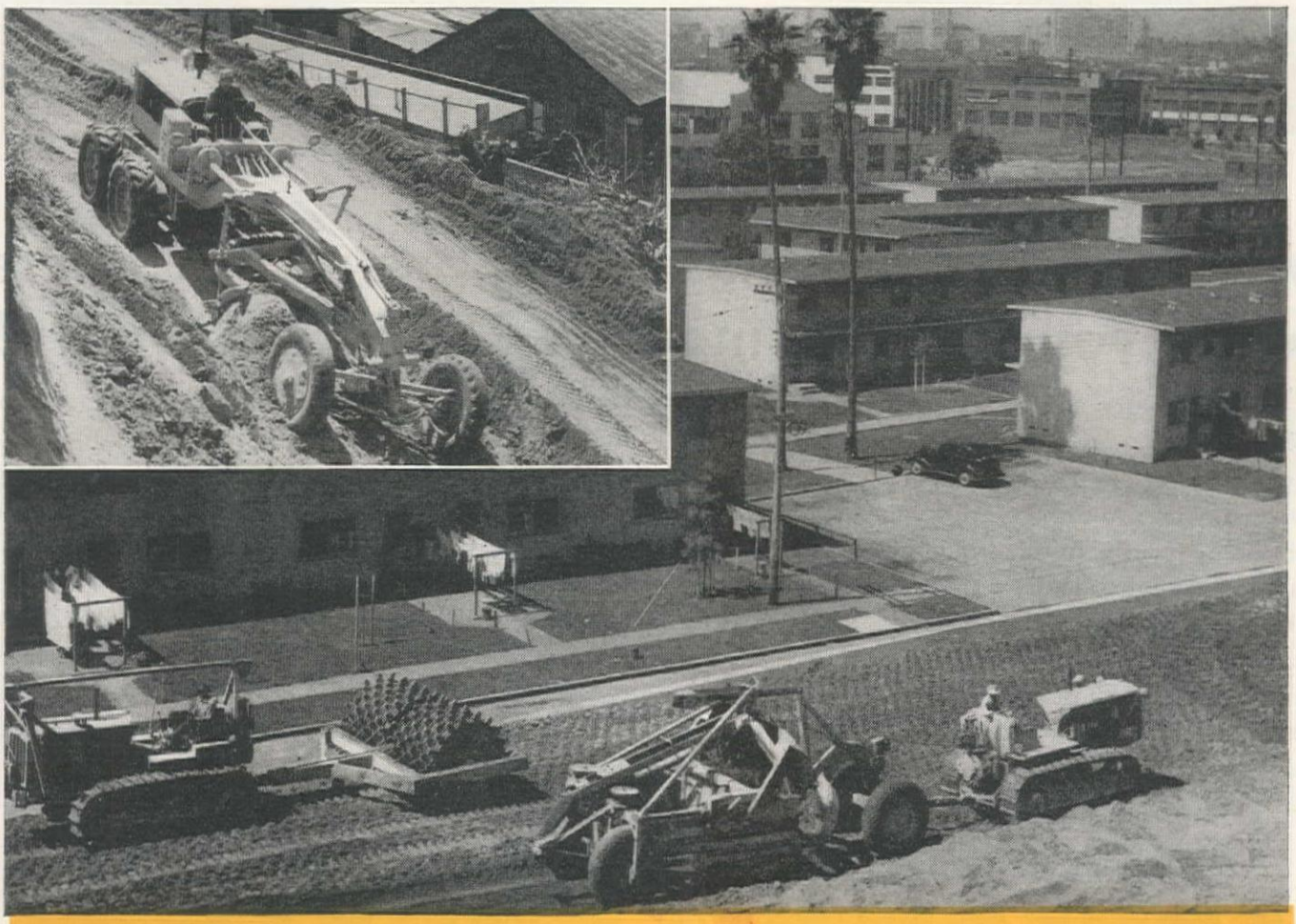
2 Track-type tractors for loading and pulling scrapers on medium hauls.

3 Wheel-type tractors for high-speed long hauls. —plus motor graders for finishing work.

HERE'S a typical example of matched equipment zoned to the job—the ideal way to go sailing through an operation with minimum lost motion and maximum time and money saving. It's a traffic bypass project (Los Angeles) to which Peter Kiewit Sons Co. (one of America's largest contractors) assigned a brigade of equipment that included two sizes of "Caterpillar" Diesel Tractors, a "Caterpillar" Diesel No. 12 Motor Grader—with scrapers, bulldozers and tampers to fit their power and controls.

Other important "accessories" you don't see—but no doubt know about—are proved "Caterpillar" quality, dependability and operating economy . . . plus dealer service that is widely regarded as the most complete, efficient and best equipped of its kind.

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



CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT—*for lowest costs on earth*

BE WISE! *Modernize Now*

Hunter Construction Co. of Ada, Oklahoma is another of the hundreds of smart earthmovers who are finding that modern LaPlant-Choate scrapers move more dirt at less cost—even with old tractors. Note the heaping load being handled by this LaPlant-Choate C-114 on a highway relocation job near Ardmore, Oklahoma.

Why gamble with inefficient pre-war scrapers when you can get modern LPC's in a hurry!

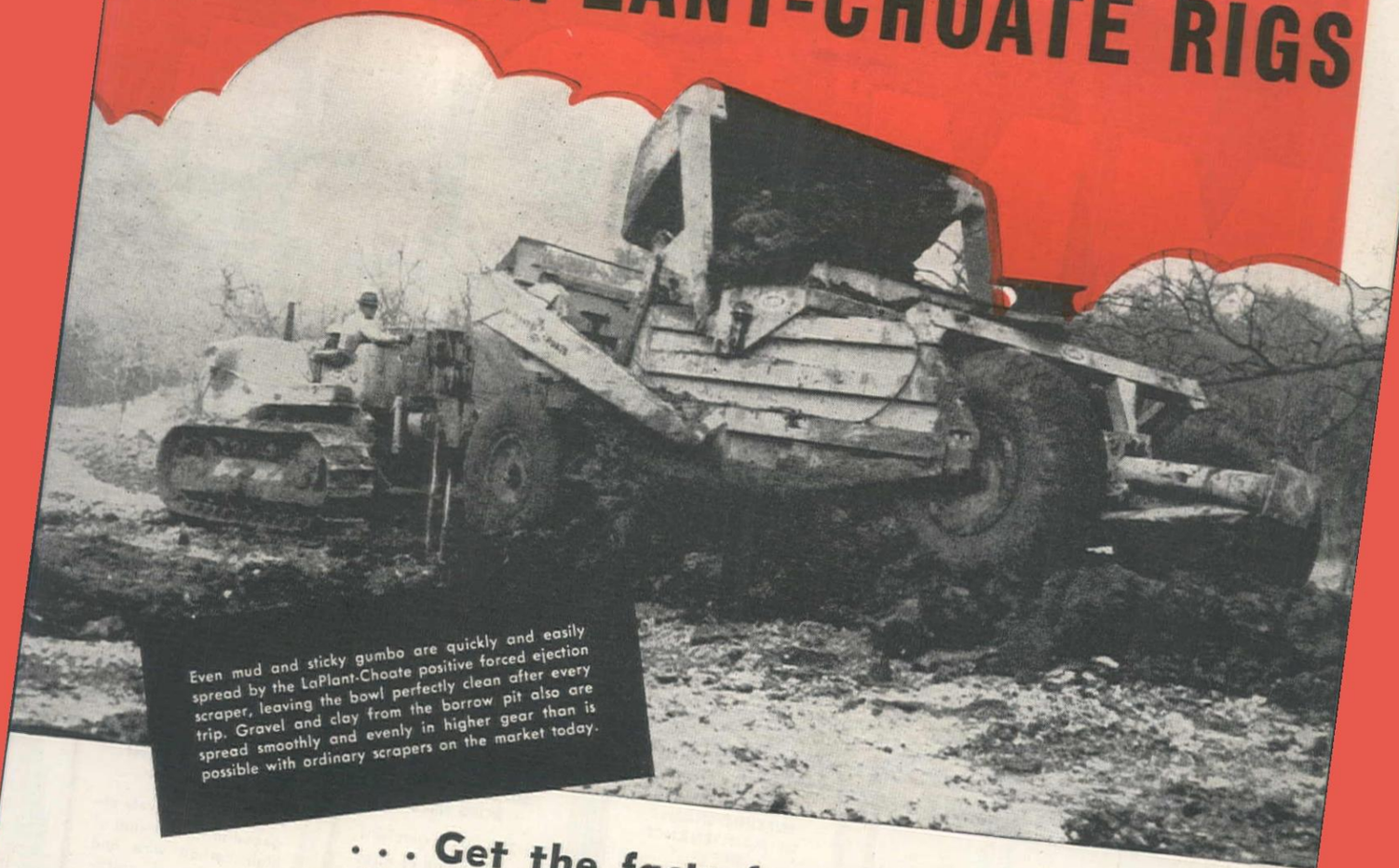
The old story about "trying to do *tomorrow's* jobs with *yesterday's* equipment" is *doubly* true of scrapers—because it's the scraper that handles the payload, which in turn controls your profit on every job. Consequently, in times like these, it just doesn't pay to struggle along with inefficient, old style scrapers that waste valuable pay yardage, burn up tractor power and require excessive maintenance. Far better to replace those old "relics" *now* with modern LaPlant-Choate units—proved by competitive tests to be the *easiest loading, fastest spreading scrapers on the market.* This way you'll get higher average production at lower over-all cost and thanks to LPC's modern open top design, which simplifies loading with shovel or dragline, you'll also be able to use your scrapers for utility hauling and spreading. Best of all, LaPlant-Choate scrapers in most sizes (from 2 to 14 yd. struck measure) are ready for *immediate delivery.* So don't delay. Better get complete facts today from your nearest LPC distributor. LaPlant-Choate Manufacturing Co. Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, California.

LaPLANT-CHOATE

Positive FORCED EJECTION SCRAPERS

FIRST in Value because they're FIRST in Performance!

with LaPLANT-CHOATE RIGS



Even mud and sticky gumbo are quickly and easily spread by the LaPlant-Choate positive forced ejection scraper, leaving the bowl perfectly clean after every trip. Gravel and clay from the borrow pit also are spread smoothly and evenly in higher gear than is possible with ordinary scrapers on the market today.

. . . Get the facts from your
Nearest LaPlant-Choate Dealer

INDUSTRIAL EQUIPMENT COMPANY

SAN FRANCISCO • OAKLAND • LOS ANGELES • PHOENIX
RENO • SACRAMENTO • FRESNO • SAN DIEGO

COLUMBIA EQUIPMENT CO.

PORTLAND
BOISE
SEATTLE
SPOKANE

LIBERTY TRUCKS & PARTS CO.

690 Lincoln St.
DENVER, COLORADO

WESTERN CONSTRUCTION EQUIPMENT CO.

505 N. 24th Street
BILLINGS, MONTANA

218 W. Pine Street
MISSOULA, MONTANA

N. C. RIBBLE CO.

Associated With Western States Welding & Press Co.
1304 N. Fourth Street • ALBUQUERQUE, NEW MEXICO

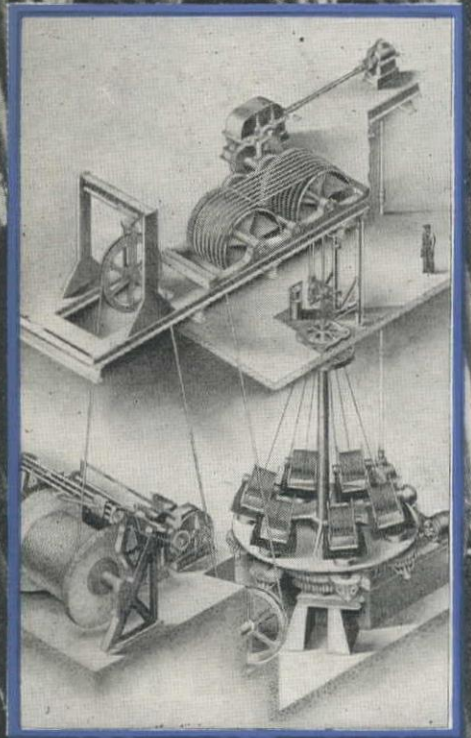
HEINER EQUIPMENT & SUPPLY CO.

501 W. Seventh Street South • SALT LAKE CITY, UTAH

Here's union's *Wire Rope* Formula

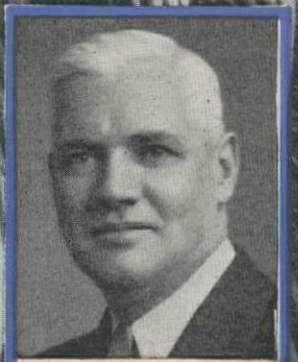
MM+OE+

MODERN MACHINERY PLUS OPERATING EXPERIENCE



M. B. HANSELL, SR.
SUPERINTENDENT OF MAINTENANCE

For 41 years a master of machinery. For 20 years in charge of installation and maintenance of all Union Wire Rope machinery; including the giant 4 story closing machine at the left. It is capable of producing 27 tons of wire rope in one continuous length or up to 4" diameter.



A. D. GALLOWAY
SUPERINTENDENT ROPE MILL

For 28 years a specialist in the stranding of wires of the right size and correct steel and closing of the right strands into hundreds of different wire rope constructions. A "know how" specialist who has trained hundreds of craftsmen.

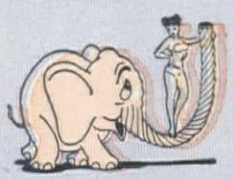
CURTIS VOIGTLANDER
SUPERINTENDENT WIRE MILL

For 43 years actively engaged in the drawing of high carbon wire and the training of craftsmen in all the intricate processes. Under his supervision many new and advanced wire making machines have been built, many others improved.

union-formed is *Preformed*

UNION-FORMED SPOOLS BETTER

. . . even with a light load it winds evenly and tightly.



UNION-FORMED RESISTS KINKING

. . . because wires and strands are free of internal stress, they do not fight to get out of their preformed positions.

UNION-FORMED RESISTS BENDING FATIGUE

. . . withstands more bends, even reverse bends, because it is more stress-free internally.

UNION-FORMED RIDES BETTER ON GROOVES

. . . does not spin and grind through blocks or over sheaves.

UNION-FORMED IS SAFER TO HANDLE

. . . worn, broken wires do not spring out and porcupine but continue to lie close to the rope.

UNION-FORMED IS FLEXIBLE AND RELAXED

. . . bends in any direction, yet has "toughness" to withstand jerking and other punishing strain.

TKH=CQ

PLUS TECHNICAL KNOW HOW EQUALS CONSISTENT QUALITY

C. M. ZERR
CHIEF ENGINEER

Since graduating at Stevens Institute of Technology, he has specialized in all technical and research phases of wire rope making as assistant to Walter Voigtlander. Their technical department is the training ground for operation men, salesmen and technicians.

WALTER VOIGTLANDER
TECHNICAL DIRECTOR

For 43 years engaged in wire rope technology and research. Under his direction for 20 years, the Union Wire Rope laboratory and technical staff has become widely recognized as the foremost in the industry. From this continuous research comes new rope constructions, new rope making equipment and consistent quality.

Wire rope in itself is a machine. It functions as the steel tendons of many types of machines and to be good it must be made on the most modern of machines. Many of the machines in the Union Wire Rope plant have been either wholly designed or improved by our own mechanical engineers.

These precision machines must be minutely adjusted and maintained in perfect condition to produce uniformly high quality in all of the hundreds of different wire rope constructions. Many years of operating experience is contained in the Union wire rope making formula.

The most vital ingredient is Technical Know How. It is obtainable only from long years of training, experience and continuous research. Ours is an organization of specialists who devote their whole time to wire rope making. It is headed by top flight engineers and technicians who through research are constantly acquiring more know how for use in specifying the finest wire rope making steel; in making every wire rope drawing process improve each heat of steel still further; in constructing wires of the finest steel into stronger, tougher wire ropes, both ordinary and Union-formed (*pre*-formed); in the development of new wire rope constructions to whip jobs noted as rope killers.

NEAR YOU THERE IS A UNION WIRE ROPE DISTRIBUTOR AND REPRESENTATIVE CAPABLE OF APPLYING UNION "KNOW HOW" IN THE FIELD

Large and regular doses of "know how" are given Union Wire Rope's field specialists and distributing organizations. They know that Union Wire Rope must do a consistently better job on the job for which it is constructed. Each field specialist, each distributor is fully equipped with a thorough working knowledge of wire rope applications and is capable of making sound recommendations. Each is a substantial citizen contributing to the economic and social welfare of his community and is an important factor in maintaining the American way of opportunity and freedom unequalled anywhere in the world.

Backed by "know how" specialists, each Union Wire Rope distributor is out to earn and hold your good will.

union Wire Rope Corporation

2146 MANCHESTER AVE., KANSAS CITY 3, MO.

Send "Steel Tendons," the book that gives a pictorial trip through your modern plant.

FIRM NAME.....

BY.....

ADDRESS.....

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

Years mean little to a GM Diesel

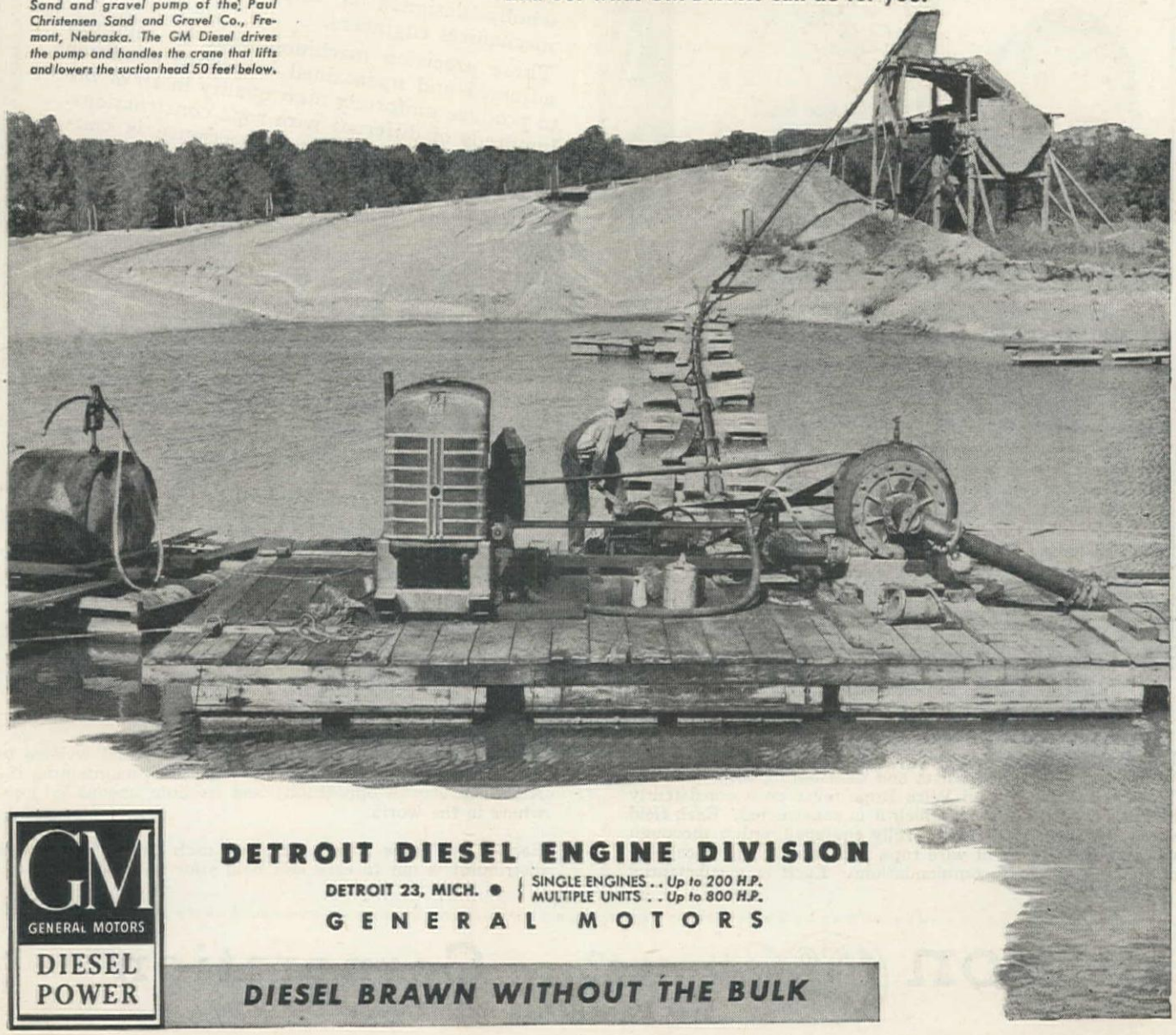
Here's old No. 167, an engine made years ago. For the first part of its life, it powered a truck. Since 1941, it has been mounted on a barge, working at another tough job.

Belted to a 6" centrifugal pump, No. 167 is sucking up tons of sand and water from a depth of 50 feet and tossing it high into a sand hopper on the beach.

It's a good example of how these General Motors Diesels, with power at every downstroke, stand up and take any job in their stride. Any owner will tell you about their economy both in fuel and maintenance—their ease of starting, and their quick pick-up under load.

All kinds of construction work can use efficient, portable power like this. So whatever the job you have, be sure to find out what GM Diesels can do for you.

Sand and gravel pump of the Paul Christensen Sand and Gravel Co., Fremont, Nebraska. The GM Diesel drives the pump and handles the crane that lifts and lowers the suction head 50 feet below.



GM
GENERAL MOTORS
DIESEL POWER

DETROIT DIESEL ENGINE DIVISION

DETROIT 23, MICH. • { SINGLE ENGINES . . *Up to 200 H.P.* / MULTIPLE UNITS . . *Up to 800 H.P.*

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

Evans Engine & Equipment Co.
SEATTLE 9, WASH.

Cate Equipment Co.
SALT LAKE CITY, UTAH

Fred M. Viles & Company
SPOKANE 8, WASH.

Mountain Tractor Co.
MISSOULA, MONT.

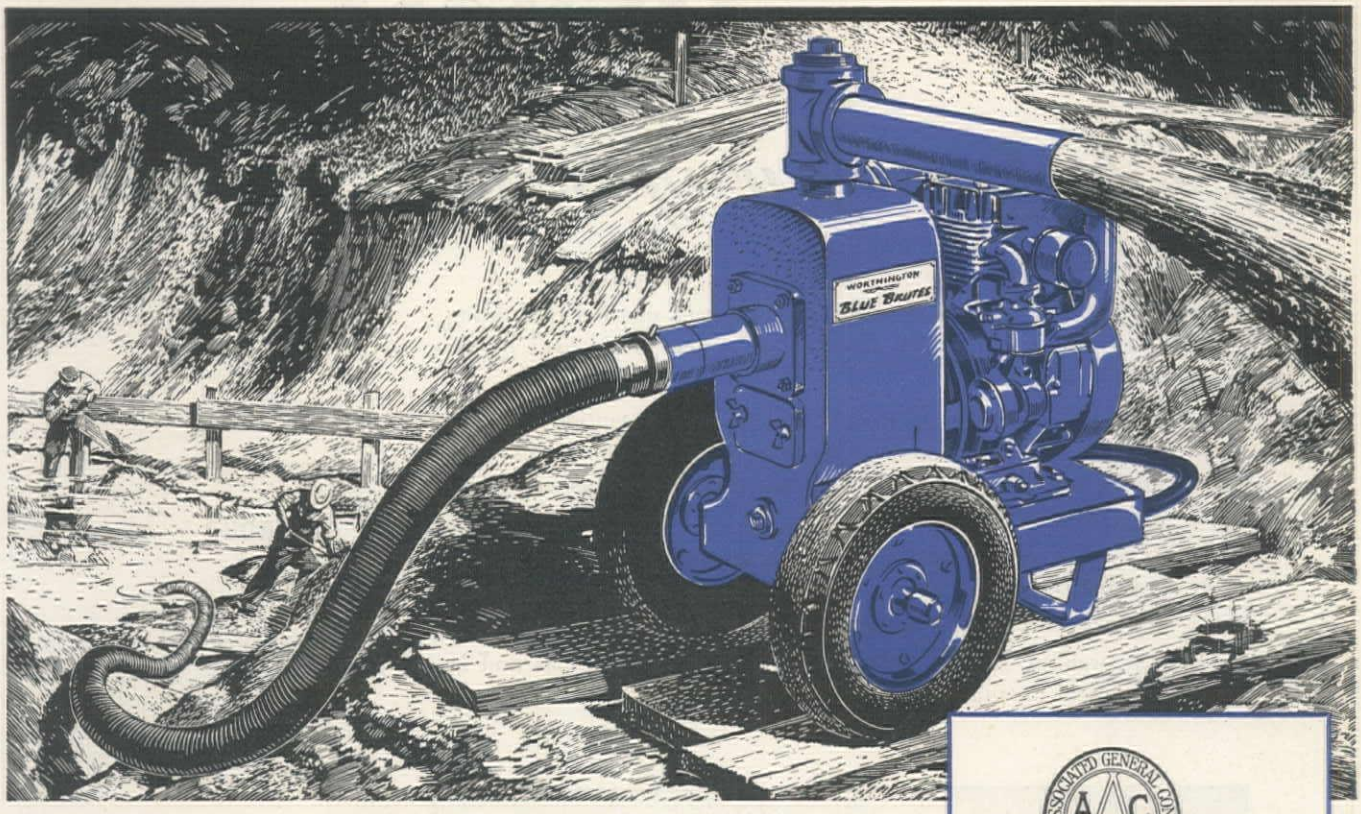
Gunderson Bros. Equipment Corp.
PORTLAND 9, ORE.

Olson Manufacturing Co.
BOISE, IDAHO

Capitol Tractor & Equipment Co.
SACRAMENTO, CALIF.

Anderson-O'Brien Co.
LOS ANGELES 21, CALIF.

NOW... A CONTRACTOR'S PUMP BY WORTHINGTON



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

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

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

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

H6-25

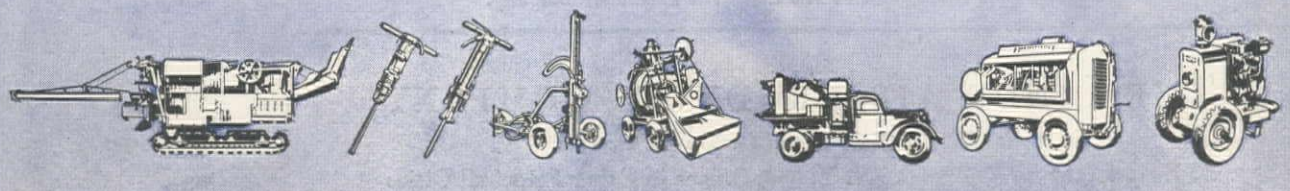
Blue Brute Pumps are built to the standards of the Associated General Contractors of America, Inc., and carry the A.G.C. rating plates.

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

WORTHINGTON

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

BUY BLUE BRUTES



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

Heliarc WELDING

A fast, easy way to join

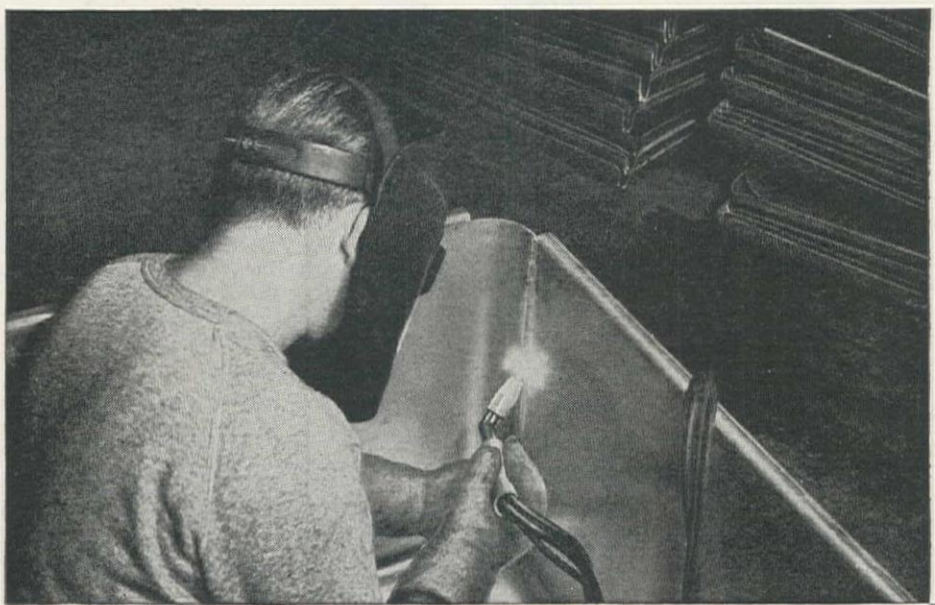
STAINLESS STEEL
HIGH-CARBON STEEL
ALUMINUM
MAGNESIUM
BRASS
COPPER
EVERDUR
MONEL
INCONEL
SILVER

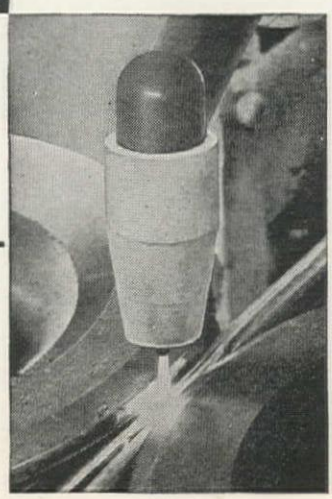
Linde's HELIARC process is a new and different method of welding with the electric arc, in which the welding action is shielded by an inert gas—usually argon.

Joints welded with the HELIARC process have exceptionally high quality. They are clean because HELIARC welding eliminates flux. Joints are so smooth, even, and neat that usually no finishing treatment of any kind is required.

Butt, lap, tee, corner, and angle joints are easily made on rolled, cast, extruded, or forged parts of stainless steel and practically all non-ferrous alloys of any commercially used thickness.

HELIARC welding can be done manually or with machines and is equally practical for mass production or job lots.





Linde service engineers are always available to help with problems of treating, cutting, joining, and forming metals.

Call or write any Linde office for information.

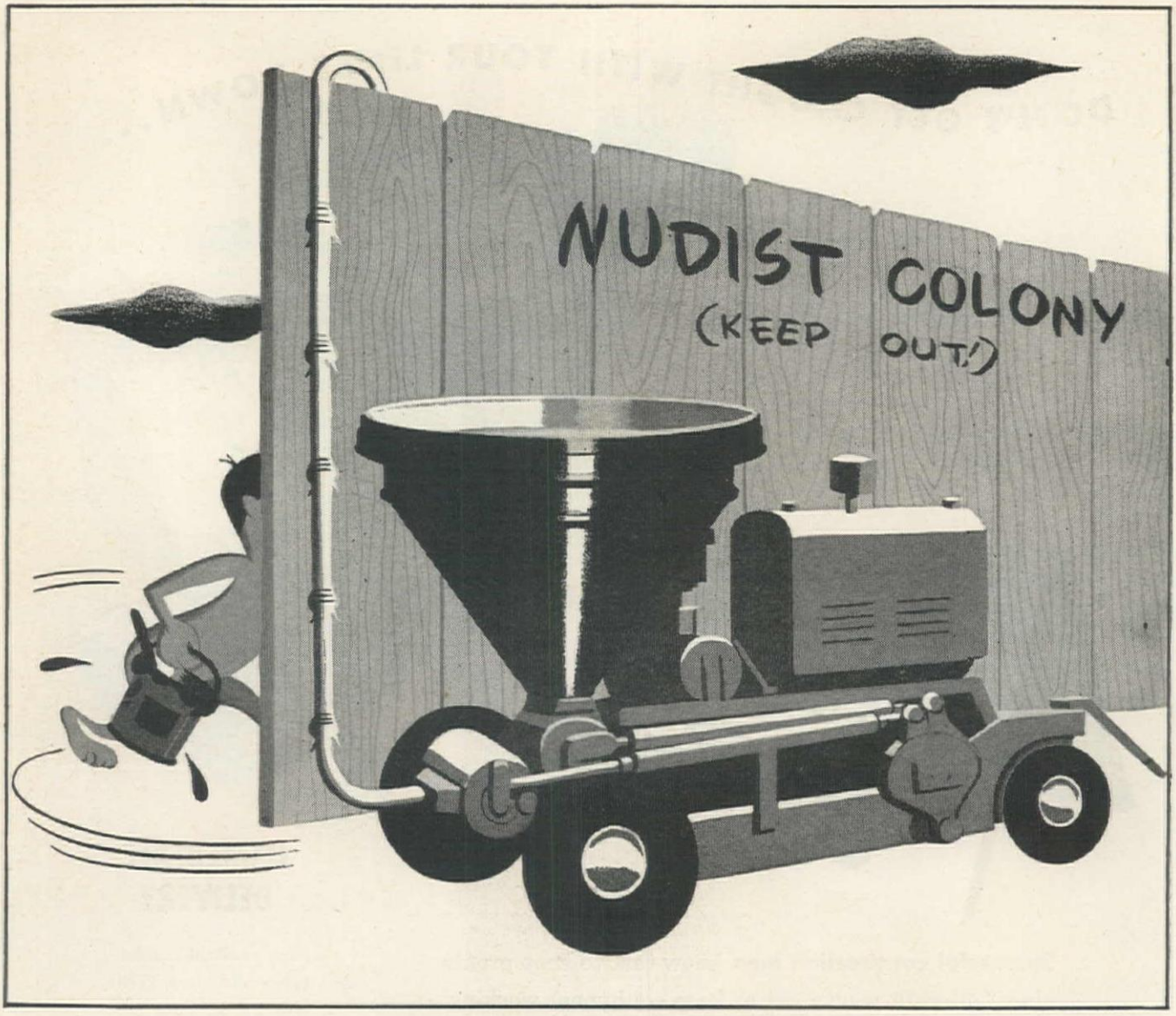
The word "Heliarc" is a trade-mark of The Linde Air Products Company.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

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

In Canada: Dominion Oxygen Company, Limited, Toronto



"It's easy to get in with Pumpcrete"

It's easy to place concrete in unusual or inaccessible locations with Rex Pumpcrete, *the pump that pumps concrete through a pipe line.* Jobs that could only be placed at prohibitively high costs are simple with Pumpcrete's flexibility.

For example, where a structure jumps a river or gorge . . . where access roads are difficult to build or maintain . . . where traffic interference presents a problem . . . where expensive preparatory work is required . . . Pumpcrete with its ability to transport on one or more levels, to elevate, lower and distribute concrete in one operation is the logical placing method.

For all the facts see your Rex Distributor.

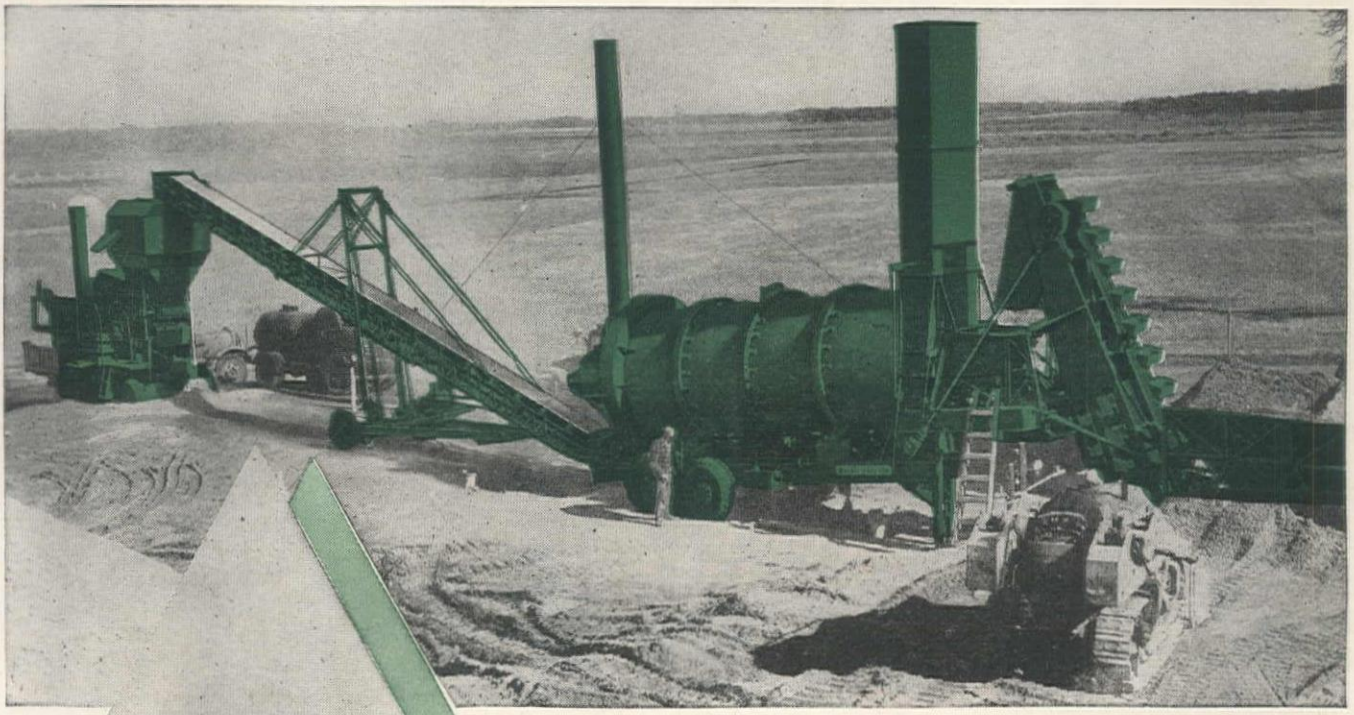
ARNOLD MACHINERY CO.	Salt Lake City 1, Utah
BROWN-BEVIS EQUIPMENT CO.	Los Angeles 11, California
BROWN-BEVIS EQUIPMENT CO.	Phoenix, Arizona
CONSTRUCTION EQUIPMENT CO.	Spokane, Washington
CONTRACTORS EQUIPMENT AND SUPPLY CO.	Albuquerque, New Mexico
RAY CORSON MACHINERY CO.	Denver, Colorado
HALL-PERRY MACHINERY CO.	Butte, Montana
INDUSTRIAL EQUIPMENT COMPANY	Oakland 3, California
INTERMOUNTAIN EQUIPMENT CO.	Boise, Idaho
LOGGERS & CONTRACTORS MACHINERY CO.	Portland, Oregon
STAR MACHINERY CO.	Seattle, Washington

REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

Barber-Greene



The B-G Tamping-Leveling Finisher will lay any mix, hot or cold. Places a continuous ridge-free surface with each succeeding strip firmly compacted against the previous one.

High-Capacity
"Intermediate" Mixing with Portability

Here's the B-G "Intermediate" Bituminous Mixing Plant that combines the convenience of true portability with the basic advantages of the B-G Bituminous Mixing System*. You can tow the units you need to the job, right to the spot that's most convenient and economical from the standpoint of aggregate source and need for finished mix.

In its accuracy the B-G "Intermediate" Plant bridges the gap between the B-G "High-type" and B-G Travel Plant. Capacity is from 80 to 120 tons per hour. It is used principally for single-aggregate mixes; however, an optional 2-compartment charging Bin, with B-G 2-gate Reciprocating Feeder, provides a method of feeding a fine and coarse aggregate where rigid aggregate gradation is not required. For details, write for literature, or see your B-G representative.

***THE B-G BITUMINOUS MIXING METHOD:** Continuous flow, with measured volumetric aggregate content, metered bitumen supply, controlled temperature, and thorough twin-pugmill mixing —through flexible, coordinated portable units. Barber-Greene Company, Aurora, Illinois.

BARBER-GREENE COMPANY · AURORA, ILLINOIS

Constant Flow Equipment

LOADERS PERMANENT CONVEYORS PORTABLE CONVEYORS COAL MACHINES BITUMINOUS PLANTS FINISHERS DITCHERS

Brown-Bevis Equipment Co., Los Angeles 11, Calif.; Brown-Bevis Equipment Co., Phoenix, Ariz.; Columbia Equipment Co., Spokane, Wash.; Columbia Equipment Co., Seattle, Wash.; Columbia Equipment Co., Boise, Idaho; Columbia Equipment Co., Portland 14, Ore.; Wilson Equipment & Supply Co., Cheyenne, Wyoming; Wilson Equipment & Supply Co., Casper, Wyoming; Contractors Equip. & Supply Co., Albuquerque, New Mexico; Ray Corson Machinery Co., Denver 2, Colorado; Jenison Machy. Co., San Francisco 7, Calif.; Western Construction Equipment Co., Billings, Montana; Western Construction Equipment Co., Missoula, Montana; Kimball Equipment Company, Salt Lake City 10, Utah.

After making new world's speed record for hard-rock tunnel-driving, crew members of two shifts pose for photo in front of east portal of Rams Horn Tunnel.

WORLD'S SPEED RECORD SET

by Tunnel Drivers Using "GELEX"

A NEW world's record for high-speed, hard-rock tunnel driving was recently set by Lowdermilk Bros., Denver, contractors on the 6880-foot Rams Horn Tunnel of the Big Thompson River project in northern Colorado.

In only 24 hours, crew members working in three shifts drove the 12-foot-diameter water tunnel a record-breaking distance of 80 feet through tough, massive biotite granite . . . 6275 feet in from the east portal!

To do the job, the hard-driving tunnel men used 1925 pounds of Du Pont "Gelex" No. 2, breaking a total of 328 cu. yds. of rock at a ratio of 5.8 pounds per cu. yd.

Lowdermilk Bros. found that "Gelex" gave superlative results in the tough, hard rock encountered on this job. Excellent fragmentation speeded mucking operations. Minimum fumes permitted early return to the face. Perforated cartridges eliminated need for slitting, thus reducing loading time. And high stick count gave additional economy.

Talk to a Du Pont Explosives Representative about using "Gelex" on your job. It may mean real savings in time and money. 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 Street, San Francisco, Calif.

PROPERTIES OF "GELEX" COMPARED WITH SPECIAL GELATIN

	Bulk Strength	Stick Count*	Water-Resistance	Fumes
"GELEX" No. 1	60%	136	Good	Excellent
Special Gelatin	60%	123	Excellent	Excellent
"GELEX" No. 2	45%	150	Good	Excellent
Special Gelatin	40%	114	Excellent	Excellent

*Stick count based on 1 1-8 x 8 inch cartridges varies within limits of 8 per cent.

DU PONT "GELEX"

A Product of Du Pont Explosives Research

DU PONT

REG. U.S. PAT. OFF.

BETTER THINGS FOR BETTER LIVING

. . . THROUGH CHEMISTRY

NOW!

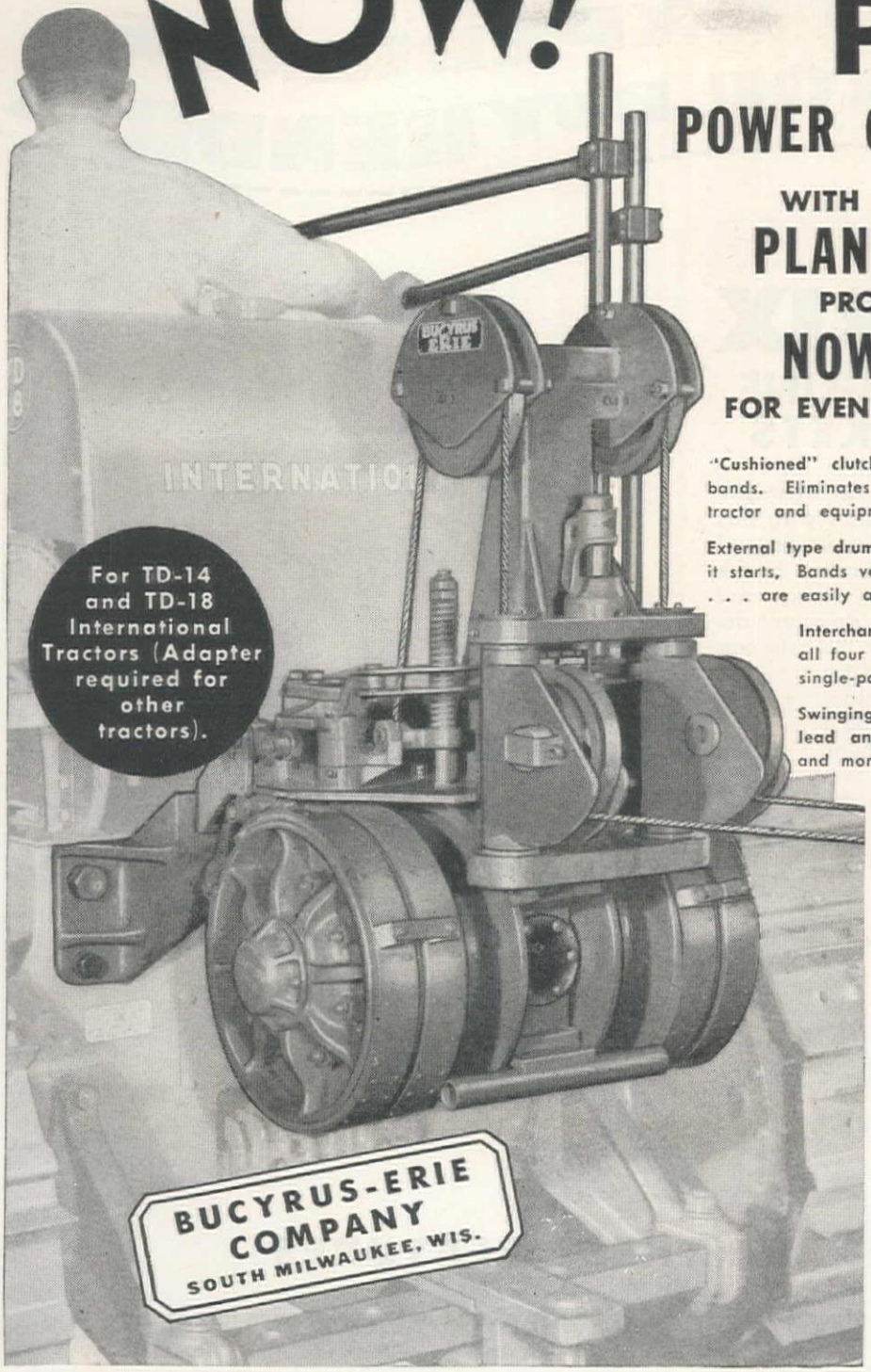
THE NEW BUCYRUS-ERIE P-25 POWER CONTROL WINCH

WITH SMOOTH, POSITIVE PLANETARY DRIVE

PROVED IN SERVICE

NOW IMPROVED

FOR EVEN BETTER PERFORMANCE



For TD-14 and TD-18 International Tractors (Adapter required for other tractors).

"Cushioned" clutch and brake action with big drums and bands. Eliminates sudden jerks and shocks. Saves rope, tractor and equipment. Cuts lost time.

External type drums and bands lick the heat problem before it starts. Bands ventilate naturally, cool rapidly, last longer . . . are easily accessible.

Interchangeable, reversible bands. Same bands fit all four drums. Reversible for extra wear. Simple, single-point band adjustment.

Swinging fairleads, large-diameter sheaves, long lead angle — all lengthen cable life, save time and money.

Non-slip wedge and socket cable anchor is accessible, easy to set, safe.

Oil-level sight, convenient oil fill and single, oil-bath lubrication assure simplified, positive lubrication for sustained efficient performance.

Anti-friction bearings. All rotating parts are mounted on anti-friction bearings for extra smoothness and durability.

Single-lever control of brake and clutch means easy handling, positive action, smooth operation. Automatic interlocking prevents dropping load. "Free" position for reeving up, installing new cable. Adjustable levers held rigidly by wide spaced double bearings.

It will pay you to see your International tractor distributor for complete information on the revolutionary Bucyrus-Erie P-25 Planetary Drive Power Control Winch.

63T47

See Your INTERNATIONAL Industrial Tractor Distributor

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

TRACTOR BUCYRUS ERIE EQUIPMENT TE-3

YOU BUY EXPERIENCE WHEN YOU BUY HENDRIX

HENDRIX *Lightweight* DRAGLINE BUCKETS

Yes, Sir, Hendrix Lightweight Dragline Buckets were designed by a man who has moved dirt and plenty of it. His desire and need for a better bucket has resulted in the best functioning unit available today and for years to come. Its lightness does not detract from its durability. Larger buckets can be used on a machine designed for small operations and still maintain the allowable loaded weight. You'll get BIGGER PAYLOADS on operations requiring a long boom, and in wet digging you leave the water in the pit. We took the load OUT OF THE BUCKET . . . to let you put it INSIDE.

3/8 to 30 Cubic Yards

COMPARE THESE FEATURES

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

Write for descriptive literature—or ask your dealer.

HENDRIX MANUFACTURING COMPANY
MANSFIELD INCORPORATED LOUISIANA

Your best bet for TOUGH *Jobs*

INTERNATIONAL Diesel Crawlers

INTERNATIONAL HARVESTER

Tune in James Melton on "Harvest of Stars" every Sunday, NBC Network.

Tough earth-moving jobs move along on schedule when International Diesels haul the scrapers. No pushers or snatch tractors needed! Even on hardpan which track shoe grousers won't penetrate, Internationals have the lugging ability to load their scrapers to the brim!

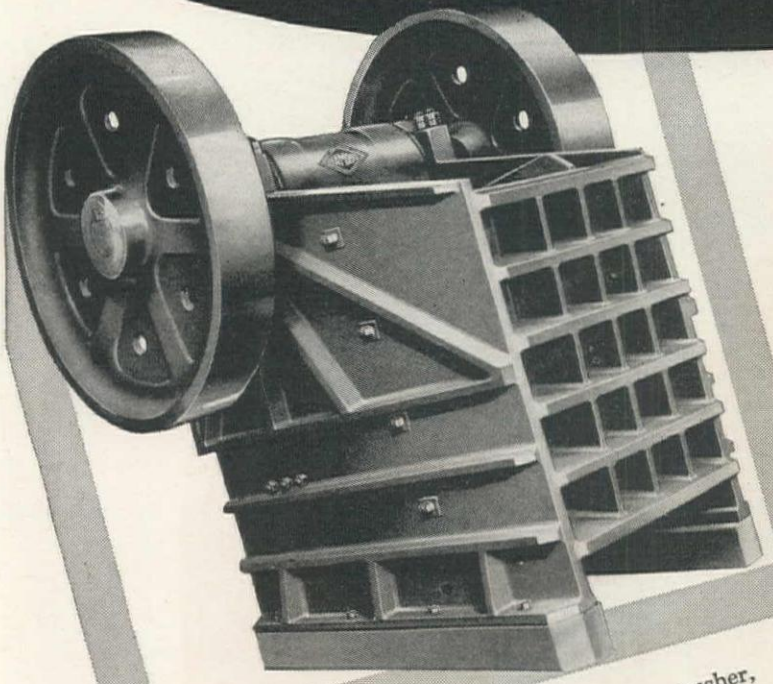
Quick starting, unbeatable operating economy and unrivaled dependability make International Diesel Crawlers your best bet for licking tough earth-moving jobs fast. See the International Industrial Distributor near you for the facts about these tractors and their matched equipment, also the service facilities and stock of parts he maintains.

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

INTERNATIONAL POWER

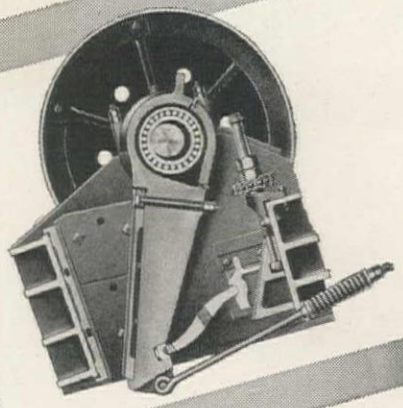
CRAWLER AND WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

Maximum PRIMARY OUTPUT



WITH THE DIAMOND "LONG JAW" CRUSHER

Developed and improved thru years of use and constant observation of the needs of operation throughout the world, Diamond jaw crushers today embody the ultimate in economy of power, volume and uniformity of product with minimum of maintenance.



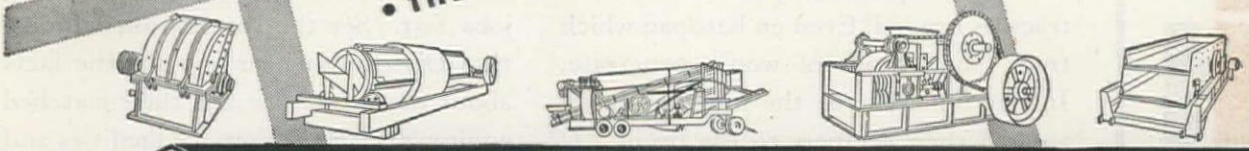
MADE IN TEN SIZES

ASK FOR BULLETIN D45

The triple action of the Diamond jaw crusher, combining a direct dynamic crunch with a relentless downward force feed action, operates from top to bottom of its long jaws. Its heavy overhead eccentric, while closing the jaws for the initial kill, supplies the downward action during the first half-cycle, and, at the up-turn, the secondary low-end crush is delivered by the rising toggle at the bottom of the jaws.

A POSITIVE AND UNIFORM CRUSHING CYCLE

• THERE'S NOTHING TOUGHER THAN A DIAMOND!

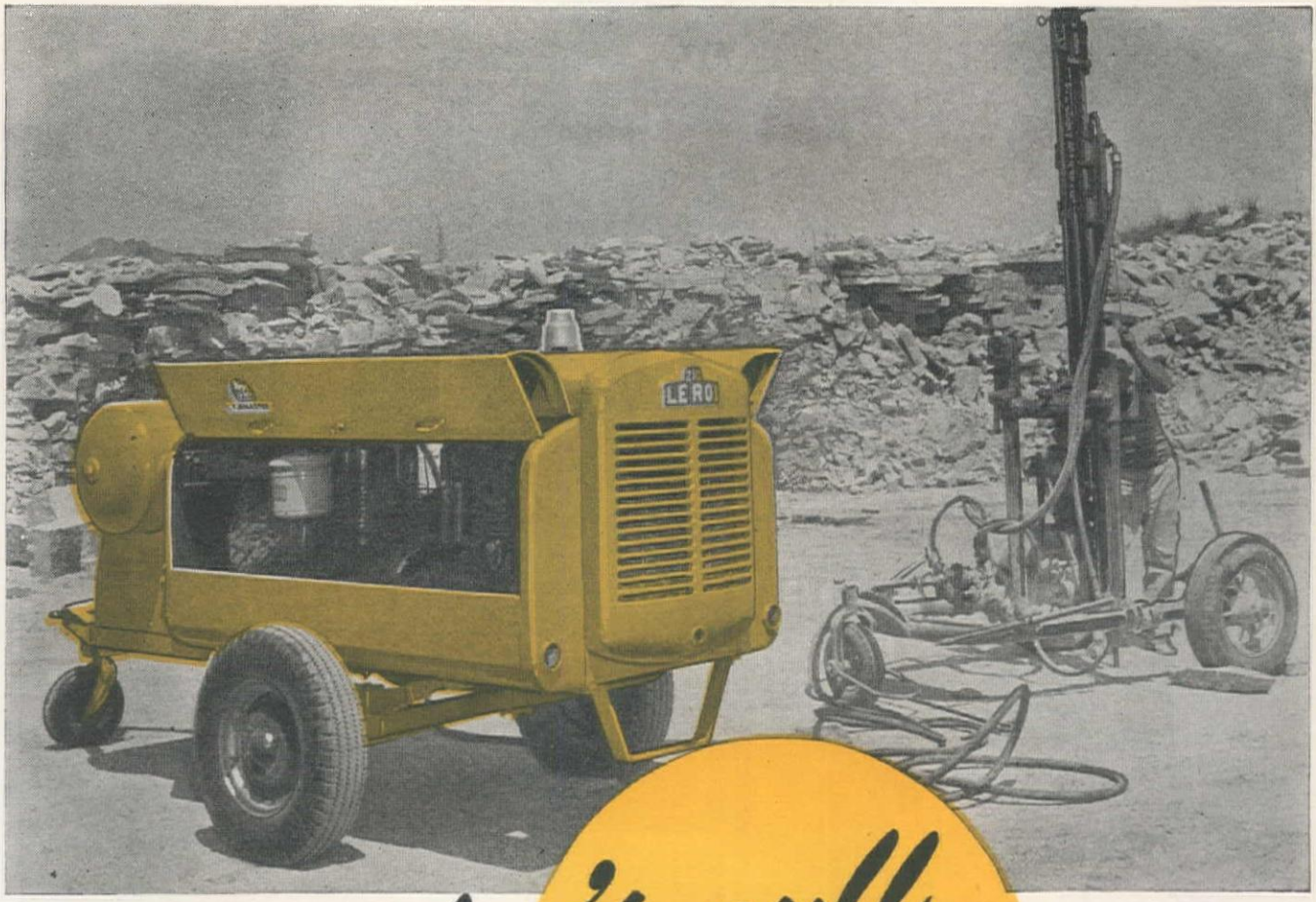


DIAMOND

DIAMOND IRON WORKS, INC.
AND THE MAHR MANUFACTURING COMPANY DIVISION
MINNEAPOLIS 11, MINNESOTA

YOUR NEAREST DIAMOND DEALER FOR SALES AND SERVICE

Oakland . . . SOULE' EQUIPMENT CO.	*Seattle* . . . . . A. H. COX & CO.	*Salt Lake City* . FOULGER EQUIPMENT CO.
Los Angeles . . . GARLINGHOUSE BROS.	*Denver* . CONSTRUCTORS EQUIPMENT CO.	*Boise & Spokane* . WESTERN EQUIPMENT CO.



You don't pull any punches

. . . that is why you make more money with dependable LE ROI AIRMASTERS

The amount of work done by rock drills and paving breakers depends upon their force of blow. This, in turn, depends upon the pressure and the amount of air delivered by the compressor.

You don't pull any punches, when you use Le Roi AIRMASTERS — your air tools do more work. Here are a few AIRMASTER features that make more money for you by increasing man-hour production:

The patented, fuel-saving Econotrol* adjusts engine speed to the demand for air. There is no rapid acceleration or deceleration. This results in higher average working pressures — air tools hit harder and do more.

*Reg. U. S. Pat. Off.

C-111

Cushioned, super-finished AIRMASTER Valves provide the most efficient, trouble-free means of delivering air to your drills and breakers.

The new AIRMASTER Intercooler Design guarantees dry, cool, oil-free air. Hose lasts longer and does not clog your tools — permitting them to work efficiently.

The day of tough competitive bidding is at hand. Now, more than ever before, you need a dependable, low-cost supply of air that does more work for you. You need an AIRMASTER* — Portable Air Power at its Best. Sizes range from 60 to 500 cfm, gasoline- or diesel-powered — see your Le Roi distributor for complete information.

Write for bulletins.

LE ROI COMPANY
MILWAUKEE 14, WISCONSIN

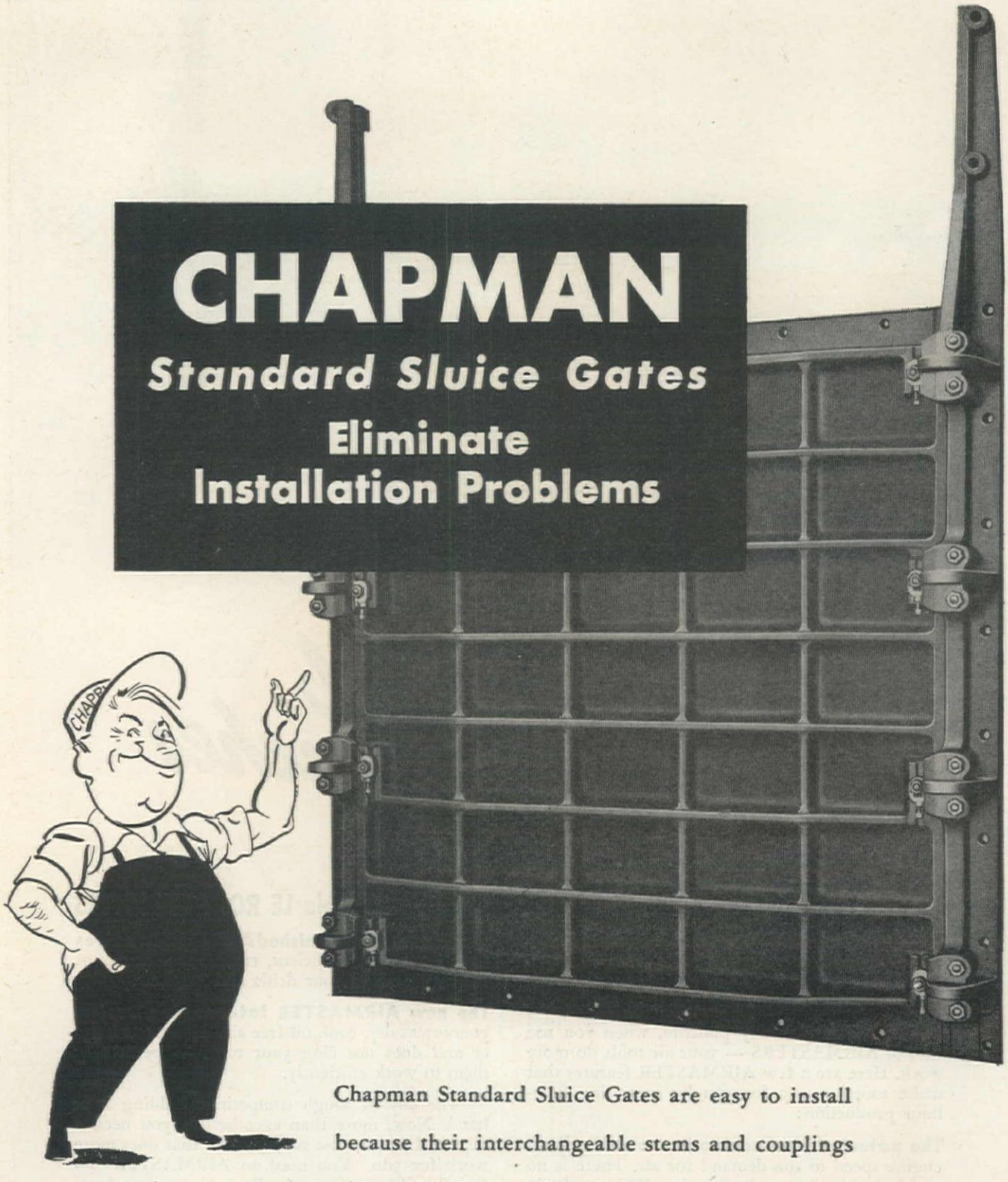
New York • Washington • Birmingham • Tulsa • San Francisco

LE ROI
MILWAUKEE

CHAPMAN

Standard Sluice Gates

Eliminate Installation Problems



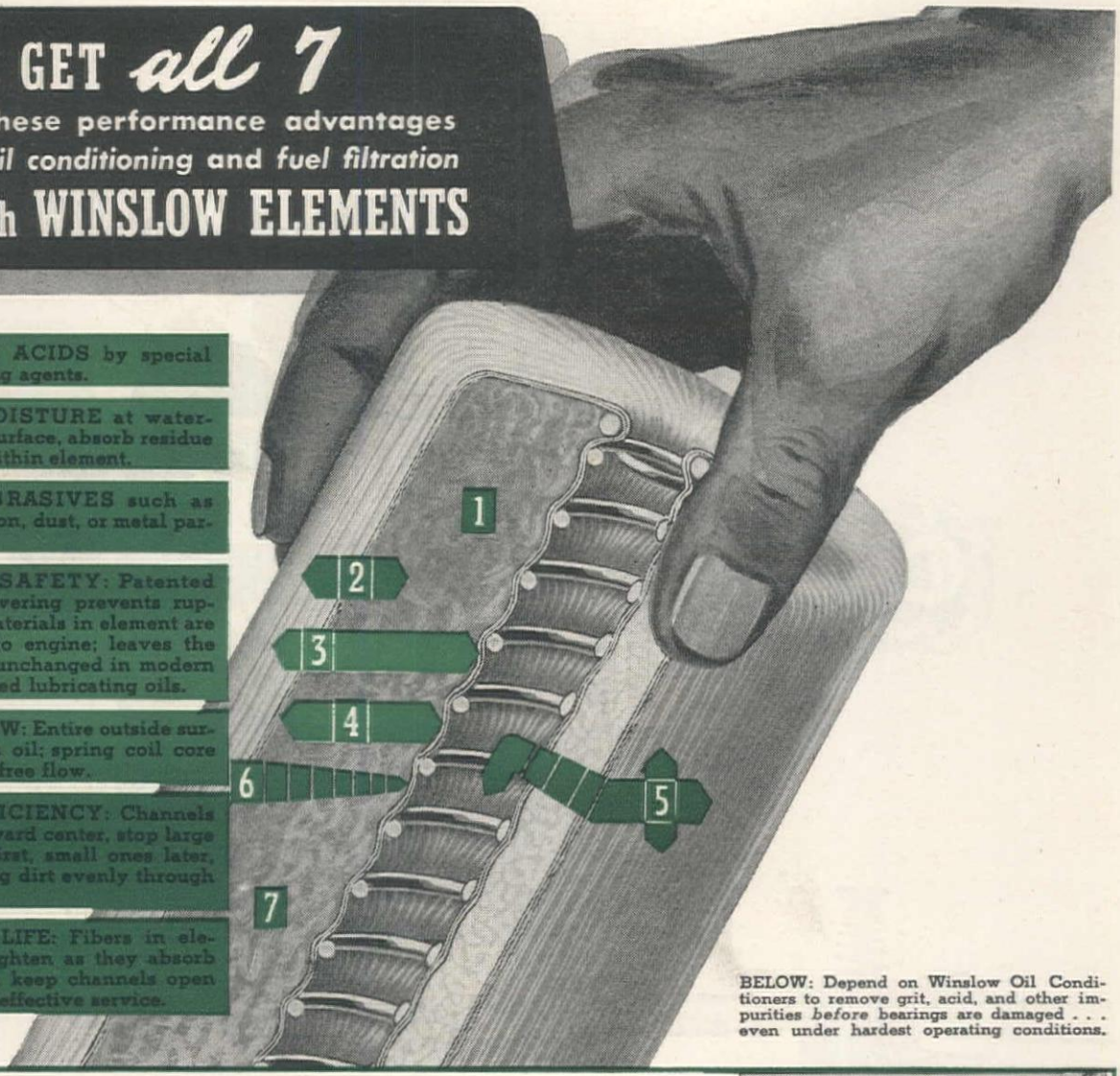
Chapman Standard Sluice Gates are easy to install because their interchangeable stems and couplings require no match-marking. They may be obtained with any type of operating control—manual, hydraulic cylinder or motor unit (completely enclosed in weatherproof housing, and delivered wired—ready for installation Send for a copy of Chapman's Sluice Gate Handbook for complete information.

THE CHAPMAN VALVE MFG. CO.

INDIAN ORCHARD, MASSACHUSETTS

GET *all 7*

of these performance advantages
in *oil conditioning* and *fuel filtration*
with **WINSLOW ELEMENTS**



1 **REMOVE ACIDS** by special neutralizing agents.

2 **STOP MOISTURE** at water-repellent surface, absorb residue in fibers within element.

3 **TRAP ABRASIVES** such as gritty carbon, dust, or metal particles.

4 **TRIPLE SAFETY:** Patented double covering prevents rupture; all materials in element are harmless to engine; leaves the additives unchanged in modern compounded lubricating oils.

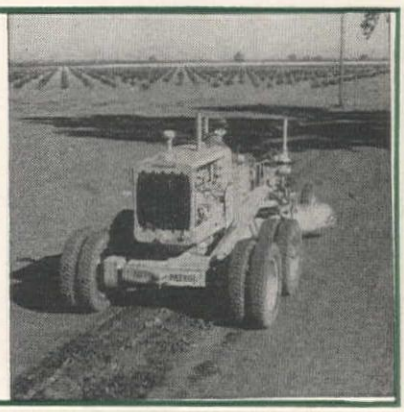
5 **FREE FLOW:** Entire outside surface filters oil; spring coil core maintains free flow.

6 **TOP EFFICIENCY:** Channels narrow toward center, stop large particles first, small ones later, distributing dirt evenly through element.

7 **LONGER LIFE:** Fibers in element straighten as they absorb impurities, keep channels open for longer effective service.

BELOW: Depend on Winslow Oil Conditioners to remove grit, acid, and other impurities *before* bearings are damaged . . . even under hardest operating conditions.

Winslow's special method of controlling progressive filtration is the result of more than a quarter of a century of pioneering research. Winslow engineers have produced an "efficiency in depth" type filter element that traps both large and small particles of grit and dirt. This efficiency results from the exclusive Winslow design which distributes dirt evenly throughout the element as the result of graded porosity. Your Diesels, gas engines, or compressors will never lack protection when there's a Winslow element or filter on the job. The Winslow line includes 100 sizes of fuel filters and lubricating oil conditioners. And, of course, there are 200 different sizes and types of replacement elements to fit all standard filters for automotive, marine and stationary engines . . . gasoline or Diesel. Be sure to clip the coupon below for complete details.



WINSLOW
ENGINEERING COMPANY
4069 HOLLIS STREET, OAKLAND 8, CALIFORNIA

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

Please send me, without obligation, more information and descriptive bulletins on the complete line of Winslow Fuel Filters and Lube Oil Conditioners.

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Company_____

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City_____ Zone____ State_____

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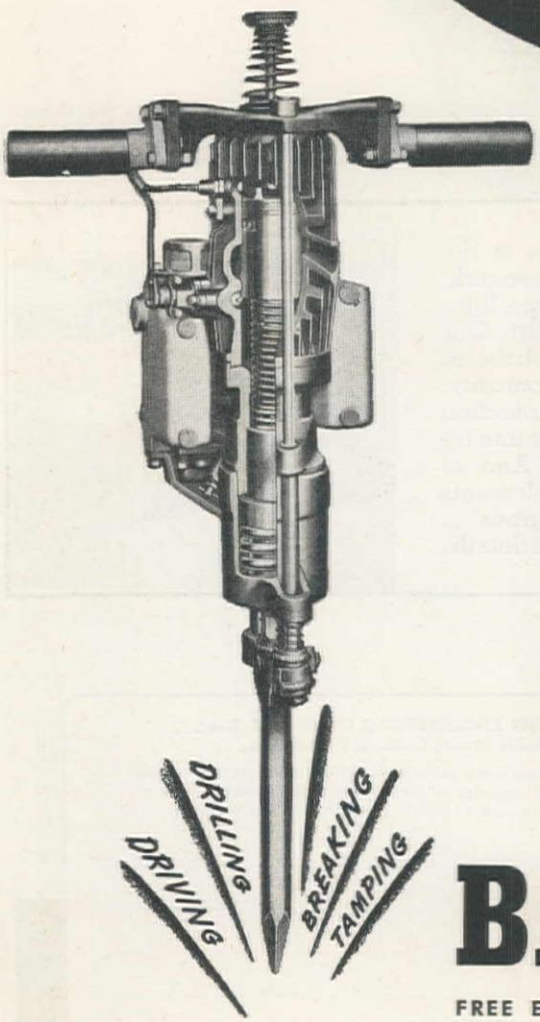
"SPEEDER UPPER"



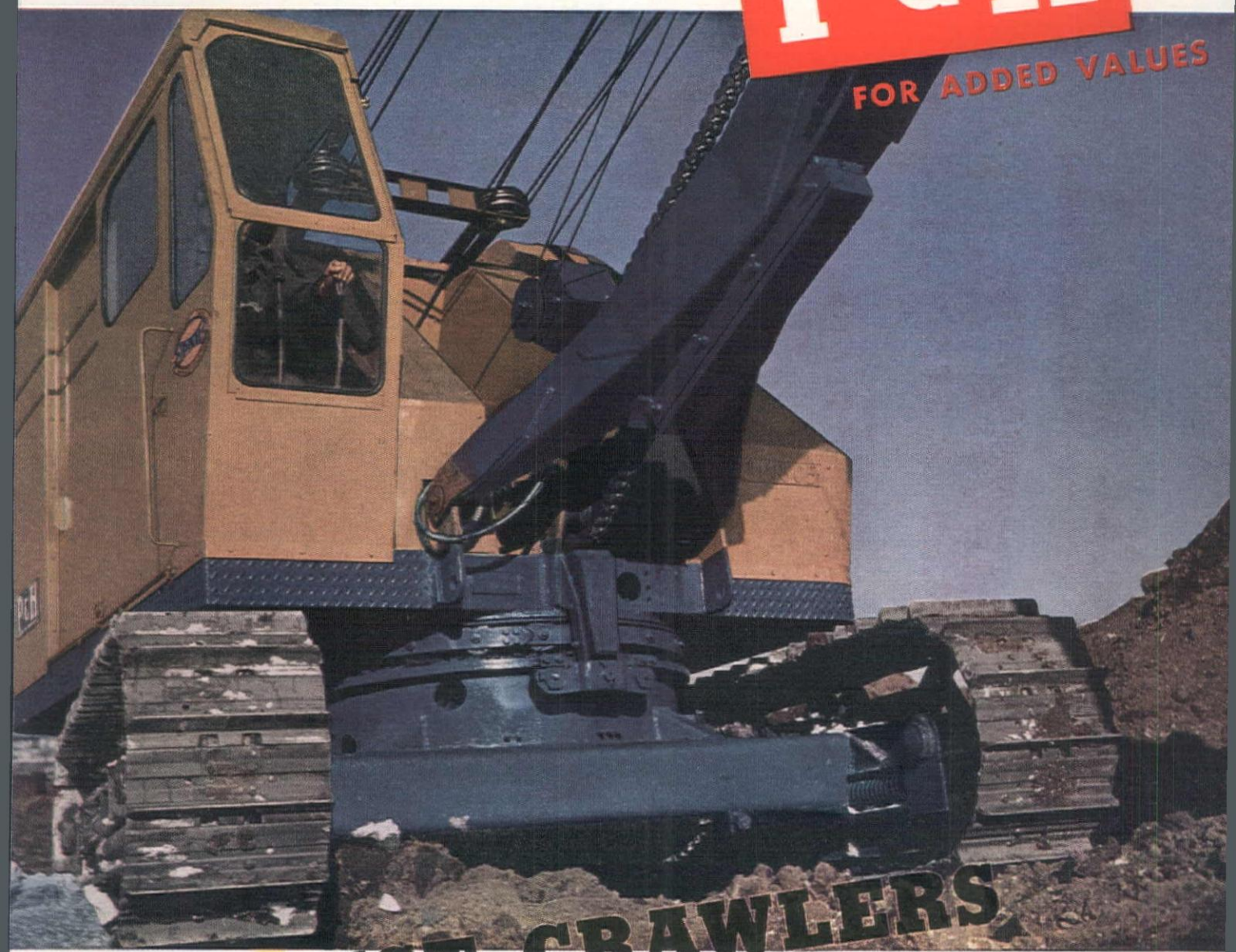
ON A THOUSAND AND ONE JOBS!

The all-around usefulness of Barco is lifting this Portable Hammer's popularity to new heights. Breaking, drilling, driving, tamping—there's almost no limit to the range of jobs Barco can do. Barco is easy to handle, easy to maintain and mighty difficult to do without. Send for complete details. Barco Manufacturing Co., Not Inc., 1819 Winnemac Avenue, Chicago 40, Illinois. In Canada: The Holden Co., Ltd., Montreal, Canada.

BARCO PORTABLE GASOLINE HAMMERS

FREE ENTERPRISE — THE CORNERSTONE OF AMERICAN PROSPERITY

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



GREATEST CRAWLERS

ever put on an excavator!

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

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

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

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

P&H EXCAVATORS

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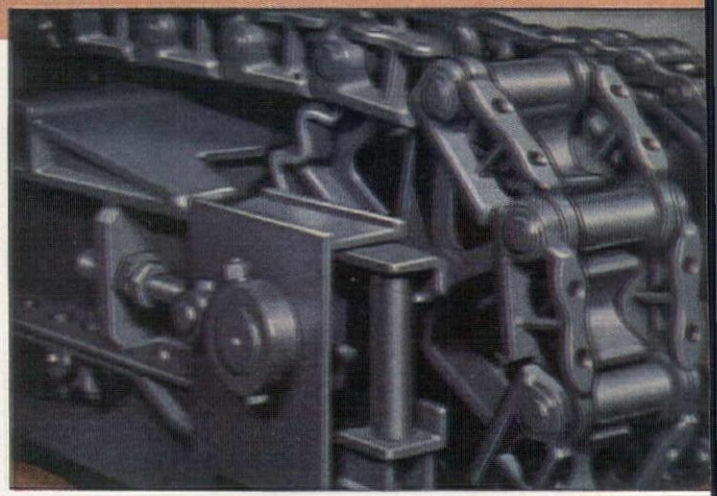
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

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

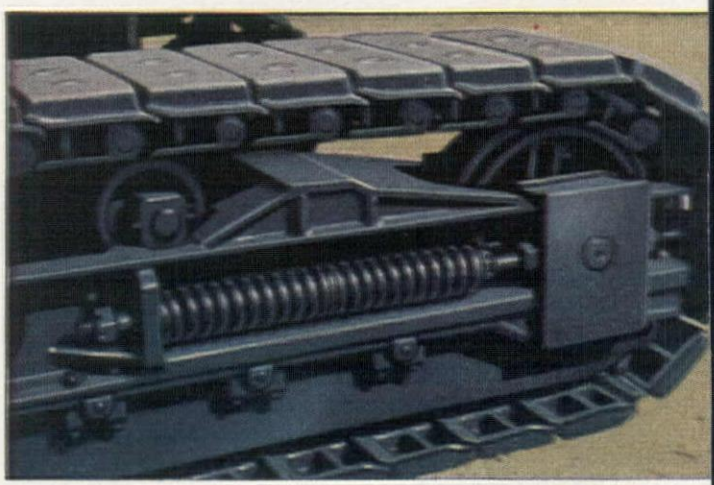
ANOTHER **P&H** ADDED VALUE

Trouble-Free Traction



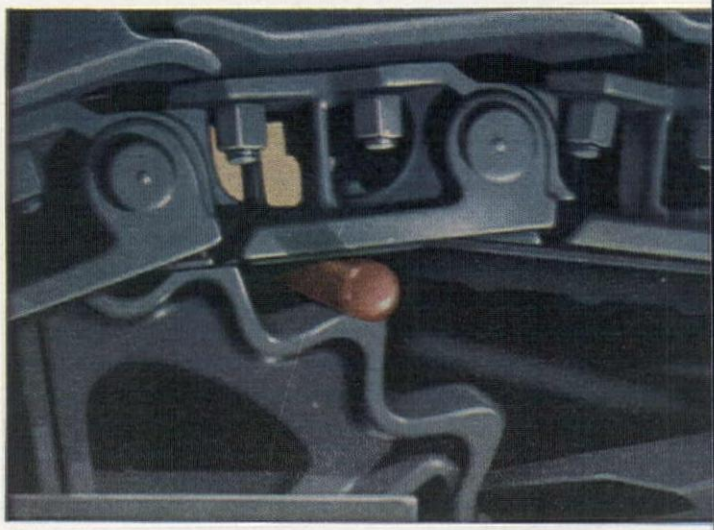
Crawlers Work on Roller Chain Principle

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



Maintains Proper Tension for All Ground Conditions

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



Protects You Against Breakage of Track Parts

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

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

Perfect Control on Steep Grades

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

HARNISCHFEGER CORPORATION:
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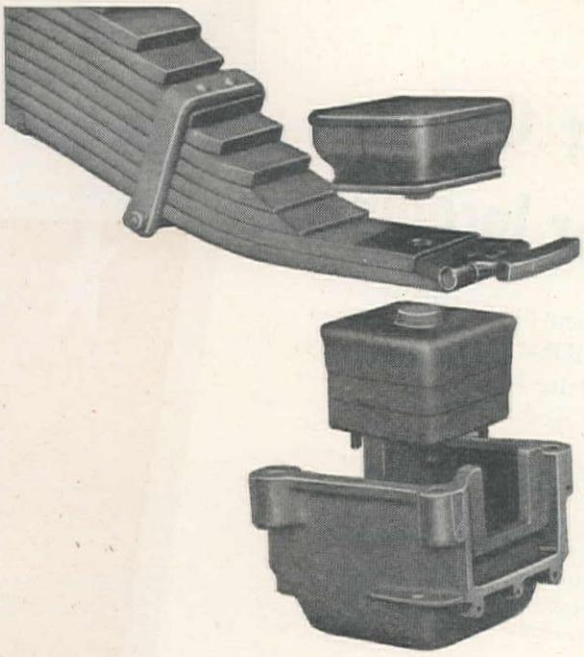
No other truck has this...



It's a rubber Shock Insulator...developed by Mack engineers more than 20 years ago. It was--and still is--the best means of retaining spring ends.

Shock Insulators do away with binding metal surfaces...there is no metallic contact between springs and chassis. They absorb vibrations. The need for lubrication and adjustment at spring ends is eliminated. Squeaks, rattles, and fast wear of parts are unheard of. Shock Insulators provide smooth performance under heavy loads. They lengthen working life indefinitely.

But how about wear? Shock Insulators have been known to last over ten years. Security? It's impossible for the spring to pull out of its housing. Twisting? The spring can never twist. Removal? It's simple and quick. Shock Insulators aren't complicated.

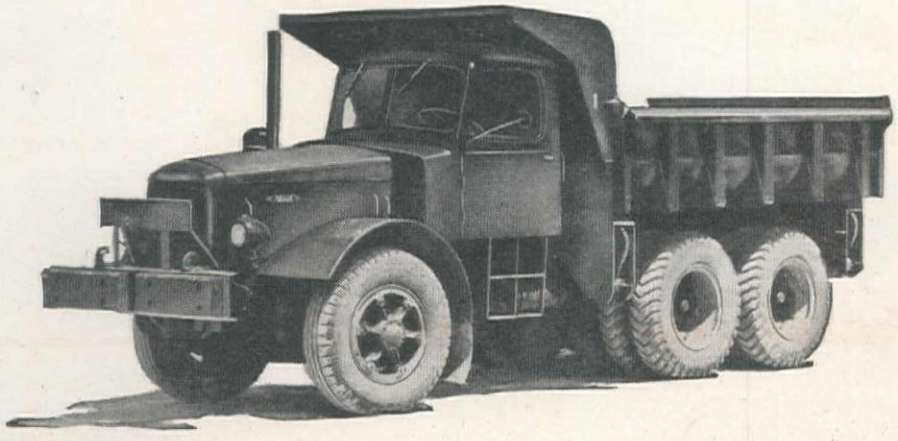
Only Mack employs rubber Shock Insulators as spring-end connectors. That's another good reason why you get more work out of a Mack. More work goes into it.

Mack

since 1900, America's hardest working truck

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

Trucks for every purpose



UNBEATABLE for downright hard work is a Mack six-wheel truck with Mack Balanced Bogie! Here is one of the fleet operated by **Ash Grove Lime and Portland Cement Co., Louisville, Nebraska.**

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

Original Woodcut by Lynd Ward

Through the spring countryside—length by length—
U. S. Cast Iron Pipe is being installed for supply lines
to carry water from source to city. Long life is of
the essence when choosing the kind of pipe to buy for per-
manent and costly long-line
construction. The long life and low
annual maintenance cost of U. S.
Cast Iron Pipe are not debatable;
they are as sure as anything
in engineering construction can be.

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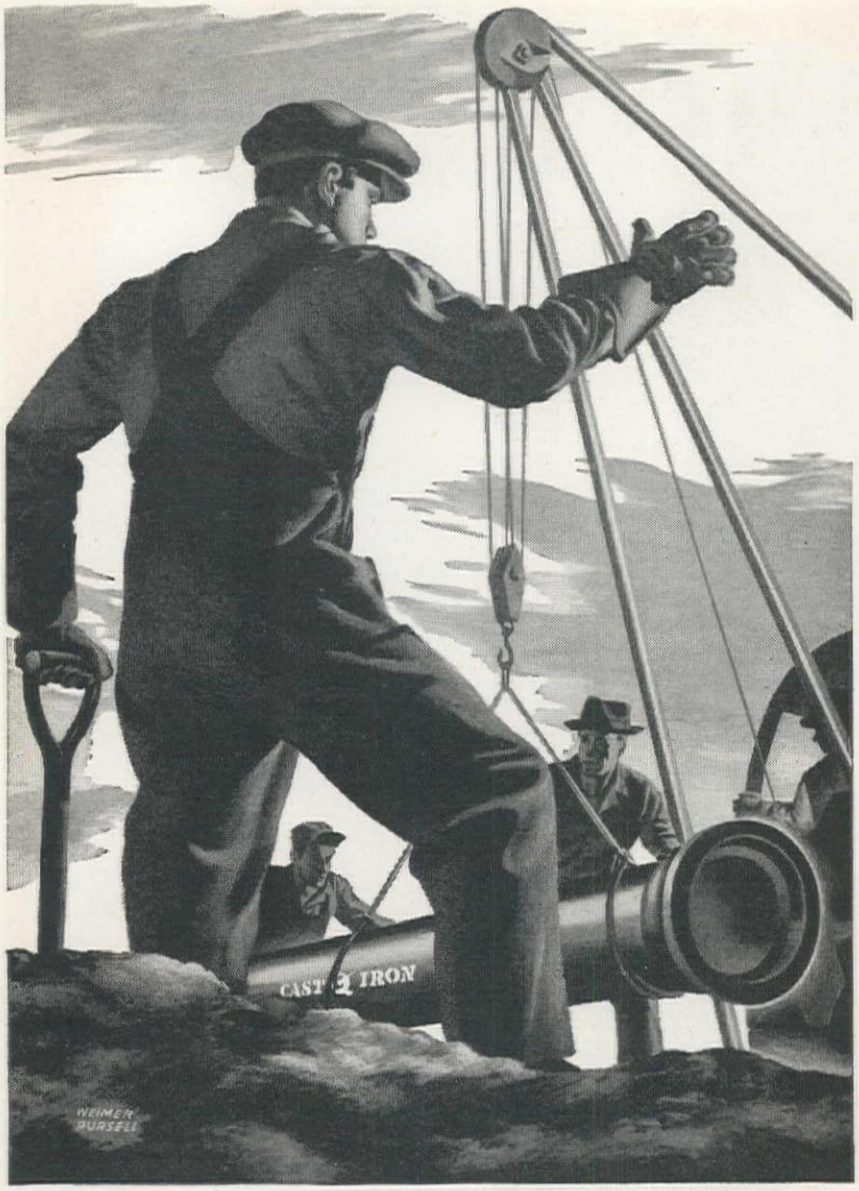

HOW can a ton of water (240 gallons) be collected, processed and delivered to the faucet, for less than a dime?

Because public water supply is a big industry—seven times bigger in tonnage volume than the combined product of all other industries—delivering an indispensable product without a substitute. This is part of the reason but not the big part.

More than half of the capital investment of public water supply systems in this country is in distribution mains, usually financed by bond issues with an average term of 30 years.

If these mains had to be dug up and replaced every 30 years—either because of failure or ruinous maintenance costs—water could *not* be sold for anything like a dime a ton.

But over 95% of all the water distribution mains in this country are cast iron mains with a known efficient life of at least 4 times the average term of an issue of water works bonds.

Cast iron mains go on serving for generations after the bonds issued to pay for them are retired and forgotten—saving millions in avoided replacement costs and millions in maintenance. A big reason why a ton of pure water costs less than a dime is the long life and efficient life of cast iron pipe. Cast Iron Pipe Research Association, T. F. Wolfe, Engineer, 122 S. Michigan Avenue, Chicago 3.

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SERVES FOR CENTURIES

LOOK FOR THIS MARK IT IDENTIFIES CAST IRON PIPE

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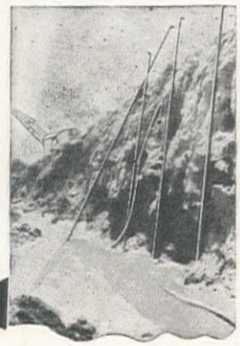
NOVO NEWS

APRIL, 1947

JANUARY, 1947

"Pronto-Prime" Survives Cave-ins, Runs 1,008 Consecutive Hours!



Dug Out, It's Ready to Run After a Bath

The scene is Bremen, Indiana. Construction workers under Arthur M. Keyser, Superintendent of Light and Water, are struggling against odds to lay a sewer line in wet, sandy soil three feet below the water table. The ditch resembles a small river despite all efforts to keep it dry. Pump after pump fails. The sandy water and eleven to seventeen-foot lift are too much. Finally, Mr. Keyser adds a Novo "Pronto-Prime" pump.

In true Hollywood style, cave-ins bury the "Pronto-Prime." Fearfully, workers dig it out time after time—remove the cleanout plate—dash in some water—bake the magneto dry—reinstall it—start the engine. Instantly, as if being buried alive were nothing, "Pronto-Prime" is at work again . . . runs steadily for 1,008 hours!

. . . and Here's the Sequel— It's *Still* Going Strong!

"It's Sure a Dandy," Says Septic Company Chief

J. G. FRANCIS

"The best performing, self-priming centrifugal pump I've ever operated," is what President J. G. Francis of Superior Septic Tank Co., Detroit, says about the "Pronto-Prime." "It's easy to prime, doesn't require any attention, throws the water regardless of whether the lift is 5 or 15 feet, and runs four or five hours on a gallon of gas. It's a dandy!"

Other Novo Equipment

Novo contractors' equipment includes diaphragm pumps, pressure pumps, hoists, generator sets, pavement breakers, traffic line-markers, and engines.

By all odds, this Novo "Pronto-Prime" pump should have been awarded the Purple Heart and retired from service long ago.

It's the 1½-inch pump which did the impossible at Bremen, Indiana . . . was rescued from repeated cave-ins . . . ran steadily for 1,008 consecutive hours . . . then licked other jobs without repairs of any kind.

And it's still going strong! Right now, this same "Pronto-Prime" is pumping water heavily laden with quicksand. In sewer work being done by the Superior Septic Tank Company of Detroit, the pump is started in the morning, swishes out the water, runs idle for 15 to 60 seconds, pumps again, idles again — continues the cycle for hours without attention.

The performance record of this pump is convincing proof of the efficiency of the Novo stout-hearted seal and the sturdiness of its over-all construction.

Allied Member of A.E.D.

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ENGINE COMPANY
LANSING 5, MICH. U.S.A.
CONTRACTOR'S EQUIPMENT
· GRAY IRON CASTINGS ·
ENGINES

FOR BETTER DRILLING IN ROCK OR COAL

MEET THE HARD-HITTING LIGHTWEIGHT J-30

A NEW JACKHAMER

It has

- A three-in-one backhead *(wet, dry or blower).*
- A sealed throttle valve *(dust and dirt free).*
- 3-piece chuck construction *(chuck, chuck driver and bronze chuck driver nut).*
- A "fighting heart" kicker port valve.
- Generous bearing faces for rigid joints.
- Raised open grip handle *(optional).*
- Rider pads for off-plank drilling.
- Smooth, powerful rotation.

ROCK DRILLS • COMPRESSORS
AIR TOOLS • PUMPS
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TRAILMOBILES have always been noted for their great stability in hauling long, heavy loads, such as fabricated steel girders, oil well casing, telephone poles, piling, logs and finished lumber, and other construction materials. That's why they are tops in the construction, petroleum and forest products industries.

Shown here are two pictures of TRAILMOBILES owned and operated by the Judson Pacific Murphy Corporation of Emeryville, California. They load their TRAILMOBILE flatbeds with 25 tons of steel and haul from points in the Sacramento Valley to Los Angeles. They tell us that they particularly like the TRAILMOBILE loading characteristics—the way they stay level when loading and unloading long steel beams.

If you are engaged in hauling in the construction, petroleum, or forest products industries, where big, heavy, concentrated loads are regular diet, you will appreciate TRAILMOBILES. They are specifically designed to meet your individual hauling requirements.

THE TRAILMOBILE COMPANY
BERKELEY, CALIFORNIA

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200 to 550 TONS per hr. Mixed in a Single Pass!

ADVANTAGES

ACCURATE CONTROL—Volume of oil is mechanically synchronized to the speed of the Road Pug and adjusted to volume of windrow by the Madsen-patented volume metering pump.

A SINGLE UNIT—A complete machine for producing road mix; no elevators or feeders and no extra attachments required except an oil-supply tank trailer.

TWO-MAN OPERATION All necessary operations for producing road mix with a Road Pug are performed by two men.

SINGLE-PASS MIXING Produces a uniform road mix material in a single-pass operation.

MANEUVERABILITY-The Road Pug maneuvers with the ease of a track-type tractor. Hydraulic controls lift the mixer opening to the transporting position and lower it to the working position.

MADSEN ROAD PUG

HERE IS THE ANSWER to low cost road surfacing. A mix-in-travel machine that turns out high quality road mix *faster, better, and at lower cost.*

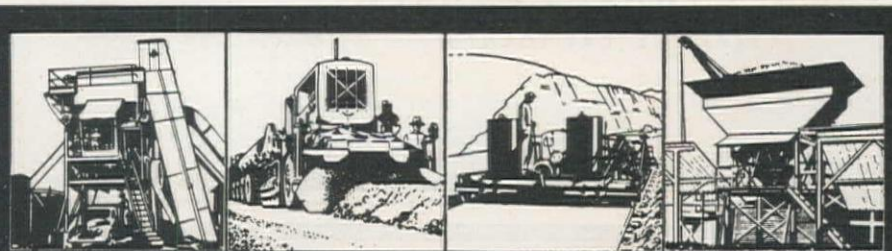
FASTER because the Madsen Road Pug, a single complete unit, picks up and dry mixes the aggregate...spray injects a *pre-determined amount* of binder ...cross mixes the material...and discharges a uniform mixture of dependable quality. BETTER because the ratio of aggregate and oil are accurately controlled.

AT LOWER COST because the Madsen Road Pug will produce from 200 to 550 tons per hour, pumping 9000 to 12,000 gallons of road oil while travel-mixing at a speed of 5 to 40 feet per minute. There are no delays because oil tank trucks hitch-on and replenish the oil supply while the Road Pug operates.

LEARN ABOUT the various jobs handled with the Road Pug...see all its outstanding features...write for 12-page illustrated catalogue. Delivery can be made in reasonable time.

MADSEN IRON WORKS
HUNTINGTON PARK, CALIFORNIA

Write for Catalog



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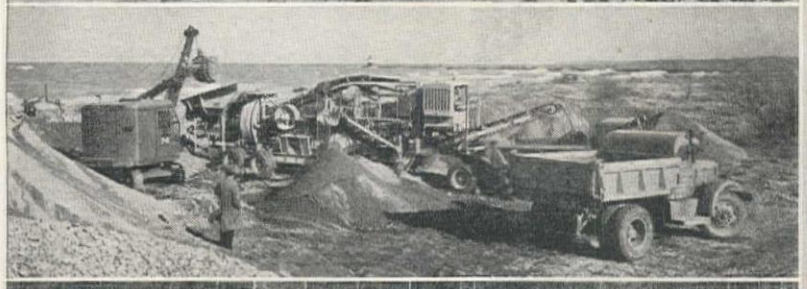
Cedarapids

Built by IOWA

the industry's most VERSATILE, LOW-COST portable crushing and screening plant

the Cedarapids JUNIOR TANDEM

Hundreds of these plants are in service in all parts of the country, in all kinds of rock and gravel and by all types of producers. You can feed a Junior Tandem the way you want to, move it wherever necessary, crush and screen whatever is available close to the job and set it up for operation with the minimum of time and expense. Maintenance costs are the lowest possible. Operators report production of 75 to 125 tons per hour—and more—of minus 1" material. Get the details from your nearest Cedarapids dealer—there is one near you.



quickly converted to Rock Plant by adding Cedarapids Portable Primary

THE IOWA LINE *of Material Handling Equipment Is Distributed by:*

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

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

THAT'S RIGHT . . . for a truck that will save you money, get a "*Job-Rated*" truck.

A "*Job-Rated*" truck is a truck that FITS your job —a truck in which every unit is engineered and "*Job-Rated*" for the size and kind of loads you carry.

Such a truck is more dependable. It will last longer. It will save money on operating and upkeep costs.

Your "*Job-Rated*" truck will be the right one of 175 Dodge chassis models to give you maximum economy and dependability. It will have the right one of 7 different engines.

It will have the right one of 5 clutches, 4 transmissions, 18 rear axles—the right units throughout to fit YOUR job . . . save YOU money!

To get such a truck, see your Dodge dealer . . . because *only* Dodge builds "*Job-Rated*" trucks!

DODGE DIVISION OF CHRYSLER CORPORATION

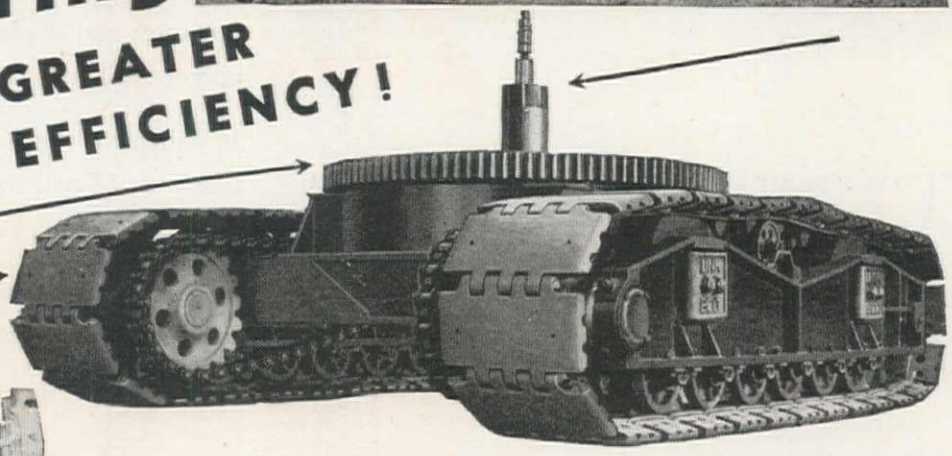
ONLY DODGE BUILDS "*Job-Rated*" TRUCKS

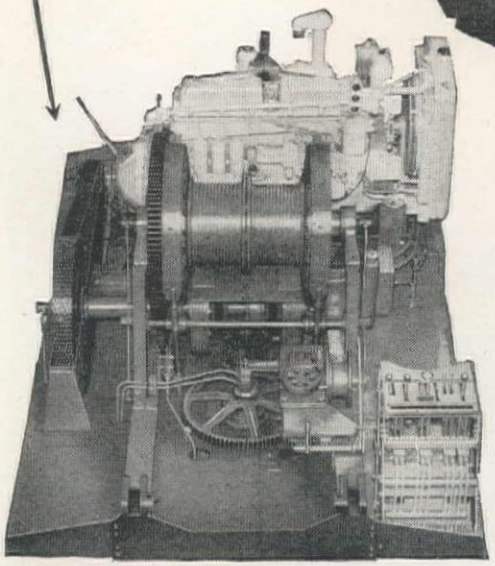
Fit the Job . . . Last Longer !

LINK-BELT SPEEDER

Advanced Engineering

GIVES YOU GREATER OPERATING EFFICIENCY!





Speed-O-Matic full hydraulic control gives greater output by eliminating all lost motion, actuating clutches faster and smoother, and by relieving operator of all manual effort, enables him to maintain top efficiency through entire shift. →

Size of dipper or horsepower of engine tell only part of the story of these Series 300, 1½ to 2 yd. Link-Belt Speeder Shovel-cranes. The real measure of their capacity for day-in, day-out yardage must be stated in terms of their speed, mobility, ease of operation and stamina that keeps them on the job. Some of these features are apparent from these pictures . . . mostly they must be seen in action to be fully appreciated. Have you asked your distributor for a demonstration?

All-steel, all-welded frame supports a clean-cut arrangement of machinery, from standard Diesel power plant to the control stand. Anti-friction bearings on drum shaft, swing and travel clutch shells and shafts. Safety type independent rapid boom-hoist, power controlled both up and down. Clutch friction blocks can be removed without disturbing drum or removing band. Propelling and steering mechanism fully enclosed in lower frame. Gears run in oil. Husky center pin and large conical rotating rollers.

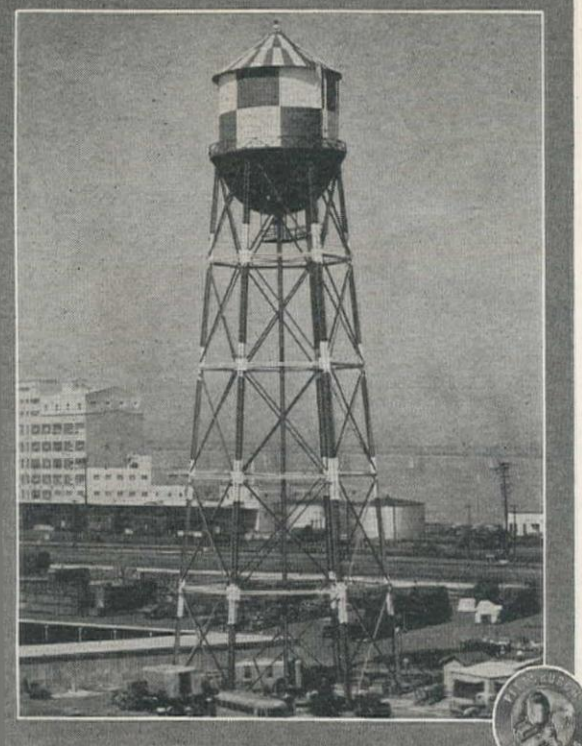
10,553

LINK-BELT SPEEDER

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

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

PITTSBURGH · DES MOINES



Builders of Elevated Steel Tanks for Better Water Storage since

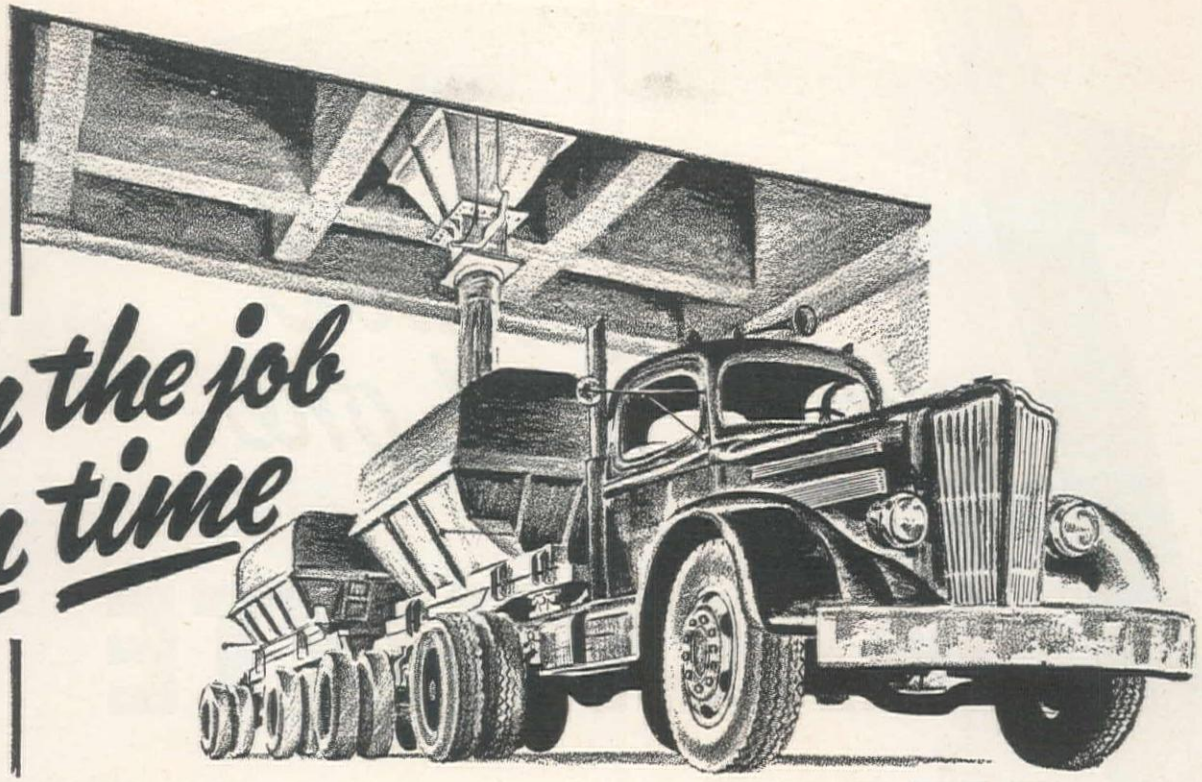
1897

These sturdy Elevated Steel Tanks, built by Pittsburgh-Des Moines to Navy specifications, are representative of hundreds of similar installations erected by us for the armed services. Above are shown the 250,000-gallon and 200,000-gallon P-DM tanks built at Alameda Naval Air Station (the wireless towers are ours, too!), and at left, the 200,000-gallon tank erected at the Oakland Naval Supply Depot.

As specialists in modern elevated steel tank design and construction, we invite your inquiries and will gladly arrange for consultation.

PITTSBURGH · DES MOINES
STEEL COMPANY

PITTSBURGH, PA., 3422 NEVILLE ISLAND—DES MOINES, IOWA, 923 TUTTLE STREET
NEW YORK, ROOM 920, 270 BROADWAY · CHICAGO, 1226 FIRST NATIONAL BANK BLDG.· DALLAS, 1227
PRAETORIAN BUILDING · SAN FRANCISCO, 629 RIALTO BUILDING · SEATTLE, 530 FIRST AVENUE, SOUTH



On the job On time

Permanente maintains modern cement packhouse and storage facilities at Permanente, Redwood City and Merced, in California, and at Seattle and Honolulu. Fast loading and delivery service bring Permanente products to your job in a hurry. At Permanente 110-barrel bulk trucks are loaded in *two-minutes* by screw conveyors and gravity-flow silos. 62,000 sacks per day come from the packhouse, where sacks are filled 28 to the minute by automatic four-spout packers. Special bulk or flat-rack trucks deliver the average order anywhere in Northern California within 6 to 24 hours after it is received. Permanente Cements, made in the world's largest plant, are not only the finest that modern laboratory and production practice can provide. They are delivered to the job *on time*.

PERMANENTE CEMENT COMPANY

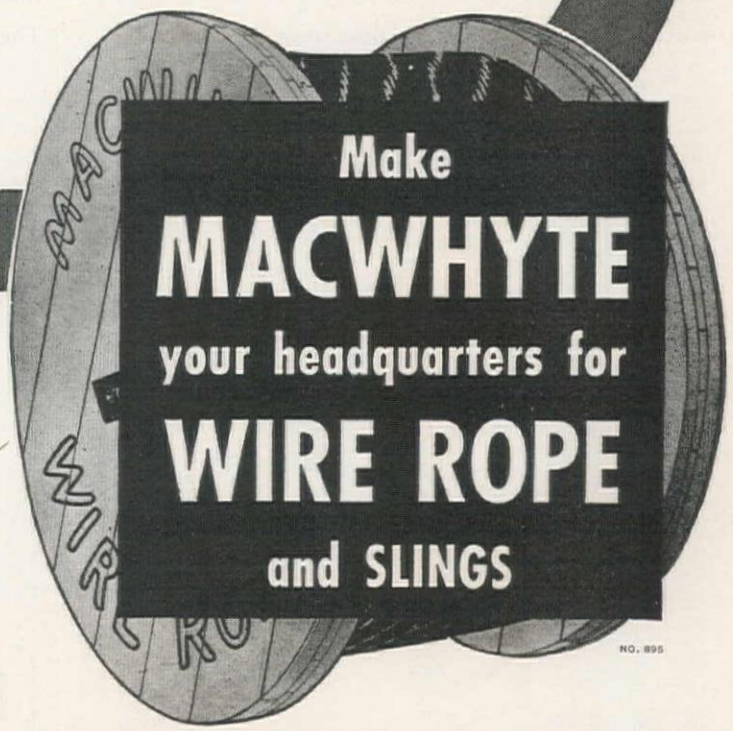
PRODUCERS OF PERMANENTE, SANTA CLARA, YOSEMITE AND KAISER BRANDS OF CEMENT AND PERMANENTE LIME PRODUCTS

OAKLAND · SEATTLE · HONOLULU

a thousand and one

MACWHYTE WIRE ROPES

...all job-proved...assure you the correct rope for your equipment



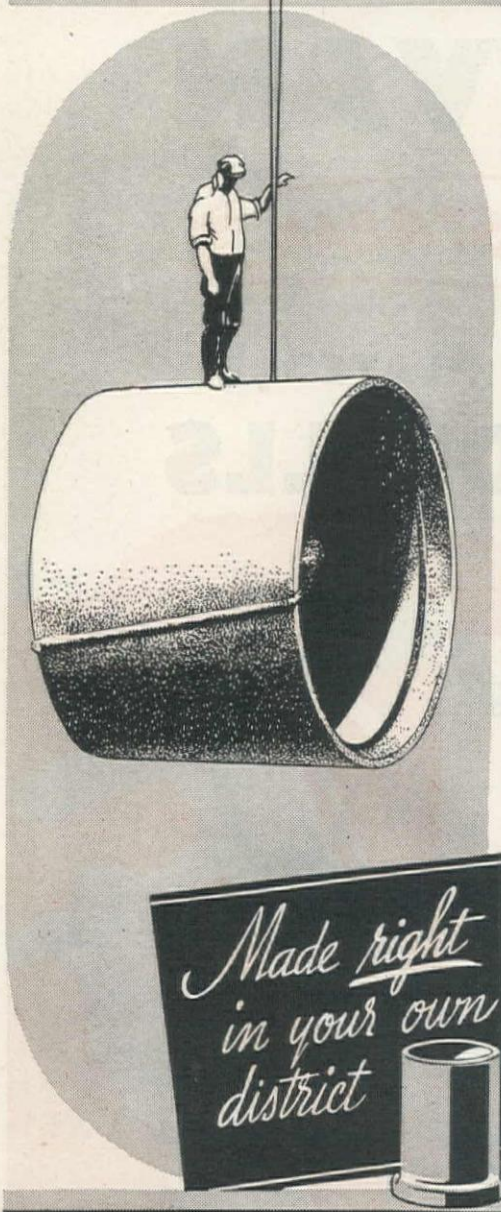
When you use the correct wire rope, both the rope and your equipment last longer, cost less to operate. Macwhyte consulting engineers will check your equipment and recommend the wire rope specifically engineered for your job. Ask your Macwhyte distributor, or write Macwhyte Company.

MACWHYTE WIRE ROPE
Manufactured by Macwhyte Company
2909 Fourteenth Ave., Kenosha, Wis.

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

MACWHYTE PREFORMED AND NON-PREFORMED INTERNALLY LUBRICATED WIRE ROPES .. MONARCH WHYTE STRAND Wire Rope...Special Traction Elevator Rope ...Stainless Steel Wire Rope...Monel Metal Wire Rope...Galvanized Wire Rope.... Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies and Tie-Rods. Catalogs on request.

You get all four in CONCRETE SEWER PIPE



STRENGTH

Designed to support all types of loads and fills and capable of resisting the impacts of the heaviest travel, concrete pipe has proved its stamina time and again under the stress and strain of railroad traffic, airport landings, modern freeways, city streets and county roads.

CAPACITY

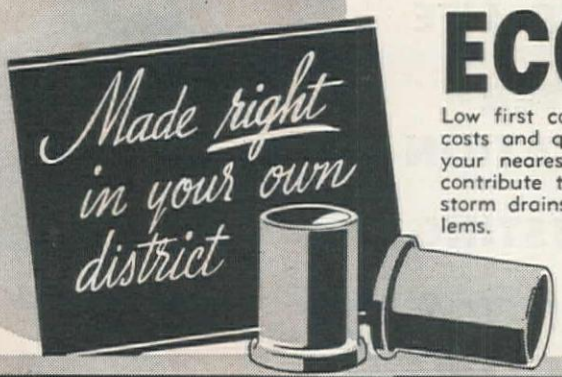
In sanitary sewers and storm drains of concrete pipe maximum hydraulic capacity is assured by the smooth interior of both the pipe and the joints, promoting a steady, even, undisturbed flow with a minimum of friction.

DURABILITY

After many years of constant service, thousands of miles of concrete pipe testify to the long life of this modern, convenient form of construction. Made to meet the highest standards of engineering specifications for every type of use, you can look to concrete pipe for exceptional durability.

ECONOMY

Low first cost, low installation costs, low maintenance costs and quick delivery on the job from the plant of your nearest association member — all these factors contribute to the lasting economy of concrete pipe for storm drains, sanitary sewers and other drainage problems.



Write for the names of your nearest manufacturer members of—

CALIFORNIA ASSOCIATED
CONCRETE PIPE MANUFACTURERS

P.O. BOX 152 FRESNO 7 CALIFORNIA

Split-Second Timing pays off . . .

ATLAS ROCKMASTER BLASTING gets results

In golf the right club plus know-how, plus split-second timing that applies power at just the right moment produces the shot that pays off. The precision timing of the new Atlas Rockmaster Blasting System is paying off. Never before has the blaster been able to achieve such amazing control of timing. And never before has he had such sensational results.

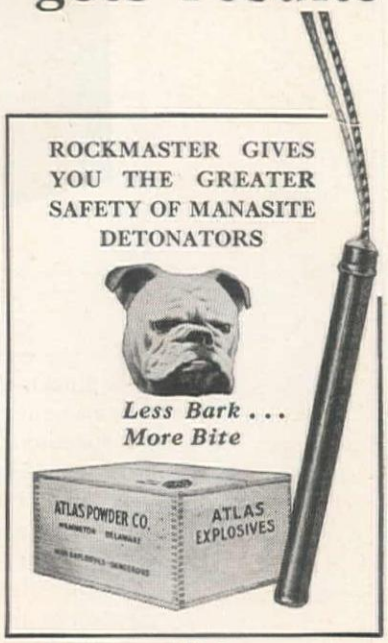
Atlas Rockmaster makes it possible for the blaster to time the delay elements of his shot in thousandths of a second. A split-second after the rock is knocked off balance by the first blast, it is hit again . . . with results you actually have to see to believe.

When Rockmaster is used dollars are saved. A tremendous increase in fragmentation is being reported by blasters all over the country . . . in many instances the increase is as high as 30%. Secondary shooting has been cut down . . . shovel efficiency stepped-up. And trouble-making complaints due to noise and vibration have practically disappeared.

Rockmaster is not just a timing device. Rockmaster is a complete blasting system of which precision timing is only a part. All factors of the blasting problem—detonators, explosive and loading—are taken into account and combined with your know-how and ours to produce true Rockmaster effectiveness.

To get outstanding results yourself, call in the Atlas representative and ask him how Rockmaster can be adapted to your blasting problem.

Offices in Principal Cities



Manasite: Reg. U. S. Pat. Off.
"ROCKMASTER"—Trade Mark

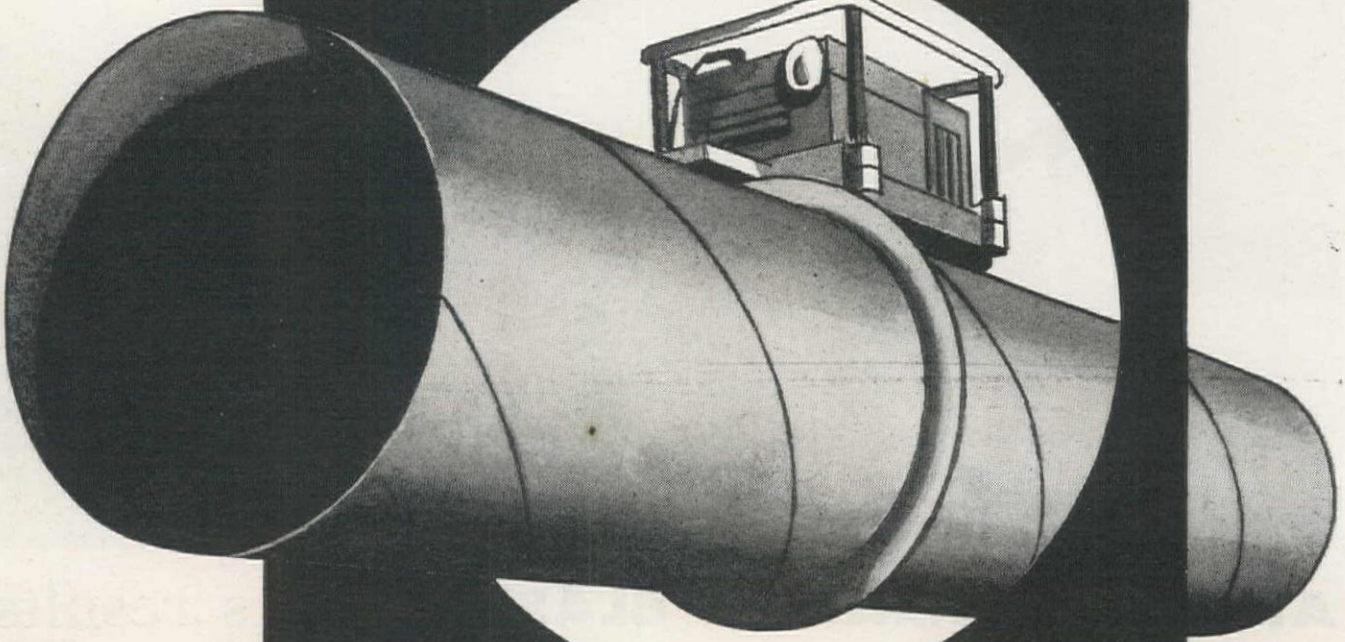
ATLAS EXPLOSIVES

"Everything for Blasting"

CHEMICALS ATLAS EXPLOSIVES

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

Electrical Field Inspection another factor involved in . . .



the economics of cathodic protection

IN the construction of corrosion-proof pipelines, experienced engineers recognize the value of complete electrical inspection. It not only eliminates holidays and improves the quality of application and handling of the pipe, but also provides a dependable guide as to the continuing stability of the enamel insulation—determines whether or not cathodic protection will be economical over a long period of years.

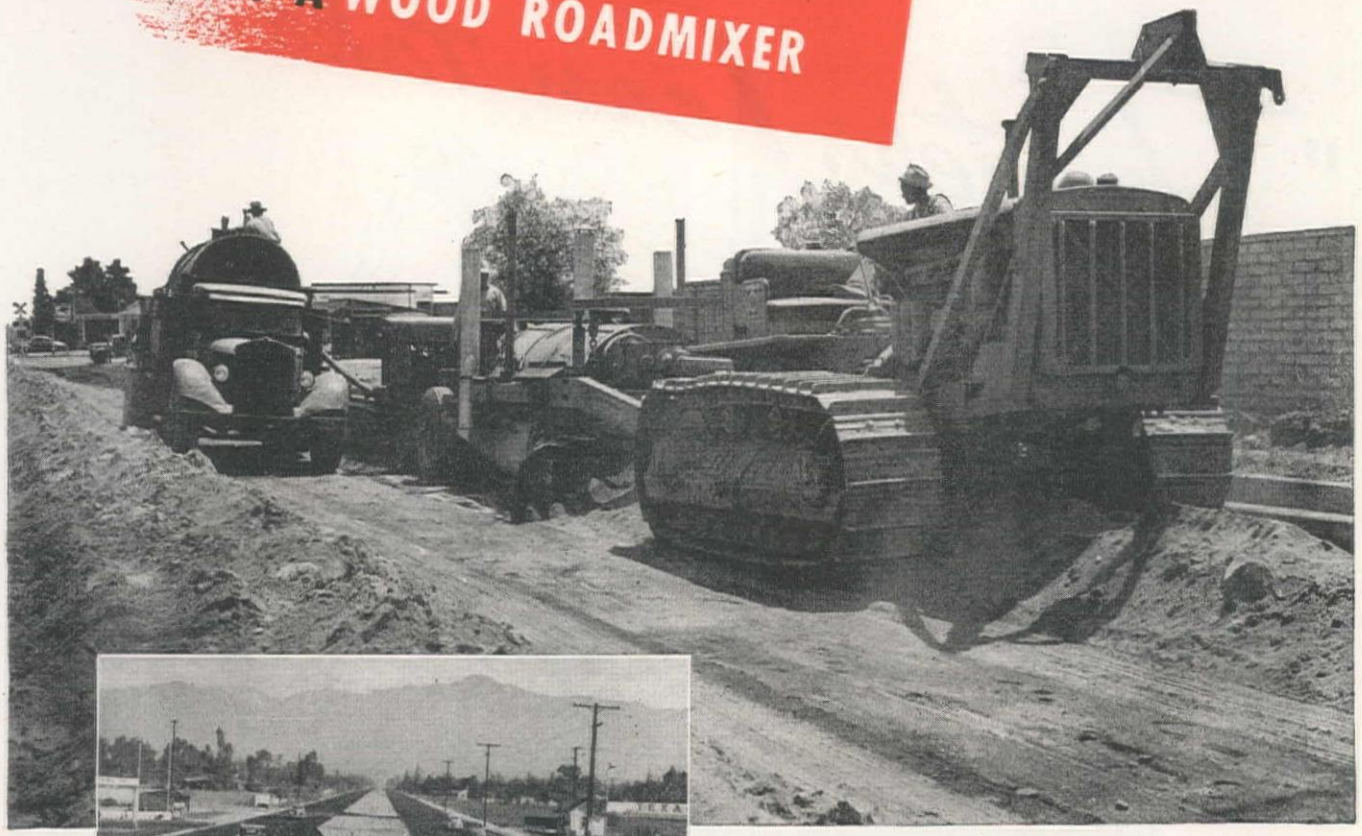
These electrical inspections insure the superior insulation value of Barrett Coal-tar Enamels. Because of their high resistance to moisture absorption, these coatings possess the unvarying *stability* of dielectric strength that is required to make cathodic protection economical. They make it possible to use a minimum number of cathodic units and a minimum application of complementary electrical energy—factors which are all-important in the design of corrosion-proof lines.

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

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

Barrett
COAL-TAR ENAMEL
Reg. U.S. Pat. Off.

MIX SOIL CEMENT IN ONE PASS WITH A WOOD ROADMIXER



ABOVE: *Wood Roadmixer preparing soil cement sub-base on California Route 168.*
LEFT: *Completed roadway.*

The Wood Roadmixer is a complete traveling mixing plant. In one pass, it mixes soil-cement, road oil, cut-back, tar, and emulsion, using existing or imported materials, ready for spreading and compacting. It is the fastest method of low-cost paving. The Wood Roadmixer is made in three sizes: Models 54 and 48 are pulled and powered by a crawler tractor, require only a two-man crew and produce up to 350 tons of ready-to-spread mix per hour; Model 36 is self-propelled, is one-man operated, and produces up to 150 tons of mix per hour. For profitable base course and surfacing operations, on any and all jobs, consult your local Wood Roadmixer dealer or write direct for literature and prices on Roadmixers, Tank Trailers, Windrowers, and V-Spreaders.

ROADBUILDING EQUIPMENT

WOOD MANUFACTURING CO.

BOX 620, 6900 TUJUNGA AVENUE • NORTH HOLLYWOOD, CALIFORNIA

Distributors: P. L. CROOKS & CO., Portland 10, Ore. ★ ARNOLD MACHINERY CO., INC., Salt Lake City 1, Utah ★ INDUSTRIAL EQUIPMENT CO., Billings, Mont. ★ WORTHAM MACHINERY CO., Cheyenne, Wy. ★ THE MINE & SMELTER SUPPLY CO., Denver, Colo. ★ HARDIN & COGGINS, Albuquerque, N. M. ★ STATE TRACTOR & EQUIPMENT CO., Phoenix, Ariz. ★ SIERRA MACHINERY CO., Reno, Nev. ★ COAST EQUIPMENT CO., San Francisco 1, Calif. ★ GOLDEN STATE EQUIPMENT CO., Los Angeles, Calif. ★ WILLARD EQUIPMENT CO., Vancouver, B. C.

THIS DRAGLINE COST $36,000

. . . but it can't work!

● This is a dragline and it cost approximately $36,000—but it can't do a lick of work because the wire rope is missing. How much does the rope cost? Ordinary wire rope—about $217. The best wire rope—Preformed Improved Plow Steel—about $260!

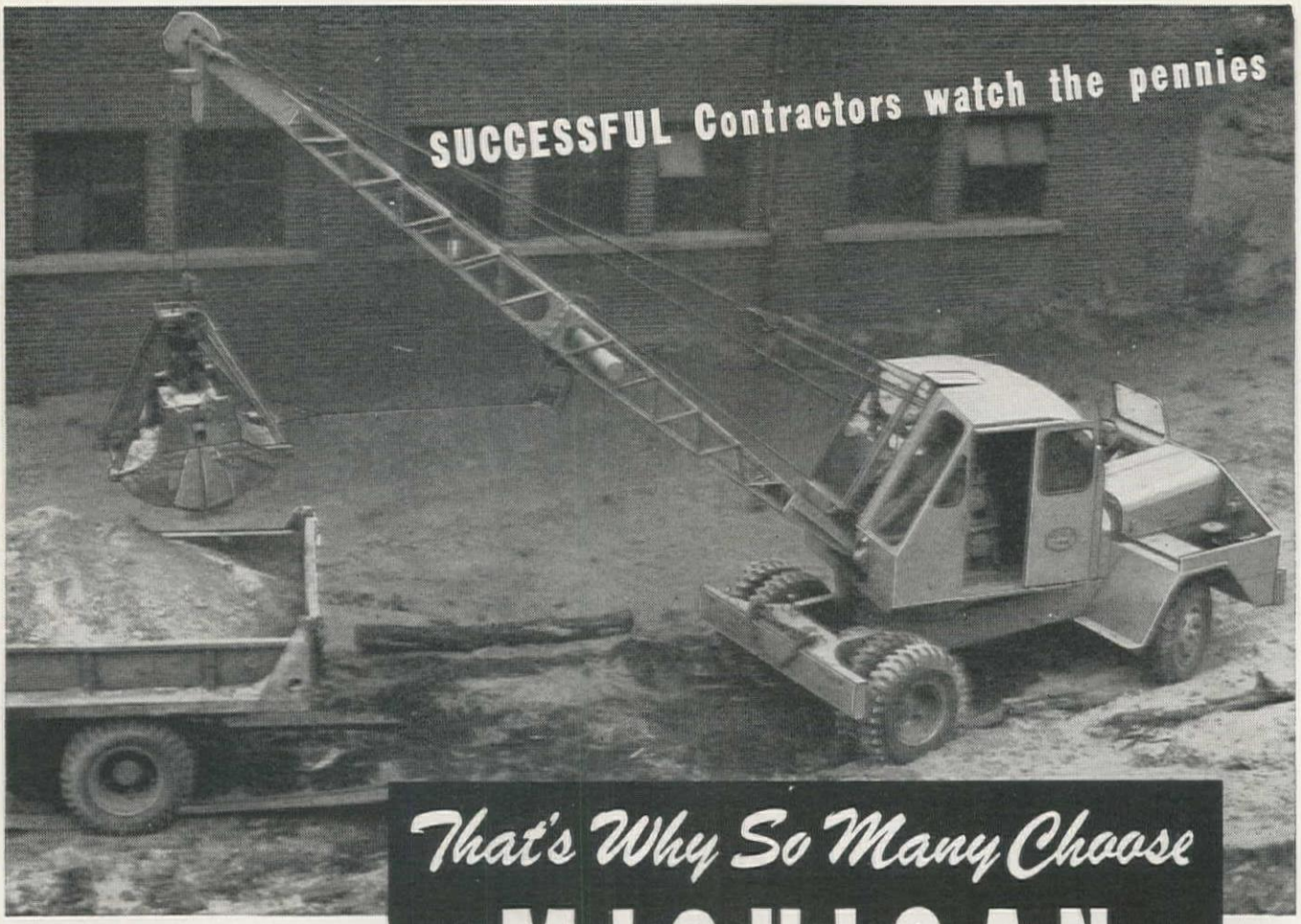
Specify Preformed Improved Plow Steel when you order for replacement. And when you buy such a machine, tell the manufacturer to equip it with Preformed Improved Plow Steel.

It lasts longer, is easier and safer to handle; it's more flexible and spools better.

WRITE FOR FREE COPY of helpful book about Preformed. Address: Preformed Wire Rope Information Bureau, 520 North Michigan Ave., Chicago 11.

ASK YOUR OWN WIRE ROPE MANUFACTURER OR DISTRIBUTOR

HANDLES EASIER - LASTS LONGER



That's Why So Many Choose

MICHIGAN

THE PIONEER AIR-CONTROLLED TRUCK-TYPE SHOVEL-CRANE

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

With contractors who keep a sharp eye on costs, MICHIGAN ranks "tops." They know that they can depend on MICHIGAN to deliver top-notch performance, day after day. They know that with MICHIGAN they can "come out on top" even on those small, scattered jobs that cannot be handled profitably with ordinary equipment . . . Get **all** the facts about MICHIGAN Mobile SHOVELS-CRANES—send for Bulletin W-47.

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

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

"THE SIGN OF EXTRA SERVICE"

It sure gave us a lift!

There's more than one way to load out trucks, but I never saw one that could beat this. We thought we used to do pretty well until our Oliver "Cletrac" dealer happened to drop in one day.

"Look," he said, "you're doing a good job of dirt moving, but here's a way to give the job a real lift. Put a new Drott Hi-Lift shovel on those Cletrac's of yours and watch the dirt fly. You see, this unit strips, scoops, carries, and dumps the dirt into your trucks. The deep shovel gets a full load every time . . . doesn't spill. It's pivoted so you can't help but get a bigger load and that means faster, more economical operation.

His suggestion gave our production a real lift. The Oliver "Cletrac" dealer sure knows his business and is a big help in ours.

Cletrac

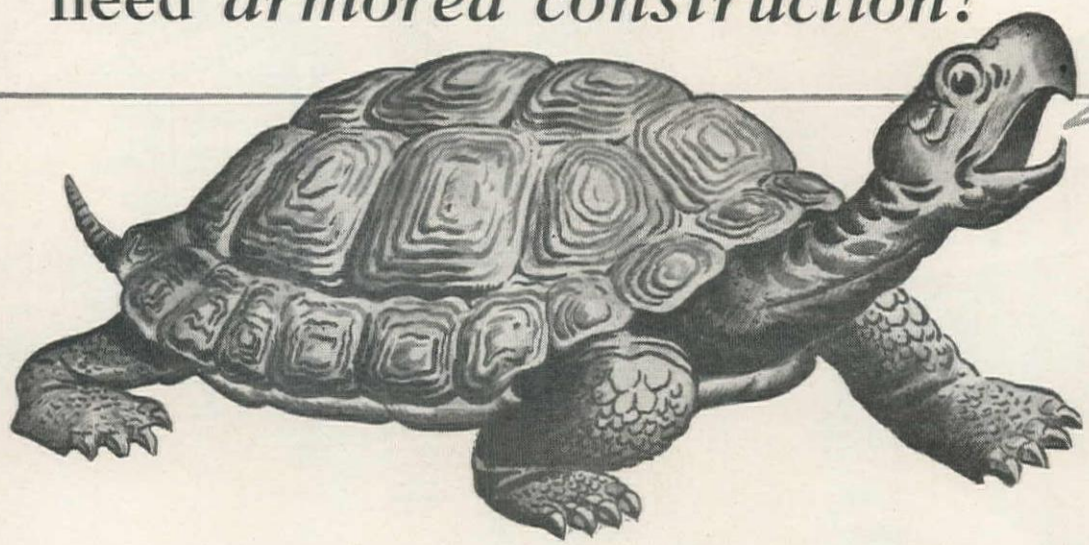
a product of

The OLIVER Corporation

Industrial Division: 19300 Euclid Ave., Cleveland 17, Ohio

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

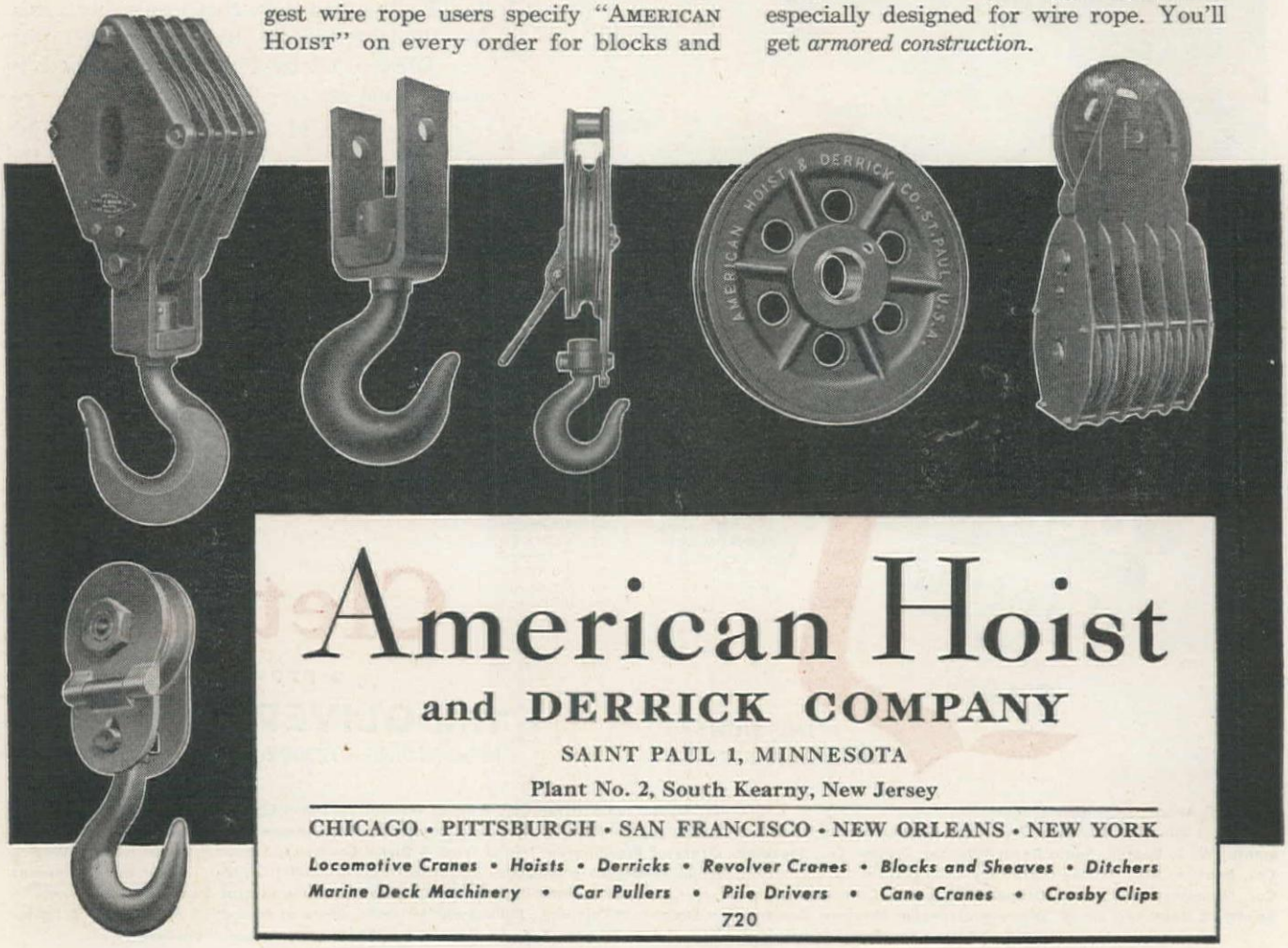
Blocks and sheaves, too, need *armored construction!*



IF you have to take a beating, it pays to be tough! And blocks and sheaves *do* take a beating. Slammed against steelwork, battered by sudden drops, exposed to the elements, dragged through sand and mud, they're either tough—or else!

That explains why so many of the biggest wire rope users specify "AMERICAN HOIST" on every order for blocks and sheaves. For we give you *armored construction*. That means extra thick side plates and reinforcing straps—oversize pins and axles—hooks and shackles of tough forged steel.

Here's a practical suggestion: Specify "AMERICAN HOIST" blocks and sheaves on every order. You'll get rugged equipment especially designed for wire rope. You'll get *armored construction*.



American Hoist
and DERRICK COMPANY

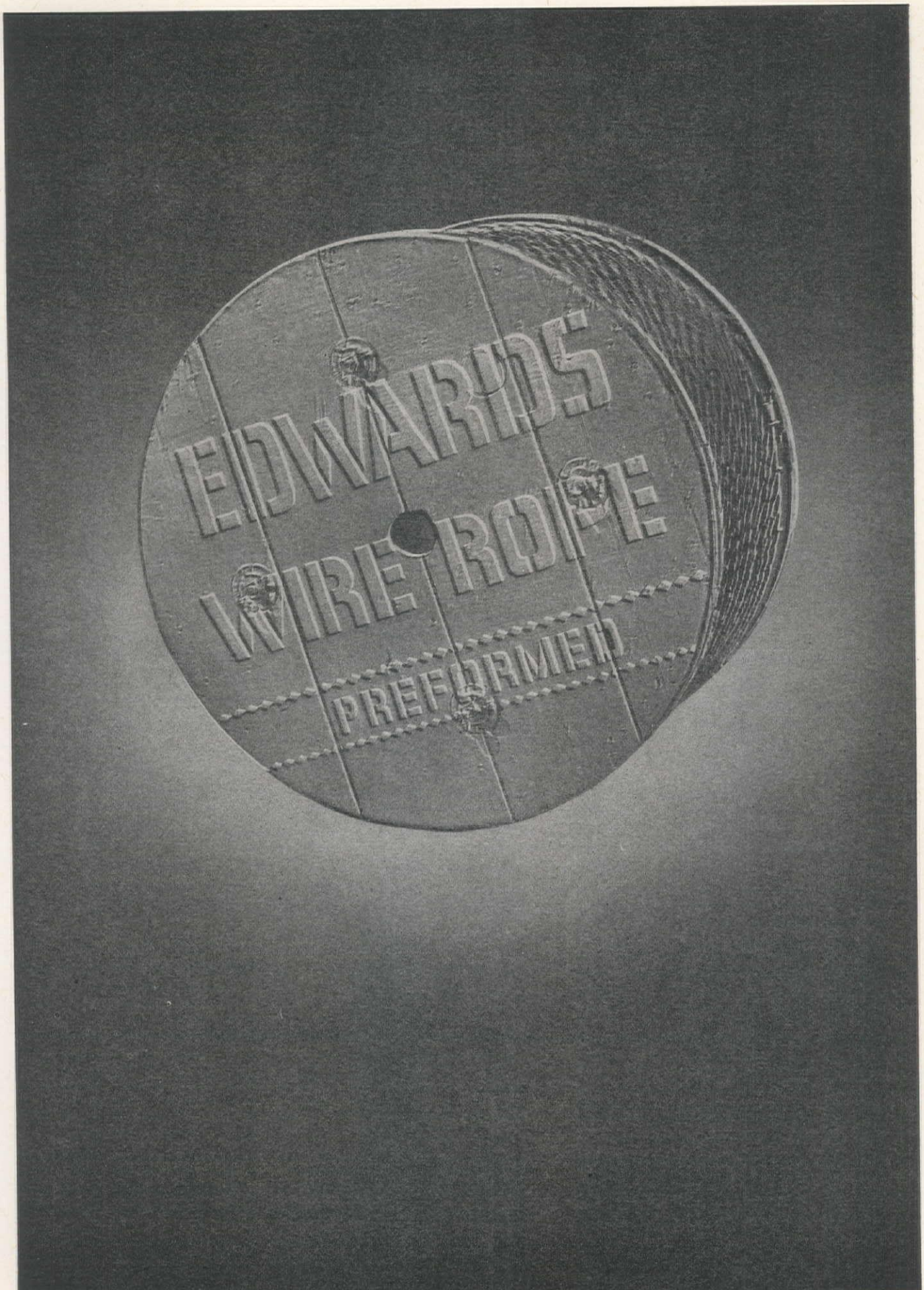
SAINT PAUL 1, MINNESOTA

Plant No. 2, South Kearny, New Jersey

CHICAGO • PITTSBURGH • SAN FRANCISCO • NEW ORLEANS • NEW YORK

Locomotive Cranes • Hoists • Derricks • Revolver Cranes • Blocks and Sheaves • Ditchers
Marine Deck Machinery • Car Pullers • Pile Drivers • Cane Cranes • Crosby Clips

720



THERE ARE TWO WAYS TO BUY ADVERTISING SPACE

FIRST, the FACTUAL way. Buyers using this method get FULL VALUE for their advertising dollars by asking these questions about media *before* they buy:

How much paid circulation (how many people have expressed interest in the publication by paying for it)? How much unpaid? Who are the paid subscribers—what occupation or business? How was the circulation obtained? At what price or prices were subscriptions sold? What premiums, if any, were used as circulation inducements? How many subscriptions in arrears? What is the renewal percentage? Where does the circulation go?

Factual-minded space buyers find the answers to these questions in reports issued by the Audit Bureau of Circulations, a cooperative association of 2800 publishers, advertisers and advertising agencies in the United States and Canada. The circulation records of A.B.C. publisher members are audited once a year by a staff of experienced circulation auditors, and the information thus obtained is issued in easy-to-read A.B.C. reports available to all advertisers.

Another kind of space buying is the GUESSWORK method where media is selected on the basis of opinions-without-facts, unverified claims, inadequate and sometimes obsolete data. When advertising is bought by guesswork it becomes a speculation, a hit-or-miss operation that has no place in modern business.

Start your advertising on the way to success by using the FACTUAL method of space buying. This paper is a member of the Audit Bureau of Circulations. Ask for a copy of our A.B.C. report and then study it.

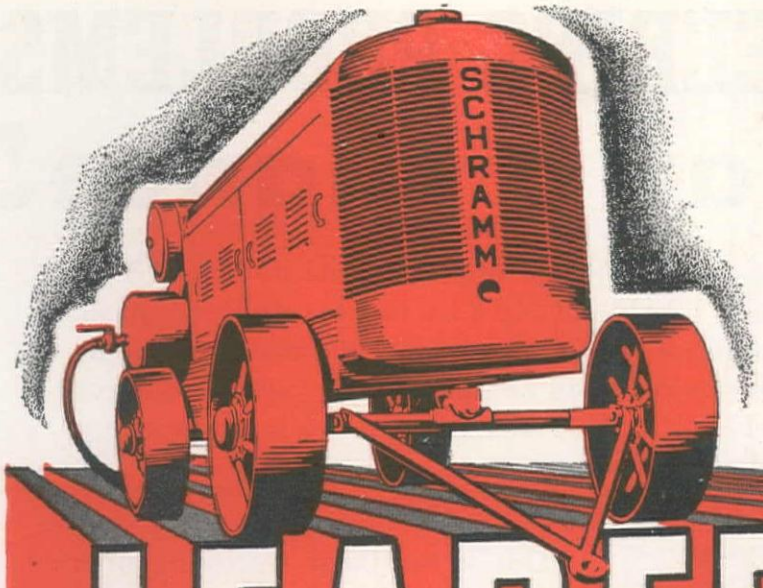
SEND THE RIGHT MESSAGE TO THE RIGHT PEOPLE

Paid subscriptions and renewals, as defined by A.B.C. standards, indicate a reader audience that has responded to a publication's editorial appeal. With the interests of readers thus identified, it becomes possible to reach specialized groups effectively with specialized advertising appeals.

WESTERN CONSTRUCTION NEWS

503 Market Street, San Francisco 5, California

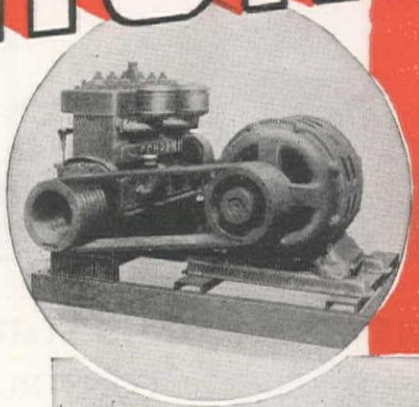
ABC = *AUDIT BUREAU OF CIRCULATIONS* = *Facts as the Basic Yardstick of Advertising Value*



LEADERSHIP

SINCE producing the first portable Compressor in 1908, SCHRAMM LEADERSHIP has been constantly maintained. Standards of construction continually revised, until today Schramm offers the most advanced line of air producing equipment that can be found anywhere. Modern manufacturing methods together with suitable high grade materials result in a unit that gives dependable trouble free services — always.

There is a rugged Schramm unit designed to take care of your Compressed Air needs. Contact branch nearest you or consult our engineering department for recommendations.



SCHRAMM INC.

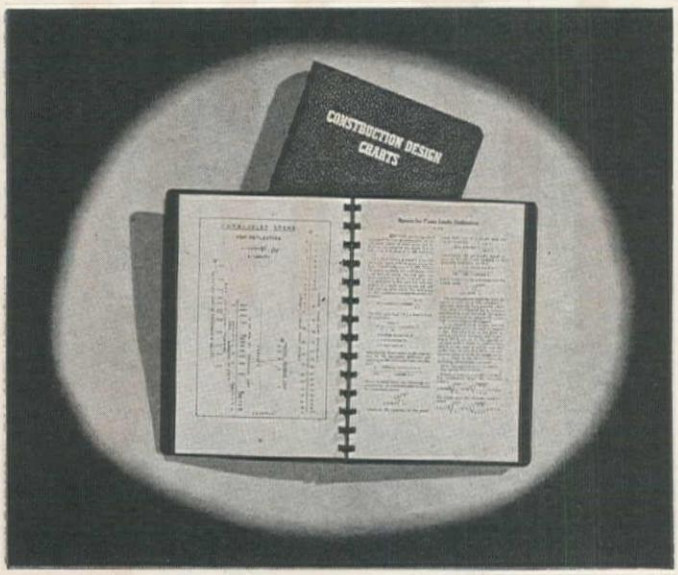
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Air **WHERE, WHEN AND AS MUCH AS YOU NEED.**

ENGINEERS — CARPENTERS — CONCRETE MEN — FOREMEN — SUPERINTENDENTS:

SOLVE ENGINEERING PROBLEMS . . . . . at a Glance!

There is no time to waste these days on tedious figuring of routine problems! This popular edition of CONSTRUCTION DESIGN CHARTS, by Consulting Engineer James R. Griffith, gives countless engineering shortcuts—gives the answers to engineering and preliminary design problems in a flash! Engineers—carpenters—concrete men—foremen—superintendents—there's a whale of a value in this book for every man engaged in construction today!



This is the third reprinting of the CONSTRUCTION DESIGN CHARTS, and the contents are exactly the same as those which appeared in the original enlarged edition of 1943. This book contains 72 charts and has 150 pages filled with valuable information that will help you. Covered in sturdy black fabrikoid, stamped in gold, the book has a special metal binding that allows each page to lie flat for easy reference.

THIS NEW EDITION IS LIMITED — ORDER TODAY

The original edition of CONSTRUCTION DESIGN CHARTS disappeared like magic, so there's no time to lose in getting your order in for this book. The latest reprinting of this popular book is now available and our supply is definitely limited. We suggest placing an order immediately.

Price

$3.00

Postpaid

Add 8c Sales Tax if ordering from a California address.

YOU GET ALL THIS

How Nomographs Are Constructed
Concrete Design
Concrete Form Design
Earthwork
Highway Design
Hydraulics
Structural Design
Timber Design
Compressed Air Transmission
Measurement of Triangular Areas

...PLUS MUCH MORE!

MAIL THIS COUPON TODAY!

KING PUBLICATIONS
503 Market Street
San Francisco, California

YES, I want a copy of CONSTRUCTION DESIGN CHARTS, for which I enclose $3.00 Add 8c sales tax if ordering from a California address. If I'm not completely satisfied, I can return book in 10 days and get my money back, plus postage.

Name.....

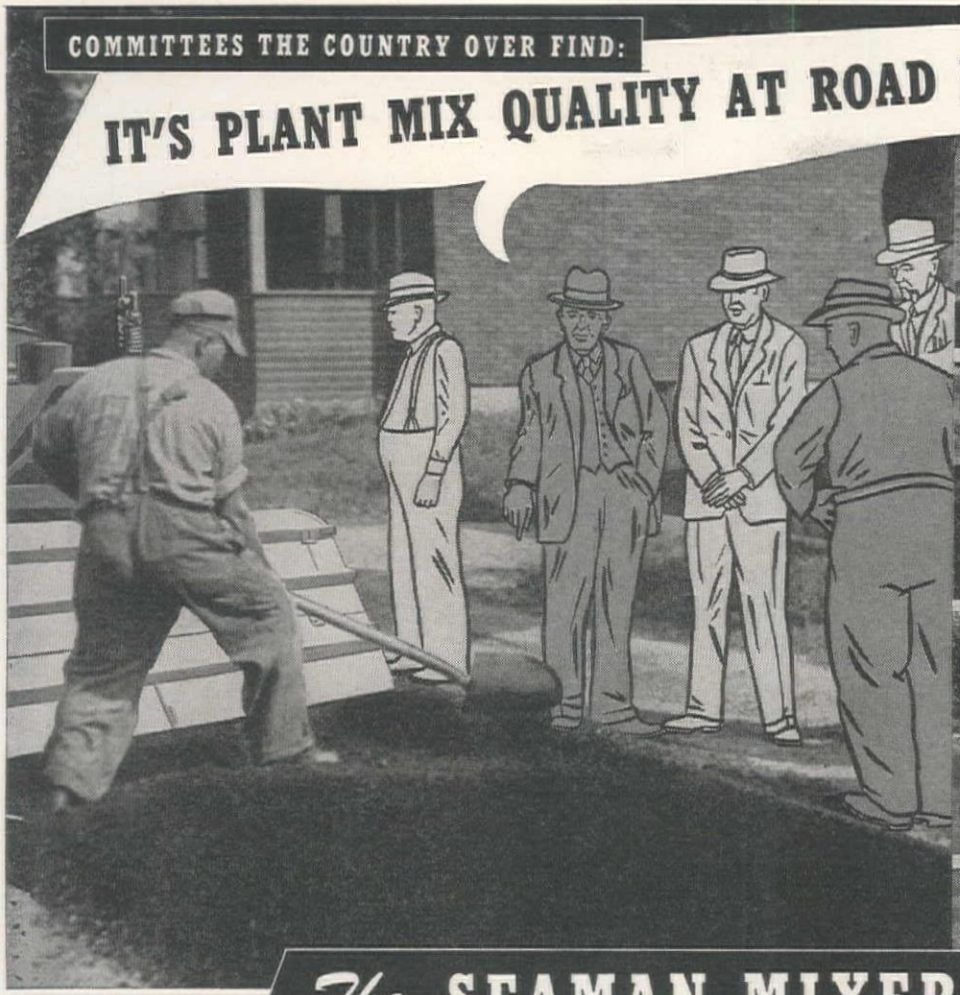
Address.....

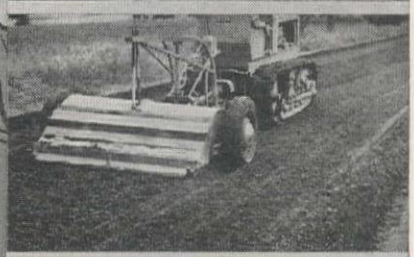
P. O.....State.....

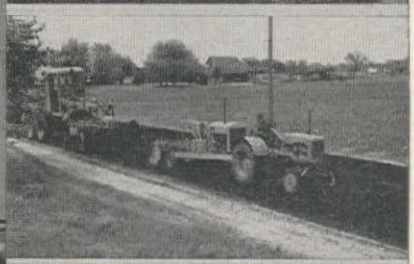
Position.....Company.....

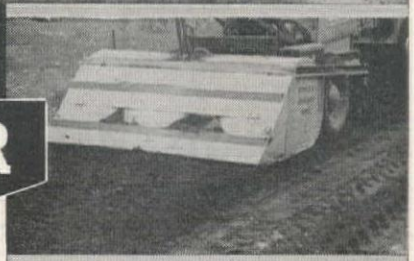
COMMITTEES THE COUNTRY OVER FIND:

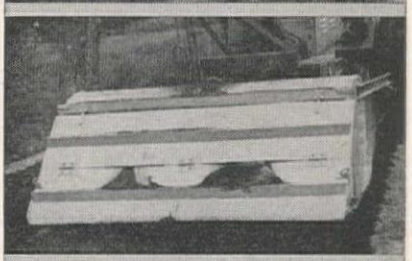
IT'S PLANT MIX QUALITY AT ROAD MIX COST!

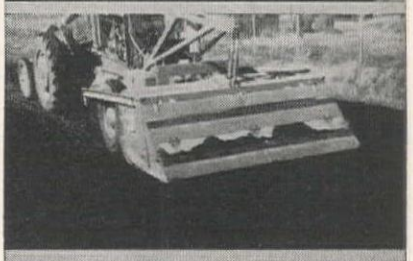












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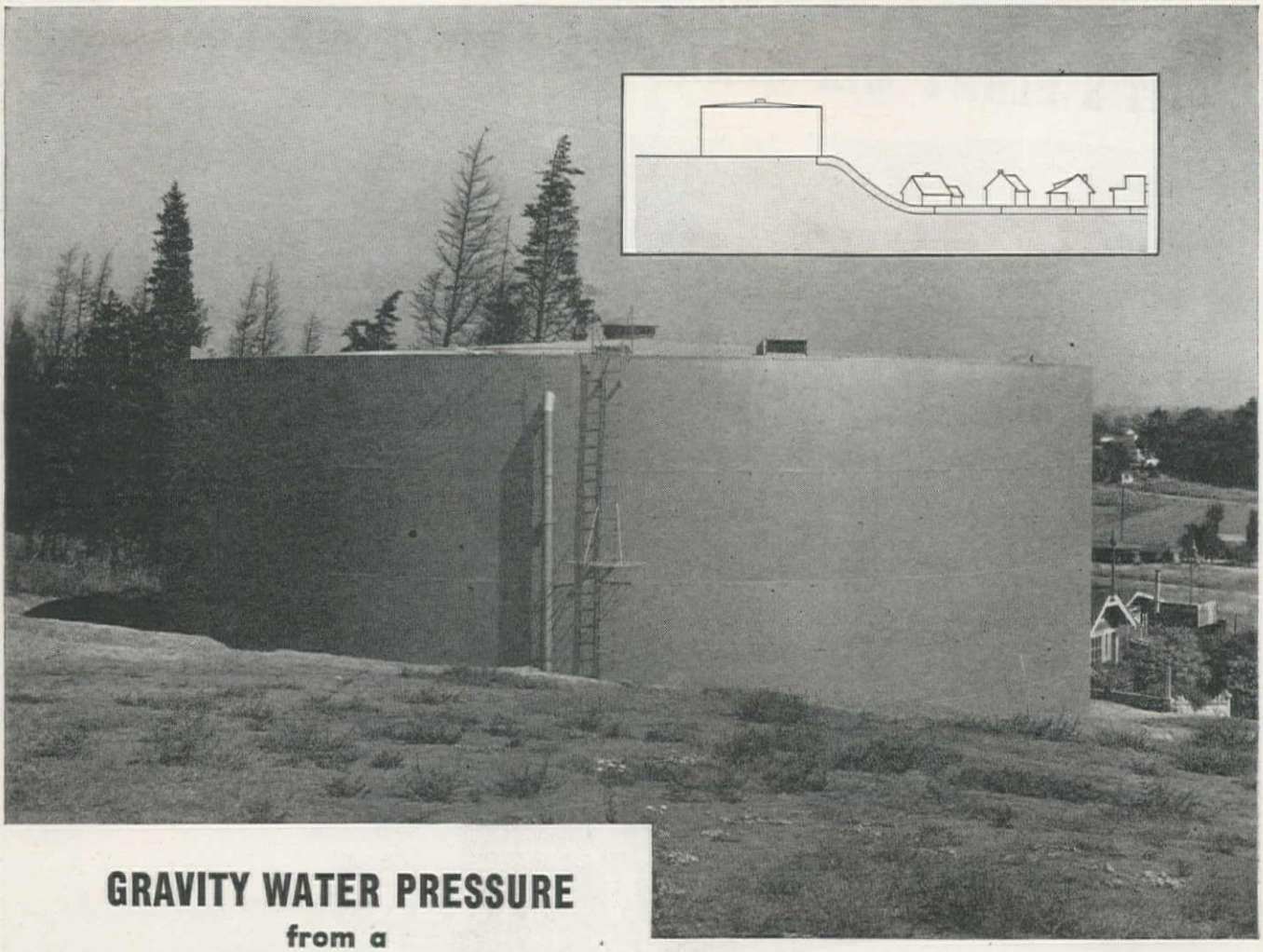

GRAVITY WATER PRESSURE
from a
FLAT-BOTTOM STEEL RESERVOIR

HORTON STEEL RESERVOIRS may be used to provide gravity water pressure in a municipal water supply system where a natural elevation is available. (The diagrammatic sketch in the upper right corner of the photo above shows how it can be done.) At Hermosa Beach, California, the topography is suited to the use of a reservoir in this manner. The California Water Service Company installed the 1,000,000 gal. Horton steel reservoir shown above on the side of a hill. It "rides" on the system like an elevated tank.

Under some circumstances engineers find it desirable to recommend a stand-pipe type of reservoir. This type of structure may be given special architectural treatment so that it will harmonize with the surrounding territory.

ADVANTAGES OF WELDED STEEL RESERVOIRS

Welded steel reservoirs have several distinct advantages. Steel will not crack and develop leaks if there should be uneven settlement. The welded joints are *made* tight and *stay* water tight. Maintenance costs are low, since regular painting inside and outside will keep the steel in good condition.

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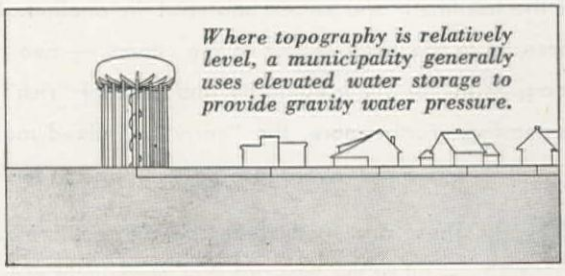

Where topography is relatively level, a municipality generally uses elevated water storage to provide gravity water pressure.

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Plants in BIRMINGHAM, CHICAGO, and GREENVILLE, PENNA. *In Canada*—HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

WESTERN CONSTRUCTION NEWS
WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER
April, 1947 Vol. 22, No. 4

J. M. SERVER, JR. . . . . Editor
D. F. STEVENS . . . . . Associate Editor
ARNOLD KRUCKMAN . . . . Associate Editor

Explanations Are In Order

FOR AS YET UNEXPLAINED reasons of his own the Secretary of the Interior has seen fit to announce with grandiloquent gestures the completion of a super plan for the development of the entire Columbia River Basin which constitutes practically all of the Pacific Northwest with over-lapping at the edges. Without having had the opportunity of examining a copy of the report itself (said to consist of 540 pages including 68 pictures, 88 statistical tables, 73 maps and charts, and 7 large colored maps) there seem to be several pertinent questions that should be put to the Secretary concerning this magnificent plan.

First and most basic of the questions is: Under what authority was the report prepared? If the report is properly prepared it must represent a vast expenditure of money and man-hours. Such an expenditure should have been so large that only a special authorization and appropriation would suffice. Further, preparation of the report could only be accomplished over a period of years. Have other investigations and reports been slighted to bring forth the Columbia Basin report at this time?

On the other hand, if the report is not properly prepared it is not worth the paper it is printed on, despite the fact that it has been published in limited, numbered copies. If it is simply a hasty throwing together of investigation findings from a multiplicity of small projects in the Columbia Basin, it is no comprehensive plan at all and should not be so labeled.

Another point in question is: Why did the Secretary of the Interior cause an over-all report on the Columbia River to be made and issued at this particular time? At the specific request of Congress the Corps of Engineers has for some time been engaged in an extensive and detailed review of its "308 report" on the Columbia River and its tributaries. Completion of this study is still in the future, and should bring forth much additional information that would affect a comprehensive plan of development for the basin. Why did the Secretary of the Interior attempt duplication of work already being undertaken by another agency at the specific request of Congress?

A third question which arises is: Why did the Secretary of the Interior announce the completion of the plan with so much fanfare instead of presenting it to the Columbia Basin Inter-Agency Committee for consideration? It would seem as though one of the main functions of the committee should be to formulate such a plan by coordinating the studies previously made and being made by the agencies of which the committee is comprised. Is this an attempt by the Secretary of the Interior to by-pass the inter-agency committee, to indicate that the committee cannot function effectively, and to create public opinion favoring establishment of a Columbia Valley Authority?

It Could Be

"THE DENIAL by employees of the right of employers to organize and the refusal by employees to accept the procedure of collective bargaining leads to strikes and other forms of industrial strife or unrest, which have the intent or the necessary effect of burdening or obstructing commerce by (a) impairing the efficiency, safety, or operation of the instrumentalities of commerce; (b) occurring in the current of commerce; (c) materially affecting, restraining, or controlling the flow of raw materials or manufactured or processed goods from or into the channels of commerce, or the prices of such materials or goods in commerce, or, (d) causing diminution of employment and wages in such volume as substantially to impair or obstruct the market for goods flowing from or into the channels of commerce."

Editor's Note: The above is not an NAM handout, but merely the first paragraph of the Wagner Act, with the "r" in "employers" changed to "e," and the "e" in "employees" changed to "r."

—from *Western Industry.*

And So It Was . . .

AFTER STRIKING 328 days at the West Allis Works of the Allis-Chalmers Manufacturing Co., Local 248 UAW-CIO returned to work March 24—without a contract and at the same terms offered by the company before the strike began. Chief results included a loss of $20,000,000 in payrolls, an estimated loss of $65,000,000 in production of tractors and other machinery and the revelation of a Congressional investigating committee that a small but powerful group of Communists dominated the affairs of the union.

Chief issues of the West Allis walkout at the outset were changes in grievance procedure and maintenance of membership. The company had granted a 13½ ct. an hour wage increase, which added to a previous 5-ct. raise, equalled the national pattern of 18½ ct. Later the union demanded a 25 ct. an hour wage increase plus a union shop.

A message from Allis-Chalmers' president, Walter Geist, to all employees of the West Allis Works said:

"It is my fervent hope and prayer that today marks the beginning of a new era which will bring peace and prosperity to both you and the company.

"This has been a long costly strike for you—our employees—the public, our customers, our dealers, and the company. Everyone loses in such a strike — particularly those union leaders whose aim has long been to destroy the friendly relationship between you and the company.

"Our company cannot be a great company unless you and our management have a cooperative relationship based upon mutual respect and friendliness. For this reason we will continue to fight with all our strength against those who try to undermine the relations between you and the company. The company will do its level best to maintain policies that are fair to you, and we ask only that you have the same attitude."

All In A Day's Work

AMONG THE INTERESTING things which confront the staff of *Western Construction News* in getting your magazine to you each month are these: During the twelve months of 1946 WCN subscribers changed their address 3,717 times, an average of 309.75 changes per month. This appears to be a steady figure, since the last half of 1945 showed 310 changes per month. About 18.6 per cent of WCN readers changed their address at least once during the year.

The circulation department received probably the most costly change of address on record a few weeks ago. A subscriber formerly living in South Dakota and now with the Vinnell Corporation of California in Shanghai, China, wrote us an air mail letter giving his new address. It cost him $2,300 to send the letter by air—Chinese that is.

One subscriber, sending in his renewal, attached a note which said, "Don't like your editorials! Written often with pure vinegar." It makes us feel good to know that our editorials are read and also to know that this man likes WCN so well that he renews in spite of differences with our editorial opinions.

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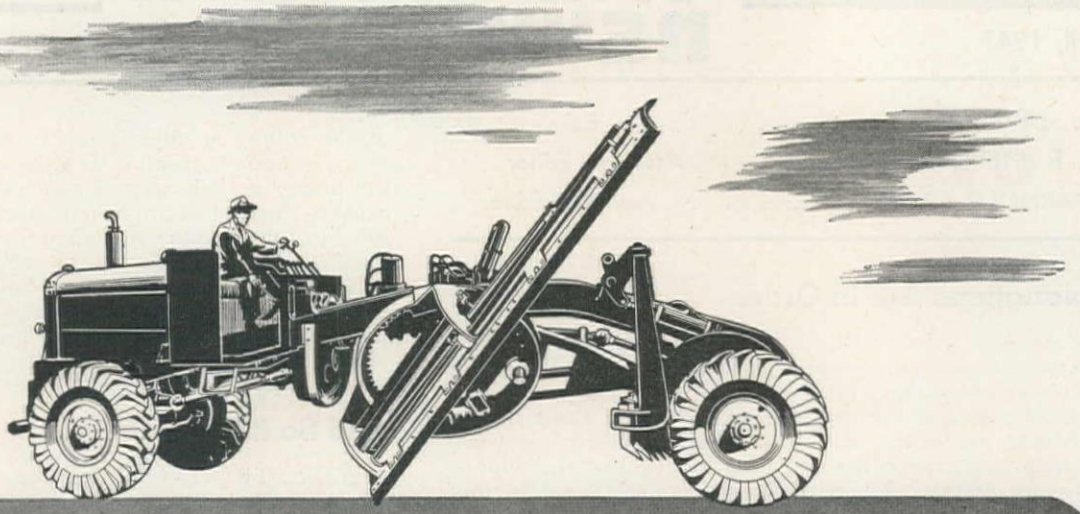

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Mammoth Earthmoving Project Under Way at San Francisco Airport Site

FILLED AREA at San Francisco Airport appears white above. In the background, under the runway is the area completed in 1944-45. The large central area is the fill just completed. Haul road appears at left.

Fleet of 85 heavy trucks and 7 shovels form production line to move 6,000,000 cu. yd. of earth and reclaim 300 ac. of land area from bay—Another 5,000,000 cu. yd. contract soon to begin—Master plan for international airport proposes four 7,750-ft. runways

ONE OF THE LARGEST earthmoving projects in the entire West, home of heavy earthmoving, one 6,000,000-cu. yd. contract is just being completed, and another of 5,000,000 cu. yd. is just getting ready to start, at San Francisco Municipal Airport, located on the shore of San Francisco Bay a few miles south of the city.

The 6,000,000-cu. yd. contract, which was awarded Macco Corp. and Morrison-Knudsen Co., Inc., on a joint bid in May, 1946, resulted in the addition of 300 ac. of new land area to the airport and the development of the most efficient "production-line" system of earthmoving ever undertaken.

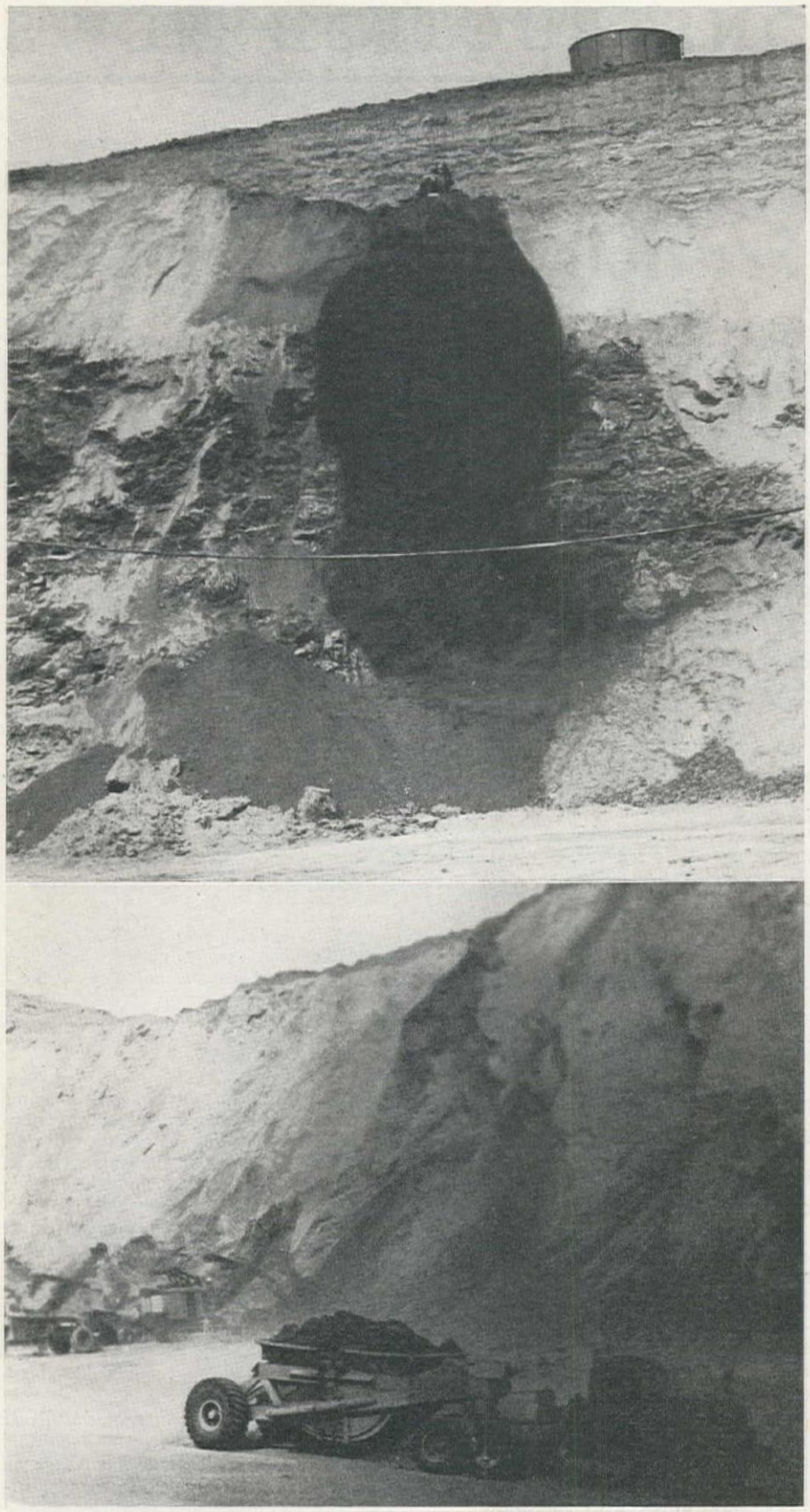
The master plan for a great international airport, as conceived by the San Francisco Public Utilities Commission, proposes two parallel runways in a north-south direction, and two in an east-west direction, each approximately 7,750 ft. long. Inasmuch as the original shore line of the bay lies on a northwest-southeast line, and expansion westerly was restricted by the existing Bayshore Freeway and an area of salt marsh, it was found that the only way to secure land for extension of present east-west runways and construction of the new north-south strips, was by filling into the shallow water of the bay.

The first important extension was constructed in 1944-45 by the same contractors, under the direction of the U. S. Corps of Engineers (see *Western Construction News*, Jan., 1945), when about 160 ac. were added to the land area of the port by placing about 3,000,000 cu. yd. of fill. The contract just closing embraces a little over 300 ac. of new land, and subsequent programs will add still other acreage. At the same time a contract was awarded by the State Highway Department for the realignment of the Bayshore Freeway around the westerly outskirts of the airport property and work is now proceeding. This involved an additional 3,000,000 tons of imported borrow, and the contract was also won by Macco-Morrison-Knudsen.

Filling on mud

When the highway contract, details of which will be reported in a subsequent issue of *Western Construction News*, is completed, extensions of taxiways, industrial areas and other facilities to the extreme western property line of the airport will be possible, and in preparation for this, a contract was awarded last month to Guy F. Atkinson Co. of San Francisco, to place 5,000,000 cu. yd. of material on the marsh land and to raise portions of the existing field from elev. +5.0 to elev. +14.0. This work will also be reported at a later date.

In the area filled under the Macco-Morrison-Knudsen contract, the bay floor is covered with soft mud and ooze



IN THE QUARRY, dirt is loosened on the upper benches by tractor-drawn rippers and bulldozed over the edge to the floor of the pit, top. On the lower level it is loaded by shovels into 13-cu. yd. Euclids, 16.3-cu.yd. Dixson Wagons (foreground) or 27-cu. yd. Peterbilts. They transport the material on an average headway of 26 sec.

to a depth of about 75 ft. Engineers have found that by making the first lift of fill to about elev. +8.0 the most satisfactory displacement procedure is obtained. As the fill is advanced, a wave of mud is forced up ahead of the new land. Approximately 16 ft. of fill is required to raise the surface to the desired elevation of 8.0. This amount of fill material, compacted by the weight of loaded trucks and by rollers, is found to bring the new surface to a point of practical stability. The portion of the fill constructed in 1945 by virtually the same methods has now reached a point of almost complete stability, deflection being in the range of 0.02 ft. per month.

It was essential that the mud wave be kept rolling ahead of the fill. In the earlier Army Engineer contract this was not very difficult to do, since the fill was constructed on a long spearhead out from the shore. However, in the later contract the problem was a very serious one since the area to be filled was restricted on three sides. On the west was the original shore line of the airport, on the north was the edge of the Army Engineer fill and on the south was the natural shore line of the bay. It was then necessary to keep the mud flowing for a distance of 3,000 ft., while converging from three different directions. This was accomplished in a most satisfactory manner and at the completion of the contract the wave extended some 700 ft. out from the new shore line and was virtually as high as the new fill itself at the point of contact.

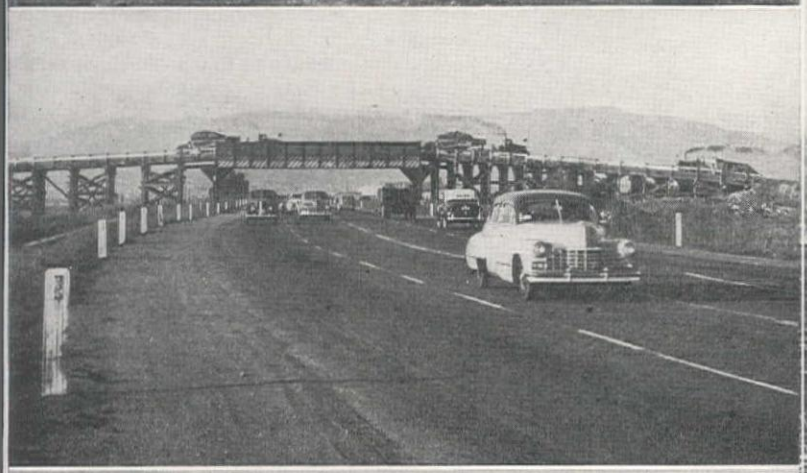
The existing fill on both the north and west sides having been in place for two years or more, a crust had formed on the top of the mud wave which had been created by the earlier work. This crust would not move by merely loading the embankment and it was necessary to remove it by draglines to elev. +2.0, backfilling with the regular fill material. As soon as all this crusted mud had been removed it was possible to advance the fill. The operation was begun in the angle between two of the legs and was advanced more or less evenly from two sides. It was found that dumping the new fill material over the edge of the embankment and thus advancing the surface directly was not practical because the dumped earth covered and entrapped pockets of the mud which weakened the bearing surface of the fill.

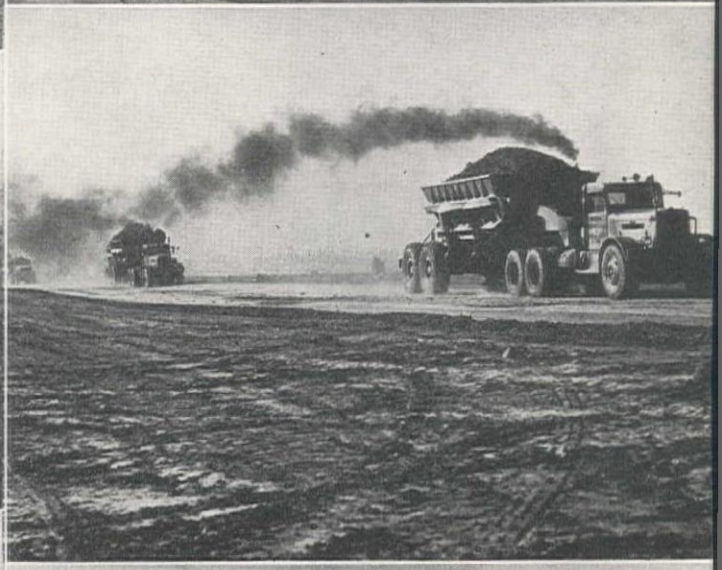
The plan adopted after having started with the excavation of the crusted mud was to dump the loaded trucks a few feet back from the advancing front of the fill, building a berm with the new material to a height of two or three feet above the final grade. This surcharge on the advancing face was adequate to squeeze the soft mud forward and bulldozers then pushed the material from the berm over the embankment face and behind the mud wave thus keeping it rolling slowly forward. By this method very few mud pockets were left under the embankment and when disclosed by borings these were excavated by dragline and the hole refilled.

A second lift, bringing the surface up to runway subbase level is made simultaneously with the bay filling but is kept far enough back from the face to prevent additional surcharge action before the mud under the fill has had time to reach a state of stable compression.

Compaction

The contract specified that the fill material was to be placed in layers of not more than 12 in. compacted thickness and these are reduced to 3-in. thickness in the top 30 in. of the subgrade. It is required that compaction reach 95 per cent modified AASHO specifications





EQUIPMENT at work on the dirt production line at San Francisco Municipal Airport. Top pictures show Bucyrus-Erie electric shovels with 6-cu. yd. buckets loading Peterbilt trucks. Next pictures show the trucks moving at 30 to 40 mi. per hr. over the haul road; the overpass was specially constructed to save time and prevent accidents. Next, the Peterbilt truck and special 4-compartment body unloading (left), and Dixson "Green Dragon" discharging its load (right). Bottom picture shows a grader spreading the material on the field preparatory to rolling. At the height of the operation this production line earthmoving scheme transported and placed over a million cubic yards of material per month. The contractor maintains a fleet of 85 trucks, with 65 in operation at any given time.

TRUCK YARD of Macco-Morrison-Knudsen on the San Francisco Airport Project. A fleet of 85 trucks is used on the fill. Above, are shown Euclids on the left and Peterbilts with special bodies on the right; below, Dixson Wagons being serviced in yard.

under the pavement and 90 per cent over the remainder of the field. In the early part of the contract sheepsfoot rollers were used to secure this compaction, twelve to fifteen passes generally being required in addition to the compaction achieved by the passage of the heavily loaded trucks.

However, as the work progressed the contractor purchased a specially constructed 5-wheel rubber tired roller weighing 60,000 lb. This was constructed by Southwest Welding & Mfg. Co., Alhambra, Calif. It is equipped with 36-ply 24.00 x 32 tires and is pulled by a rubber tired tractor.

Proctor readings are made on every lift and frequent borings are made to check the elevation of the mud under the fill.

Haul road

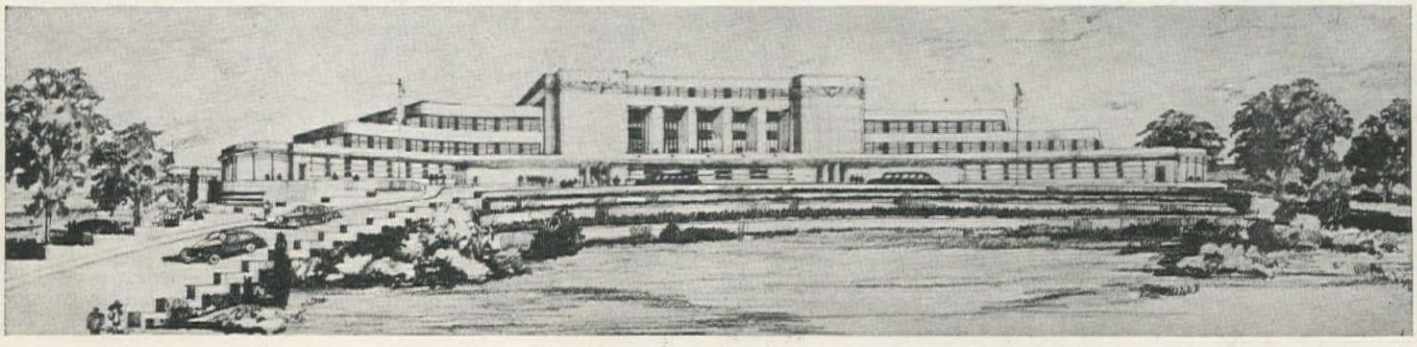
Possibly the most interesting feature of this project has been the production line procurement and delivery of the fill material. The contractors secured a quarry site in the hills to the west which form the backbone of the San Francisco peninsula. They constructed a private haul road from the quarry to the airport. This in itself was a considerable undertaking. Those portions of the road crossing the wide marshy area between the shore line and the hills are built on a heavy stone base over a fenced private right-of-way. Grades and curves are designed for 40 mi. per hr. traffic and the subbase and paving are constructed heavily enough to support a continuous string of very heavily loaded trucks. The road is asphalt paved.

The haul road crosses two of California's busiest highways, El Camino Real which carries a daily traffic of some 20,000 vehicles and Bay Shore Freeway used every day by 30,000 vehicles. It also crosses the Southern Pacific main line between San Francisco and Los Angeles and the peninsula branch of the San Francisco municipal electric railway. In order to avoid the inevitable delay and accidents which would occur at a grade level intersection of the very busy haul road with these much travelled thoroughfares, the contractor at his own expense erected three overhead crossings, one above each of the two highways and one above the two railroads. With these structures in place an uninterrupted movement of trucks from the quarry to the fill area was possible and at the height of the construction program loaded trucks were passing over the haul road at an average spacing of one every 26 seconds.

The private haul road was originally constructed for the passage of trucks during construction of the Army Engineer fill, but remained in place and was used in the present contract and also is being used for trucks supplying dirt to the fill for the new freeway.

Quarry

The fill material is produced from the quarry mentioned above. Excavation was begun there in 1944 and over 9,000,000 cu. yd. have been removed from the pit, all from a single floor level. The face of the pit is about 240 ft. high. In the



ARCHITECT'S DRAWING of the impressive terminal building to be built at the airport when new runways are completed and Bayshore Freeway is re-routed, making available all of the city-owned land.

earlier operations some blasting was used to loosen the material, but complaints from residents in the neighborhood caused the cessation of this system and material is now loosened on the upper levels by tractor drawn rippers and shoved over the edge by bulldozers. Shovels working on the pit floor then load this material into the trucks.

The material in the pit is of two kinds. That from the higher elevations is a brown, decomposed sandstone, all fine enough to pass through a ¼-in. screen. The other is a blue, cemented sandy loam which frequently breaks out in blocks. The fill is paid for on the basis of cross-sections taken of the material in place at the quarry, with an allowance of 8 to 10 per cent for bulking on the embankment.

The pit material is loaded into trucks by seven shovels, three electric shovels with 6-cu. yd. buckets and four diesel shovels each being equipped with 2½-cu. yd. buckets. In general the plan is for the electric shovels to load the 30-cu. yd. hauling vehicles and the smaller shovels to load the smaller trucks.

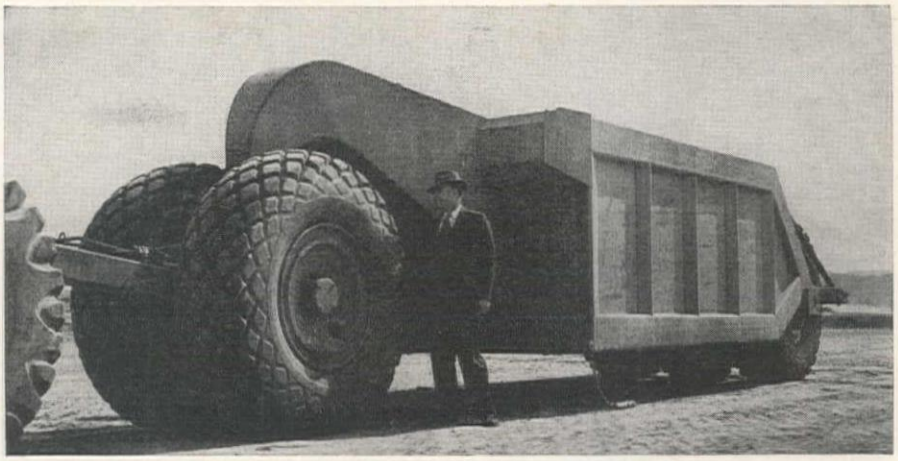
Hauling is performed by a fleet of 85 heavy trucks, including 35 bottom-dump Euclids, 30 Peterbilt tractors with bodies specially constructed by Southwest Welding & Mfg. Co., and 20 Dixson Wagons, known familiarly as Green Dragons. The Euclids are standard 13-cu. yd. units. The Dixson Wagons are of a new design recently introduced, and carry 16.3 cu. yd. They are bottom-dump machines operating on a somewhat different principle than usually employed. The body is divided into two half shells which open somewhat in the manner of a clamshell dredger bucket. The Peterbilt machines are powered by a 200-hp. diesel tractor and the special body carries 27 cu. yd. of material in four hydraulically operated compartments which may be dumped separately or together as desired. The rigs weigh 140,000 lb. fully loaded, yet are capable of a speed of 40 mi. per hr.

Placement record

This production line basis of providing fill resulted in an unparalleled record of placement. During each of the months of August, September and October more than 1,000,000 cu. yd. of embankment was delivered to the airport.

Macco-Morrison-Knudsen placed the 3,000,000 cu. yd. of fill in the earlier Army contract at a unit price of $0.78 per cu. yd. On the present contract the unit price was $0.623 per cu. yd. hauled and placed plus $0.12 for compaction. On the new contract won by Atkinson Company for 5,000,000 cu. yd. the bid price was $0.657 per cu. yd. plus $0.082 for compacting. Atkinson has made arrangements with Macco-Morrison-Knudsen to secure the material from the same quarry and use the existing haul road.

The airport is designed by the Public Utilities Commission of the City of San Francisco of which James H. Turner is general manager. B. M. Doolin is airport manager and A. J. Wehner is project engineer for the city. For Macco-Morrison-Knudsen, Orville H. Tucker is project manager and George Hensel is general superintendent.



RUBBER TIRED roller purchased especially for compaction of embankment at San Francisco Airport. Its five tires support a weight of 60,000 lb. It was specially built for this work by Southwest Welding & Manufacturing Co. The editor of *Western Construction News* is dwarfed by the huge machine.

University Studies Show Possible Saving of Steel in Bridge Decks

FINDINGS indicate savings as great as 30 per cent in the amount of reinforcing steel required for concrete highway bridge floors on designs developed by the University of Illinois departments of Civil Engineering and Theoretical and Applied Mechanics. They are destined to be of world-wide interest.

Professors Frank E. Richart and N. M. Newmark, who have been directing the concrete slab investigation at the university since the cooperative project was launched in 1936, point out that this economy in steel may be highly important in current rebuilding programs—particularly in foreign countries where steel is scarce.

In cooperation with the Illinois Division of Highways and the United States Public Road Administration, the Engineering Experiment Station has studied exhaustively two types of highway bridges, the slab bridge and the I-beam bridge.

Results show that vehicle loads are better distributed than has been indicated previously. As a result, research workers have been changing the manner of reinforcement—adding steel where the stress is greatest and using less where the need is less. Not only has there been a saving in steel and a reduction in the required depth of concrete flooring, but the new designs have greater safety.

One relatively new development, composite construction, involves a design providing for rigid connection between the concrete slab which forms the roadway of the bridge and the steel I-beams on which the slab rests. The design not only permits use of a lighter beam than ordinarily employed, but it also enables builders to obtain greater stiffness in bridge structures.

Research procedure involves first a mathematical solution to a problem in design. These findings are compared with field experience and observations, and then are tested in large scale models of bridges in the laboratory, the results being analyzed and compared with the mathematical findings. If the analyses and the tests agree, then it is possible to predict what would happen to bridges in actual use under varying conditions.

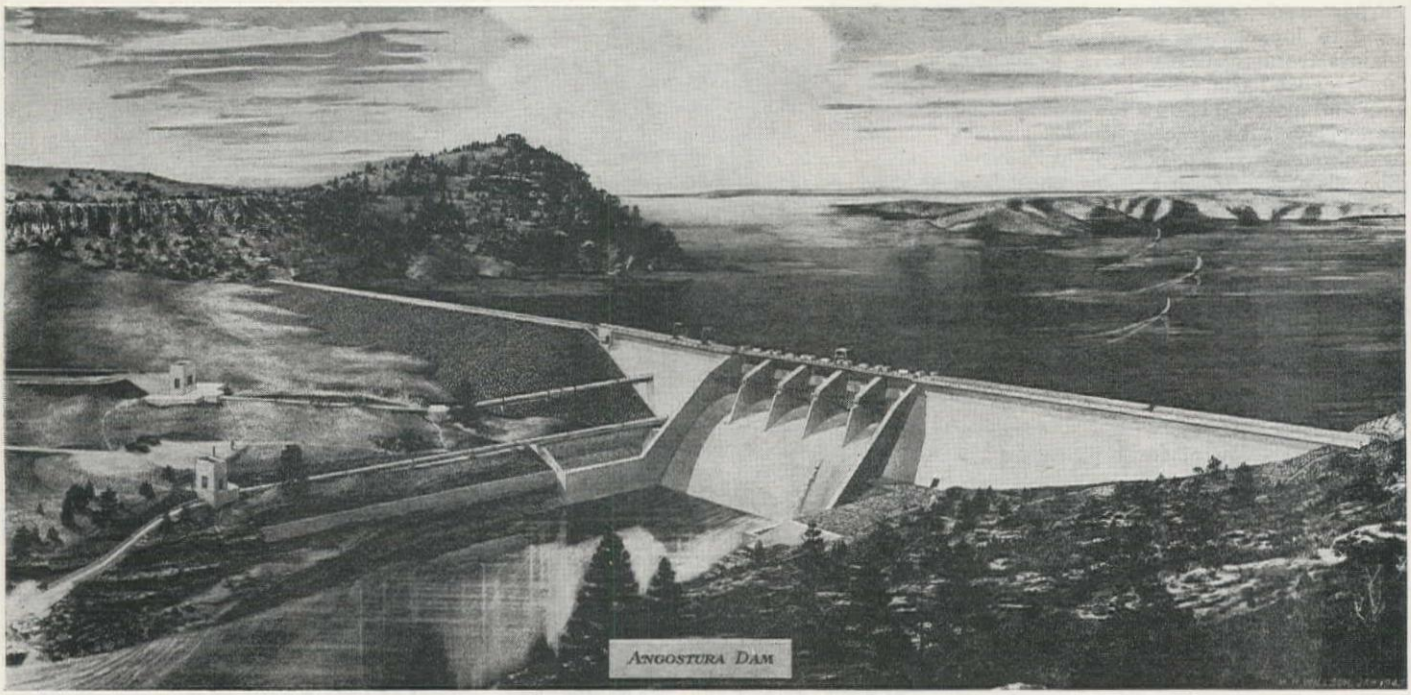
In the first 10 years of research on the concrete bridge floor project, laboratory tests have been made on 36 scale-model bridges, ranging in length from 5 to 30 ft., and on more than 200 smaller test specimens consisting of reinforced concrete or mortar slabs, composite T-beams, and shear connector specimen.

Production of Concrete Blocks Sets New Record

OUTPUT OF CONCRETE BLOCK in the United States reached a record mark of 934 million units (of 8 x 8 x 16-in. block equivalent) during 1946, according to preliminary figures released by the Bureau of the Census. In addition, a total of 214 million concrete brick was produced during the year. These figures are based on returns from over 3,800 concrete masonry plants employing one or more workers during the year. The plants were located in every state of the nation. Of the total output of block during the year, three-fifths represented heavy-weight aggregate block.

Production of concrete masonry during the fourth quarter of 1946 totaled 234 million blocks and 53 million brick, representing one-fourth of the year's production of each item. Fourth quarter output of block represents an 18% drop from the record third quarter output of 284 million units while concrete brick production during the final quarter declined 24% from the output during the preceding 3-month period.

The number of plants engaged in producing concrete block during the fourth quarter totaled 3,066; this was a decline of 11% under the 3,430 active block plants during the third quarter.



Second Missouri Basin Unit Started

Utah Construction Co. begins work on Angostura Dam in South Dakota, first irrigation feature of the Missouri Basin Project—Composite concrete and earthfill dam to rise 160 ft. above bed of Cheyenne River and will impound 220,000 ac. ft. of water for irrigation of 16,000 ac.

By ERNEST R. SCHULTZ
Engineer, Bureau of Reclamation
Denver, Colorado

CLOSELY FOLLOWING the beginning of construction at Kortes Dam in Wyoming for power production (*Western Construction News*, Sept., 1946) was the start of work last fall on Angostura Dam in South Dakota, first irrigation feature of the extensive Missouri River Basin Project to be placed under construction by the Bureau of Reclamation. Foundation excavation and other preliminary operations that have been carried on during the winter will make possible substantial progress on the structure during the season ahead.

Angostura Dam, the first feature of the Angostura Unit of the Missouri Basin Project, is another step in the basin-wide program to provide irrigation water to the 4,760,000 ac. of moisture-starved land in the basin of the Missouri River and its tributaries. Located on the Cheyenne River near the town of Hot Springs in the southwestern corner of the state, Angostura Dam will form a storage reservoir having a total capacity of 220,000 ac. ft. of water for the irrigation of approximately 16,000 ac. of land lying along the river.

An irrigation project

This project is designed primarily for irrigation purposes and will help to rehabilitate and stabilize an established agricultural community now farmed unsuccessfully by dry-farming practices. It will also provide flood protection in the area and silt control for this tributary of the Missouri River. The project will eventually include a power plant located on the main canal four miles downstream from the dam with an installed capacity of 3,000 kw.

Angostura Dam will be a composite structure consisting of a concrete overflow section across the river channel extending to the left abutment and a rolled earth embankment section on the right abutment. The crest length of the combined sections is to be about 1,900 ft., and the height of the structure above riverbed about 160 ft. The concrete section is to be of the gravity type with an overflow spillway of 247,000-cu. ft. per sec. capacity.

Construction at the dam site was begun early in September by the Utah Construction Co. on their low bid of $4,237,476 for construction of the dam, river and canal outlet works, and stilling basin. The contract was awarded in June, 1946. Work now under way at the site includes the excavation for the foundations of the concrete spillway and the earth embankment sections and drilling grout holes in the cutoff trench.

Foundation conditions

The rock in this region is a part of the formation in the Black Hills area. Doming of the earth's crust has elevated the sedimentary formations which are resting on very ancient crystalline rocks. The sedimentary formations, sandstones and shales, range in geological age through the Paleozoic into the Cretaceous horizons of the outer plains area. Bedrock at the dam site is composed of sandstone beds varying in thickness from a few inches to as much as 65 ft. These beds are separated by shale and limestone seams, also widely varied in thickness. Although these strata, together with an underlying formation of ancient crystalline rock, comprise a structurally sound foundation for the dam, the shale seams are a possible source of seepage from the reservoir. In addition to the grouting program it is also planned to excavate cutoff drifts at the upstream and downstream face of the dam in the shale seams and backfill the drifts with concrete. An extensive foundation grouting program, in addition to the drift work, is expected to insure a relatively impermeable foundation.

The general plan for grouting the foundation rock under the concrete dam provides for preliminary low-pressure shallow grouting through grout holes drilled approximately 25 ft. deep. This will be followed by a main upstream grout cutoff grouted through holes drilled approximately 100 ft. deep. Foundation drainage will be provided by a series of drilled holes discharging into

the foundation gallery gutter, which drains into an unwatering sump provided with a deep well pump.

Construction of dam

The concrete mass of the dam will be divided into blocks by vertical contraction joints. The concrete will be artificially cooled by circulating river water through a system of pipes laid on the surface of each succeeding lift of concrete. These pipes will eventually be filled with cement grout when no longer required for cooling purposes. After the concrete mass has cooled sufficiently, the contraction joints will be grouted by means of a system of pipes embedded in the concrete. The coarse aggregate for concrete will be obtained from a limestone quarry to be opened up in Shep's Canyon about seven miles upstream from the dam site. Sand for the concrete is to be secured from deposits located in the vicinity of the dam site.

The embankment portion of the dam will be composed of a moistened and rolled fill of clay, sand, and gravel, with an upstream slope of 3 to 1 covered by a 3-ft. layer of rock riprap and with a downstream slope of 2½ to 1 covered with a rockfill. A concrete cutoff wall with footing extending into bedrock will be constructed for the full length of the embankment. Low-pressure shallow grouting through grout holes in the cutoff wall footing will provide a grout cutoff under the earth embankment. It is planned to obtain impervious material for the earth embankment from an area on the left side of the river upstream from the dam site. Sand and gravel material for pervious section of the earth embankment is to be taken from a borrow area tentatively located on the right side of the canyon downstream from the dam site. Riprap is to be obtained from the limestone quarry in Shep's Canyon or sandstone from the higher elevations of the right abutment.

Outlet structures

The 247,000-sec. ft. capacity spillway is required to adequately provide for the Cheyenne River in flood stage. The river drains an area of 9,100 sq. mi. in a region where heavy summer rains or spring floods from melting snow may cause a sudden torrent of water to flow into the reservoir. Flow over the spillway section, which is to have a total length of 274 ft., will be controlled by five 50 by 30-ft. radial gates operated from a structural steel operating bridge over the entire length of the spillway. The energy of the overflow will be dissipated by a specially designed slotted type large-radius spillway bucket within training walls at either end of the spillway section.

Release of water through the dam will be accomplished by the river outlet works and the canal headworks. The river outlet, through the concrete portion of the dam at the right of the spillway, will consist of a 54-in. diameter outlet pipe extending downstream about 650 ft. to a valve house in which is located a 4 by 4-ft. high pressure control gate. Water will be discharged from the valve house into the river channel over a trajectory type apron. The canal outlet through the concrete portion of the dam located on the right of the river outlet will consist of a 72-in. diameter outlet pipe extending about 500 ft. to a valve house and stilling basin at the canal heading. The discharge will be controlled by two 3½ by 3½-ft. high-pressure control gates. The entrances of both outlets will be protected by circular trashracks located on the upstream face of the dam. Fixed wheel slide gates will also be provided on the upstream face of the dam for each outlet.

During construction the river will be diverted through two 8-ft. diameter diversion conduits located in the spillway section of the concrete dam adjacent to the left abutment. After construction of the dam has been completed, the diversion conduits will be backfilled with concrete. Provision will be made to cool the concrete in the plugs by circulating river water through a system of embedded pipes. After the concrete in the plugs has cooled sufficiently, grout under high pressure will be forced into the joints between the plugs and the concrete dam, by means of a system of pipes embedded in concrete, to insure a watertight joint.

Activities at the dam are under the supervision of H. V. Hubbell, project engineer for the Bureau of Reclamation. The activities of the Bureau of Reclamation are directed by Michael W. Straus, Commissioner, and the engineering design and construction are under the supervision of Walker R. Young, Chief Engineer. For the Utah Construction Company, Ben Arp is general manager of the project.

Portions of Portland Sewer Project to Be Contracted

THREE SECTIONS of the Columbia Slough sewer and pumping plant, portions of the $14,388,000 Portland sewage treatment plant, will be offered for bid this month according to plans approved by the Portland city council, the project engineers, John W. Cunningham & Associates and Stevens & Koon, and Ben Morrow, city engineer. The three sections of sewer line are estimated to cost $1,500,000 in the aggregate, and will be offered for separate bids. Bids on a section of the Columbia Slough line were rejected last year as being too high.

PRELIMINARY EXCAVATION for Angostura Dam was carried on during the winter months. This view taken from the right abutment shows the progress of excavation under the spillway section. Rock at the site is sedimentary in character and will require extensive grouting, also cutoff drifts at the upstream and downstream faces of the dam, to be filled with concrete.

FWA Advances Further Funds For Public Works Planning

ANNOUNCEMENTS by the Federal Works Agency, Bureau of Community Facilities, during the past month include many Western communities that are to receive Federal funds to aid in the preparation of engineering plans. Advancing of these funds enables the various agencies and communities to proceed with their planning work before the completion of the financing for actual construction work. When construction is undertaken the planning money is to be repaid without interest.

Alaska

Fairbanks was advanced $6,500 for a fire station and garage, estimated at $190,500.

California

Auburn received $1,400 for grading, paving and widening of Elm Ave., work estimated at $72,900. In Los Angeles County: Hawthorne School District, $6,250 for a $142,000 elementary school at Hawthorne; Garvey School District, $2,400 for additions to the Emerson School at Wilmar, estimated to cost $55,000; El Monte School District, two advances of $1,250 each for administration units at McGirk School and Arden School, each estimated to cost $34,750. Oroville Union High School District received $1,500 for a shop building at Oroville, which is estimated to cost $33,000. Sonora was granted $1,550 to plan a sewage treatment plant addition at an estimated cost of $54,500.

Seven advances were made to the Sacramento Unified School District: Crocker School toilet additions, estimated cost $23,850, Federal advance $1,350; El Dorado School additions, including classrooms, playroom and toilet facilities, estimated cost $99,400, Federal loan, $5,400; Riverside School additions, including classrooms and an auditorium, estimated cost $164,000, Federal advance, $9,000; Tahoe School additions, including kindergarten, library, classrooms, auditorium, offices and toilet facilities, estimated cost $302,700, Federal advance, $16,650; Judah School additions, including classrooms and toilet facilities, estimated cost $82,000, Federal advance, $4,500; two elementary schools in newly-annexed areas, estimated cost of each $219,000, Federal advance for planning of each, $12,000.

San Gabriel received three grants, one for $4,950 for a storm sewer system for the area north of Las Tunas Drive, estimated cost of which was $105,212; Federal advances of $12,350 were made on an estimated $261,877 storm sewer system for the area between Mission and Las Tunas Drives; and $19,200 was granted for a storm sewer system for the area south of Mission Drive and east of Del Mar Avenue, whose estimated cost would be $407,675. Solvang Sanitary District was awarded $9,000 for a sanitary sewer system at Solvang, including treatment plant and outfall sewer, estimated to cost $197,000.

Colorado

Flagler, for a sanitary sewer system and treatment plant estimated at $89,500 received $2,800 for planning; Kremmling received a like amount for a sanitary sewer system, including treatment plant, to cost about $95,000; Littleton was granted $6,600 to plan a sewage treatment plant estimated to cost $152,460.

Idaho

Independent School District No. 10, Gooding Co., received an allotment of $8,000 for the designing of a grade school at Gooding, the building estimated to cost $270,000.

Kansas

Hodgeman County Community High School was advanced $13,750 for a new high school at Jetmore, to cost about $350,000, including equipment.

Montana

Gallatin County was advanced $10,000 to finance engineering preparation for airport facilities at Bozeman, estimated cost $250,000. The project involves grading, drainage, landscaping and lighting; runway, taxiway and apron paving, and an administration building.

Nevada

The State was granted by and through the Board of Trustees, Nevada State Historical Society, Inc., $2,500 for a library at Reno, the cost of which is estimated at $42,000.

New Mexico

Alamogordo received $8,000 for a hospital estimated at $216,000; Bayard, $1,400 for sanitary sewer system extension, $39,800; and Las Vegas, $3,100 for airport facilities estimated to cost $93,900.

North Dakota

Dickinson School District No. 1, Stark Co., was granted $8,300 for elementary and junior high school planning of classrooms, shops, etc. at Dickinson, at an estimated cost of $225,000. Reeder, Adams Co., was granted an allotment of $1,400 to plan a waterworks system, estimated cost $51,530.

Oklahoma

Caddo County Commissioners were given $18,000 by FWA for a new courthouse and jail at Anadarko, estimated cost of which is $492,000. Freedom was advanced $1,000 for a water well and supply line, estimated to cost $24,550.

Kingston received $2,550 for a sanitary sewer system and disposal plant, estimated at $52,390; and Walters was allotted a Federal advance of $3,000 for sanitary sewer system extensions and construction of a disposal plant, at an estimated cost of $106,500.

Oregon

Coos County School District No. 9 was advanced $2,150 for an athletic field house and grandstands at Coos Bay, which will cost in the neighborhood of $39,950.

Texas

Anna received two advances: $1,600 for sanitary sewer system and disposal plant, estimated at $40,878; $1,550 for water system extensions and improvements, $37,276. Beeville Independent School was also granted two advances: elementary school, $8,000—$237,100; high school improvements, $4,800—$147,700. Brownsville was advanced $62,500 for improvements to the Rio Grande Valley International Airport, at an estimated cost of $2,137,500. The project includes a new passenger terminal, aprons, taxiways; grading, remodeling of existing buildings and reconditioning of lighting system. At Denton, the Texas State College for Women was given $6,650 to plan a cooperative dormitory for girls, estimated cost $199,330. Donna was granted $7,500 to plan water distribution system extensions, water treatment plant, sewage collection system and treatment plant improvements, the project to cost an estimated $192,011. Karnes City received $2,850 for sewer system improvement and extension, total estimated cost $71,050. Ropesville was allotted $3,500 for an $81,750 water system project, and $2,450 for a sanitary sewer system and disposal plant, cost $55,450.

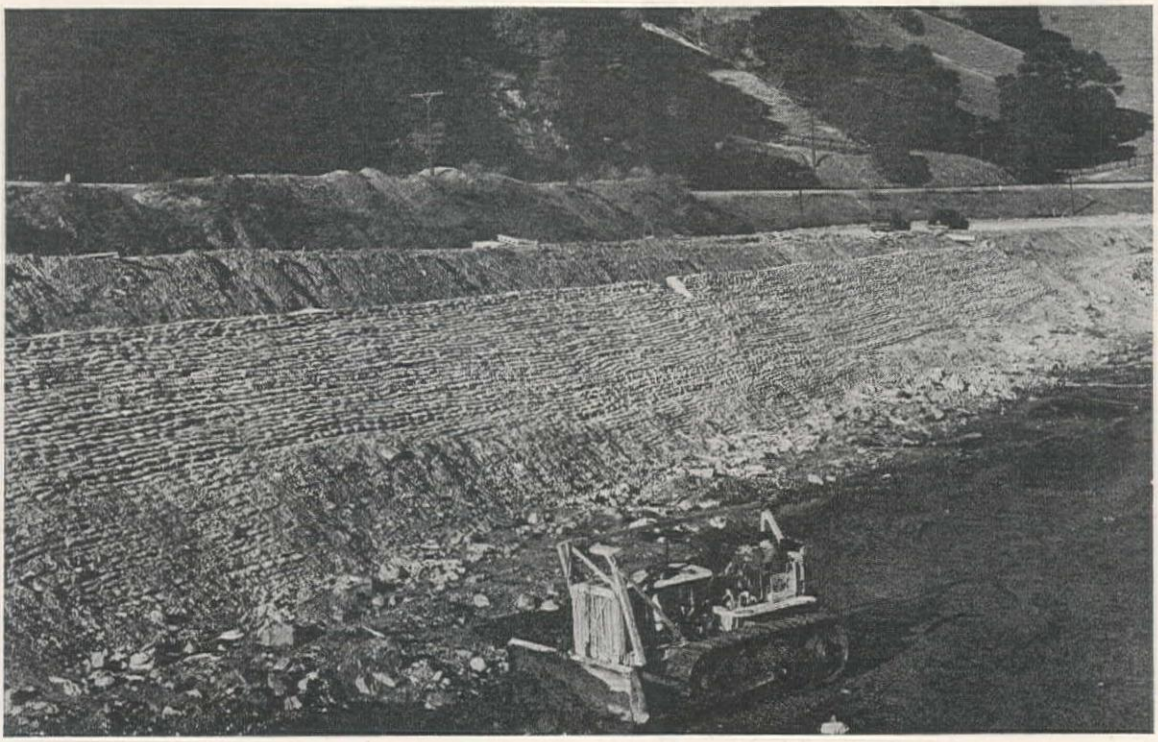
Idaho Power Expansion Projects Show Progress

WITH THE IDAHO Power Company pledged to $30,000,000 in the next five years on new power plants, lines and facilities in the Snake River valley, work is being pushed on the utility concern's 16,500-kw. hydroelectric project at Upper Salmon Falls near Hagerman, reported in *Western Construction News*, May, 1946.

Also under construction in the same area, all by Morrison-Knudsen Co., Inc., of Boise, are other projects at Lower Salmon Falls and on the Malad River, a tributary of the Snake.

Idaho Power announced in March that its new $450,000 substation on the bench area east of Boise was complete save for the pulling in of cables and installation of switching equipment. Two Westinghouse 20,000-kva. transformers at the substation will be used to step down 138,000-volt current from the power firm's Hagerman-born transmission line to 69,000 volts for distribution throughout the area to smaller substations. Power company officials expect the unit to be in operation by early summer.

The Hagerman valley hydroelectric developments will furnish 85,000 kw. (about 124,000 hp.), in all, upon completion. The Lower Salmon project will require a concrete dam structure 1,000 ft. across the Snake River to provide a 60-ft. head of water to drive four turbine-operated generators.



Concrete Riprap Bridge Approaches

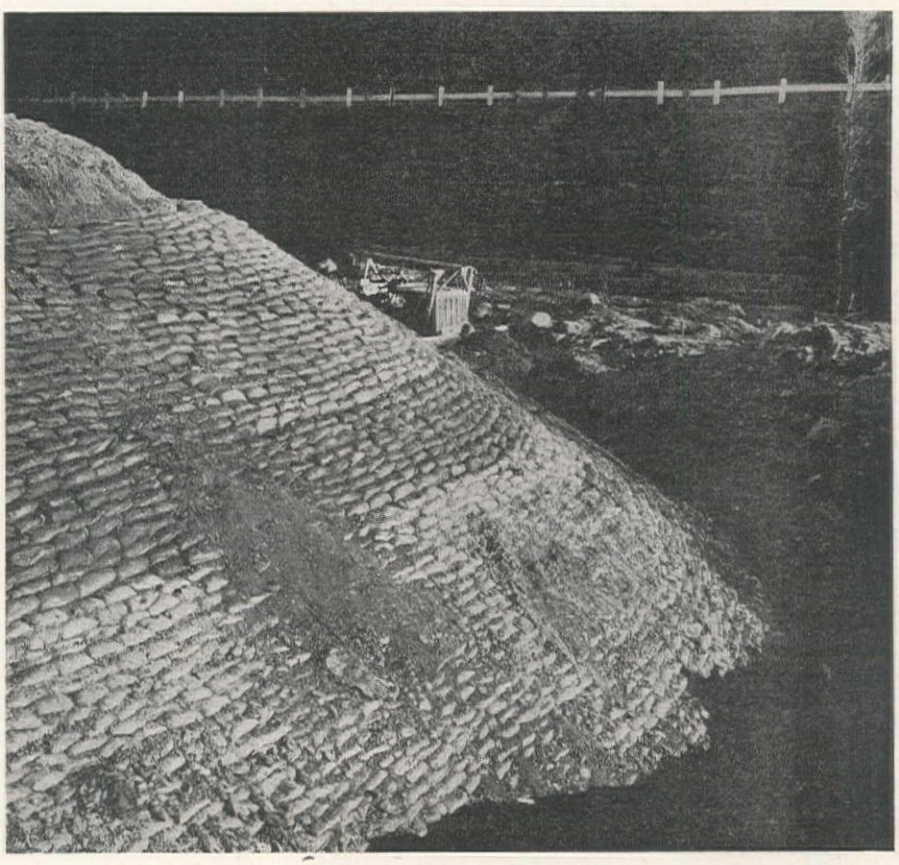
Sacked concrete used as bank protection on California highway built in former creek bed —Narrow bridge eliminated by construction of new bridge and 2,250-ft. long approaches

THE USE of sacked concrete "rip-rap" as bank protection is being tried for the first time in the Niles Canyon, California, area, where a new highway is under construction. The old river channel in Niles Canyon, two and seven-tenths miles west of Sunol, is being converted into a two-lane, blacktop road with the center of the former creek marking the top edge of the new highway.

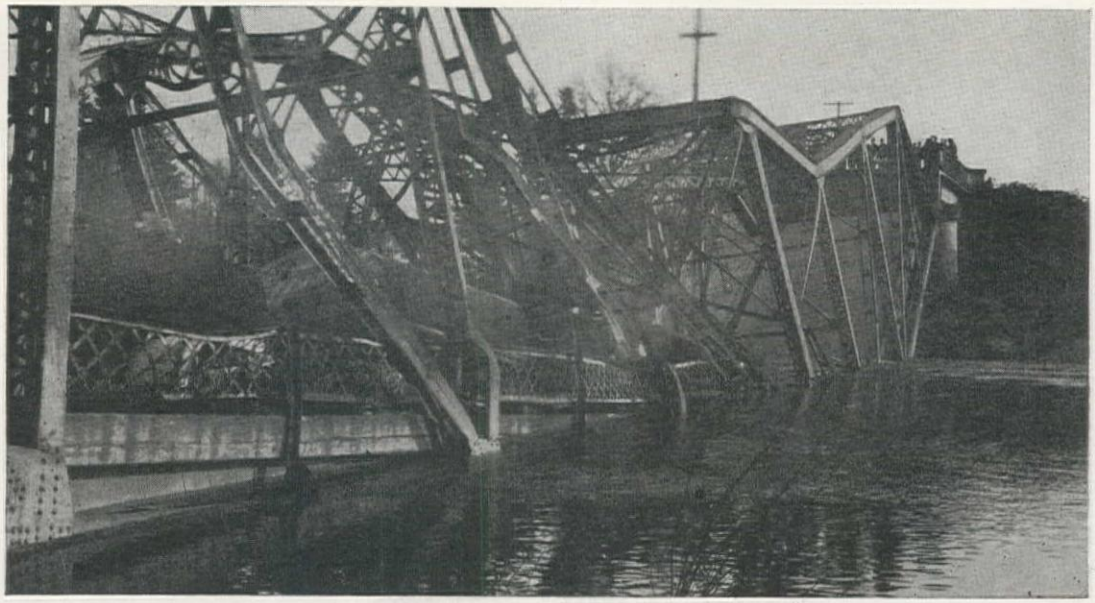
Construction of the new road, which includes a new bridge over the Western Pacific Railway and the present highway, will also eliminate three dangerous curves and an old narrow bridge. Shortages of material needed for the all-steel pilings on the bridge, a two-lane box girder type, are holding up its construction, but work is continuing on the bridge approaches.

Seven-tenths of a mile is the total of both bridge approaches. In the accompanying photographs, one of the 2,250-ft. long approaches may be seen. The course of the Alameda Creek channel was changed by dragline and bucket to facilitate building of the approach. Tractors and bulldozers spread 12,000 cu. yd. of the old bank for fill while 50,000 cu. yd. of imported borrow were trucked in to make the approach pictured. Eighteen hundred cubic yards of sacked concrete "rip-rap" for bank protection tops the fill and seven feet more will be added at the top later. Cement and aggregate were placed dry in the sacks, which were later wet to form concrete.

The $427,000 contract for the job is held under a combination bid by R. G. Clifford and Al Biasotti and Son, contractors of Stockton, California. Work on the road was begun last July.



COURSE of Alameda Creek was changed to facilitate construction of bridge approaches. Top edge of future highway was once the center of the creek.



Fire Destroys Steel Bridge

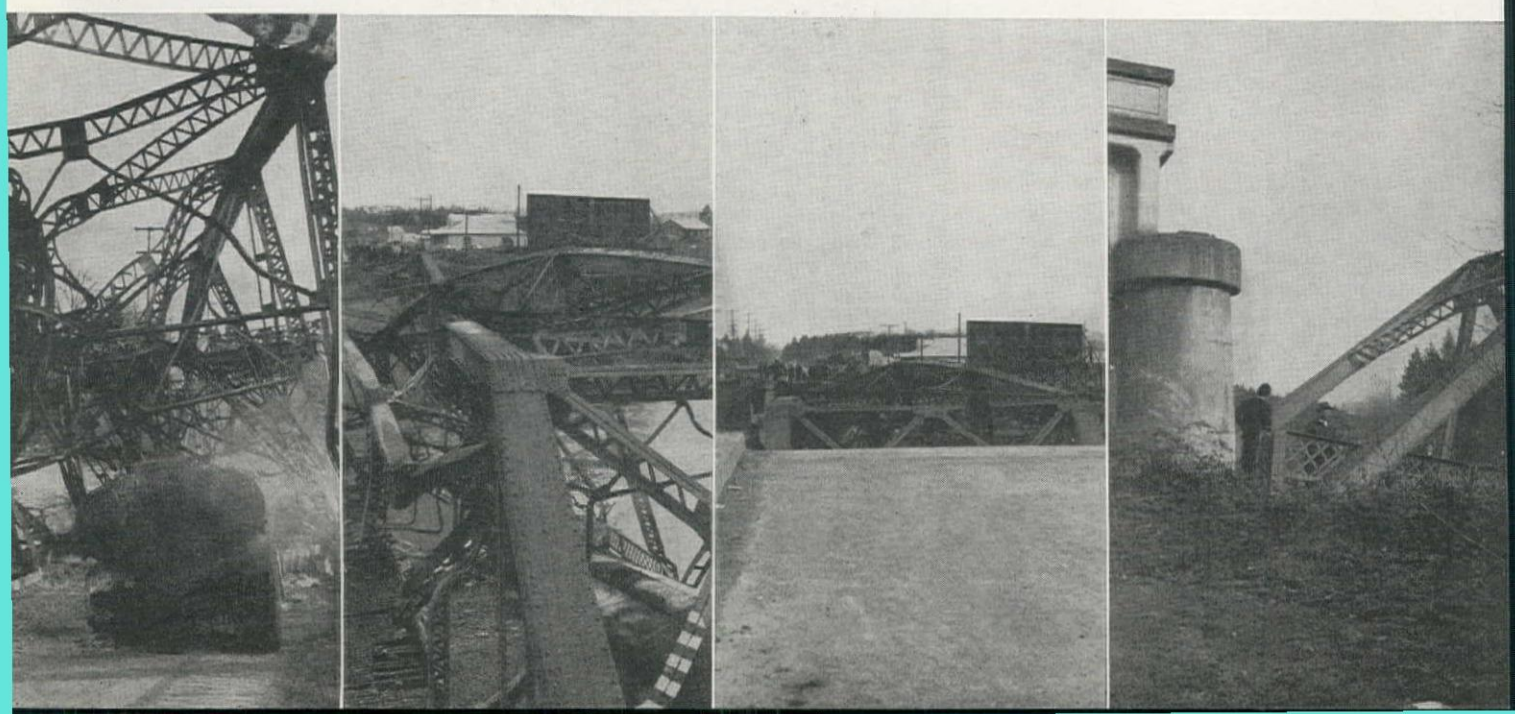
NINE THOUSAND gallons of burning gasoline destroyed a 220-ft. steel through truss span on U. S. highway 830 near Washougal, Wash., on Feb. 8. Eastbound on the highway which follows the Columbia River on the Washington side, an oil tank truck and trailer grazed a hay truck which had stopped at mid-span to permit the truck to pass. The tanker stopped as the hay truck went on, and a few moments later the tanker was hit by a second oil tank truck and trailer which had been following a short distance behind the first. Both vehicles were immediately enveloped in flame and burned for four or five hours. Within 15 min. after the accident the bridge began to buckle, and about 40 min. afterward the entire span dropped into the Washougal River, both ends of the truss leaving their piers.

Burning gasoline running out of a downspout from the deck drain apparently acted like a huge blowtorch on the lower chord near mid-span so that the lower chord was the first to show signs of giving way. However, the heat from the fire on the deck quickly weakened the top chord, permitting the entire span to drop into the river. The bridge had been built about 20 years ago, and was considerably below present bridge standards in regard to width and heigth clearance. Officials of the Washington state highway department have indicated that legal action may be brought against the truck owners in an effort to secure reimbursement for the loss of the bridge, which was not insured.

TWISTED WRECKAGE of Washougal River Bridge, smoke still rising from burning oil tanks, photograph at left; collapse of the upper chord, left center; bridge was pulled completely off the piers when the lower chord folded, photo at right. Lateral view of structure, top of page.

Loss of the Washougal bridge brought to five the number of bridges lost by the Washington highway department during the past winter season. The other four, all smaller bridges, were destroyed by floods, or slides caused by floods. The total loss to the highway department for the five bridges is estimated at about $500,000 by Ralph Finke, bridge engineer for the department.

However, the necessity for immediate replacement of the Washougal bridge brings up a more serious problem involving the allocation of steel for new and replacement bridge construction. With only a limited amount of steel allocated to the state for bridge construction this year it had been planned to construct four or five new spans. This program will now be upset by reallocating a part of the steel to the Washougal bridge, and may necessitate dropping plans for construction of at least one other steel bridge this year.



Payette Pump Unit Program

Work on Idaho irrigation project will be carried out under three schedules, namely: the erection of a pumping plant, and earthwork and structures on two C Line Canals — Five siphons will be built in the East Canal and one in the West Canal—Vernon Bros., Marshall & Haas are constructing the project

By S. A. MARSHALL
Project Superintendent,
Marshall & Haas
Caldwell, Idaho

CONSTRUCTION of the Pump Unit of the Payette Division, Boise Project in Idaho, will bring irrigation water to approximately 27,000 irrigable acres in 1948. The contracts for the first step of the project were awarded by the Bureau of Reclamation on June 28, 1946.

The bids for the project were divided into three schedules. Schedule No. 1 involving the construction of the C Line pumping plant was awarded to Vernon Bros. Co. of Boise on a bid of $200,269. Schedules No. 2 and 3, earthwork and structures on the C Line canals were awarded to Marshall & Haas, a joint venture consisting of E. T. Haas Co. of San Mateo, Calif., and S. A. Marshall of Sacramento, Calif., on their bid of $621,-656. Notices to proceed were issued Sept. 16, 1946, and 400 calendar days were allowed for completion.

Water to be used in this project will be made available from Cascade dam and reservoir now under construction on the Payette River near Cascade, Ida. The water will be taken from the Black Canyon Canal west of Emmett. The pumping plant being constructed by Vernon Bros. Co. will pump 500 cu. ft. per sec. of water through a 90-ft. lift and discharge it into the C Line canal. Four electric motor driven centrifugal type pumping units are included in the pumphouse structure. They take water from a forebay canal 403 ft. long and discharge into four 60-in. diameter monolithic concrete discharge pipes 425 ft. long. These pipes flow into an outlet structure 29 ft. long and tapering from 23 ft., 8 in. in width at the discharge point to 43 ft. at the outflow lip.

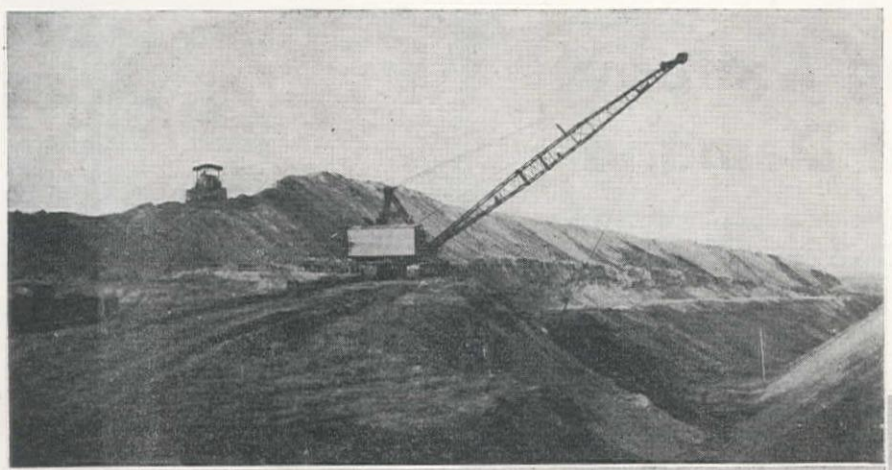
C Line canals

On the C Line canals, Marshall & Haas awarded subcontracts for the construction of all concrete structures and appurtenant work to Henry L. Horn of Caldwell and for the excavation of an 80-ft. through cut on the main canal to Aslett & Sons Construction Corp. of Twin Falls, Ida. A single canal runs from the outlet lip of the discharge structure for 5,275 ft., this being a trapezoidal section 16 ft. wide at the bottom with 1½:1 side slopes and a water depth of 7.48 ft. Freeboard above the water surface is 3.5 ft. Where fill is required on the low side a berm 14 ft. wide is constructed. The canal branches at this point, C Line East running for 104,926 ft., all constructed with trapezoidal section similar to that described above except that water depth is reduced to 6.9 ft. and freeboard to 3.1 ft. The grade of the canal is uniformly .00015. At its beginning, the C Line East canal carries a flow of 500 cu. ft. per sec.

The other branch of the canal known as C Line West runs 127,400 ft. from the branching point. It, however, is a smaller capacity canal, having a bottom width of 7 ft. and water depth of 3 ft., with sides sloping 1½:1. This section is further reduced as water is removed along the route of the canal until at its end the section has a 4-ft. bottom width and a water depth of 1.6 ft. Gradients increase from .0003 to .0007. At the end of each of the canals a wasteway structure is constructed. The initial capacity of this canal is 60 cu. ft. per sec.

Five siphons are included in the C Line East construction. The first 831 ft. east of the canal branch is a square barrel measuring 7 ft., 9 in. in each direction and a maximum head of 9 ft. This siphon is for the purpose of passing under the surface drainage channel. At 24,538 ft. from the canal branch another siphon of similar dimension passes under a drainage channel and has a maximum head of 7 ft. At 43,523 ft. is the Hartley Gulch siphon, a structure 7,486 ft. long constructed with circular sections 6 ft., 6 in. in diameter and reinforced concrete walls 8 in. thick. The maximum head on this siphon is 53 ft. At 90,000 ft. from the canal branching point a siphon is being constructed of 54-in. reinforced concrete pipe. The structure has a maximum head of 29 ft. and a length of 735 ft. The final siphon

DRAGLINE FINISHING canal section and roadway berm with a dozer in the background pushing back excess soil material, picture at top. A 40 ft. cut on C Line East canal being worked by two draglines, lower left. Some of the key men for the contractor are: left to right, CARL MAUER, dragline superintendent; SAM MARSHALL, project superintendent; W. O. COX, foreman; and DICK WOODS, bookkeeper.



TRACTOR and 14-cu. yd. carrier scraper hauling dirt for the corebank construction. The corebank is designed for all canal sections where the water surface of the canal will be above natural ground, and is composed of compacted selected material.

on C Line East is in the wasteway, a distance of 100,850 ft. from the branch and also consists of 54-in. precast concrete pipe. It has a head of 5 ft. and a length of 168 ft.

One siphon is being constructed in C Line West. It is located 57,655 ft. west of the canal branch and is constructed of 39-in. precast concrete pipe. The siphon has a maximum head of 90 ft. and a length of 4,045 ft. In addition numerous checks, turn-outs and other structures are included in the contract.

The largest single item of excavation is an 80-ft. through cut involving some 500,000 cu. yd. of material. This operation is being carried out with tractors and carrier scrapers, all material being wasted outside of the canal section. All other excavation is being performed by two draglines, one of 2½ cu. yd. capacity and one of 1¾-yd. capacity. In those sections where the water surface of the canal is above natural ground, a core bank is being constructed of compacted selected material. This work is being carried out with a tractor and 14-cu. yd. carrier scraper.

Personnel

The work on the contract is under the supervision of George N. Carter, district engineer for the Bureau of Reclamation at Boise. R. W. Adams is resident engineer, W. W. Ketchen is field engineer and R. W. Ramsey, office engineer for the Bureau, all with offices at Caldwell.

For the contractor, S. A. Marshall is project superintendent. Carl Mauer and W. O. Cox are dragline foremen, Ken Bradburn is shop foreman and Dick Woods is bookkeeper. The contractor's office is also at Caldwell.

Supply of Building Material Expected to Meet Demand

PRODUCTION of almost all items of construction materials is expected to be sufficient in 1947 to meet the demands of the anticipated large building program, the Construction Division, Department of Commerce, has reported.

Large increases in production of practically all construction materials were registered in 1946, in many cases exceeding shipments or production in 1941. Prospects for this year are that output will continue to increase. Asphalt roofing materials and gypsum board (including lath), were among the materials that attained record levels in 1946. Lumber and a few other materials came very close to the previous peak levels achieved in 1941 and 1942.

"Despite the excellent performance of the industry last year, shortages were widespread," the report states, "chiefly because the volume of construction under way increased at an even more rapid pace than did shipments of materials. The shortage of construction materials was thus partly a matter of timing since many materials were not available when they were required. It was also a problem of distribution; the materials produced were not readily available at wholesale and retail levels in all geographic areas."

Some of the difficulties encountered by builders last year will again appear in 1947 because the supply-demand situation will be too closely matched for comfort, according to the report. For construction materials to be in easy supply, production must exceed demand by a margin of at least one or two months' production—that is, 10 to 15 per cent above the annual total—or else this margin must be provided by inventories at various distribution levels.

"At present there is no sizeable inventory cushion. Though inventories of lumber, brick and plywood logs have increased slightly, they have not increased enough to promise an easy flow. For example, the accumulation of lumber stocks thus far means mostly stocks of green lumber. Only a very small beginning has been made in building up stocks of seasoned lumber."

Although export controls are being relaxed as rapidly as the availability of construction materials permits, such controls continue in effect on all materials considered to be inadequate in supply for domestic construction needs. Discussing the export situation and outlook for 1947, the report states:

"During 1946 exports of most building materials, exclusive of steel items, averaged less than 2 per cent of production. This is a considerably smaller proportion than was exported in the prewar year 1939. Moreover, the volume of 1946 imports of most materials was as much as three times the volume of exports; during 1939 exports exceeded imports for most materials."

Willamette Valley Gets Power Supply Increase

A THREE-YEAR CONTRACT, which will give partial relief to the Mountain States Power Co. in its present acute power supply situation in the Upper Willamette valley, and at the same time bring lower cost power to communities in southwestern and western Oregon, has been executed by the company and the Bonneville Power Administration.

Under terms of the contract, BPA will supply the requirements of the company in excess of the company's generating capacity on that portion of the Mountain States Willamette valley system now being served from West Salem.

Part of the power and energy supplied to the company at West Salem would be in exchange for power and energy which the company would supply for Bonneville's account to the Central Lincoln People's Utility district at Reedsport, the city of Bandon and the Coos-Curry Electric cooperative.

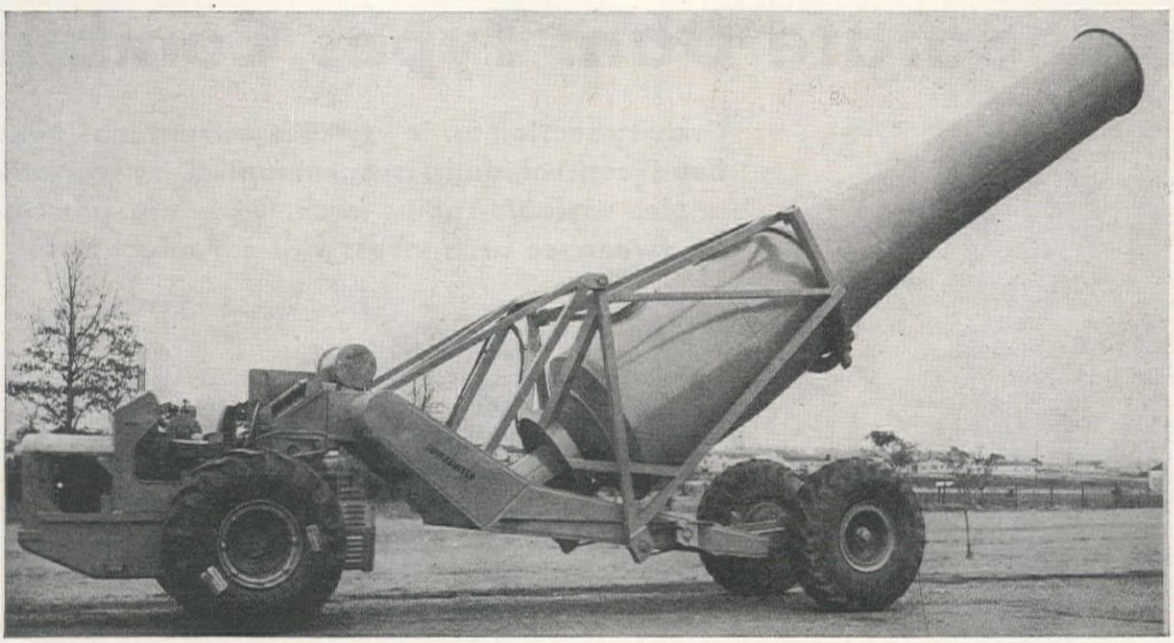
The contract will be of considerable financial advantage to the public agencies by providing them with a supply of power at lower cost than is now available. Estimated annual savings to the public agencies are estimated at $80,000.

Additional power can be made available in the Reedsport area in time for the peak loads in the winter of 1947-48.

Initial deliveries by Bonneville to the company will approximate 7,000 kw. above the approximate 3,000 kw. required for transfer to the public agencies.

The arrangement, while materially helping the company's present situation, will not fully remedy the power supply problem in the Willamette and coastal areas. Complete solution of the problem must await the construction by the federal government of additional high-voltage transmission facilities into the area. At the present time there are no 230,000-volt main transmission grid extensions in the Willamette valley, although these are contemplated as far south as Roseburg. With completion of such facilities the Willamette valley will be in a position to have an adequate power supply as soon as additional generation comes in on the Columbia river.

Giant Mixer Supplements Tournalayer



ENORMOUS size of the concrete mixer enables pouring at heights up to 20 ft., thus eliminating the necessity for scaffolding and other equipment.

ORIGINATED to supplement the huge Tournalayer machine, designed for mass production of concrete houses, a new giant 7-cu. yd. transit concrete mixer, capable of delivering the concrete necessary for a monolithic concrete house in record time was recently introduced by R. G. LeTourneau.

The enormous mixer, which requires relatively few trips to the batching plant, is able to pour the mixture up over the top of the house forms or at a height over 20 ft. for other building construction, thus eliminating the necessity for scaffolding, discharge or distribution chutes, troughs, wheel barrows, or similar equipment. The rapid mixing action, in addition to speeding up the job, provides a completely plastic mixture throughout the entire structure which will minimize voids and other dangers of non-uniform hardening. A time saver as well as a money saver, the mixer saves many hours of waiting on the job, due to the large capacity and high discharge features.

The Tournamixer travels under its own power to the pouring site and operates at a selectively variable speed in either direction of rotation of the drum. This will permit the concrete to be thoroughly mixed while rotating in one direction, and to be forced out the discharge end due to the corkscrew action of the blades, when rotated in the other direction, a method of control which has done away with the need for a discharge door.

Maximum power is utilized in the mixer as it is driven directly by its power plant, located at the central or rotating axis of the drum. A splined hub which is bolted to the drum and attached to the power unit by an internal spline causes the drum to turn one revolution with each revolution of the power unit. The novel drive unit, consisting of an electric motor and built-in gear box, the driving spline of the gear box being in line with the rotor of motor, requires no chains, belts or other means to transmit the power.

Major components of the complete machine include the main frame structure, swing frame structure, mixing drum, and the draft unit, which is a two-wheel rubber tired Tournapull tractor. The main frame, which provides a pivotal mounting for the swing frame, is equipped with two sheave blocks to direct power from the attached swing frame motor and drum to corresponding sheave blocks on the swing frame. Providing a cradle in which the drum rotates, the swing frame consists of structural members supporting a rear bearing ring and rollers and the drum motor housing. The drum is an elongated steel structure containing integral blades, helically shaped and progressing in size proportional to the size of the drum. Two manholes located in the body of the drum may be used for inspection, cleaning, and alternate loading as required. The base of the drum is recessed to accommodate the splined hub for attachment to the power unit and a machined bearing ring is located at the rear of the drum for engagement with the swing frame bearing rollers. Swing frame motor and gear box are attached to the main frame near its flange attachment to the Tournapull and contain a windlass and cable system which operates through the sheave block on the main and swing frames to produce elevation and depression of the mixing drum. Motor is equipped with a brake which sets automatically when the motor is shut off, providing a variable height of discharge.

ROAD SPEEDS for the Tournamixer vary in five separate gears up to 15 mph. Nine ft. wide, it is nearly 45 ft. long.

The gigantic transit mixer operates over all types of terrain at road speeds varying in five separate gears up to 15 mph. The 7-cu. yd. machine weighs in the neighborhood of 30,000 lb. and measures 9 ft. wide and approximately 45 ft. long.

Water and dry mixture are rotated in the mixing direction in the drum while tractor and mixer are proceeding to the location for pouring. Discharge end is located directly over the desired placing point if the concrete is to be poured for a low height form. To discharge the mix into the forms, the operator rotates the drum in an opposite direction from that of mixing, which, due to the peculiar shape of the blades, forces the mixture out of the drum and places it at the required height. Discharge end of the machine is easily moved in an arc while pouring to provide an evenly distributed load at speeds varying from 5 to 18 r.p.m. The mixing chamber is operated independently of the propulsion unit and agitation of the concrete may be stopped even though the chassis is in motion. For higher structural forms, the drum may be elevated by means of the swing frame and motor through push button controls on the Tournapull dash, with the mixture discharged in the same manner as before. The barrel of the mixer may be lengthened or shortened to meet the demands of the contractor.

Matilija Dam—
Two Separate Dam Types Combined

Gravity section for lower 25 ft. of Ventura County flood control dam is surmounted by variable-angle, variable-radius arch, with slip joint between, so arch stress will not affect base

IN MATILIJA CREEK canyon about sixteen miles upstream from the city of Ventura, Calif., a dam combining a cantilever arch with a gravity base is now under construction. Matilija Dam, as designed by Donald R. Warren Co., engineers, will be for the sole purpose of flood control and water supply. It is located about 1,500 ft. above the junction of Matilija Creek and North Fork in a wooded U-shaped canyon. The arch section is now being poured, and the dam is scheduled for completion in late June or July of this year. Contractors are the Guy F. Atkinson Co., W. E. Kier Construction Co., and Bressi-Bevanda Constructors, Inc., of Los Angeles. Huso Festich is general superintendent; John A. Kier is project manager.

A discussion of the design of the structure was published in *Western Construction News* for August, 1946.

The gravity section was started in October, 1946, but three flash floods destroyed the earliest constructions. The last and worst flood occurred on Christmas Day when the water built up to a depth of 40 ft. at the right abutment excavation and completely flooded the site, floating out all of the newly-laid forms.

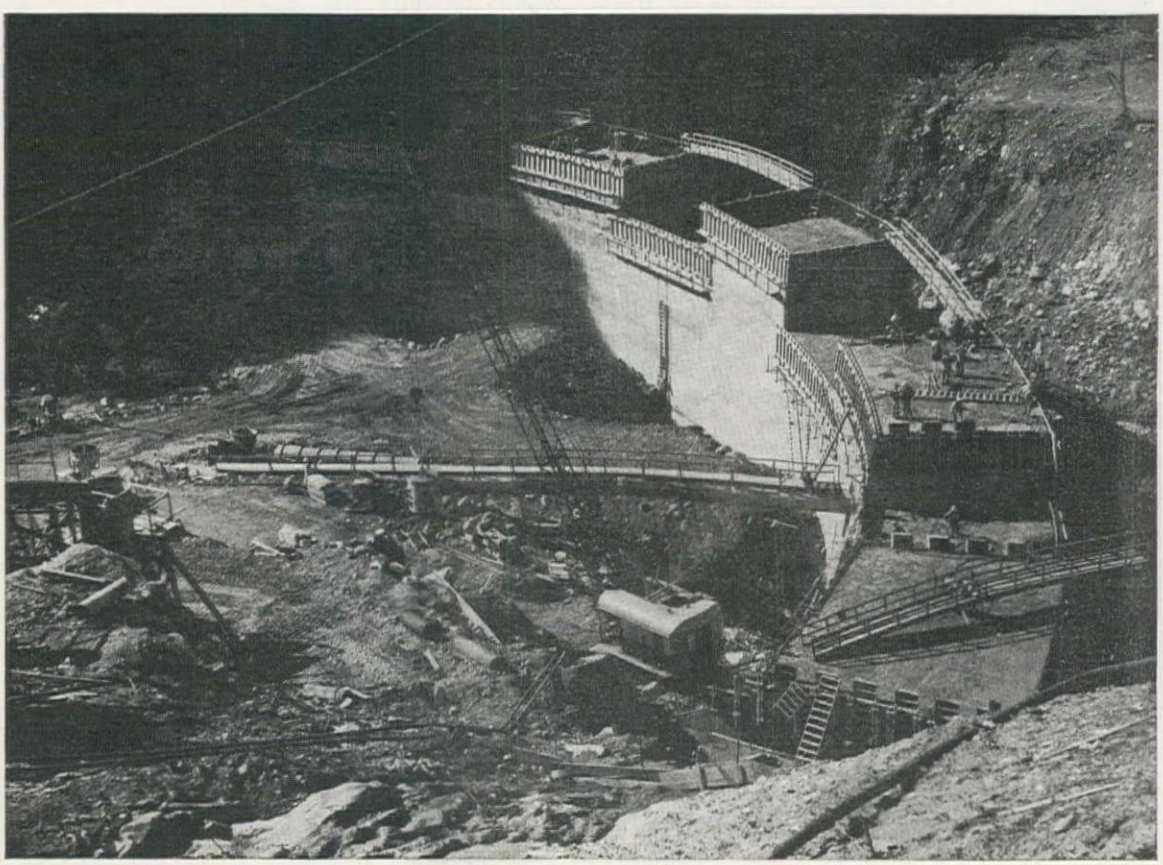
Design

As designed, Matilija Dam is in reality two dams, since it has a gravity section composite cross-section, consisting of an arched base extending from elev. 935 ft. to 960 ft. where a slip joint separates the gravity from the variable radius, variable angle, thin section arch, which continues to the crest at elev. 1140.

This slip joint was constructed by polishing the surface of the gravity dam and applying approximately ⅛ in. of graphite paste, then a sheet of asbestos, impregnated with graphite. The arch section was laid on this, and on the upstream side, from abutment to abutment, the joint was sealed with a copper water stop, and that sealed with rubber gaskets. This slip joint divides the two sections and makes a definite point where the cantilever action is separated from the gravity section. The action can slip along this plane and the stresses in the upper portion will be transmitted to the abutments without acting on the gravity base. The arch rings are 35 ft. thick at the bottom and 8 ft. at the top. In the upper 74 ft., the rings will be of constant thickness from crown to abutment, but below elev. 1051 are designed as fillets from the quarter point to the abutment.

At the abutments, thrust and gravity blocks are being constructed. The thrust blocks are designed tangential to the arch and make possible a shorter and therefore more economical arch section. A gravity block, perpendicular to the contours, carries the water load. On the right abutment, these blocks are relatively small, but on the left abutment, considerable scaling to uncover proper

THIS ARTICLE on the construction of Matilija Dam was written by English students of Santa Paula High School, after a thorough inspection trip over the project with Resident Engineers Taylor and Hyde. The authors are Roy Fosterling, Royal Johnson, Lawrence Kyber, Don LeDoux, Lura Lee Lincicum, Jabin Messenger, Marilyn Munger, Jack Prieur and Edgar Turner. The photographs were taken by Royal Johnson.



bearing rock necessitated the use of a larger thrust block.

The spillway crest is located at elev. 1125, 165 ft. above the apron, and except for the gravity abutments, the entire 629-ft. crest will be for overflow. Matilija Dam will have a 36-in. outlet at elev. 1025 to regulate downstream flow.

In addition to these outlets, a 48-in. sluice gate is constructed in the center of the dam near the streambed level at elev. 980. This will be used when it becomes necessary to drain the reservoir for purposes of silt disposal or unforeseen requirements. A fish ladder will also be installed.

In the streambed, on the downstream side of the dam, a 4-ft. thick apron will be constructed. It will be 46 ft. wide at the abutments and 79 ft. in width at the center and will be constructed to form a 40-ft. deep pool to dissipate the energy of spilled water. A control house located above the left abutment will serve in operating the outlets and gates of the dam through electrical remote control.

As this dam will furnish an additional water supply for Ventura County area, a valve house will be located 200 ft. downstream which will have three shut-off valves to control the diversion of water to the Ventura and Ojai areas and to the proposed Casitas reservoir where water in excess of Matilija Dam capacity will be stored.

Foundation preparation

In July, 1946, the necessary excavation for the dam was started and by October, approximately 82,000 cu. yd. of debris had been excavated for the gravity base section. This does not include excavation for the spillway apron or the excavation that is yet to be done on the left abutment. The debris was loaded onto trucks by power shovels and hauled away to disposal areas.

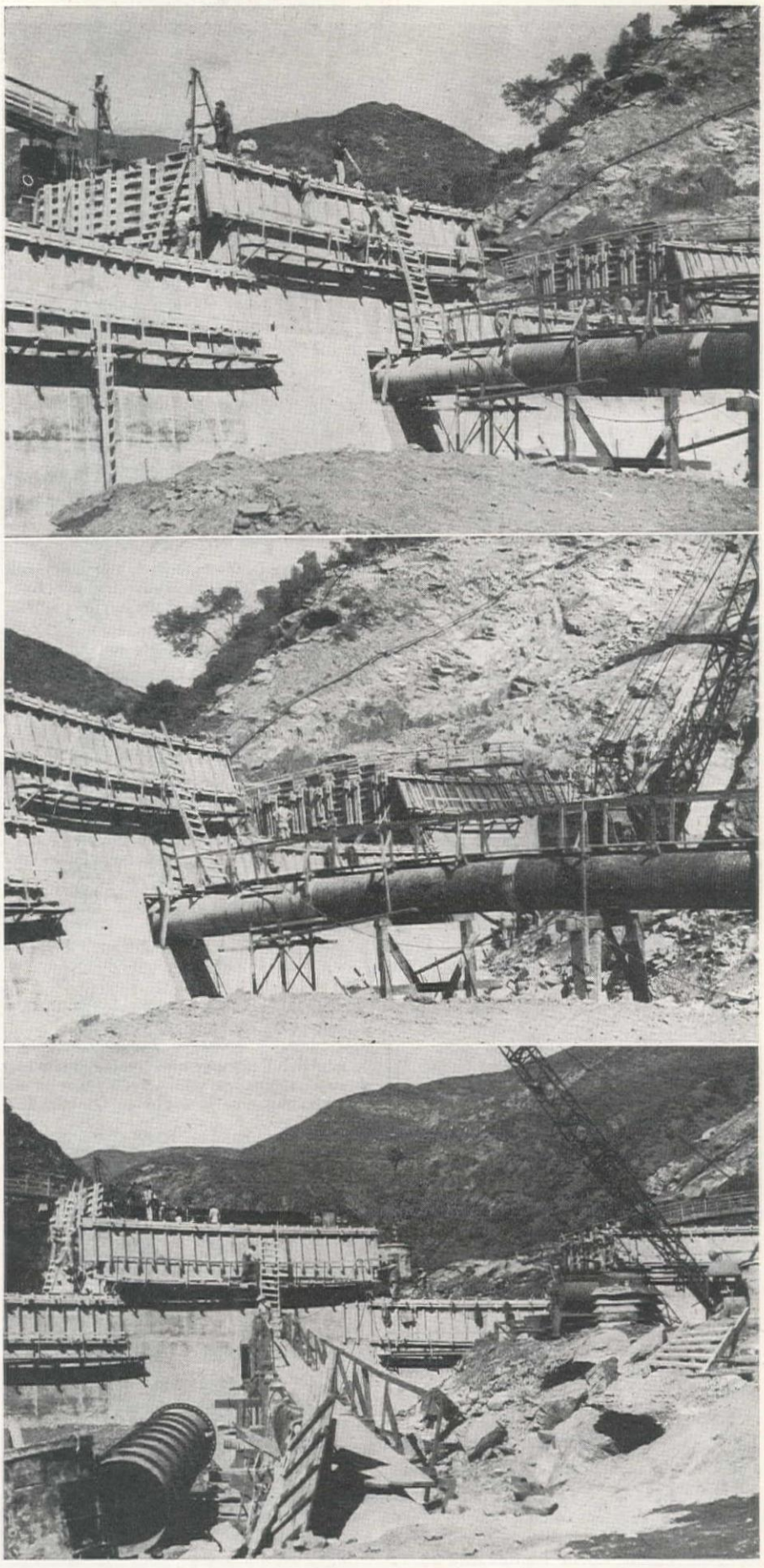
The excavation to date on the left abutment required dynamite blasting and the use of Caterpillar bulldozers, but there was little excavation necessary for the right abutment. Bedrock, at the actual site, is a hard sandstone interbedded with relatively thin seams of shale. Large boulders were encountered on the bottom, and in order to reach solid bedrock near the right abutment, it was necessary to go down from 40 to 49 ft. below streambed, while near the left abutment, the necessary excavation was only 10 ft.

H. F. Folks & Co. of Los Angeles is clearing the trees and brush to elevation 1160 from the sides of the canyon within the reservoir area. The capacity of this reservoir will be some 7,000 ac. ft.

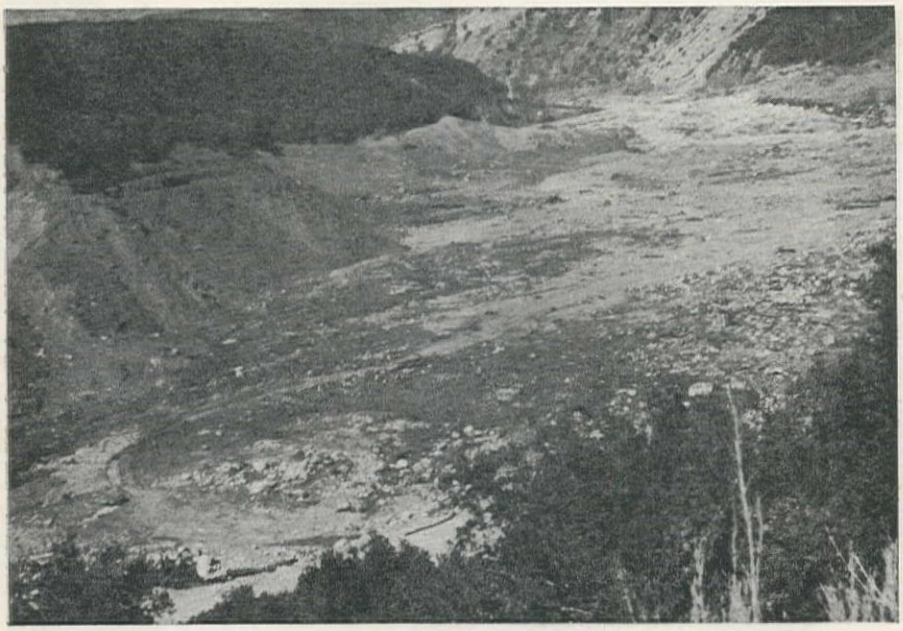
Concrete

Equipment and materials for the dam are all hauled in by truck. The sand comes from the Saticoy Rock Co., Saticoy, Calif., while the rock comes by rail to Ojai from the San Gabriel rock pits near Irwindale, Calif. Cement is also delivered by rail, and with the rock is then carried to the dam site in trucks.

These trucks dump their loads into hoppers from which conveyor belts carry the materials to several other smaller bins where the 3-in., 1½-in., and 1-in. rock are segregated.



CONSTRUCTION OPERATIONS near the left abutment. Top, slip forms being raised by chain blocks on pipe A-frames from poured section into place for next pour; surveyor is required to give position for forms, since it varies with each pour due to changing curvature and thickness of variable-angle dam. Center, 48-in. diversion pipe through the dam; it will be removed and the hole plugged after dam is completed. Bottom, concrete is placed from bottom-dump bucket transported by mobile crane.



RESERVOIR basin for Matilija Dam has been cleared. When filled, the reservoir will contain 7,000 ac. ft. of water. Dam is located about 1,500 ft. above the junction of Matilija creek and North Fork. Flash floods in the fall destroyed the earliest work.

Contents from these bins are then accurately measured in a batcher which discharges into a mixer where they are mixed for one and a half minutes. Here Pozzolith, a chemical admixture, is added to the rotating mass to increase workability and help eliminate previous difficulty encountered in discharging the concrete from the buckets. According to engineers in charge, it also helps to maintain the consistency of wet concrete and does not seriously impair the strength of the dry.

From the mixer, high on the left abutment, the concrete is chuted into 2-cu. yd. bottom dump Gar-Bro buckets located on trucks. The trucks carry the concrete to the site of the actual pouring where a Lima crane with an 80-ft. boom raises the buckets to sufficient height for dumping into the forms.

The boom on this crane will later be lengthened to 110 ft. to facilitate the pouring of upper levels. When this is no longer practicable, a direct trestle from the mixer to the levels will be used.

In this manner, from 40 to 45 cu. yd. of concrete are being poured per hour, and it is believed that this will soon increase to 55 cu. yd. The finished dam will contain approximately 62,000 cu. yd. of concrete.

Pouring

Under the management of Howard Taylor, resident engineer, and J. B. Hyde, assistant engineer, work on the dam is being carried on in two 8-hr. shifts, with fifty men on each shift. It is being raised in checkerboard fashion, using a system of slip forms 5 ft. high and 40 ft. in length. The thickness of the dam varies as the pouring progresses. There are approximately 200 cu. yd. of concrete in the lower blocks and there will be 150 cu. yd. in the upper ones. Concrete is vibrated mechanically to make a uniform mix and eliminate any possible air bubbles.

It takes from four to five hours to pour each block, and twelve hours later the surface is washed with compressed air and water. Another twelve hours are allowed to elapse before the slip forms are lifted. Twenty-four hours later the adjacent upper form can be poured.

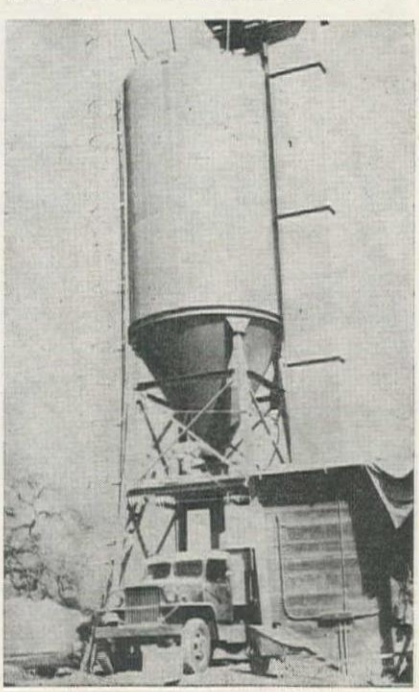
The slip forms are of steel plate, ribbed on the outside for reinforcement. Twenty-four hours after the concrete is poured, they are drawn up by chain blocks mounted on steel A-frames and adjusted for use with the adjacent upper block. Since the dam is designed with variable central angles on both intrados and extrados, the curve of each form panel is different and must be established by careful surveying. Steel hairpins are imbedded in the top of each pour to act as an inside fastening for the next higher forms. Shearing at the construction joints is checked by a series of keys located between the blocks.

Samples of the concrete are taken in each pour and sent to Smith-Emory of Los Angeles to be tested for strength. Specifications require a minimum compressive strength of 3,000 lb. per sq. in. after 28 days. Flash tests after one or three days may be taken if necessary to indicate apparent strength.

The problem of stream diversion has been met by the construction of an earth cofferdam and the use of a 48-in. pipe. The cofferdam upstream diverts the entire normal flow of the stream into the pipe which passes directly through the main dam. Later this opening will be plugged with concrete.

A system of 2-in. pipes is being imbedded in the dam through which grout will be forced under pressure of 100 lb. per sq. in. for the filling of contraction cracks and joints. This grouting started the week of Feb. 24, and will follow the block pouring as the concrete cools.

CEMENT hopper and loader at the railroad siding at Ojai. Both cement and aggregate are brought to Ojai by rail.



Piombo Is Low Bidder For Fresno Dam Work

THE PIOMBO Construction Co. of San Francisco was the low bidder on initial work for the construction of Pine Flat Dam on the Kings River 30 mi. northeast of Fresno, Calif. Their bid is $261,988. The work is under direction of the Corps of Engineers, Sacramento District.

Nearest competitor in a field of eleven was the Westbrook and Pope Co. of Sacramento with a bid of $293,590. Bowen, McLaughlin & Lentz also cut under the Government estimate with a figure of $322,560. The engineer's estimate was $329,563. The work includes only two major items, an access road, and excavation of the left abutment. This will keep obligations well under the million dollar total allowed by Congress for the start of the work. The balance of this fund will be used for an engineers' camp and such rights-of-way as may be necessary to begin and extend the construction of the million acre-foot reservoir.

After checking and approval, it is expected that the award and notice to proceed will be made in order that the work may get under way next month.

Engineers Triumph Over Rivals in College Stunt

ENGINEERING students at the University of New Mexico in Albuquerque proved too ingenious for the arts and sciences college students, in their traditional St. Patrick's Day rivalry, when the latter group undertakes to pull down the engineers' flag just before the annual engineers' dance.

This year, the engineers insured the safety of their flag by digging an 80-ft. trench from the powerhouse, piping live steam in at 180 deg. Fahrenheit inside the hollow flagpole, and daring all comers to climb it. Nobody disturbed the flag.

Parallel Bay Bridge Proposed

California Department of Public Works recommends $99,300,000 bridge spanning the bay just north of and parallel to existing structure—Proposed two deck bridge would support five 12-ft. lanes on each level — Chosen as best of eleven plans, bridge would divert most traffic—Flexibility of operation stressed as well as need for crossing

AFFIRMING THE NEED for another crossing of San Francisco Bay, the California Department of Public Works, headed by Director of Public Works C. H. Purcell, recently followed the joint Army-Navy Board's proposal for a causeway-tube crossing with their own report recommending a span parallel to the existing San Francisco-Oakland Bay Bridge, at a cost of $99,300,000. The Army-Navy report was reviewed in *Western Construction News* last month.

A second bridge spanning the bay just north of, and generally parallel to the existing bridge was recommended as necessary and economically and physically feasible by the State in their "Report Covering Preliminary Studies for an Additional Bridge Between San Francisco and the East Bay Metropolitan Area," filed with the California Toll Bridge Authority Feb. 13. The design of the new structure would be practically identical with the existing one.

Best of eleven

After a detailed study of eleven crossing locations, a parallel bridge was recommended on the grounds that: (a) it is in the most favorable location for construction approaches to all important traffic centers in San Francisco; (b) it crosses Yerba Buena Island on the line most suitable for side-road connections and economy of construction; (c) it does not interfere with the existing facilities on the Key Route Mole or the Oakland Port of Embarkation; (d) it is the closest practicable line to the centers of gravity of all traffic in both San Francisco and the East Bay municipalities. It was also declared that a new bridge could be built without increasing tolls on the present San Francisco-Oakland Bay Bridge. Tolls on both structures would be the same.

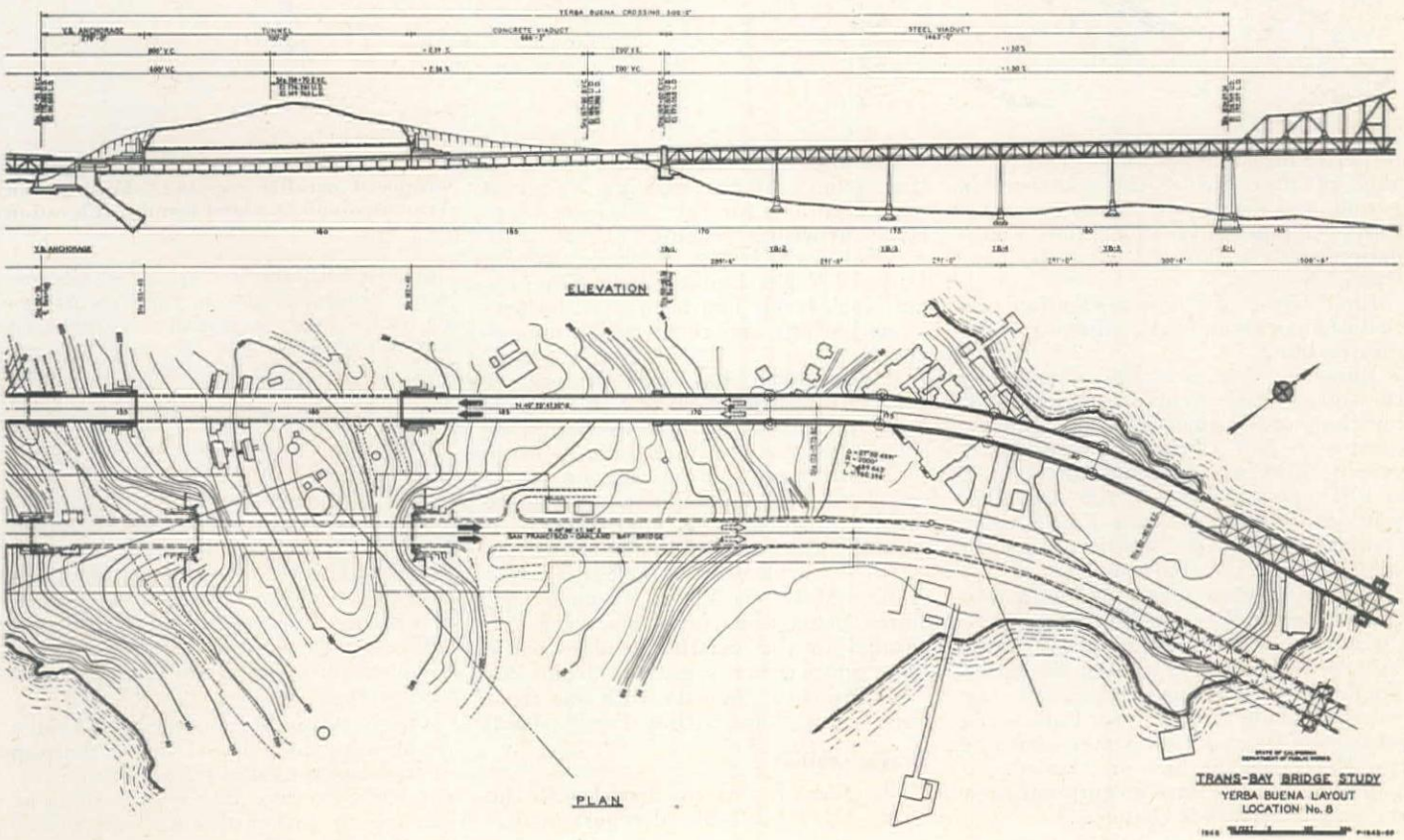
An estimate of $21,000,000 covering twin two-lane tubes under the Oakland estuary with connections to the East Bayshore Freeway and to Alameda was submitted also. This was figured in the total cost of $99,300,000. Bridge alone plus approaches would cost approximately $84,000,000.

The proposed second crossing would be built on a line between Rincon Hill and the Key system mole via Yerba Buena Island, north of and approximately parallel to the present bridge. The two-deck structure would be about 300 ft. from the present structure and would support five 12-ft. lanes on each deck. One-way flow of traffic could be permitted on each bridge, if desired.

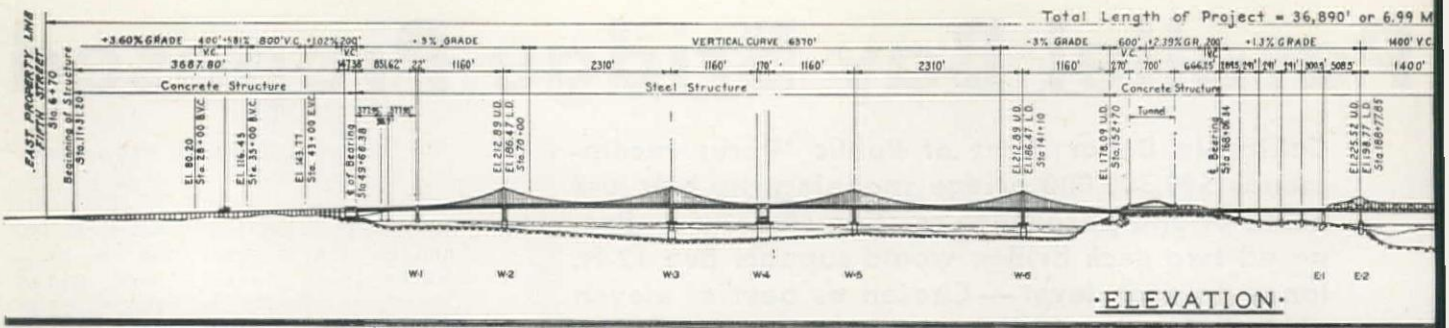
It was pointed out that it would be impractical to include steam train traffic. The report stated that on a high-level structure north of Hunters Point the rail elevation will be 200 ft. above the elevation of the terminals, and since approach grades of 1 per cent are the maximum that can be effectively operated over by passenger trains or short freight trains, and then only at slow speed, it would require over four miles of approach between the bridge and rail terminals.

Phases of study

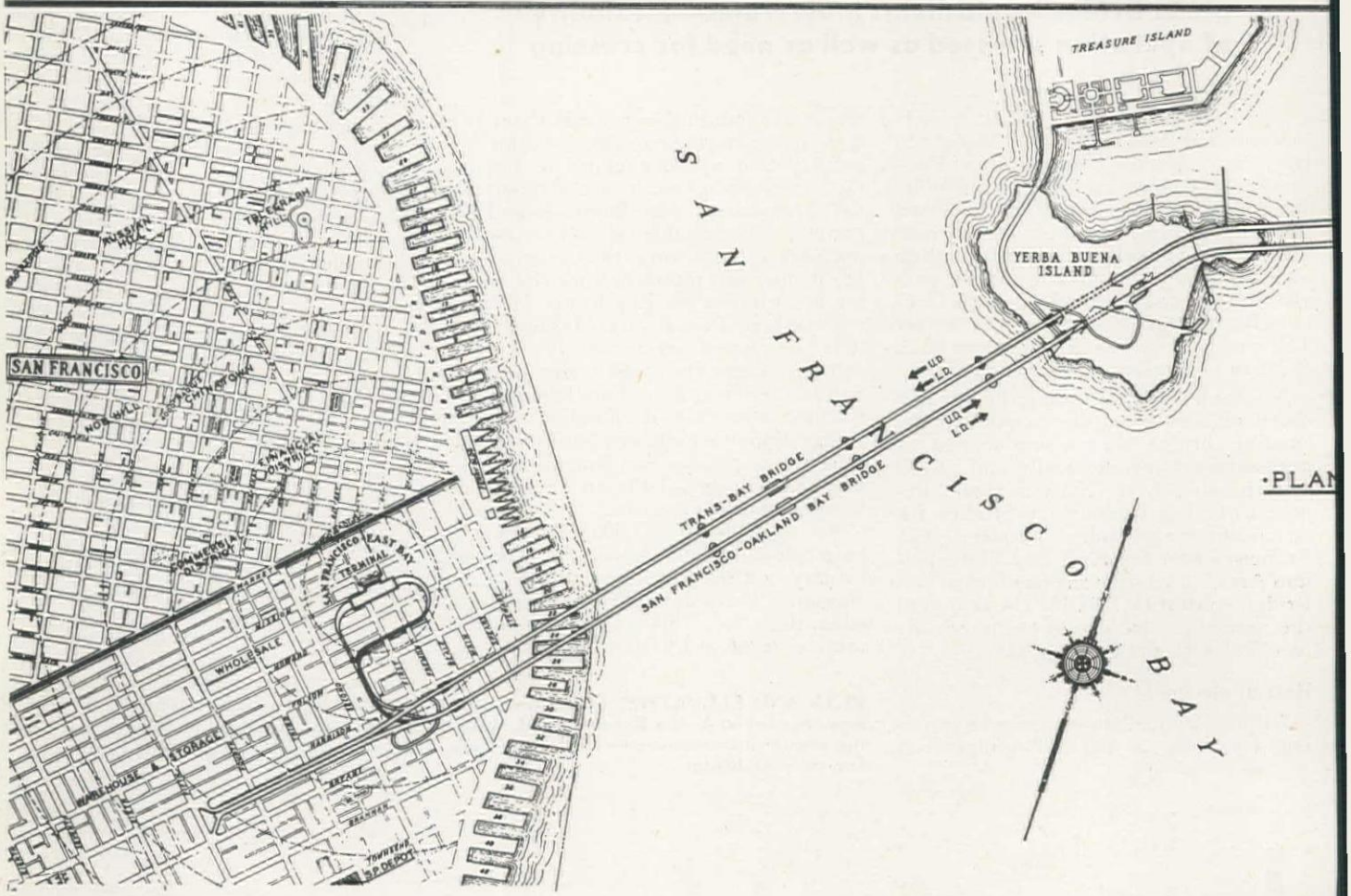
The Bay Bridge studies organization had three phases of investigation. First was a detailed study of traffic volumes and capacity of the existing bridge to determine the need for an additional crossing. Second phase was the collection and classification of such data as: (1) origin and destination of transbay traffic; (2) available and potential terminal distributive highways and streets; (3) foundation materials available at the alternative locations; (4) advantages, disadvantages, and indirect costs of al-



PLAN AND ELEVATION of the proposed new crossing at Yerba Buena Island, showing required tunnel somewhat longer than for present bridge.



·ELEVATION·



·PLAN

OVERALL VIEW of existing Bay span and proposed parallel crossing, showing San Francisco and Oakland termini. Elevation

ternative locations; (5) unit costs probably effective during the construction period, and (6) general designs suitable for development of each location. Foundation study included borings by contract.

Final phase of the investigation was that of analysis and detailed study of the information.

Numerous locations were studied by the state engineers before recommending the parallel structure. The four locations in San Francisco were: Telegraph Hill, Potrero Point, Rincon Hill, and Hunters Point. On the East Bay side, locations were: Key Route Mole, Oakland Mole, the southerly line of Alameda, and Bay Farm Island.

Because of more favorable foundation conditions, bridges which cross on or to the north of the line, Rincon Hill-Oakland Mole, should be located via Yerba Buena Island, it was declared. Any crossing from the Potrero Point area must have its east end located south of the Naval Air Station in Alameda to avoid interference with its entrances and the Oakland Harbor channels.

The report stated that a location in the vicinity of the existing bridge is most favorable for any high-level, long-span structure because of the submerged rock saddle between Rincon Hill and Yerba Buena Island. The general rock levels had been fixed by previous borings and construction experience.

It was stated that since the present bridge interurban electric railway is capable of handling twice as many passengers as now use it, and can be made to handle more if necessary, no provision for additional facilities of this type seemed justified.

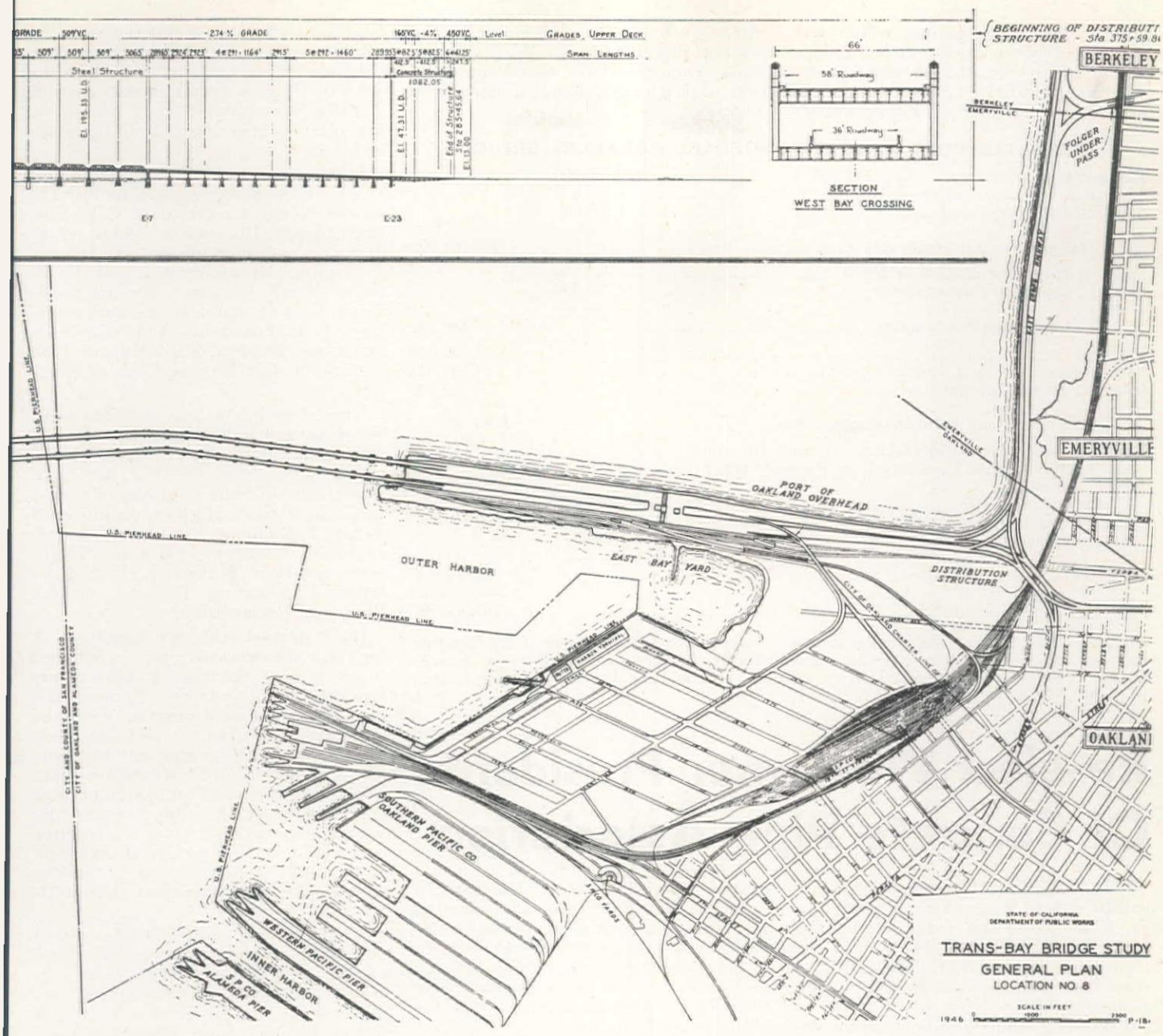
Of the plans studied by the board, five called for bridges from Telegraph Hill to Key Mole, via Yerba Buena Island. Three plans were for spans near and parallel to the existing bridge, while three more were suggested from Potrero Point to Alameda, with one from Candlestick Point to Bay Farm Island.

Traffic studies

The State report concurred with the Army-Navy Joint Board report in that both declared another bridge was necessary. Present traffic on the Bay Bridge is twice the originally anticipated amount, flowing now at a rate not predicted until 1970. In 1946, the bridge traffic averaged 69,000 vehicles daily, divided 63,000 on the upper deck and 6,000 on the lower. Peak day was Easter Sunday, April 21, 1946, with 79,016, of which 76,609 were handled on the upper deck.

The traffic pattern has also changed since the bridge was first opened, it was declared. In 1940 the greatest traffic was over the week-end, whereas today, traffic on the five working days is greater. This change is indicative of the growing use of the crossing as an inter-city business artery.

Origin-destination counts of bridge traffic were studied to show distribution of transbay vehicular traffic. Of all present bridge traffic, 55 per cent stops or starts in the principal downtown area of



of the suggested new crossing is shown above. Typical section of the west Bay crossing is shown in the upper right.

San Francisco, both north and south of Market Street. Of the total, 79 per cent stops or starts in this downtown area and the part of the city directly west and north of it, including Treasure Island.

Of all present bridge traffic, 65 per cent stops or starts north and west of a line following 14th Street, Lake Merritt, MacArthur Blvd., and High St. in Oakland. Only 8 per cent of the bridge traffic originates south and east of the above points, while direct traffic between the northerly areas on each side amounts to 50 per cent, or six times as much.

Therefore, the State report claimed, no location other than one in close proximity to the existing bridge would be likely to divert anything like half of the traffic which at present is using the San Francisco-Oakland Bay Bridge. A Potrero Point-Alameda crossing would not divert more than 20 per cent, and one on the Hunter Point-Bay Farm Island location not more than 5 per cent.

The State's engineers agreed that a second bridge location should make suitable connections with all important traffic centers and be so located that high-speed connections to other areas are feasible as soon as their development warrants them. The parallel crossing was recommended because it was believed that it would afford the greatest and longest-lasting relief for traffic congestion on the present Bay bridge. Due to the type of structure and the favorable foundation conditions, the cost per additional transbay traffic lane is less than that of other practicable crossings. Since plans for the present bridge can be used as a pattern for the parallel structure, engineering investigation and design costs would be greatly reduced also.

Flexible operation

Flexibility of operation was also stressed in the report. With two structures in such close proximity, it would be possible to operate each as a one-way bridge, an arrangement that could be modified to meet future traffic needs and patterns.

The parallel structure, which would offer no additional hazard to navigation, would connect directly with the Bayshore Freeway in San Francisco, to be built by the State, providing four points of distribution in the downtown business district. Extensions reaching to the north of Market St. to Van Ness Ave., and south to the Potrero-Bay View districts via the proposed Maritime Freeway, are practicable, it was stated.

The proposed second crossing would terminate at the focal point of East Bay traffic arteries connecting with the East Bayshore Freeway (north and south) and MacArthur Blvd. Additional traffic capacity of the terminal arteries will be obtained (a) by adding lanes to the present distribution structure for north-south city traffic, (b) by the construction of a connection with 22nd St. across the S. P. Co. tracks, and (c) by additional tubes under the Estuary connecting Alameda with the Bayshore Freeway.

The State investigation, which was authorized by the California Toll Bridge Authority on Oct. 30, 1945, was done by a special Bay Bridge Studies organization, under Director of Public Works Purcell, who was chief engineer on the present Bay Bridge. F. W. Panhorst, bridge engineer of the California Division of Highways, handled immediate direction.

ESTIMATED COST OF STATE-PROPOSED PARALLEL BRIDGE

Bay and island crossings	$62,350,000	
Electrical, buildings and miscellaneous work	1,190,000	
San Francisco main approach	1,260,000	
Total main bridge construction		$64,800,000
San Francisco approach connections	940,000	
Oakland approach connections	4,760,000	
Total approach construction		5,700,000
Property		4,300,000
Engineering, legal and insurance costs		4,500,000
Interest, during construction		4,700,000
Total, bridge and immediate approaches		$ 84,000,000
Twin two-lane tubes under Oakland Estuary with connections to the East Bayshore Freeway and to Alameda—		
Construction costs	$18,000,000	
Enginering and general costs	2,000,000	
Interest during construction	1,000,000	
Total, Estuary crossing		21,000,000
Grand Total		$105,000,000

(The above figures include interest during construction which, because of the fact that interest is paid from San Francisco-Oakland Bay Bridge revenues, is only a book charge. The cost, exclusive of interest, of the bridge and the Estuary crossing is seen to be $99,300,000.)

Re-elect Westerner President Of Concrete Pipe Association

THE AMERICAN Concrete Pipe Association held its annual convention in St. Louis, Mo., last month under the leadership of Elmer L. Johnson of the Concrete Conduit Co., Colton, Calif., its president, and Howard F. Peckworth, managing director.

President Johnson stated that the demand for concrete pipe has increased in 1947 and that the indications point toward a peak year. He added that two bottlenecks may interfere with meeting the needs for such pipe. These bottlenecks are the shortage of steel for reinforcing and the shortage of skilled and unskilled labor. He estimated that more than 3000 additional workers could be absorbed in the industry.

Peckworth reported that 2,287,807 tons of concrete pipe had been manufactured in 1946 as compared with 1,510,000 tons in 1945. The peak production year, however, was 1942 with 4,000,000. He stated that the association is being incorporated as a non-profit organization under the laws of the State of Illinois.

Johnson was re-elected president and H. X. Eschenbrenner, Columbus, O., was re-elected vice-president. C. H. Bullen, Chicago, Ill., was re-elected treasurer. Newly elected officers were Henry C. Eames, Massachusetts, and F. B. Gray, North Carolina, as vice-presidents; G. B. Denham, Mississippi, secretary; E. H. Fox, Ohio, T. J. Walsh, Illinois, and Hugh P. Ford, Eugene Pipe & Concrete Co., Eugene, Ore., as directors.

Numerous interesting speakers were heard during the three day convention, outstanding among them being Al Hale, executive secretary of the American Association of State Highway Officials; D. C. Greer, State Highway Engineer of Texas; R. Robinson Rowe, senior bridge engineer, California Division of Highways, and H. R. McBirney, chief of the Canal Engineering Division of the Bureau of Reclamation.

Hale decried the philosophy that highway construction can be deferred to serve as an economic stabilizer during depressions, and Greer discussed the farm-to-market road program which he termed as "affecting the very life blood of America." He pointed out the wide use of concrete pipe culverts on these roads. Rowe spoke on concrete pipe culvert practice in California and delivered an interesting paper on the three problems receiving particular attention in that state. They are high over-fills, pipe weight, and installation under traffic.

McBirney was obliged to be absent due to illness, but his paper was read for him. He discussed the use of concrete pipe on reclamation projects, stating that the first reported job using it was on the Milk River Project in Montana in 1906. He indicated that one of the most serious problems is the securing of efficient yet economical joints. He gave examples of several jobs using concrete pipe, including the San Diego and Salt Lake City aqueducts.

WESTERN MEN attending the Concrete Pipe Convention included, l. to r.: H. W. CHUTTER, Fresno, Calif.; G. D. WILLIAMSON, Yuba City, Calif.; R. R. ROWE, Sacramento, Calif.; E. L. JOHNSON, Colton, Calif., president of the association; WALTER LENZ, St. Helena, Calif.; HENRY WEIGAND, San Jose, Calif.; HUGH P. FORD, Eugene, Ore.; D. A. DUNKLE, Los Angeles, Calif. The 1948 Convention will be held in New Orleans, La.

Seattle Engineer District To Commence Alaska Project

AUTHORITY has been received by Colonel L. H. Hewitt, District Engineer, Seattle District, Corps of Engineers, to commence work on the Wrangell Narrows, Alaska and Lake Crockett, Wash., projects. The Wrangell Narrows project consists of dredging approximately 16,000 cu. yds. of ledge rock and 245,000 cu. yd. of other than ledge rock. The work at Lake Crockett will call for the dredging of approximately 400,000 cu. yd. of material in the lake, with an entrance channel from Admiralty Bay, and the construction of a rubble-stone breakwater containing approximately 28,000 tons of stone, all in the vicinity of Fort Casey, Whidby Island, Wash.

CONSTRUCTION DESIGN CHART

LXXXII . . . Distance Requiring Web Reinforcing

By JAMES R. GRIFFITH
Birch-Johnson-Lytle
Seattle, Wash.

THE CONVENTIONAL building code requires the use of web reinforcing in concrete beams in such areas wherein the unit shear exceeds a specified amount. This value, above which web reinforcing is required, is usually

$$v_c = 0.02\, f'_c$$

for cases wherein special anchorage of longitudinal steel is not provided.

On page 24 of our Reprint[1], a chart is given for the determination of the spacing of vertical stirrups based on an allowable tension in the stirrups of 18,000 p.s.i. While I know that this allowable tensile stress is lower than the 20,000 p.s.i. currently allowed, I am still inclined to favor it. As a result of my own observations, unsightly cracks are more frequently caused by inadequate web reinforcement than from any other one cause.

It is a simple geometric problem to determine the distance from the support to which it is necessary to continue the web reinforcing. However, it is a problem which is repeated for almost every beam. When the load is uniformly distributed, the solution involves the use of two similar triangles, resulting in the relation:

$$\frac{x}{L/2} = \frac{v - v'}{v}$$

where x = distance from support requiring web reinforcing
L = span of beam
v = unit shear at support
$v' = 0.02\, f'_c$ = allowable unit shear without web reinforcing.

The accompanying chart has been designed to solve this equation by use of a single straight line intersecting all three scales. Provision has been made for two grades of concrete, $f'_c = 2{,}000$ p.s.i., and $f'_c = 3{,}000$ p.s.i. A solution line has been drawn on the chart for the following assumed conditions:

Span of beam, $L = 18$ ft.
$f'_c = 2{,}000$ p.s.i.
$v' = 0.02 \times 2{,}000$
$= 40$ p.s.i.
Unit shear at support, $v = 90$ p.s.i.

Uniformly distributed load.

According to the chart, it will be noted that it is necessary to continue web reinforcing for a distance of $x = 5$ ft. from the support.

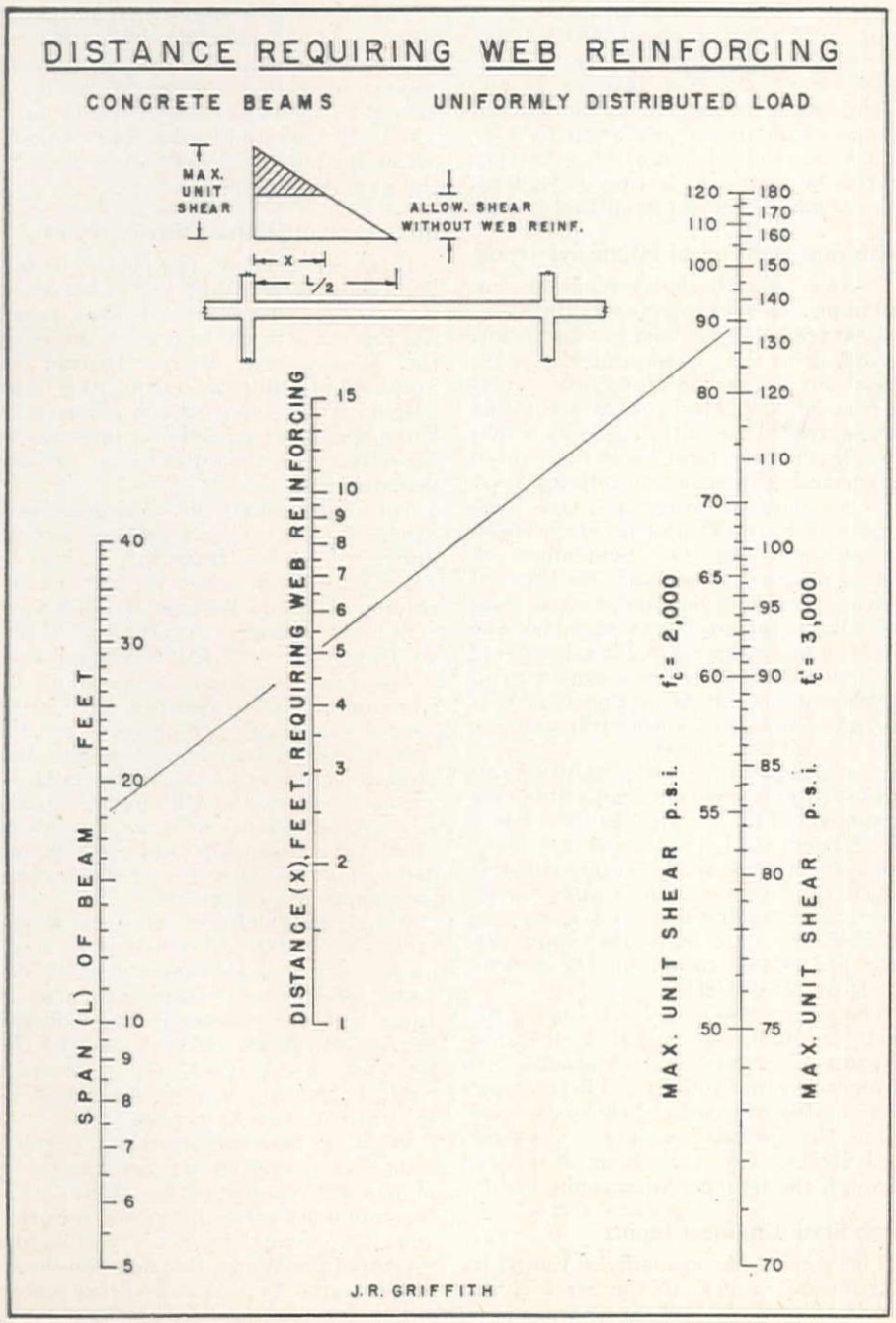
Substituting the assumed conditions in the equation, we obtain

$$x = \frac{(v - v')\, L/2}{v} = \frac{(90 - 40)\ 18/2}{90}$$
$$= 5.0 \text{ ft.}$$

Knowing the distance (x) and the unit shear at the support, it becomes a simple mental problem to determine the location of other values of unit shear for changes of stirrup spacing. Thus in the problem above, at a point 2.5 ft. out from the support, stirrups must care for a shear of

$$v - v' = \frac{45}{2} = 27.5 \text{ p.s.i.}$$

[1] "Construction Design Chart" Revised Edition, Western Construction News.



Highway Change Moves Tiny Colorado Cemetery

TINY DEAD MAN'S Canyon, pioneer cemetery, located fifteen miles south of Colorado Springs, Colo., is being moved to make way for projected highway changes. Ernest Montgomery, division engineer of the State Highway Department has found a tree-shaded site a quarter of a mile northeast of the present cemetery which will be clear of the Colorado Springs-Canyon City highway, improvements in which are running through the old site. As long as a change is to be made, however, he feels that the bodies of the few pioneers buried there should be moved to Evergreen cemetery, owned by the city of Colorado Springs. One victim of the Espinosa outlaws' bloody fray in Colorado in the 1860's is buried there, together with another pioneer and two children.

Before the bodies can be moved, district court proceedings must be instituted, according to the county attorney.

Construction Progress, Needs Revealed by Western Reports

PROGRESS and hoped for achievements in the field of Western state construction were documented and commented upon in four interesting reports recently issued by Western agencies. The reports, which commented in the main upon highway and water problems, included the seventeenth biennial report of the Oregon State Highway Commission; the fifteenth biennial Division of Highways report to the Governor of California by the Director of Public Works; the twenty-fifth biennial report of the State Engineer to the Governor of Utah; and the eighth annual report of the Metropolitan Water District of Southern California.

Oregon report

Truck and log-traffic problems in connection with highway maintenance were discussed in the Oregon State Highway Commission report, which covered the period from July 1, 1944 to June 30, 1946. Difficulties of providing smooth, serviceable roads to carry the essential war and civilian traffic during the war years, due to manpower and materials shortages were stressed. Even now, it was declared, it is difficult to procure highway workers, and shortage of materials is even more pronounced now in some ways than before.

Oregon, while as far behind as other states in the maintenance and expansion of highways, is now embarking on a postwar construction program of modernizing and extending its needed highways. Under the terms of the 1944 Road Act, passed by the 78th Congress, $500,000,000 of federal funds were made available to the states for each of the three postwar years, the first postwar year beginning on July 1, 1945. Of the national total, $225,000,000 was made available each year for primary federal-aid highways, both rural and urban. Oregon's share of the federal funds is $3,728,908, which, together with Oregon's matching requirements, totals $6,315,000.

Of the $150,000,000 allotted by the federal government for secondary and feeder roads, $2,544,582 comprises Oregon's share, which, together with state funds, totals $4,310,000. A total of $1,375,000 has been allotted Oregon for construction of federal-aid routes through urban areas having populations of more than 5,000. National total was $125,000,000, with Oregon's federal allotment comprising $810,873.

Trucking problem

Lumber, Oregon's chief industry, has also raised many state problems, especially in regard to transportation. The cost of building highways for trucks exceeds the cost of building highways for lighter vehicles by about fifty per cent. Log truckers are now failing to pay their fair share of the present cost of the system of roads by an amount of from $100,000 to $150,000 per year. Additional road maintenance cost, due to heavy loads carried, amounting to from $350,000 to $500,000 per year plus reconstruction work brings the total of these extra expenses to the state highway system to somewhere between $675,000 and $875,000 a year.

Conclusions of the board were that modernization of the present highway system, which before the war was estimated to cost $141,700,000, will at present prices cost about $212,500,000. Twenty years would be required for this accomplishment, during which time there will be a normal depreciation in highways and streets. In addition to reconstruction expenditure, new obligations, such as arterial highway construction, improvements on rural highways, and other things would bring the program to a total of about $480,000,000, which equals an expenditure of $24,000,000 per year. Net revenue to the Highway Department for the next biennium is estimated to yield annually $18,400,000, leaving a deficit of $4,360,000 per year to be met by a portion of $17,000,000 estimated to be on hand Jan. 1, 1947.

California Division of Highways report

Postwar state highway rehabilitation and improvement projects totaling $145,000,000 are being planned for California, according to the Division of Highways report for the period from July 1, 1944 to June 30, 1946. Here, too, it was found that increased use of the roads by trucks carrying heavier total loads has caused extensive highway deterioration.

Three postwar programs have been approved by the California State Highway Commission. On September 24, 1945, a program of projects for the first postwar year was adopted, and as soon as federal approval was received, the Division of Highways began advertising for bids. Total engineer's estimates of contract items for the first postwar year projects amount to $44,400,000, and low bids totaled $43,900,000.

In addition to the state highway programs, federal and state funds are being administered for Federal Aid Secondary or Feeder road improvements being used on county roads. Approximately $5,000,000 a year has been apportioned for each of the first three postwar years. In 1945, the state legislature appropriated $12,000,000 to match the federal funds of $15,000,000.

The report also stated that during the past biennium, on August 1, 1945 the Carquinez Straits and Antioch Toll Bridges became toll-free. These structures were purchased in 1940 by the state from the privately-owned American Toll Bridge Co. for about $6,000,000 through the issuance of revenue bonds.

Utah State Engineer report

The appropriation made by the State Legislature in 1945 to the State Engineer's office to seal or repair wells that leak or waste water has paid for itself many times, it was declared in the Utah State Engineer's twenty-fifth biennial report, covering the period from July 1, 1944 to June 30, 1946.

In cooperation with well-owners, the State Engineer's office furnished a "mud jack" and two trained men during the summer of 1946 to control wasting wells. All materials used were furnished by the well owners and new replacement wells were drilled by the owners. The office has to date sealed a total of 62 wells, into which has been pumped a total of 900.5 cu. yd. of clay and 143 bags of cement. The cost of sealing these wells is small, compared to water value. Total amount of water placed under control was 3,593 gal. per min., or 8.0 sec. ft.

The State Engineer is representative for the state of Utah on the Upper Colorado River Basin Compact Commission, and negotiations for a compact for the division of Colorado River water apportioned to the Upper Basin by the Colorado River Compact are under way.

The report also stated that proposed adjudications on the Bear River, Cedar City and Escalante Valleys are nearing conclusion and will soon be ready to submit to the respective district courts. The Utah Lake and Jordan River adjudication has made substantial progress in the preliminary surveys.

Metropolitan Water District report

Increased demand, together with unprecedented shortage of chemicals, maintenance materials and labor, taxed the ingenuity of the operating forces of the Metropolitan Water District of Southern California during the year 1945-46, it was reported, but plants were being operated successfully almost up to capacity, with the promise of greater demands ahead.

Continued growth of constituent areas of the district is shown by the increase during the period from July 1, 1945 to June 30, 1946, in water production, including Colorado River water, of 9.5 per cent representing a constant flow of 57.9 cu. ft. per sec. or 37,420,000 gal. per day.

The use of Colorado River water by constituent areas expanded during the year to a quantity 52.6 per cent greater than in the previous year. Anaheim, Laguna Beach, Santa Ana and Santa Monica used softened and filtered Colorado River water almost exclusively, while all areas except Glendale and San Marino drew upon the District supply as their individual needs required.

A daily peak delivery of 140 cu. ft. per sec. or 90,484,000 gal. per day occurred on June 25, 1946. Maximum monthly delivery of softened water was also in June, 1946 and averaged 102 cu. ft. per sec., or 65,920,000 gal. per day. In the previous fiscal year the maximum monthly delivery was in August, 1944, at a rate of 70 cu. ft. per sec.

With the increase in coastal population, which resulted in a great increase in property values, it was found that the combined value of taxable property and tax exempt property within the Metropolitan Water District, and thereby protected by Colorado River water, is now greater than $3,100,000,000.

Columbia Basin—
Bureau Urges Consolidation Program

Over-all long range development proposed—238 individual projects lumped together in a single river basin project—5,360,000 ac. ultimately to be placed under irrigation in the five and a half billion dollar program, which also includes power, navigation, flood control and other features

COMPREHENSIVE development of the entire Columbia River Basin has been proposed in an over-all, long-range plan which has just been announced by the Department of the Interior. For the first time in its 45-yr. history, the Bureau of Reclamation, which is responsible for the preparation of the plan, has proposed that all projects be lumped together in a single river basin project.

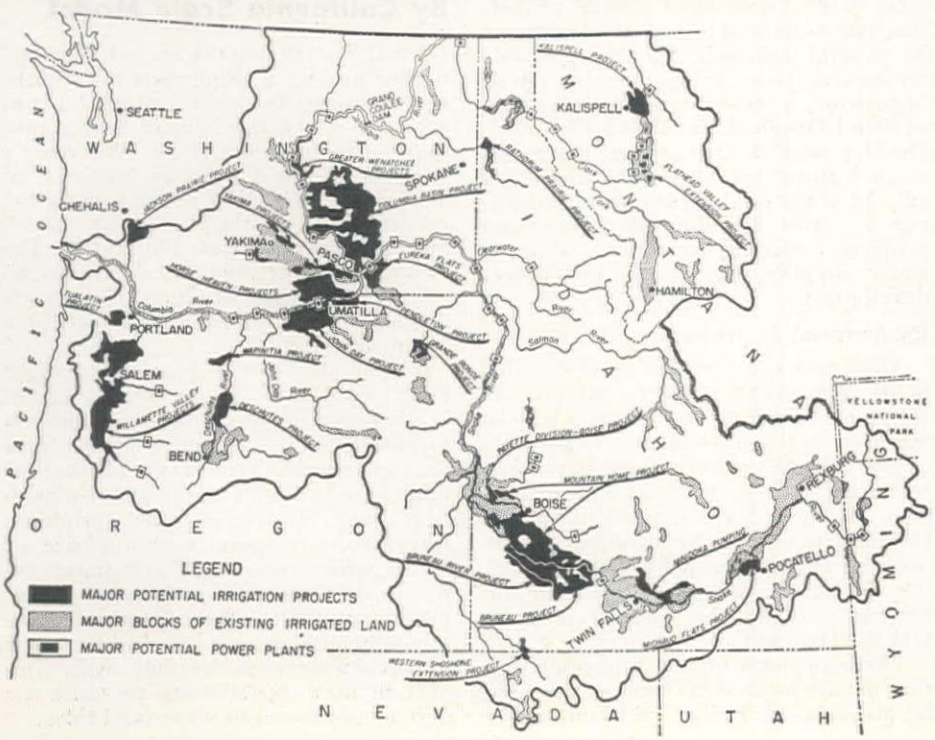
Including 47 projects now authorized for construction by the Bureau of Reclamation, the Corps of Engineers, or the Office of Indian Affairs, and recommending 11 projects not now authorized for immediate construction, the plan proposes a total of 238 individual projects for ultimate development in the Columbia River Basin area. The United States portion of the Columbia River Basin includes most of the states of Washington, Oregon, and Idaho as well as that part of Montana west of the Continental Divide and small portions of Wyoming, Nevada, and Utah.

Total cost $5,600,000,000

Under the plan proposed by the Bureau of Reclamation 5,360,000 ac. of land would ultimately be placed under irrigation in the Basin, installed hydroelectric generating capacity would be increased by 10,500,000 kw., flood control protection would be extended to nearly 1,500,000 ac., drainage to more than 500,000 ac., and slack water navigation provided as far as Wenatchee, Wash., on the main stem of the Columbia, to Lewiston, Idaho, on the Snake River, and on the lower Willamette.

Total cost of the comprehensive development, based on 1946 cost indices is estimated at $5,600,000,000 of which some 84 per cent would be returnable through sale of power and repayments from water users. The remainder of the costs would be chargeable to navigation, flood control, pollution abatement, recreation, and wild life benefits. Of the reimbursable costs about 92 per cent would be contributed by power sale revenue.

MAP OF THE American section of the Columbia Basin Project, showing major existing and potential irrigation projects and power plants. No attempt was made to correlate development of that section of the basin which lies within Canadian territory.



By establishing a single account for the entire Basin a financial pool would be set up from which construction costs for irrigation and power facilities would be charged, and to which revenues from irrigation and potable water users and power sales would be credited. Presumably this arrangement would make possible the construction of a number of projects with border-line feasibility since unfavorable economic ratios of benefits to costs could be overbalanced when considered as a whole with projects having highly favorable economic ratios.

Benefits in favorable ratio

Annual benefits of the whole program are estimated at about $385,000,000 which is about $100,000,000 above the estimated annual costs. The development will involve the joint efforts of all Federal agencies concerned with water resources development. Most of the projects in the plan would be constructed either by the War Department or the Department of the Interior.

Various local, state, and federal agencies participated in compilation of the report which has now been transmitted to the governors of Washington, Oregon, Idaho, Montana, Wyoming, Nevada, and Utah for review and comment. Federal agencies are also being asked for comment. The report, together with comments of the reviewing agencies, then will be transmitted to the President and the Congress.

Projects described in the report do not include every possible water-use development in the basin. Further investigations are expected to reveal additional possibilities for worthy irrigation and multiple purpose project development. Some projects now included in the report may be excluded after more careful investigation.

A breakdown of the 238 projects listed in the report shows that 142 projects will include multiple purpose dams; 63 projects will provide facilities for power generation; 14 reservoirs will be developed for water storage only, 12 river navigation locks will be constructed; 4 projects involve channel improvements; and 3 projects are for increases in installed hydroelectric capacity at existing generating plants. In addition to these primary projects, an appendix lists 115 reserve power sites of which 28 are in Washington, 42 in Oregon, and 45 in Idaho.

Major power plants

Of the 63 power projects specified in the report 24 will have an installed capacity in excess of 100,000 kw. Included in this list is Grand Coulee, completed except for two-thirds of the ultimate power generating capacity, as well as McNary dam which has been author-

ized but not placed in the construction stage, and Foster Creek dam for which final engineering studies are now being made. Most of the power dams listed will serve one or more additional purposes such as irrigation storage or navigation improvement as well as power development. The complete list of the 24 major dams with power generating facilities follows:

Dam Site	Head (ft.)	Installed Capacity (kw.)
Columbia River (main stem)		
The Dalles	76	658,000
John Day	59	480,000
Arlington	48	400,000
McNary	82	690,000
Priest Rapids	131	720,000
Rock Island*	48	160,000‡
Rocky Reach	55	380,000
Chelan	90	475,000
Foster Creek	162	1,024,000
Grand Coulee*	330	1,156,000‡
Snake River		
Gage Island	105	231,000
Monumental	75	172,000
Little Goose	112	262,500
Granite Point	83	216,000
Asotin	138	175,000
Nez Perce	140	175,000
Wolf Creek	436	425,000
Hell's Canyon	533	495,000
Bliss	473	158,000
Clearwater River		
Kooskia	456	259,000
Pend Oreille River		
Z Canyon	277	400,000
Clark Fork River		
Cabinet Gorge	107	132,000
Flathead River		
Hungry Horse†	373	142,000
McKenzie River		
Quartz Creek	223	128,000

*Existing. ‡Increase. †Authorized.

Large irrigation projects

Irrigation possibilities covered in the report are too numerous to mention in detail. Some of the larger include the Mountain Home and Bruneau projects in southwestern Idaho; Umatilla Rapids project in Oregon and Washington; the Upper Horse Heaven project in Washington; and the John Day and additions to the Deschutes project in Oregon. Each of the above named projects is estimated to include more than 100,000 ac.

Largest of all the new projects is the Bruneau in Idaho to be served by the world's highest earthfill dam which would be built in the Snake River Canyon near the town of Bliss. A dam 500 ft. high at this point would create a reservoir storing about 2,000,000 ac. ft. of water. In addition to generating power as mentioned previously, it would be possible to irrigate 300,000 ac. by gravity and an additional 100,000 ac. by pumping. The second unit of the Mountain Home project, consisting of some 150,000 ac. would also be served by this reservoir.

Main storage needed

Next largest of the projects mentioned in the report would be the John Day on the south bank of the Columbia. Water stored in the Clarno reservoir on the upper reaches of the John Day River, supplemented by the smaller Eight Mile reservoir, would serve an estimated 233,500 ac. of new land as well as provide supplemental irrigation water for 23,100 ac. Clarno reservoir would have a storage capacity of 1,250,000 ac. ft.

Third of the major irrigation projects would be the Umatilla Rapids of which the major unit would be Horse Heaven on the north bank of the Columbia in Washington. Covering an area of 127,500 ac., this unit would be served by pumping from the reservoir to be formed behind McNary dam, as would be the Cold Springs unit, a smaller area in Oregon east of Hermiston. The Upper Horse Heaven project of 140,000 ac. could be irrigated by gravity systems with diversions from the Klickitat and Cispus Rivers. This area is in Washington east of the Klickitat basin.

One of the more controversial projects discussed in the report is the storage of water in Pend Oreille Lake in northern Idaho. A dam at Priest Rapids on the Pend Oreille River about 30 mi. below the lake outlet could provide storage of 1,300,000 ac. ft. without raising the level of the lake beyond an objectionable level. Over-all development of the Columbia River is considered to be dependent upon the establishment of a main storage site. The most practical plan appears to be utilization of storage in and adjacent to Pend Oreille Lake where as much as 20,000,000 ac. ft. could be stored by development of dam sites between the lake and the Canadian boundary.

The potential reservoir area, however, contains a considerable area of rich farm land, several developed mining properties, saw mills, and towns, and is crossed by several railroads. Not only would flowage costs be large, but also public opposition is strong against the raising of Pend Oreille Lake above El. 2062.5. Development of large storage reservoirs at such upstream sites would undoubtedly be of material advantage in stabilizing the river flow for all downstream projects including irrigation, domestic water supplies, navigation, and power development.

Recommend 11 projects

To permit the preparation of detailed plans for other projects which the Bureau of Reclamation expects will be required in the near future, 11 projects of the 191 not yet authorized have been recommended for immediate construction. Of these 5 are located in Idaho; the Payette unit of the Mountain Home project; the Cambridge Bench project; the Hayden Lake unit of the Rathdum Prairie project; the Council project; and the Hornet Creek project.

Three projects on the immediate action list are located in Oregon: the Canby project; the Bully Creek unit of the Vale project; and the Crooked River project. The remaining three projects are located in as many states: the Bitter Root Valley project in Montana; the Kennewick division of the Yakima project in Washington; and the Upper Star Valley project in Wyoming.

The total cost of these 11 projects is estimated at $179,572,000 of which irrigators will be expected to repay $27,714,000 and power sales are expected to return $143,160,000. The remaining $8,698,000 of the cost is allocated to flood control and wild life conservation. Completion of these projects will bring 273,025 ac. under irrigation, provide supplemental water for 58,670 ac., and result in 177,000 kw. of new installed hydroelectric generating capacity.

First phase to take 10 years

Another specific recommendation is made for three small developments which have been authorized under the Water Conservation and Utilization Act, but have not as yet been constructed. The report suggests that the Mann Creek project in Idaho, the North side unit of the Missoula Valley project and the Woodside unit of the Bitter Root Valley project in Montana be reauthorized under the reclamation laws.

The remaining 180 projects in the over-all plan (excluding the 47 projects now authorized and the 11 recommended for immediate construction) would be deferred with authorization to be requested as expansion of the Pacific Northwest and consideration of its varied resources demonstrates which should be undertaken first. In the meantime continued study and investigation of detailed projects will go forward. Completion of the first phase of the plan, the 11 projects recommended for immediate construction, would require an estimated 10 yr. for completion.

Guam Harbor Project Tested By California Scale Model

GUAM'S PROPOSED $400,000,000 harbor project is being tested in Southern California from a scaled model constructed in a large hangar near Azusa under the direction of Dr. Warren O. Wagner of the California Institute of Technology. Dr. Wagner described the construction of the hydraulic model, and showed pictures illustrating the various construction phases and tests, to members of the Structural Engineers Association of Southern California at a recent meeting.

The model, covering a large hangar floor represents 10 sq. mi. of Guam Harbor, and is constructed of accurately formed concrete segmental blocks from data submitted by the Navy. The harbor model is filled with water and a newly-developed wave machine produces waves to correspond with the size of waves which occur at Guam under typhoon conditions. From data to be computed as a result of these tests, will come recommendations for type and locations of breakwaters, docks and other important naval installations to resist the destructive forces of waves and tides.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD

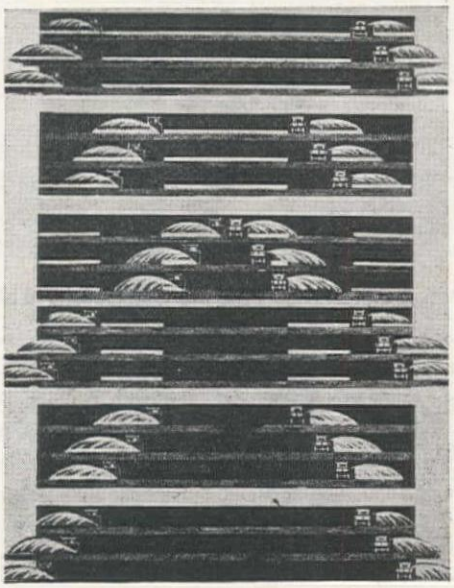
High Speed Snow Plow Aids Rapid Airport Snow Removal

A SPECIAL REVERSIBLE snow plow, designed for high-speed efficient snow removal from airport runways has been developed recently by the Four Wheel Drive Auto Co. of Clintonville, Wis. Powered by a four-wheel drive truck, this new plow, which throws the snow in a layer of uniform depth for a width of 30 to 40 ft., with no windrow at the discharge end, operates at a speed of 25 m.p.h.

Airport snow removal, due to the wider areas it was necessary to clear, required different equipment from that used in highway snow removal. The requirement for a hydraulic reversible plow with controls inside the cab of the truck was met by the FWD engineers, who designed a plow with a moldboard shaped so that snow is picked up by the whole length of the cutting blade and moved in a helical path across the face of the moldboard to the discharge end. The moldboard section was given a spiral shape in order to uniformly accelerate the speed of the snow from the lead point to the discharge end. Cutting angle was made greater and gave more side-thrust than those found on highway plows, but with power being applied at all times to all four wheels through a free running center differential, this excessive side-thrust was overcome.

Long shoes, shaped somewhat like skis and adjusted to leave one-half to one inch of snow on runways, aided the plow to run more smoothly. Sun, wind and propeller blasts of airplanes soon dissipated the layer of snow remaining.

Tests of the new plow were conducted at a field with three 150-ft. runways, with shoulders graded to a total width of 500 ft. Runways are 3,200 ft., 3,600 ft., and 4,100 ft. long, arranged about a central, intersectional area. Width of the area kept clear of snow was arbitrarily set at 300 ft., providing a permanent storage area of 100 ft. on each side of the runway.

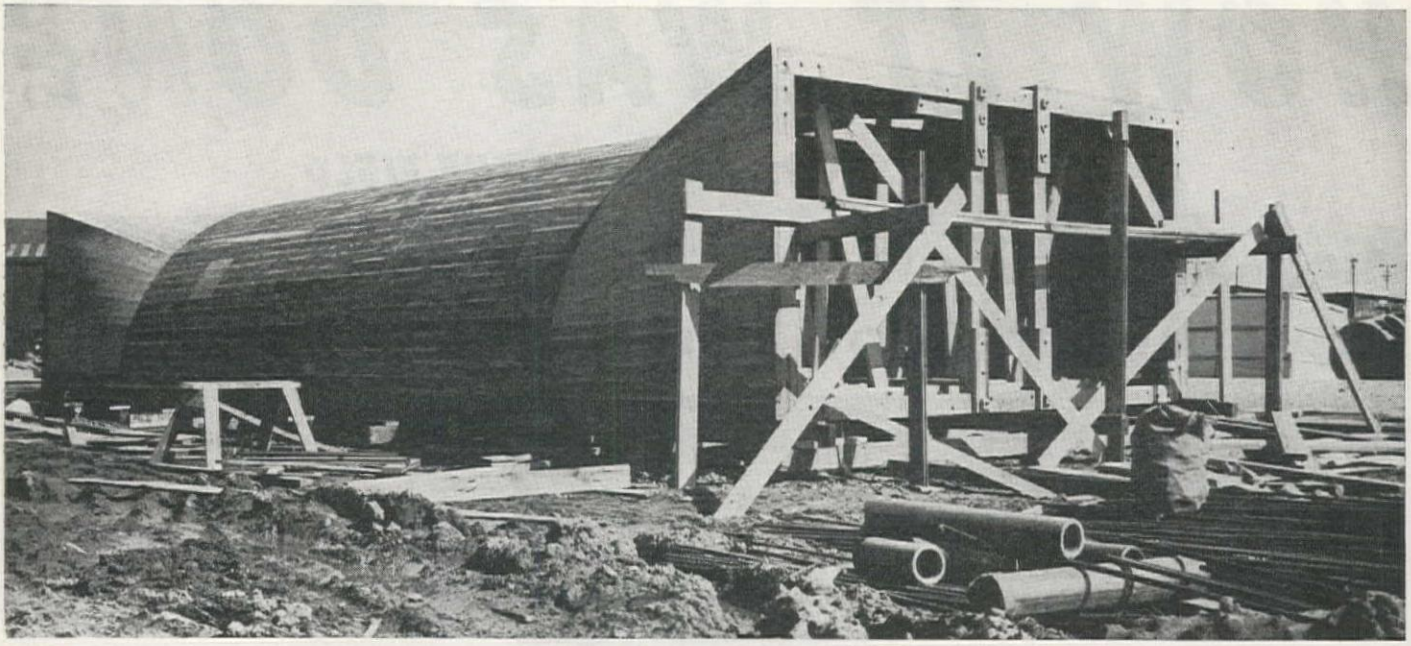


IN THE FIRST series of snow removal cuts, 30 to 40 ft. of snow on each side of strip is thrown completely off runway by plows heading in opposite directions. Trucks continue to center of runway, then out again.

After extensive experiments, it was discovered that the device completely cleared a 4-in. heavy, wet snowfall from all three runways and shoulders to a width of 300 ft. and removed all snow from the intersectional area in 26 hours. Wind direction was most important and snow was moved in a down-wind direction as much as possible. Snow-clearing operations were started on the cross-wind runways during a storm, since a wind shift can usually be expected immediately after a snow storm and the cleared area would usually become the windward runways.

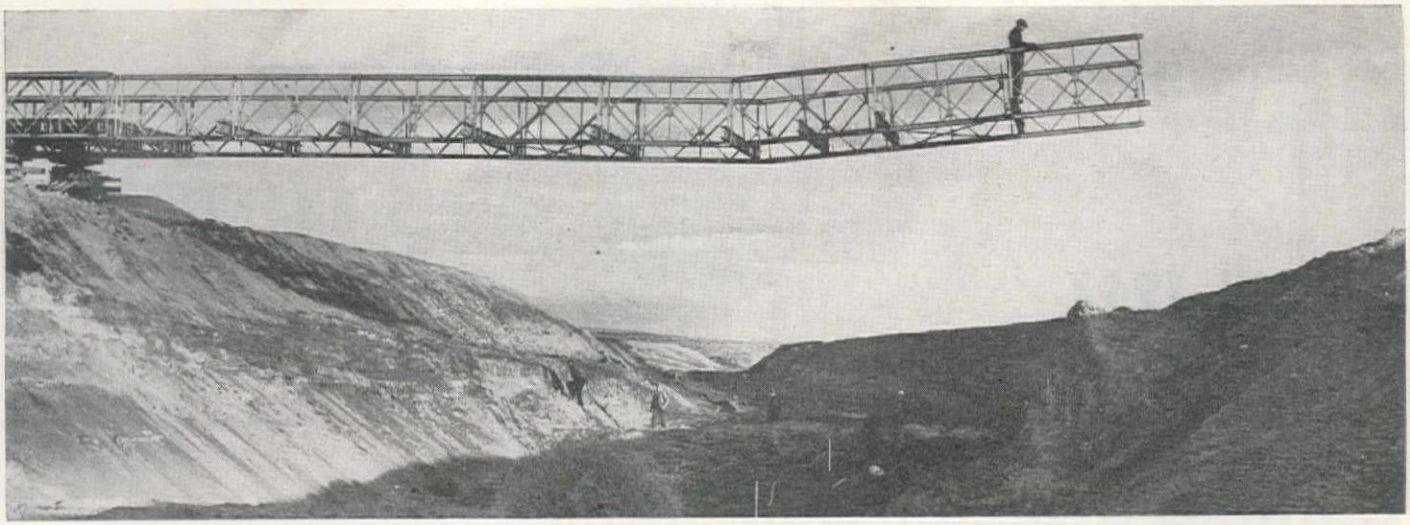
In an extremely heavy snowfall it was found that considerable snow accumulated before hauling operations could be started. Most practical results were then obtained by starting the plow 30 or 40 ft. inside the boundary of the operational area and moving this 30 or 40-ft. strip of snow over to the boundary. Second operation was to start another 30 or 40 ft. towards the center of the operational area, moving this snow onto the area previously cleared by the first operation. This was repeated until the center of the operational area was reached. A cleared strip 60 to 80 ft. wide was then left at the center. Next operation was to start back at the first location and repeat this process until the plows reached the central cleared strip, thus doubling the cleared width in the center. With this method, a 60 to 80-ft. strip of cleared runway was available for use within a short time after the beginning of plowing operations.

In order to avoid dangerously high banks, the snow was deposited in the form of a low, wide bank extending from the boundary 15 or 20 ft. into the operational area. After the storm was over and the operational area had been cleared, banks could be eliminated by taking successive narrow cuts on the outside of the bank. A series of windrows over a width of 40 or 50 ft. outside the boundary of the operational area resulted. The bank, originally three ft. high and 15 or 20 ft. wide, was then spread over a width of 40 to 50 ft. and to a depth of less than a foot, by raising the plow about 10 in. off the ground and driving over each windrow.



SPECIAL TRANSITION FORMS CONSTRUCTED FOR UNITED AIR LINES ENGINE TEST CELLS

FOR CONSTRUCTION of a six-cell engine test building in connection with the United Air Lines maintenance building being erected at San Francisco Municipal Airport by the Austin Co., contractors and engineers, a special form has been pre-fabricated to shape the circular center section and the 7-ft. long transition section from round to square. The central circular section is built of three layers of 1 x 4-in. tongue-and-groove lumber lapped, and the transition section of ripped plywood, with all interior members of 2 x 6 and 2 x 4, securely bolted. After construction, the form was sawed into three transverse sections, to facilitate removal after pouring. Picture below shows the bottom half of one of the cells completed, with the form removed and then replaced in the inverted position to act as form for the upper half.



Bailey Bridges Used to Cross Canal

THREE BAILEY BRIDGES recently released from Army surplus are carrying traffic over the Columbia Basin's main canal. The first bridge is located north of Adrian, Wash., the second on the Stratford-Coulee City county road and the third north of Stratford on the road to Long Lake Dam.

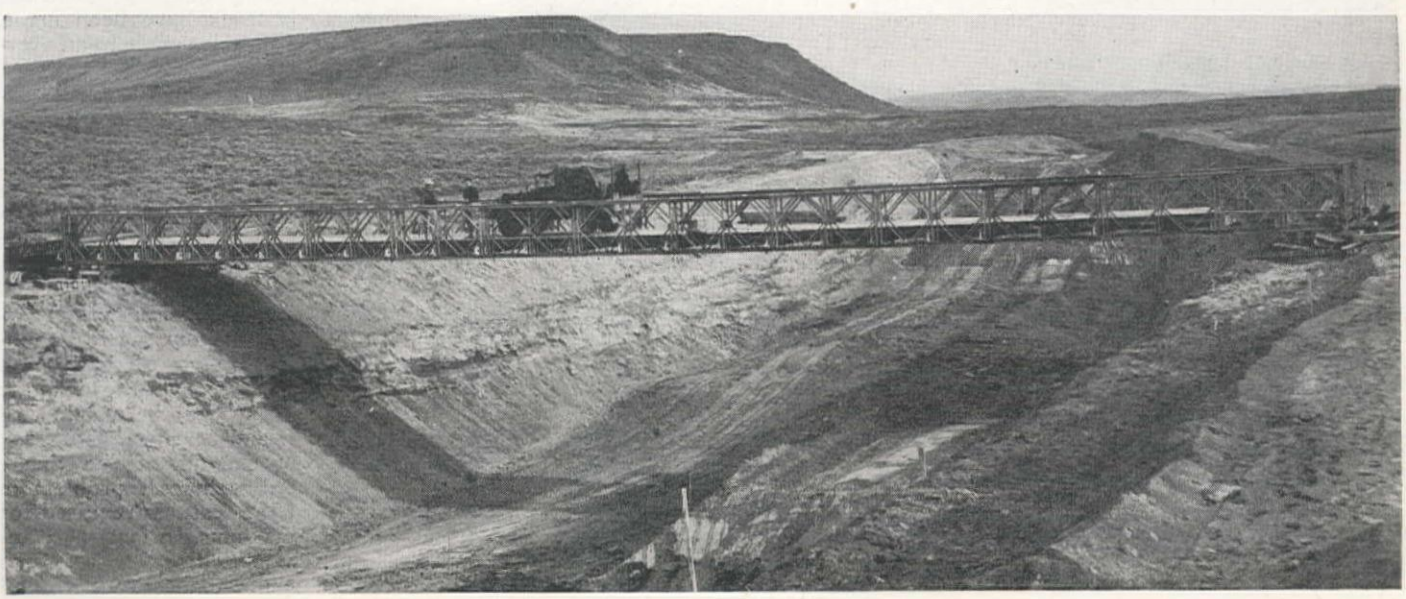
The problem of carrying traffic over canals during construction before new permanent bridges could be constructed developed when construction forces began excavating canals across country in the Basin. Eventually permanent highway bridges will span these 120-ft. to 150-ft. gaps. However, during construction it was necessary to provide a temporary crossing. The most economical and fastest bridge to build was found to be the Army's Bailey bridge. The Bureau of Reclamation has purchased several hundred feet of this bridge.

The Bailey is a "mechano" type bridge. The main girders are built up from 10-ft. sections called panels. These can be assembled to form girders one, two, or three panels wide and one, two, or three panels high, depending upon the length of the bridge and the load to be carried. The panels support the floor system which consists of transverse members called transoms and stringers and decking. The roadway supported by stringers carried on the transoms has a clear width of 10 ft., 9 in.

These bridges are erected by constructing them on the bank and launching them across the gap using special launching rollers with a skeleton launching nose. They can also be erected over the gap by the use of a crane. The Bureau erected a bridge over a gap of 120 ft. with eight men and one crane in two working days.

The Bailey bridge made a name for itself during the war by the extensive use made of it by the Allies in Africa, Europe, and the Pacific. It is now beginning to show its merits for peace time use as an emergency structure. In addition to the emergency use, the Bureau plans to use these bridges for permanent cattle crossings on the larger canals and for farm bridges on smaller canals and laterals.

BRIDGES were constructed on the bank, then pushed across the Columbia Basin's main canal. Below, a former army weapons carrier makes a test run over the recently installed bridge.



NEWS OF WESTERN CONSTRUCTION

APRIL, 1947

Columbia Basin Committee Hears Snake River Report

FOUR DAMS with two of the largest single-lift ship locks ever constructed will be recommended as the proper solution for aiding navigation on the Snake River by Col. O. E. Walsh, Portland district engineer. A preview of the project report, which has been in the making for the past four years, was given at the seventh meeting of the Columbia Basin Inter-Agency Committee meeting in Lewiston, Ida., last month.

Presentation of the report to the committee was the principal business of the meeting. In introducing Col. Walsh, Col. T. D. Weaver, North Pacific division engineer and chairman of the committee, made it clear that the report of the district engineer had not yet received the approval of the division or of the Chief of Engineers, who will submit the report to Congress for action.

Channel 15 ft. deep

Substance of the report was presented by Col. Walsh and two of the district's civilian engineers, Louis E. Rydell, senior engineer in charge of the multiple-purpose project planning section, and Otto R. Lunn, senior engineer in charge of Snake River investigations. Col. Walsh opened the discussion with the statement that the report would recommend construction of four dams as the most economical plan for providing navigation of the Snake River from the mouth at Pasco, Wash., to Lewiston, Ida.

Three plans were considered during the making of the report, the alternate plans calling for construction of four, five, and six dams in the 140-mi. stretch of river. Of these it was determined that the four-dam plan will provide the maximum benefits. In his portion of the presentation Rydell stated that all plans would have provided for a minimum channel depth of 15 ft. and a width of 250 ft., with limited channel improvements required below some of the dams. Locks at all four dams will be 86 x 360 ft., with 14 ft. of water over the sills. The maximum lift required under the four-dam plan will be 100 ft.

All dams are planned to include power generating facilities and the four dams together will have an initial installed capacity of 1,051,000 kw. Kaplan turbines will be used which will result in less damage to fingerling fish passing down stream. Gravity fish ladders are planned similar to those which will be constructed at McNary dam for the upstream passage of fish.

Six dam sites studied

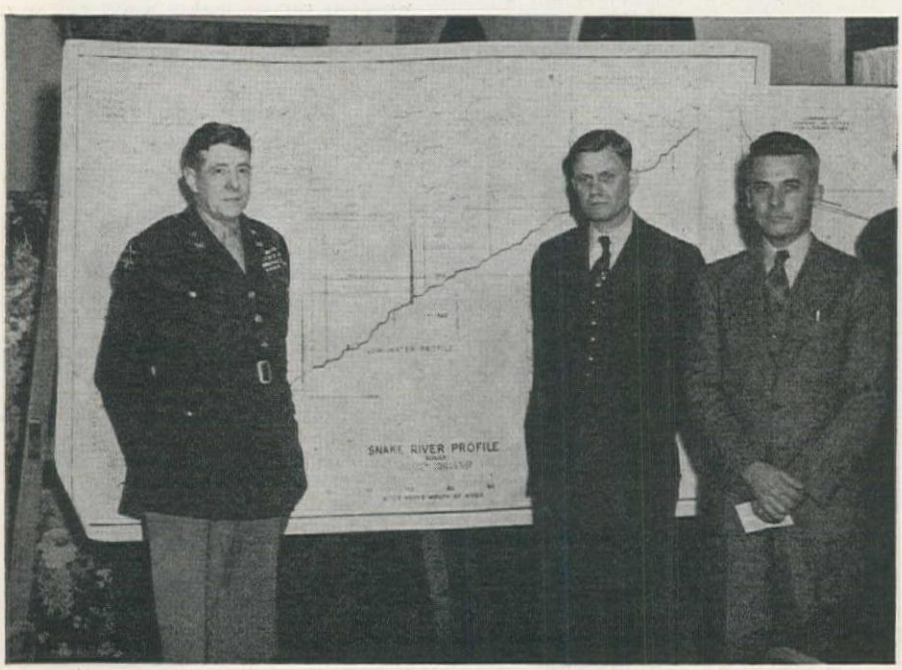
One of the construction problems will be the relocation of railroads along the river. About 155 mi. of railroad will have to be rebuilt at higher elevations and at a cost of about 10 per cent of the total project cost.

Of the six dam sites studied, only one was surveyed in detail, Lunn reported in his discussion of design features of the structures which are planned for the project. Surveys of the remaining sites were made by photogammetric methods, and geologists have studied all sites. Although trenchings and auger holes were made at only one site, some 200 probings to bedrock have been made, and 100 core drill holes made to an average depth of 80 ft.

Probably the outstanding construction problem will be the locks, two of which will have 100-ft. lifts, 20 ft. higher than any lock which has been built heretofore. The high, single-lift locks were found to be more practical in the Snake River than tandem locks of lower lift would be. In order to support the 120-ft., 500-ton lock gates a special spherical bearing, similar to the main swing bearing in large power shovels, will be employed. Running in an oil bath in a water-tight chamber below the lock gate pintle, the bearing will be a spherical section race of ball bearings.

The narrow canyon of the Snake River presented a difficult problem in locating all of the features required for each of the four dams. In fact space requirements eliminated some of the dam sites first considered, while others will

COL. ORVILLE E. WALSH, Portland district engineer (left), LOUIS E. RYDELL, senior engineer and head of the multiple purpose project planning section (center), and OTTO R. LUNN, senior engineer in charge of Snake River investigations, presented a summary of the completed Snake River navigation project report at the seventh meeting of the Columbia Basin Inter-Agency Committee at Lewiston, Idaho.



have to be widened by excavation. All spillways will be centered in the existing channels and will be designed for a maximum discharge of 850,000 sec. ft. Approaches to the locks will be straight.

To cost $284,781,000

Two fish ladders will be provided at each dam, a ladder on each side. They are designed with a slope of 1:20 and will be 30 ft. wide. Power houses will be constructed as integral parts of the dams, which is considered feasible for dams up to about 100 ft. in height. Each dam will have a construction period of 4 yr. The total estimated cost of the four dams is placed at $284,781,000 based on the 1940 cost index. On the 1946 cost index the total cost is set at $301,800,000.

The five-dam plan was estimated to cost about $20,000,000 more than the four-dam, and the six-dam plan about $50,000,000 more than the four-dam. The ratio of annual benefits to cost is favorable by 1.14:1 using the 1940 cost index estimates. Sale of generated power would provide by far the largest single benefit, and is in fact larger than all other benefits combined. The next largest benefit is the saving to navigation.

From the mouth of the Snake at Pasco and going up stream the first dam would be Ice Harbor, 10 mi. above the mouth. This would be the most expensive of the four dams to construct, and one of the highest with a pool elevation differential of 100 ft. Next up stream is Lower Monumental, 44.7 mi. above the mouth with a pool elevation differential of 93 ft. The third dam will be Little Goose, 72.2 mi. up stream with a pool elevation differential of 100 ft. Last dam would be Lower Granite, 113.1 mi. above the mouth, the lowest of the four dams with a pool elevation differential of 82 ft.

Actual dam heights will vary from 128 to 159 ft. Reservoir lengths will be about 30 mi. for each dam. Each power house will have five generating units with the exception of Lower Granite which will have only four.

Rural Power System Loans Paid Back Before Due Date

REA BORROWERS have paid back more than $20,000,000 before the due date, in repaying loans on their rural power systems, according to year-end summary figures of the Rural Electrification Administration made public by the U. S. Department of Agriculture.

By the end of Dec., 1946, $107,085,709 had fallen due in interest and principal on the loan funds advanced to nearly a thousand borrowers, mostly cooperatives. By that date, the borrowers had made payments of $126,098,602—including prepayments of $20,052,590. Payments 30 days or more overdue totaled $892,941, which is eight-tenths of one per cent delinquency.

By the end of 1946, REA had advanced loan funds totaling $595,730,269. As of the year's end, total repayments of principal amounted to $67,729,229 and total interest payments to $58,369,372.

American Contractors Given Equal Rights in Philippine Construction

AMERICAN CONTRACTORS can undertake construction work in the Philippines under the Rehabilitation Act of 1946 on an equal footing with Filipino contractors, according to Thomas H. MacDonald, Commissioner of the Public Roads Administration, Federal Works Agency. The announcement is based on a recent opinion of the Philippine Secretary of Justice.

In public works undertaken exclusively at the expense of the Philippine Government, Filipino contractors are legally entitled to preferential treatment. However, the Secretary of Justice has stated that these preferential laws do not apply to public works, undertaken under the Philippine Rehabilitation Act, which will be financed entirely by the United States Government or jointly by it and the Philippine Government. For such work, American contractors will have equal status with Filipino contractors in qualification for bidding, determination of the low bidder, and award of contract.

The Secretary of Justice also ruled that American contractors will be permitted to take equipment and supplies to the Philippines subject only to the same taxes as those imposed on Filipino contractors. Under recent free trade legislation and by agreement between the Public Roads Administration and the Philippine Government, no import taxes will be levied on equipment and supplies taken to the Philippines by American contractors for use in road construction under the Philippine Rehabilitation Act. Contractors may also take key personnel to the Philippines without regard to immigration quotas.

For contracts financed entirely by the Philippine Government, foreign contractors are required to employ a registered Filipino engineer to be in complete charge of the work. American contractors are released from this requirement when engaged in work under the Rehabilitation Act.

The Philippine Government has advised Frank C. Turner, Public Roads Administration division engineer in the Philippines, that American contractors will be accepted as qualified for submitting bids on road and bridge construction under the Rehabilitation Act if they are considered qualified and acceptable in the United States by the Public Roads Administration.

Ten million dollars has been allocated for highways in the fiscal year 1947 in the Philippine rehabilitation program. Eighteen construction projects have been approved so far, at a total estimated construction cost of $4,285,500. Included in this approved program are four projects for high-type pavement construction, totaling 21 mi. in length, and ten projects for 25 bridges ranging in span from 23 to 336 ft.

The first of the projects to be handled by contract was advertised for bids on March 20. It is expected that projects of large size or particular interest to American contractors will be announced in this country at the time they are advertised.

Guided Missile Demonstration Held At Top California Test Center

A GUIDED MISSILE demonstration, together with a display of the latest types of pilotless aircraft, was shown to newspaper men late in March when the Navy played host at Point Mugu, Calif., top United States Navy guided missile test center.

Located 30 mi. south of Oxnard, Calif., Point Mugu, potentially one of the most important military installations in the Western Hemisphere, is number one item in the Navy's public works program to be submitted to the present Congress for appropriations.

Funds amounting to 29 million dollars have been requested for the first increment of the strategic military installations, and the President and joint chiefs of staff have joined in approving the vast project.

A careful survey of the entire United States seaboard was made before the Point Mugu site was chosen. Guided missile test work must be accomplished over an unlimited range, which the ocean affords, and nowhere else are there offshore bases on which to build radar installations for tracking the missiles over a testing range such as the Santa Barbara Islands, off the southern California coastline.

With new additions of land which the Navy is seeking to acquire east of the present station, the station will include 7,200 ac. of land, only 670 of which are under cultivation with only five homes included in the area.

Drainage in the Calleguas creek area is planned to be increased by the Navy by installation of flood control measures and tidal gates, thus lowering the water table and increasing the size of the Ventura County citrus belt. The proposed new flood control channel will be engineered to handle all run-off water at maximum flood with out-flow being directed into the submarine canyon lying offshore from the present inlet. This outlet will be properly combined with the entrance channel to be dredged into the proposed harbor and seaplane runway, and the surrounding soil grade in the delta area will be raised approximately two feet.

Three other bases of this type are located in desert areas of the western

United States, but they do not provide an over water range. Contractors engaged in developing guided missiles and other types of pilotless aircraft are also concentrated on the west coast.

Private enterprise in Southern California is backing the Navy Program to the fullest. A tremendous housing project, entirely under private financing, is well past the planning stage, and will provide permanent homes for an excess of 2,500 families.

Ozonation Failure At Sewage Plant

OZONATION, proposed as the principal means of sewage treatment at a Kelso, Wash., sewage plant, was declared unsuccessful at that plant after two weeks of operation. According to Robert Leaver, district engineer for the Washington State Department of Health, the plant, completed last fall by the Amozone Co. of Oregon, has been partially dismantled and completely shut down and locked up, while the city awaits action by the company.

The ozone generator failed to function satisfactorily, apparently because air could not be sufficiently dried out before passing through the machine, and nothing was done with respect to the final disposal of accumulated sludge. No way could be found to keep plates from burning out during operation, it was reported.

The Kelso plant was built by the Amozone Co., headed by Edward S. Marnon, at a cost of approximately $30,000 on the understanding it would receive payment only if the plant proved successful. West Kelso was to be served by it, the city proper already having sufficient sewage facilities.

The July, '46 issue of *Western Construction News* contained a report of the Northwest Sewage Works Association convention, at which time communities were warned "from entering into proposals which claim ozonation as the principal means of sewage treatment."

FPC Approves Electric Energy Rate Schedule

THE FEDERAL Power Commission has confirmed and approved a proposed rate schedule filed by the Southwestern Power Administration covering rates and charges for electric energy to be marketed by the Administration.

The rate schedule provides that such energy shall be available to any customer purchasing power in wholesale quantities for firm power service and contracting for a specific number of kilowatts. It is also provided that the charges shall consist of a demand charge of $1.35 per month per kw. of billing demand, which includes the use of 200 kw. hr. per kw., and an energy charge of 4 mills per kw. hr. for all additional power used, with the demand charge to be the minimum monthly bill.

The rate schedule is an interim schedule, and is to remain in effect until further study and experience indicate the desirability for revision, such time being limited to 6 years.

Southwestern Power Administration is an agency of the United States established in the Department of the Interior to dispose of electric power and energy made available to the Secretary of the Interior from the reservoir projects under the control of the War Department in the area which includes Arkansas, Louisiana, and parts of Kansas, Missouri, Texas and Oklahoma. Presently constructed projects include Denison and Norfork developments.

National Clay Pipe Men Hold Annual Meeting

CLAY PIPE production for sanitary sewers and drainage in 1946 exceeded 1,100,000 tons, highest point since 1942, according to a report made at the annual meeting of the National Clay Pipe Manufacturers, Inc., in Chicago, recently.

Estimates by the manufacturers that this year's production would exceed 1946 by 15 to 25 per cent were advanced at the meeting, at which election of new officers and directors for the coming year was an important event.

G. Lawrence Avery, president of Lehigh Sewer Pipe & Tile Co. of Fort Dodge, Iowa, was elected president of NCPMI at the March 10 meeting. Directors representing various production sections for the next 12 months include: W. E. Robinson, Akron, and E. K. Sheffield, Logan, O.; G. Lawrence Avery, Sioux City, Iowa; Hans Wilhelmsen, Kansas City, Mo.; C. B. Beasley, Birmingham, Ala.; John Palmer, Clearfield, Ky.; Roy Lacy, Los Angeles and George Mays, Niles, Calif.

President-elect Avery, one of the leading producers of vitrified clay pipe and other clay building products in the Midwest, served in the Navy with the rank of Lt. Commander during the war.

G. L. AVERY, newly-elected president of National Clay Pipe Manufacturers, Inc., for the year 1947.

Employers Sued by Ex-Jap Prisoners

CHARGING that five construction companies failed to provide for their wartime safety, approximately 690 civilian workers who were captured by the Japanese on Wake Island, Guam and Cavite recently filed suits in Chicago of $50,000 each against them for back pay and damages.

The suits, joined with those of nine petitioners who filed on Jan. 17 in Chicago district court asking $500,000, and together with bonus, subsistence and other demands brought the total asked of the companies to almost $50,000,000.

Companies named in the suits are: Hawaiian Dredging Co., Ltd.; Raymond Concrete Pile Co.; Turner Construction Co.; Morrison-Knudsen Co., Inc., and J. H. Pomeroy and Co., Inc.

The plaintiffs charged they were entitled to wages and damages from Jan. 1, 1942, to Sept., 1945, when, attorneys said, most of them returned to the companies. About 100 of the petitioners are survivors of employees who died while in the hands of the Japanese, Attorney Irving Einstein said.

The plaintiffs claim damages because the companies allegedly failed to provide them with a safe place to work and neglected to evacuate them.

Congress had authorized some remuneration to those imprisoned, but according to Attorney Louis M. Mantynband, the suit would cover items not provided for by Congress, but which were included in the workers' contracts with the construction companies.

Technical Groups Form New Joint Committee

TO PROMOTE harmonious relations in dealing with the many phases of the construction industry common to both the Associated General Contractors of America, the American Institute of Architects and the Structural Engineers Association, a joint committee consisting of three representatives from each organization's Southern California chapter was formed in Los Angeles recently.

The joint committee will hold regular monthly meetings and is intended to coordinate the activities, as well as solidify the action, of the three different groups.

Objectives of the committee will be:

1. Joint consideration of all existing and proposed legislative matters pertaining to the construction industry.

2. Consideration of mutual problems involving labor matters.

3. The joint committee shall function as a clearing house for submission of ideas relating to the practices of standards of design and construction with the idea of promoting standardization and uniformity.

A. L. Pozzo, representing the AGC, was named permanant chairman for the remainder of the year with Adrian Wilson of the American Institute of Architects, serving as vice-chairman.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—Budgetary legislation will increasingly supplant all other issues before the Congress — and the nation. How much to spend, where to spend it, and where to get what we spend, are the paramount problems, because it will take huge sums to implement the program to "contain" Russia. The $400,000,000 involved in the Greece-Turkey enterprise is relatively peanuts to what must come later.

Foreign entanglements

There is little doubt in the Capital that Gen. George Marshall has sold his idea that now is the time to hold Russia within reasonable bounds. It is the general thought that another five years of uncertainty about what to do — such as now confuses Congress — would enable Russia to get a grip in Europe and Asia that would make the Soviet supreme.

Our program is now clear and definite, according to those in the know. As soon as Congress has voted the Greece-Turkey greenlight it will be asked to do the same in relation to Korea. They tell us the plan is ready. The situation in Korea is so acute that we hear some military men are sending their families home. By next fall, probably sooner, it is expected similar action will be initiated for the politico-economic rehabilitation of China.

The Army-Navy people intend to establish, as soon as possible a great naval base at Singapore; and, possibly, elsewhere on the China coast. Then, we are expected to assume dominance in the Mediterranean, which means Syria, Palestine, Arabia, Persia, Egypt, and points east.

The other day we made a contract — a treaty — with the Philippines whereby we undertake to expand existing installations, or to build new ones for our own use, at Pampanga, Bataan, Baguio, Manila, San Francisco, Delmonte, Rizal Angeles, Leyte-Samar, Zambales Province, Subic Bay, Olongapo, Tawi Tawi, Cavite Province, Bagobantay, Quezon City, Palawan, Talampulan Island, Loran, Naule Point, Castillejos, Mactan Island, Florida Blanca, San Fernando-La Union, Puerta Princesa, Sulu Archipelago, and Aparri. You may get some idea of the heavy construction involved in the Philippines (and elsewhere in the "containment" program), by the fact that the immediate schedule provides for dredging and filling; construction of garrison and naval bases; improvement and deepening of harbors, channels, entrances and anchorages; construction of roads, bridges, and moorings; airfields, installation of submarine bases, buildings and even towns. The Philippine work apparently is to start now. American contractors are protected by the treaty so they will not be subjected to non-American legal or Governmental controls.

This "stop Russia" program patently will cost billions, not millions. They tell us here, off-the-record, that our British friends have a plan to induce us to funnel dollars into the European and Far Eastern areas, which dollars then may be spent in England, or among British contractors and suppliers. This would give the British the American dollars they need to buy in America.

Building foreign industry

Meanwhile, obviously, the preparedness or security program means the allocations made to rehabilitate the Europeans and the Orientals will largely be spent in the United States for materials, machinery, equipment, goods, anything and everything needed. The plan is not only to help them to make defensive and offensive installations, but to build up their industries in order to take them off our backs. Even Germany is to be put into gear for the operation of light industries.

All this means, of course, a competitive flow of goods, made with our equipment, under the tutelage and direction of our technicians and administrators, and financed by our dollars. The point that concerns many of our legislators is the fact that the manpower, the labor, used abroad, works for pennies per hour — relatively — at the same jobs for which our manpower is paid dollars. This will enable foreign competition to flood us with cheap goods, made under low living standards, unless we do something to **contain** these alien encroachments.

Naturally, the most immediate effect will be a huge production stimulus in this country. But the goods will go out of the country, while the dollars pile up at home; and it is feared this will cause more inflation, higher prices, and rising wage scales. It is admitted there must be some rigid controls, similar to the controls of war time. Building construction now is scheduled to remain under control until Dec. 31. Export controls remain. They say the building controls will largely be ignored.

This correspondent, in common with many other observers here thinks the controls ahead in essence, will be just as stiff and as numerous, even if they are different, than they were during the war. The present great puzzle at the White House is what to do about dressing up these controls so they will not revive the bad taste of the abandoned war-time regulations. The theory is that you will not mind if the regimentation creeps up on you, step by step; it's the technique perfected by FDR and his lieutenants. It clearly is being applied to Congress as well as to the people at large. 'Tis the old poetic philosophy that what you first reluctantly endure you can eventually be habituated to embrace.

Economy?

You may hear much Congressional clamoring for economy, supported by appropriate legislative gestures; but it takes little perspicacity to realize that this sound and fuss will be designed to embarrass Truman rather than to achieve economy. For instance, there is that appropriation for reclamation. It was the idea that it would be cut at least, at the very least, 50 per cent. We do not yet know what the Committee will report; but the betting now is, despite the bitter dislike of Congress for Mike Straus and Secretary Krug, the cut will not exceed 25 per cent. The assumption is that this impending war economy makes more food, and more hydroelectric energy, imperative. There is little doubt about the need for more food, if you live here in the East. Prices are fantastic and scarcities are incredible, while the pipelines to Europe are filled with what we lack.

Congress doesn't like the "stop Russia" program, but it has no better plan, because it has no leaders in a big sense, with the ability to inspire conviction and reflect that plus quality we call "spiritual" for the lack of a better word. Thus far the leadership has utterly lacked that burning zeal and that magnetism of great stature, and the ability to express our problems and some answers in simple terms.

The pleasing little man in the White House has so far had the breaks because his counselors have been able to guide him to make the moves that contrasted effectively with the obvious confusion and bewilderment on the Hill. But there is no more real "spiritual" quality in the White House leadership than there is elsewhere. The only clear, specific thinker in the Government set-up is Gen. Marshall and he knows what he wants, where he wants it, and he is gifted with the ability to put over his ideas within the purlieus of a small circle. Marshall is not a spellbinder; he has not developed the talent of public leadership — which is a pity, because he is unquestionably the most selfless and patriotic man in our public life. And he is a gentleman as well as a scholar and a genius. In the uncertainties ahead, it will be wise to keep an eye on Gen. Marshall.

Much as Congress does not like the

LATE WIRE

IT IS expected that the Wagner-Ellender-Taft Housing Bill will be reported by Committee and enacted by the Senate possibly late in May or early in June, but it is not thought to have a ghost of a chance in the House. It probably will not even get out of Committee there. Therefore, it cannot be considered as probable legislation as now drafted and under present circumstances.

"stop Russia" program, the only alternative would be to retire from everything European and Oriental, and build up our fences wholly on this hemisphere. And that plan does not seem sensible. So, willy nilly, we are forced into taking over the conduct of the affairs of the globe in order to inspire the people of the globe to do as they please, not as the totalitarians please. And all this adds up thus: there is little likelihood of tax relief; prices will remain high; the budget will not really be cut, despite appearances otherwise; production of goods needed abroad will come under controls; there will be Government controls to determine what we may have and what may go abroad; marketing, transportation, and warehousing, inevitably will come under Government control; there will be industrial mobilization under military guidance; and foreign trade logically will expand.

Putting Reclamation under law

Meanwhile, the champions of reclamation and power again gathered here during March to do battle with the House Committee on Public Lands, which designated a subcommittee, under the chairmanship of Congressman Rockwell, of Colorado to hold hearings on HR 1886, the bill which seeks to "contain" the Bureau of Reclamation, and the Department of the Interior. Chairman Rockwell is completely sold on the plan to place the Bureau and the Department under the control of Congress again, and to invalidate the authority assumed by the Department's lawyers to presume to put meanings into laws that are diametrically opposed to the intentions of Congress. However, as so often happens, the array of high-geared technical experts, legal and otherwise, who drafted the bill, which Congressman Rockwell sponsored, made it so involved in meticulous technicalities, that it is hard to understand; and the members of the House Committee have apparently given it chiefly perfunctory attention. The hearings have lasted well through March and threaten to last well into April, while the high-geared and high-fee-ed experts linger here.

This incident gives point to what ails this world, in the broad sense—its problems and documents and definitions need simplification. Big ideas are wrapped in too many folds of multi-syllable words by little men.

A good power bill

A bill of another caliber was introduced in the Senate by Senator Thomas of Oklahoma. S 972 is clear, specific, and comprehensive in the effort to make a power policy for the nation. It provides that hydroelectric energy developed as an incident to public works, including flood control, reclamation, and navigation projects, shall be developed only when approved by Congress and with funds appropriated by Congress; and that the revenues derived from the enterprises shall be credited to the cost and maintenance of the projects. Excess power is to be sold and allocated by the Federal Power Commission which is to have sole jurisdiction over rates and contracts. The moneys collected from power sales are to be deposited in the Federal Treasury.

Sen. Thomas holds his bill will save the nation $635,076,000 — the cost of building stand-by steam plants, now programmed by the Interior Department and other agencies. He holds that proper integration of power enterprises, now scattered among several agencies, will save the nation billions, and make money for federal, state, city, county, and district treasuries.

He points out we have already invested $2,000,000,000 in Federal power projects; that clash of authority, and duplication, have wasted public funds. The Senator emphasized that the public power policy once defined by Secretary Ickes is not in reality a policy because it has no Congressional approval. There are now 59 hydroelectric plants in the Interior's program, and 20 similar enterprises under the direction of the Corps of Engineers. The total of electric energy represented by this vast system is over 11,044,800 kw.; which would be increased by 5,522,400 kw. when the contemplated steam stand-by plants are built. The Thomas bill will be enacted when public support is made evident.

Bills affecting reclamation

Sen. Downey introduced S 693 which would place a strict limitation on the powers of the Secretary of Interior to give to Mexico benefits from the Colorado River under the terms of the treaty enacted in 1944. HR 2180 would extend the Reclamation Act to cover Alaska, Hawaii, Puerto Rico, and the Virgin Islands. HR 655 and 656 exempts Central Valley projects from acre limitations of the Federal reclamation laws. HR2583, which was discussed in Public Lands Committee hearings, would make Reclamation projects self-sustaining. It was opposed by Mike Straus. The Committee, incidentally, was advised that former Congressman Robinson, of Utah, is now on the Interior Department's payroll.

HR 1977, presumably drafted by Interior lawyers, would protect the Bureau of Reclamation in emphasizing low power rates rather than to benefit irrigation.

Sen. Moore, Okla., sent a communication to the House Committee on Appropriations, transmitting an offer of nine private power companies to assume all transmission facilities; to buy all power developed by the Southwestern Power Administration; to take over its construction contracts and liabilities; and to guarantee full distribution, with preferences to public bodies and cooperatives. Sen. Moore urged the deal because it would save the Federal Government $202,000,000, to be spent by the Southwestern Power Administration, much of it for duplicating facilities. The House is expected to regard the offer favorably. The Senate is expected to fight it.

HR 2440 would extend reclamation laws to Louisiana. S. J. Res. 82 would transfer irrigation projects on Indian reservations to the Bureau of Reclamation. The Department of Agriculture urged Congress to write legislation which would require the Interior Department to permit the Department of Agriculture to share in recommending new reclamation projects. S 945 provides for the establishment of a reservoir on Bear River, Utah; HR 2334 seeks to integrate the American River development as part of the Central Valley Project. HR 2439 grants consent to Utah and Wyoming's plan to negotiate a compact to divide the waters of Henrys Fork River.

Although the name has never been legally changed, S 673, H.J.R. 140, and other bills, specifically provide that Boulder Dam shall be called Hoover Dam. The bills were enacted into law, and the term, Hoover Dam, is now used in all discussions, and legal documents.

H.J.R. 132 approves the agreement with Canada for the Great Lakes-St. Lawrence Basin development. HR 2437 directs that the Conservation Branch of the U. S. Geological Survey be transferred to Casper, Wyo. Legislators from the Pacific Northwest have recently impressed upon the Government that the region requires 1,565,000 more kilowatts of electric energy by Nov. 1, 1953.

TVA national fertilizer monopoly

The Flannagan Soil Fertility Policy bill, HR 2494, was re-introduced in March. It would enable the Department of the Interior to give the TVA priorities, which would permit the TVA to acquire public lands with phosphate and potash deposit. The TVA would have the power to build the necessary plants to make fertilizers. The product would be distributed by cooperatives to farmers. The farmers would be able to obtain 50% of their supplies free.

In effect, the bill would establish the TVA as the fertilizer monopoly of the United States. It is important to the West, since the principal deposits are found in West slope states.

Miscellaneous

During March, California, through its attorney, Fred N. Howser, appeared before the Supreme Court and denied the validity of the claim of the Federal Government to the tideland oil deposits. Howser pointed out that the suit was started at the initiation of the President, without authority from Congress; and that the action is in opposition to the settled policy of Congress. The lawyer maintained, for more than a century Congress has confirmed the States as the owners of the marginal sea beds.

S 821 would authorize appropriations to build rural local roads; HR 1419 would authorize improvement of rural mail routes; S594 would create the Alaskan International Highway Commission; and S 800 would make $25,000,000 available to build access roads to standing timber. HR 2365 authorizes cities and municipalities to apply for designation as terminal points or intermediate points on routes of air carriers; and S 364 would authorize the War Assets Administration to turn over surplus airports, facilities and equipment, to cities, states, counties, and territories, without cost.

Atkinson et al., Win Dorena Dam Award

GUY F. ATKINSON CO., bidding jointly with W. E. Kier, Bressi & Bevanda Constructors, Inc., and A. Teichert & Son submitted the low bid and were awarded the contract for construction of Dorena dam on the Row River northeast of Eugene, Ore., by the Portland district of the Corps of Engineers. The $7,737,571 bid of the Atkinson, Kier, Bressi-Bevanda, Teichert combination was the lower of two bids submitted on March 20 in Portland. Morrison-Knudsen Co., Inc., in association with Peter Kiewit Sons Co., Nat McDougall Co., Raymond Concrete Pile Co., S. Birch & Sons Construction Co., F & S Contracting Co., and McLaughlin, Inc., submitted a figure of $8,380,000 which was the only other bid for the job. The engineers' estimate was $6,536,978.

Dorena dam is the third of a series of flood control dams on tributaries of the Willamette River in western Oregon. It will be an earthfill structure 140 ft. high with a crest length of 3,350 ft. The modified concrete ogee spillway will be 200 ft. long with a 150-ft. stilling basin. Outlet facilities will consist of two 5 by 6-ft. slide gates. Completion of the structure is expected to require 3 to 3½ yr.

Some preliminary work at the Meridian dam site on the Middle Fork of the Willamette River southeast of Eugene was in progress last week, and bids for a portion of the railroad relocation were received in the Portland district office. The R. E. M. Construction Co. submitted the low bid of $195,936 for construction of abutments and piers for three bridges which will be required on the relocation of the Southern Pacific railroad. The engineers' estimate for the job had been $214,709. Grading for an 1,100-ft. spur track was undertaken at the dam site last month.

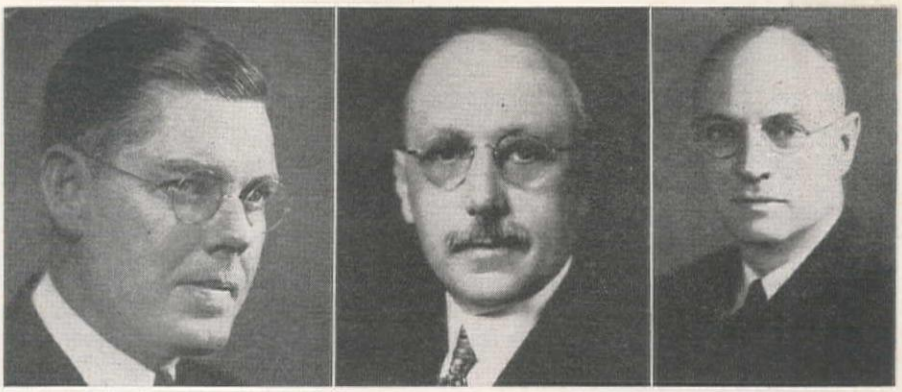
Nevada Officials Meet To Discuss Dam Plans

PLANS concerning proposed construction of an earth and stone fill dam nearly 50 ft. high and 1,000 ft. long in Clark creek canyon near Carson City, Nev., were discussed at a recent meeting of state officials. Preliminary studies have already been completed by engineers of the Indian Service, officials of the State Engineer's office and the State Highway Department.

Officials present at the recent meeting were Ralph Gelvin, superintendent of the Carson Indian agency; Paul F. Henderson, district engineer of the Indian Service from Portland, Ore.; A. M. Smith, State Engineer; Edmund Muth, deputy state engineer; Ralph Preece, agricultural engineer for the Nevada district of the Indian Service and Warden Richard Sheehy of the Nevada state prison.

A joint project between the Indian Service and the Nevada state prison, with the former furnishing necessary machinery and the latter the manpower, location of the planned dam would be slightly west of the county hospital near the point where the Jacks Valley road crosses the bridge, several hundred feet off U. S. Highway 50.

The dam, which is under consideration by the legislature now, could be completed within a year if early construction is undertaken. When completed, it would furnish water needed for many acres of arid land on the Nevada state prison farm, as well as the Carson Indian agency.



OFFICERS of the American Water Works Association for 1947-48 include, left to right: L. H. ENSLOW, editor of "Water & Sewage Works," vice-president; WILLIAM W. BRUSH, editor, "Water Works Engineering," treasurer; and N. T. VEATCH, member of Black & Veatch, consulting engineers, president. Veatch has been a member of the Association since 1915 and is also a member of the A. S. C. E.

Seattle Flood Problem Discussed by Engineers

PROPOSALS FOR flood control on the Green River will probably be centered around a large dam to be constructed in Eagle Gorge a short distance upstream from the Tacoma water supply dam according to testimony brought out at a hearing held by the Corps of Engineers in Seattle last month. Flood control problems in the Duwamish-Green River Valley from Seattle south to Auburn are being reconsidered by the Seattle district of the Corps of Engineers after an earlier finding of non-feasibility some 13 yr. ago.

New emphasis on the need for flood control in the valley was placed last winter when floods caused extensive damage. Estimates of the damage from the December 1946 flood, now being compiled by the municipal research and services department of the University of Washington, place the cost at about $1,902,000. More than 90 per cent of the total damage was to agricultural land while the second largest classification was damage to county-owned roads and bridges in the valley.

Col. L. H. Hewitt, district engineer, indicated that a dam 200 ft. high in Eagle Gorge would probably cost about $10,000,000 to construct, about a third less than a low dam originally proposed for the area near Auburn. The dam in Eagle Gorge will help to eliminate earlier objections of fishermen who held that a dam near Auburn would cause an annual damage of $200,000 to the fishing industry.

Tunnel System to Divert River at Garrison Dam Site

DIVERSION OF THE MISSOURI River at Garrison dam site in North Dakota will be accomplished by a group of tunnels 1,200 ft. long and 30 ft. in diameter, it has been announced by Col. W. W. Wanamaker, district engineer for the Garrison district, Corps of Engineers. At least seven tunnels will be driven through the bluffs at the right abutment of the dam to be used for diversion of the river during the construction period and as penstocks to the power plant after completion of the dam. Use of driven tunnels rather than cut-and-cover conduits for the outlet works will permit year-round construction and save about 500,000 cu. yd. of concrete included in the original plan.

State Paving Program Will Aid Albuquerque

A NEW MEXICO State Highway Department paving program to aid Albuquerque city traffic was announced recently by Highway Commission Chairman L. E. Ruffin. Broadway, the city's widest street but now paved for only a mile or so of its length, will get approximately 3.7 mi. of new paving, designed to lift a big part of the traffic load off Central, Coal, Fourth and Second Streets, the city's main thoroughfares at present.

A new through east-west artery to the municipal airport, Kirtland Field, Sandia Air Base and the Veterans Hospital will be furnished by the paving of Miles Ave., which connects South Broadway with Yale Ave., near Gibson.

The city of Albuquerque, which is cooperating with the Highway Department in paving that portion of South Broadway lying within the city limits, estimated that their share in the program would be between $7,000 and $8,000, and would cover installation of curb and gutter as well as absorbing part of the paving costs.

From the city limits, the State Highway Department will pave the roadway

south to the stockyards at Wesmeco St. at a standard 30-ft. width, and will then pave the cross street to South Second.

In addition to the new paving program, the Highway Department will cooperate with the city in re-surfacing a badly worn and bumpy section of North Broadway near the Highway Department's district office and city shops, Ruffin said. This project will be deferred however, until the city completes installation of a new pipeline.

Physics Student Solves Old Navigation Hazard

REMOVAL OF Ripple Rock, the long-condemned Seymour Narrows' navigation hazard, may be solved by the invention of a fourth year physics student at the University of British Columbia. He is James Lubzinski, Steveston, B. C.

Canadian Department of Public Works engineers admitted that Lubzinski's plan to attach a caisson to the rock at low tide with dry ice, is the most feasible of 23 plans submitted since the government closed down work on the rock last spring.

Tests made with a model caisson on a small rock in a laboratory tank at the university were successfully completed recently. The caisson froze so securely to the rock that it could not be pried from it.

Engineers point out the advantage of using dry ice because it works so rapidly it can freeze a caisson to the rock in half an hour. This may solve the problem of "getting at" Ripple Rock, which is bare for only 45 minutes at extreme low tide.

Engineers suggest that if a steel caisson at least 25 ft. in diameter was frozen to the rock they would be enabled to construct a concrete caisson inside the steel one, which would give double security. They could then work despite tides, and drive tunnels and drifts through the rock.

These tunnels would be filled with dynamite and the entire rock could be blown out of the channel with one blast.

According to Ken Morton of the public works department larger model experiments will be carried out shortly in the rip tide at Brockton Point off Stanley Park, Vancouver.

Addition to Central Valley Project Proposed by Bill

DEVELOPMENT of California's American River, already authorized as a flood control project under the jurisdiction of the Army Engineers, would become another part of the Central Valley reclamation project under a bill introduced recently in Congress by Rep. Miller (D-Calif.).

Under Miller's bill, the proposed project, which consists of a dam below the confluence of the north and south forks of the American River near Folsom, Calif., and diversion canals from that point to the Stanislaus River and north to Roseville, Calif., would be transferred to the Bureau of Reclamation.

Hoover Dam Alterations Finished 75 Days Early

TUNNEL AND river-channel improvement work which has been in progress during the past two years in the area immediately below Hoover Dam under a contract with the Guy F. Atkinson Co. has been completed, according to C. P. Christensen, Director of Power of the Boulder Canyon Project.

The job was described in an article by V. B. Uehling in the June, 1946, issue of *Western Construction News*. Contract for the work was awarded to the Atkinson company in Feb., 1945, on a low bid of $2,586,450 with all work to be completed in 750 days from date of notice to proceed. Actual work began in April of that year, and the contractor finished the job approximately 75 days ahead of schedule.

The contract specifications called for an extension of tunnel No. 1 (the Nevada spillway tunnel); alterations of outlets for tunnels Nos. 2, 3, and 4; a total of 2,200 ft. of dredging the river's channel below the outlets of the spillway tunnels; removing all loose earth and rock on each canyon wall for a distance of 1,700 ft. below the spillway outlets; and relocating the "lower portal" road to the power plant.

"One of the most significant benefits resulting from the work," said Mr. Christensen, "was the successful lowering of the river channel below Hoover Dam. By the dredging operations, the channel was lowered five feet, which is equivalent to five feet of additional water in Lake Mead for operation of the power plant. In other words, five feet of additional 'head' have been added for turbine operation."

In charge of the work for the Atkinson company were: Robert J. Jenks, project manager; Jack Sinfield, superintendent of excavation; William Reeves, carpenter foreman; and Robert L. Brown, company engineer.

OBITUARIES . . .

Ray Lester Allin, well-known consulting engineer in the northern California area, died March 13 at his home after a heart attack. Allin, who served as consulting engineer for the City and County of San Francisco from 1923 to 1939, was a member of the American Society of Civil Engineers and the Structural Engineers Association of Northern California.

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Walter A. Walman, 52, assistant street superintendent for Astoria, Ore., died March 11, in Astoria.

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James B. French, Jr., 61, civil engineer for the Puget Sound Bridge & Dredging Co., Seattle, died on March 20. During the last war he served as job manager in charge of the construction of the $35,000,000 naval air base at Sitka, Alaska, and later served as consultant on construction in the Aleutian Islands. Before joining the staff of Puget Sound Bridge & Dredging Co. he had been chief engineer in charge of public works field inspections for the Department of the Interior in 13 western states.

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Lacey Graham Say, 80, an employee of Morrison-Knudsen Co. in Boise, Idaho, for the past 20 years died in Boise on March 20. A resident of Boise for 70 yr., Mr. Say cut and drove the logs on which the first pavements were laid in the city.

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John M. Clifton, 64, highway contractor of Spokane, died Feb. 28. A native of Ohio, he had been engaged in the construction industry at Missoula, Mont., before moving to Spokane in 1913. He was president of the firm of Clifton & Applegate at the time of his death. He had served on the board of directors of the Associated General Contractors of America.

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James Milton Dumm, 88, retired building contractor, died recently in his Denver, Colo., home after a brief illness. A native of Ohio, Dumm moved to Casper, Wyo., in 1901 and entered the sheep business. He later turned to contracting, moving to Denver in 1940.

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John R. W. Davis, retired chief engineer of the Great Northern railroad, died in Seattle Feb. 19. He was a member of the railroad's engineering department from 1903 until his retirement in 1940. He was in charge of the construction of the 8-mi. Cascade Mountains tunnel completed in 1929.

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Walter Milliken, 72, pioneer civil engineer of Nampa, Idaho, died on March 7. He assisted with the survey of the original townsite of Nampa, and was engaged in the design and construction of the Phyliss canal near Nampa.

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Earl Morgan, widely-known Denver building contractor, died Feb. 20 in Phoenix, Ariz. Morgan was associated in the building business in Denver with his father and brother.

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Seth L. Williams, veteran Sparks, Nev., building contractor and resident of Nevada for the past 44 years, died March 3.

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L. E. Imhoff, civil engineer with the Great Northern railroad was killed at Whitefish, Mont., Jan. 30, when he was struck by a passing train.

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Carl E. Forsell, engineer with the Corps of Engineers at Bonneville dam, died March 3.

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Jack Wilson, 59, manager of the Seattle branch of John A. Roebling's Sons Co., died in Seattle on March 6. Well known as a wire rope field engineer, he had been associated with the Roebling organization since 1920.

PERSONALLY SPEAKING

E. B. Hickock, safety engineer and district auditor for the Sound Engineering & Construction Co., has been appointed secretary-manager of the Seattle Chapter of the Associated General Contractors. Hickock succeeds the late Chauncey Smith. **C. Lloyd Gilbert,** who has been serving as acting chapter manager, will continue as assistant to Hickock. The new secretary-manager has been with Sound Engineering & Construction Co. since 1941, specializing in cost engineering and safety. Prior to that time he served six years as engineer with the Nebraska state department of roads and irrigation.

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R. M. Parsons has been appointed district highway engineer at Coeur d'Alene, Idaho, and **Jerry McCreedy** at Lewiston for the Idaho bureau of highways. Parsons succeeds **Elmer W. Swan,** and McCreedy succeeds **James O. Reid,** who was appointed state highway engineer in January.

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Alex Jonsson, engineer for the Electric Bond & Share Co., has been assigned as resident engineer at Kerr dam during construction of a powerhouse addition and installation of a new turbine and generator. Kerr dam, on the Flathead River near Polson, Mont., is owned and operated by the Montana Power Co.

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Richard M. Smith has been appointed assistant King County, Wash., engineer to succeed **Grover C. Gaier,** who becomes district engineer for the county's north road district. **Alfred E. Pierce** has been appointed right-of-way engineer, and **Floyd Turnbull** has been appointed flood control engineer for the Green River flood control project.

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The Gardner-Byrne Construction Co. is now located at 649 So. Olive St., Los Angeles, Calif. Officers of the company include **Russell W. Byrne,** president; **Adryl W. Gardner,** vice-president; and **Raymond S. Mullen,** secretary-treasurer. The firm of Gardner-Byrne Construction Company of Redlands, Calif., a co-partnership consisting of **Beulah L. Gardner, George Gardner, Jr., Adryl W. Gardner** and **Russell W. Byrne** has been dissolved.

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Maj. Calvert W. Tazewell has taken over the position of military assistant to **Col. E. H. Walter,** Fort Peck district engineer, Corps of Engineers, at Fort Peck, Mont. Maj. Tazewell served as a civilian engineer with the construction division of the Quartermaster Corps for 8 yr. prior to the outbreak of the war, and during this period was in charge of construction projects in the southeastern United States. He has been with the civilian production administration until his recall to active duty and assignment to the Fort Peck district.

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Wilbur H. Landaas has been appointed assistant to **Paul C. Fredrickson,** manager of the Mountain Pacific Chapter of the Associated General Contractors. Landaas has been employed by the Veterans Administration in Seattle following his release from active duty with the U. S. Navy with which he had six years of service.

PAUL C. FREDRICKSON has taken over the management of the Mountain Pacific Chapter, Associated General Contractors, with headquarters in the Benjamin Franklin Hotel, Seattle.

William J. Snyder and **Eugene D. Snyder,** Great Falls, Mont., have established a partnership to be known under the firm name of W. J. Snyder & Son, contractors. In addition to general construction practice the new firm plans to accept agencies for manufacturing equipment.

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T. O. "Jack" Moseley and **C. W. "Chet" Sherman,** both of whom have been active in Arizona construction work, **are now in** business as excavation contractors under the firm name of Moseley and Sherman. Business offices are at 2210 W. Van Buren St. in Phoenix, with a yard at 2210 W. Grant in the same city.

Appointment of **Charles H. Carter** as regional engineer, Bureau of Reclamation for Utah, Nevada, western Wyoming, western Colorado, northwestern New Mexico and southeastern Idaho was announced recently by **E. O. Larson,** Region 4 director. Carter was formerly acting chief design engineer, Region 4. In his new capacity he will be responsible for the technical adequacy of all designs, construction cost estimates and construction programs affecting the submission of reports on new projects. The program for Region 4 is estimated to involve an expenditure of nearly $3,000,000 this year.

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Bert Lyall has been elected chairman of the associate membership of the Spokane Chapter of the Associated General Contractors. He succeeds **Roy Smith,** who was chairman last year and who remains a member of the executive committee along with Lytell, **Roland McAlpin,** and **Otto Dalzall.**

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Evan Peterson, former structural engineer with the Corps of Engineers, has been appointed city manager of Coos Bay, Ore., (formerly Marshfield) filling a position that has been vacant since the resignation of **Harry C. McCrea** last October. In his new position he will also serve as city engineer of Coos Bay.

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Oren L. King, city manager of Montrose, Colo., for six years prior to the war, has been appointed as the first city manager of Pendleton, Ore. Pendleton voters approved adoption of the city manager form of government at last November's election. King has previously been employed by the Colorado Highway Department and the Bureau of Reclamation.

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J. B. Warrack, president of J. B. Warrack Co., well-known building contractors of Seattle, has been appointed as a member of the governing provisions committee of the Associated General Contractors of America. The committee is charged with the responsibility for interpreting and re-

COLONELS ANDERSON T. W. MOORE (left) and SAMUEL N. KARRICK recently assumed duties as district engineers for the Corps of Engineers. Moore heads the Los Angeles District office, succeeding Col. R. C. Hunter, who has retired. Karrick, who recently returned from thirty-two months in the Southwest Pacific, will be in charge of the San Francisco District. He has previously served as Manila District engineer and was Chicago District engineer from 1935 to 1940. Karrick relieves Col. George Mayo, who is retiring. Col. Karrick is a member of the A. S. C. E.

NORBERT H. LEUPOLD, president of Leupold & Stevens, manufacturers of hydrographic and engineering instruments of Portland, is president of the Oregon Section of the American Society of Civil Engineers for the year 1947.

porting to the board of directors of the national organization all governing provisions for official action by the board.

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Roy Robins, city engineer of Compton, Calif., was recently appointed director of public works in charge of the new $411,800 water department expansion program. The department will be responsible for drilling new wells, including the possible rehabilitation of an abandoned well.

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U. B. Ozanne, formerly purchasing agent for the Alaska Road Commission, Seattle, has been promoted to chief purchasing agent for the Alaska Railroad, also with headquarters in Seattle.

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Corwin & Co., engineers and architects of Great Falls, Mont., have been retained by the city of Shelby, Mont., to prepare plans for the construction of a $250,000 airport which will be built under the joint sponsorship of the city and Toole County with federal assistance.

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Starling M. Morse, who has been connected with Luke Army Air Field, Phoenix, Ariz., in the capacity of civil engineer since October, 1944, was recently given the additional title of superintendent of construction and maintenance at the same base.

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L. O. Grossnickle, who for many years was in key positions with heavy duty contractors in the southern California area, is now in business for himself as a general contractor with offices at 1151 East 10th St., Long Beach. He is also connected with the ventilating business at the same address.

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James H. Gould has been assigned as project engineer for the Federal Works Agency to supervise movement of an officer's club building from the Ellensburg, Wash., air base to the campus of the Central Washington College where it will be remodeled for use as a student union building.

H. T. "Slim" Lewis, who has been closely associated with aviation in Wyoming since 1923, was recently named state aeronautics director for Wyoming. A flyer since 1912, Lewis first came to Cheyenne as a pilot with the post office department to fly the mail. He has served as chief pilot for first Boeing, then United Air Lines when they took over the mail service.

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George Shannon was selected by the city council of Oxnard, Calif., to be the town's first city manager under a new ordinance adopted by public initiative. For the past year and a half, Shannon has been city manager of Lynwood.

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New contracting firm in Yuma, Ariz. is the C. B. Cansler Construction Co., which consists of **C. B. Cansler,** formerly with L. M. White Contracting Corp. at Tucson, and **Roy Shupe,** formerly with the State Highway Department.

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Gordon Ross, formerly inspector for the Bureau of Indian Affairs at Seattle, has been transferred to a similar position with the Alaska Road Commission, also in Seattle.

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J. EDWARD (NED) HERGERT, recently appointed manager of the Montana Contractors Association, has just opened the first permanent headquarters of the association in the Placer Hotel, Helena, Mont. Hergert has also been appointed secretary-treasurer and manager of the newly organized Montana Builders Association.

Paul L. Nichols, formerly resident engineer and bridge designer for the Nevada State Highway Department, is now associate civil engineer for the East Bay Municipal Utility District, located at Oakland, Calif. Nichols will do civil and structural engineering.

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John S. Rice, Guy Huestis, Jr., and R. F. Clary, Jr., Great Falls, Mont., have organized and incorporated a new general contracting company to be known as the Falls Construction Co., with headquarters in Great Falls.

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The firm of Barrett & Hilp, well-known northern California contractors, which, prior to March 1 had been conducted as a partnership, is now a corporation. No change has been made in the interest or in the management, however, and the name also remains the same.

W. W. Ivans, San Bernardino, Calif., was appointed engineer for the Tulare Lake Basin Water Storage District, succeeding **Roy L. May,** who, prior to his death was chief engineer for the Lake group for many years. Ivans, who comes to his valley post from the county surveyor's office in San Bernardino County, served as a captain with the army engineers in the last war.

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Richard F. Goforth is instrument man for the Bonneville Power Administration, Gardiner, Wash., in their survey for 115 KV and 230 KV transmission line along the Fairmont-Port Angeles line.

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Deane S. Terry, Jr. was recently appointed Stockton, Calif., city traffic engineer, by City Manager **Walter B. Hogan.** Terry was previously traffic coordinator of the San Joaquin Safety Council.

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Five civil engineers were granted licenses to practice in the state of Washington last month. New licenses went to **H. W. Berger, H. P. Cate,** and **A. F. Chittenden,** all of Seattle; **N. W. Temple,** Tacoma; and **C. F. Thomas,** Portland.

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L. J. Peterson, who has been well-known in the construction business for many years, recently went into business for himself, with offices located in San Bernardino, Calif. His son is with him.

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Fritz Zapf, formerly city engineer of Redondo Beach, Calif., resigned his position on March 1 to become a partner in an engineering firm in San Diego.

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Harry Trumbull has been appointed city building inspector for Puyallup, Wash.

JAMES M. LACKEY, recently appointed as The Asphalt Institute district engineer for southern California and Arizona, brings to his position a background of twenty-two years of employment in the California Division of Highways. As senior highway engineer in the Los Angeles district, he has supervised all asphalt paving for the past thirteen years.

SUPERVISING THE JOBS

Complete list of supervisory personnel on the Davis Dam project is headed by **H. E. Williams** as project manager and **T. L. Terry** as general superintendent. Other key men include: **R. E. Amberger,** housing manager; **H. W. Johnson,** chief accountant; **R. J. Johnston,** paymaster; **J. F. Madura,** safety engineer; **T. G. Richard,** office manager; **J. A. Shaw,** personnel director and labor coordinator; **J. A. Wagner,** purchasing agent.

Superintendents include: **P. A. Barksdale,** electrical superintendent; **F. A. Garrison,** lubrication superintendent; **J. A. Graham,** sheet metal; **C. I. Green,** graveyard shift; **Cliff Kidwell,** carpenter; **G. C. Larson,** facilities; **H. S. Meyer,** welding; **R. H. Masterson,** transportation; **W. M. Matthews,** erection superintendent and assistant to Terry; **H. K. Thiessen,** master mechanic; and **W. B. Vestal,** Louise Yard superintendent.

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Jack Lee is in charge of engineering for Buttress-McClellan on their million dollar job of constructing four buildings, a factory and a warehouse for the Pacific Airmotive Corp., Burbank, Calif. **R. A. Welden** is general superintendent; **Al Kleeman,** general carpenter foreman; **Floyd Shoemaker, Pat Worden, J. Van Over,** and **Earl A. McLain,** carpenter foremen. Other key men include **R. C. Wyatt,** concrete foreman; **Manuel Marquez** and **J. Lopez,** labor foremen; **James Thomson,** paymaster and office manager; and **Clair D. Head,** timekeeper. The job was started in July, 1946, and is expected to be completed by the first of April.

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Mel H. Scherer, in the position of job superintendent, is one of the key men on the Waale Camplan Co. & Smith, Inc., $2,500,000 contract, which calls for construction of a steel frame and concrete factory building on Crenshaw Blvd. and 203rd St., Torrance, Calif. Other important men on the Los Angeles contractor's job are: **Frank Bort,** project manager; **W. E. Browning,** labor foreman; **Joseph S. Judge,** chief field engineer; and **Marvin L. Williams,** office manager and purchasing agent.

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Karl Poss is superintending construction of a state highway between Calaveras River and Lodi, Calif., for the Fredrickson & Watson Construction Co., Oakland, Calif. **B. V. Fredrickson** is quantity engineer; **L. A. Nedrow,** grade foreman, **John Forza,** header foreman; **W. B. Rogers,** concrete foreman; **C. W. Stephenson,** mechanical foreman; **Archie Edmonds,** grade foreman; **Virgil Humphrey,** plant foreman; **Verne Baker,** grade foreman; **Geo. A. Passmore,** office manager; **Al Landi,** timekeeper. Approximately 50 per cent of the $811,180 contract has been completed. State resident engineer is **A. L. Lund.**

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Rex B. Sawyer, formerly construction manager for Griffith Co., Los Angeles and San Diego, for 29 years, is now construction manager with Basich-Price-Sawyer Co., who have the contract for a stretch of California highway located in Fresno Co. **J. F. Price** is office manager; **Fred Tautrim,** master mechanic; **K. S. Cornell,** grade foreman; and **Ed Burrows,** concrete structure foreman. State men on the job are **Phil Boutton,** resident engineer, **Earl Scott,** district engineer, and **Don Evans,** district construction engineer.

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W. H. Johnson has the job of resident engineer for the Guy F. Atkinson Co. contract to build an underpass on Silver Lake Blvd., Los Angeles. **A. G. Chaussee** is district superintendent, with **John Murphy** as grade foreman, **C. C. Thompson** as general foreman, and **Lee Cox** as carpenter superintendent. Other key men are **Robt. "Bob" Boyd,** general superintendent; **Earl Weyrick,** office manager, and **Henry Howell,** office engineer. The job is expected to be completed the first of November.

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A. C. Anderson and **J. W. Ragsdale,** Hutchinson, Kans., are general superintendent and general foreman respectively for the Del E. Webb construction of a grain elevator at So. 24th St., Phoenix, Ariz. **Chalmers and Borton,** also of Hutchinson, Kans., are architects and engineers for the job, which is expected to be completed by the first of May.

* * *

Keith Wasson is on the job as general superintendent for the Peter Kiewit Sons' Co. project at Friant Kern Canal, Calif., with **Lester Brown** as his assistant. Other key men are **Paul Robinson,** supervising concrete canal lining; **D. O. Kelly,** superintendent of structures; **F. R. Grounds,** general foreman on structures; **C. F. Wait,** in charge of draglines; **C. F. Schmidt,** in charge of blasting; **Ray Fowler,** superintendent of cats & scrapers; **C. L. Lowry,** office manager; **F. L. Lowe,** office engineer; **Jimmy Bohn,** purchasing agent; and **Don Mosley,** master mechanic.

* * *

H. V. "Vic" Colburn is general superintendent for Christensen & Lyons on their $750,000 contract which calls for construction of a factory and office buildings at 4th and Addison Sts. in Berkeley, Calif. Resident engineer on the job, expected to be completed by September, is **Stanley Newton.** Other key men are **Ed Oversen** and **Carl Carlson,** carpenter foremen.

* * *

Everett J. Peters has the position of job superintendent with Howard S. Wright & Co., Seattle, Wash., on construction of a two-story newspaper plant in Seattle. Other key men on the $900,000 contract include **George C. Hamner,** general foreman; **E. Koster,** labor foreman; **H. E. Merritt,** office engineer; **E. W. Jayne,** field engineer; and **E. C. Hightower,** accountant.

* * *

Carl D. Edwards is supervising a 52-unit housing project at Orange and Artesia, Long Beach, Calif., for R. E. Campbell. General carpenter foreman on the $500,000 contract is **R. H. Wohlforth,** with **R. K. Grahm** and **E. L. Peppers** as carpenter foremen. Labor foreman is **H. L. "Dick" Crann,** and **C. J. Counts** is timekeeper.

* * *

Don Daybell officiates as general superintendent for Haddock Engineers, Ltd., Los Angeles, on their $483,700 contract which calls for construction of three classroom buildings, and a mechanical shop building of steel and wood frame at Barstow, Calif. Project superintendent for the contract is **Joe Thomas.**

* * *

R. King, formerly associated with the Northern Construction Co., Vancouver, B. C., is now supervising construction for a new company known as Port Alberni Construction Co., Ltd. The company is now working on a housing project for Port Alberni, to accommodate employees of the

ELECTRICAL CREW on the Pacific Press Bldg. at Vernon, Calif., include, front row, l. to r.: MURRAY OLDMAN, office manager; JAMES R. HAYS, steward; H. B. KATZ; T. W. TRISLER; R. E. GREEN; H. P. (PAT) BAKER, general foreman; O. A. PICKERRELL, foreman; HARRY SCHWARTZ; STAN WYSOKINSKI. Standing, l. to r.: HARRY FULKS; GRADY DAGNON; BERNARD SAZER; P. A. MORRISSEY; H. B. CRANMER; FRED HAMMONS; EVERETTE WATSON; D. S. THOMAS; G. J. THOMAS; V. O. GILLESPIE; K. A. BOYNTON.

MECHANICS and foremen on the $1,098,840 Mission Valley highway project near San Diego include: Back row, left to right, JOHN FULLER, lube assistant; OLLY STOFFEL, mechanic; BILL BALCH, welder; HOWARD O'DELL, lube foreman; JIM NORRIS, mechanic; BOB BLACK, master mechanic; T. M. McCARLEY, crew foreman; HOWARD ROBINSON, mechanic. Front row, left to right, G. B. "HI" THOMPSON, General Petroleum Co. lube engineer; LEE FINNEY, lube assistant; CHARLES THOMPSON, contractor truck salesman; CHESLEY JONES, JR., commercial salesman. Basich Brothers Construction Co. are contractors for the 4-mi. construction job, with TED MOSHER as project manager for the company.

recently erected pulp and paper plant. Workshops, equipment and storage sheds have already been erected.

* * *

Hector Goudeseune is supervising the job for Fred D. Chadwick, Lynwood, Calif., on a $336,071 contract to build a lift span bridge over Cerritos Channel, Terminal Island, in Los Angeles County, Calif. **Fred A. Chadwick** is general manager for the project.

* * *

Ralph Puddycomb is supervising construction of irrigation canals for the Adler Construction Co., Seattle, Wash., on the Deschutes Project in Jefferson County, Oregon. Other key men on the $602,832 job include **George Osborn,** chief engineer; **Harold C. Adler,** project manager; and **Charles Oriet** and **John O. Mitchell,** excavation foremen.

* * *

Since his release from the service, **C. H. Ingersoll** is now connected with the R. P. Shea Co., Indio, Calif., general contractors, in the capacity of master mechanic. Other men connected with the company include **E. Hughes,** mechanic; **E. Todd,** first oiler; **Lloyd Collingsworth,** superintendent, and **Nick Crosley,** engineer.

* * *

George Thatcher is general superintendent for construction of an overcrossing at Benton Way and Hollywood Parkway, in Los Angeles, Calif. Byerts & Dunn, contractors for the job, have **Jack Sylvester** as resident engineer, with **G. A. Morse** as assistant engineer. **D. J. Rossiter** is carpenter foreman.

* * *

L. W. Kuckenberg has charge of general supervision on the Kuckenberg Construction Co., Portland, Ore., contract to improve the S. W. Harbor Drive approaches to Barbur Blvd. and Ross Island Bridge, in Portland, Ore. Other key men on the $986,993 job include **L. H. Gordon,** general superintendent, and **W. E. Soucie,** office manager.

Dave Pierson is job superintendent for R. E. Campbell on their contract calling for an addition to the Lafayette Hotel in Long Beach, Calif. **Harry E. Holdrege,** who formerly supervised various jobs in the southern California area, is job engineer, with **Jim Clark** as carpenter foreman, and **Lee Murray** as labor foreman. **Jack Schob,** representing Rutherford-Skoubye & Stolte, Inc., the steel subcontractors, is supervising this job and other work in this area as southern California Division superintendent.

* * *

R. K. "Bob" Boyd is supervising construction of an overpass at Silver Lake Blvd. and Temple St., in Los Angeles, for Guy F. Atkinson. **W. H. Johnson** is resident engineer, with **R. A. McLellan** as general carpenter foreman; **Lee Cox** as concrete and carpenter superintendent; **C. C. Thompson** as general foreman; and **Don Muse** as office manager.

* * *

Justin Barber is general superintendent for Western Contracting Corp. of Sioux City, Iowa, on the Yuma-Gila Bend Highway project in Arizona known as the Telegraph Pass job. Seven and three-quarters mi. long, the contract is for approximately $500,000. **Dave Tucker** is general foreman and **Vance Cauble** office manager. Master mechanic is Roy Phillips.

* * *

H. Brown is resident engineer for the construction of an office building for the Southern California Telephone Co., Los Angeles. **Robert E. Miller** is Brown's assistant. Other key men are **A. E. Pushee,** general superintendent; **John "Whitey" Power,** general carpenter foreman; **Henry Helander, Chas. Brassel,** and **J. K. Jensen,** carpenter foremen; **Tony Meehleis,** steel subcontractor; **B. N. "Curly" Westfall,** steel foreman; **M. J. Waters,** labor superintendent; **C. E. Carlson,** paymaster and office manager; **Dan F. Connolly,** time keeper; and **Rod Smith, Jr.,** receiving clerk. P. J. Walker Co., Los Angeles, has the contract.

D. W. Shupp is project manager for the Johnson Western Co., Alameda, Calif., on construction of a bridge and approaches across the east branch of Razor Slough and the Sacramento River, near Butte City, Calif. Other key men on the $359,151 contract include **G. Blackman,** as general superintendent; **A. E. Graham,** engineer; and **J. Dofflemeyer,** office manager.

* * *

Leslie Bethers is job superintendent for Bethers Bros., Heber City, Utah, on their contract to construct 4.3 mi. of bituminous surfacing of U. S. Highway 6 between Hinckley and the Nevada line, Millard County, Utah. **Reed Bethers** is office manager for the $103,033 contract, while **H. Bethers** is general foreman and **Paul Bethers** is truck foreman.

* * *

Fred D. Chadwick of Lynwood, Calif., is personally supervising his own job of paving and grading the Cerritos Channel Bridge on the Ford Ave. Freeway in Wilmington, Calif. **O. V. Barkman** is chief inspector for the U. S. Navy on the same project.

* * *

Guy Reid is supervising highway construction for Nathan A. Moore on Superior Highway at Florence Junction, Ariz. **B. "Buck" Newberry** is grade foreman; **Bill Hamilton,** general foreman; and **J. H. Campbell,** grade inspector. **Gus Rath** is resident engineer on the job, to be completed in July.

* * *

Delbert Bangs is on the job as job superintendent for F. G. Haase & Associates, Perkins, Calif., on their $122,500 contract to erect a frame and brick veneer frozen food warehouse on F. St. at Patterson, Calif. **E. Fred Haase** is general superintendent.

* * *

L. A. Kirkley is job superintendent for the Grafe-Callahan Construction Co., of Dallas, Tex., on their $121,497 job which calls for 15.4 mi. of hot mix asphalt and concrete paving from .9 mi. north of the Dallas-Ellis Co. line to the north city limits of Ennis, Tex. **E. B. Calvin** is engineer on the job.

* * *

On the Manhattan Village project, a $2,500,000 development at Manhattan Beach, Calif., **Carl H. Johnson** is superintendent for the contractor, Lindgren & Swinerton, Inc. He was formerly for a number of years with Swinerton & Walberg Co. in a similar capacity.

* * *

Dean Anderson is supervisor for the Morrison-Knudsen Co., Inc., Seattle, Wash., job of general tank construction at an atomic energy plant at Hanford, Wash. Other important men on the $1,779,258 job are **O. O. Williams** as office manager and **H. A. Kenyon** who is grade superintendent.

* * *

Stanley Runyan has the contract for construction of two swimming pools at Las Vegas, Nev. His general superintendent on the job is **Alvin J. Baker,** with **J. E. Wooten** as carpenter foreman, **R. L. Baird** as steel foreman, and **Ruben Hendrix** as cement finishing foreman. **D. A. Rupp** is foreman for the Larkin Plumbing Co., who have the sub-contract. Job is expected to be completed by the middle of May.

J. R. Weaver has the job of superintendent for J. E. Haddock, Ltd., of Pasadena, Calif., in their $592,913 contract which calls for grading, paving and surfacing 3.4 mi. between Montalvo and Ventura, in Ventura Co., Calif. **L. Ronnenberg** is structure superintendent for the job, with **Jess Black** as general foreman and **Don Snyder** as office manager.

* * *

E. S. Hufford, Fort Worth, Tex., is job superintendent on his own $58,900 contract which calls for construction of school facilities at Arlington, Tex. **Phil Hopkins** is assistant superintendent, **R. A. Cartwright** is office manager and accountant, and **Mason Lankford** is timekeeper and material checker.

* * *

Duncan Manning is supervising the job for Cox Bros. Construction Co., Stanton, Calif. Office engineer for the contract which calls for 4.9 mi. grading and surfacing between Laguna Beach and Dana Point, in Orange Co., Calif., is **R. C. Reif.**

* * *

William Kennish is supervising the Morrison-Knudsen Co., Seattle, Wash., job of building a 2 mi. rock fill to replace a wood trestle on the track along the East Astoria waterfront, in Washington. **Paul Moehlenpah** is office manager for the $250,000 project.

* * *

J. C. Woolcock is superintendent for the Charles W. Pettifer Co. of Long Beach, Calif,. on additions to the building of the Associated Telephone Co. in North Long Beach. Engineer on the project is **Maurice Sasso.**

* * *

Joe V. Doug is supervising for the Harris Construction Co., of Fresno, on their $60,200 contract which calls for construction of a classroom building at the site of the Orange Cove School, in Orange Cove, Calif.

* * *

Wade W. Johnston, for many years with Monaghan & McGuire, Denver, Colo., is now superintending excavation for G. E. Kerns, contractor of Long Beach, Calif., on the new American Ave. Bridge structure.

* * *

A. W. Matson is supervising the steel erection at the Redondo Beach Edison plant for Consolidated Steel Corp. **Ralph Calisher** and **S. R. Farwell** are steel foremen on the construction work.

* * *

H. L. Wheat is job superintendent for H. L. Royden, Phoenix, Ariz., on their $159,924 contract to construct a reinforced concrete overpass and approaches on the Flagstaff-Winslow Highway, 7 mi. east of Flagstaff, Ariz.

* * *

Elmer Crosby is supervising erection of a one-story addition to the telephone building at Palo Alto, Calif., for Haas & Rothschild, of San Francisco. Contract was awarded for $350,000.

* * *

N. A. Morris is supervising the construction of additions to a junior high school in San Angelo, Tex., for Evans & Taylor, of San Angelo. Amount of the contract is $69,900.

Marty Dys is on the job as superintendent for the Robert D. Bardell, Oakland, Calif., contract to remodel and enlarge a department store building at Hobart and Franklin Sts., Oakland. General superintendent on the $100,000 contract is **Robert Duncan.**

* * *

Paul C. Scroggs is supervising the Boyle St. overpass of the Santa Ana Parkway for Peter Kiewit Co. **Malvin Kruse** is job superintendent, with **Tiny Madison** as labor foreman.

* * *

C. S. Lenoir is acting as general superintendent for the H. C. Price Co. on their contract to build a pipe line from Blythe, Calif. to Santa Fe Springs, for the Southern California Gas Co. and the Southern Counties Gas Co. **W. B. Williams** is construction superintendent, and **P. O. Rutlege** office manager.

* * *

C. A. Budnik is project manager for the Maxon Construction Co., Inc., of Miamisburg, Ohio, on construction of Monsanto Chemical Company Unit No. 5 there.

* * *

W. Willoughby is supervising the Barry O'Leary, Billings, Mont., contract for $183,363 to construct sanitary sewers in Billings, Mont.

* * *

R. E. Steele, formerly warrant officer in the Sea Bees in the Pacific Area, is now supervising construction of a building in Los Angeles for Grant and Bruner, Ltd.

UNIT BID SUMMARY

Bridge and Grade Separation . . .

California—Siskiyou County—State—Bridge and Underpass

Carl N. Swenson Co. of San Jose, Calif., was low before the State Division of Highways at Sacramento with a bid of $378,247 for the construction of a bridge across Cottonwood Creek and an underpass under the tracks of the Southern Pacific Company about 5.5 miles north of Hornbrook. All materials in connection with items 27 and 28 will be furnished by the State. Unit bids follow:

(1) Carl N. Swenson Co. ..... $378,247 (2) Guy F. Atkinson Co. $462,940

		(1)	(2)
Lump sum	clearing and grubbing	500.00	$2,500
14,000 cu. yd.	roadway excav.	1.50	4.50
2,550 cu. yd.	struct. excav.	6.00	4.00
6,000 cu. yd.	struct. backfill (Bailey Hill underpass)	4.25	5.00
2,000 cu. yd.	imported borrow	3.00	4.50
2,090 cu. yd.	Class "A" P.C.C. (structs.)	62.75	63.00
480 cu. yd.	Class "A" P.C.C. (arch rib)	79.25	85.00
324 lin. ft.	concrete rail	8.00	14.00
224 lin. ft.	rubber waterstops	4.00	6.00
6,770 lin. ft.	furn. steel piling	2.85	2.75
268 ea.	driving steel piles	40.00	90.00
26 ea.	steel pile splices	25.00	25.00
800 sq. yd.	membrane waterproofing	3.00	5.00
40 lin. ft.	8-in. C.M.P. (16-ga.)	2.50	2.00
168 lin. ft.	8-in. perf. M.P. underdrains (16-ga.)	2.50	2.00
22 cu yd.	filter material	7.00	10.00
380,000 lbs.	furn. bar reinf. steel	.065	.09
380,000 lbs.	placing bar reinf. steel	.03	.05
3 ea.	portable timber barricades	50.00	50.00
1,100 lbs.	misc. iron and steel	.60	.60
69	M.F.B.M. Douglas fir timber (shoofly trestle)	275.00	200.00
10,000 lbs.	struct. steel (shoofly trestle)	.35	.17
6,210 lin. ft.	furn. timber piling (shoofly trestle)	1.00	.50
138 ea.	driving timber piles (shoofly trestle)	40.00	85.00
990 lin. ft.	furn. steel piling (shoofly trestle)	3.00	2.85
22 ea.	driving steel piles (shoofly trestle)	45.00	100.00
Lump sum	track work	$5,000	$9,000
Lump sum	track work (shoofly)	$15,000	$12,000
Lump sum	removing shoofly trestle	$5,958	$9,000
Lump sum	engineers office	$2,500	$2,500

Arizona—Coconino County—State—Overpass

H. L. Royden, Phoenix, submitted the low bid of $159,924 to the Arizona State Highway Department, Phoenix, and was awarded the contract for the construction of a reinforced concrete overpass structure and approaches including Portland Cement Concrete pavement. The work is located on the Flagstaff-Winslow Highway, approximately 7 mi. east of Flagstaff. The following unit bids were submitted:

(1) H. L. Royden $159,924
(2) Fisher Contracting Co. 166,860
(3) Packard Contracting Co. $169,846

		(1)	(2)	(3)
2,154 cu. yd.	roadway excav. (unclassified)	1.50	1.20	1.30
14 cu. yd.	drainage excav. (unclassified)	1.50	1.00	2.00
300 lin. ft.	grader ditches	.25	.07	.20
119 cu. yd.	struct. excav. (unclassified)	5.00	2.25	4.00
56,485 ton	imported borrow	.75	.80	.75
4,991 ton	aggregate base	1.65	1.40	1.75
2,600 cu. yd.	stripping pits	.15	.25	.30
2,167 M. gal.	sprinkling	3.25	4.00	4.00
520 hour	rolling	6.00	6.25	6.50
100 hr.	mech. tamping	4.50	4.50	5.00
7,627 sq. yd.	conc. pave.	3.96	3.70	3.90
217 cu. yd.	Class "A" conc. (incl. cement)	58.00	62.50	65.00
139 cu. yd.	Class "D" conc. (incl. cement)	58.00	62.50	65.00
44,480 lb.	reinf. steel (bars)	.11	.11	.12
143,835 lb.	struct. steel	.15	.18	.18
365 lin. ft.	struct. steel handrail	9.00	10.00	9.00
136 lin. ft.	8-in. corr. metal pipe	1.50	2.00	1.75
5 ea.	corr. metal catch basins (Std. A-23)	25.00	25.00	30.00
3,965 lin. ft.	standard line fence	.20	.20	.25
2,800 lin. ft.	road guard (Std. A-7)	2.15	2.50	2.30
6 ea.	guide posts (Std. A-1 or Special A-1a)	4.00	3.90	5.00
8 ea.	right-of-way markers (Type "E")	5.50	6.00	6.00
664 ton	mineral aggregate	2.10	1.70	1.80
57 ton	road oil	35.00	30.00	35.00
0.541 mile	processing road mix	$1,500	845.00	$1,000
64 ton	screenings (for seal coat)	8.50	7.80	10.00
11 ton	emulsified asph. (Cl. "A")	42.00	40.00	50.00
1,840 lin. ft.	placing bitum. mix curb	.75	.75	1.00

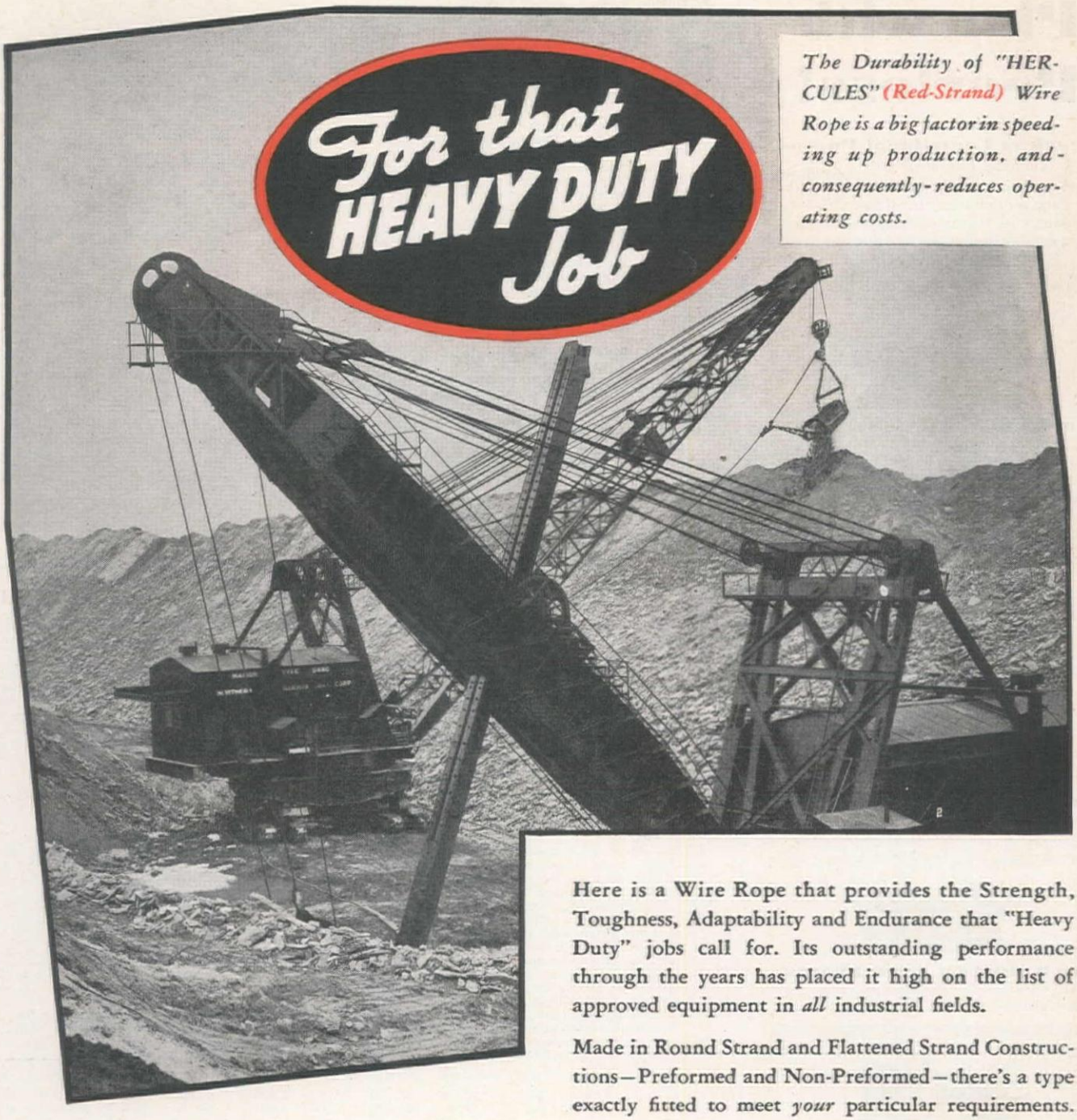
New Mexico—San Juan County—State—Grade & Bridge

Skousen Construction Co. of Albuquerque, New Mexico, was awarded a contract by the State Highway Department at Santa Fe on its low bid of $331,430 for grading, minor drainage structures, one continuous slab concrete bridge 374.90 ft. in length, levelling course, ballast, watering and rolling, bituminous top course surfacing and miscellaneous construction on 6.1 miles of N. Mex. Route 44, betw. Bloomfield and Cuba. Unit bids were submitted as follows:

(1) Skousen Construction Co. $331,430
(2) Brown Contracting Co. 336,871
(3) R. P. Skousen & J. H. Ryan 371,303
(4) Floyd Haake $404,091
(5) Armstrong & Armstrong 407,779

		(1)	(2)	(3)	(4)	(5)
Lump sum	removal of old structures	50.00	50.00	50.00	100.00	100.00
Lump sum	removal of obstructions	50.00	50.00	50.00	50.00	100.00
272,000 cu. yd.	excav., unclassified	.25	.24	.28	.39	.38
145 cu. yd.	excav. for structures	2.00	2.00	3.00	2.00	2.00
500 cu. yd.	excav. for pipe culverts	2.00	4.00	3.00	2.20	2.50
382,000 sta. yd.	overhaul	.02	.02	.015	.01	.03
41,000 ¼ mi. yd.	haul	.10	.08	.05	.06	.06
930 hr.	mechanical tamping	3.00	4.00	4.00	3.00	4.50
1,800 hr.	rolling, sheepsfoot roller	4.00	4.00	4.00	4.00	4.00
180 hr.	rolling, steel tired roller	5.00	6.00	6.00	5.00	5.50
2,355 hr.	rolling, pneumatic tired roller	2.00	5.00	4.00	4.50	4.50

(Continued on next page)



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18,800	ton	ballast	.60	.94	.58	.60	.57
17,510	ton	leveling course	1.00	.98	.75	1.10	.90
7,775	M.	gal. watering	2.00	2.50	2.00	2.25	1.50
222	cu. yd.	Class "AE" concrete	27.00	28.00	30.00	35.00	32.50
3,866	sq. yd.	waterproofing concrete	.50	.50	.60	.80	.70
243,592	lb.	reinforcing steel	.08	.08	.08	.09	.095
848	lin. ft.	stand. reinf. conc. culv. pipe, 24-in. diam.	5.00	5.00	6.00	5.00	5.50
88	lin. ft.	stand. reinf. conc. culv. pipe, 42-in. diam.	12.00	14.00	13.00	12.00	15.00
2,767	cu. yd.	derrick stone riprap	6.00	4.00	8.00	7.00	7.00
1,694	cu. yd.	excavation for riprap	3.00	1.00	2.00	2.00	1.25
1	ea.	cattle guard 18-ft. roadway	.....	.....	.....	.....	.....
2	ea.	reinf. conc. monument and marker	50.00	100.00	50.00	30.00	50.00
20,900	lin. ft.	galv. barbed wire fence	.15	.15	.15	.12	.13
4	ea.	gates, Texas type	10.00	10.00	10.00	5.00	7.50
60	ea.	bracing	3.00	2.00	3.00	8.00	7.50
270	ea.	treated timber warning posts, refl.	7.00	8.00	6.00	7.00	8.00
82	ea.	right-of-way and station markers	5.00	4.00	5.00	6.00	5.00
1.2	mi.	obliterating old road	300.00	200.00	200.00	450.00	400.00
6,200	lin. ft.	contour ditches	.10	.10	.10	.10	.06
165	cu. yd.	rock and wire check dams	10.00	12.00	6.00	12.00	9.00
510	bbl.	cutback asphalt, Type MC-1	7.00	6.00	7.00	6.00	6.90
2,420	bbl.	cutback asphalt, Type MC-3	6.30	6.00	6.50	6.00	6.90
8,250	ton	top course surf.	1.00	1.20	.80	1.20	1.00
6.046	mi.	mixing asph. and aggregate	700.00	800.00	700.00	600.00	700.00
560	bbl.	120-150 asphalt (for seal coat)	7.00	6.00	7.00	6.00	7.25
975	ton	aggregate (seal coat)	6.00	6.00	5.00	5.50	4.00
		BRIDGE ITEMS					
2,462	cu. yd.	excav. for structs.	7.00	6.00	13.50	12.00	15.00
671	cu. yd.	Class "AE" conc. superstruct.	33.00	33.00	45.00	40.00	50.00
1,073	cu. yd.	Class "AE" conc. substruct.	33.00	33.00	40.00	42.00	34.00
24,836	lb.	structural steel	.20	.15	.18	.14	.20
916	lin. ft.	stand. reinf. conc. culv. pipe, 24-in diam.	.....	.....	.....	.....	.....
296	lin. ft.	stand. reinf. conc. culv. pipe, 30-in. diam.	.....	.....	.....	.....	.....
52	lin. ft.	stand. reinf. conc. culv. pipe, 42-in. diam.	.....	.....	.....	.....	.....
916	lin. ft.	corr. galv. metal culv. pipe, 24-in. diam.	4.00	4.40	4.00	3.75	3.75
296	lin. ft.	corr. galv. metal culv. pipe, 30-in. diam.	5.00	5.30	5.00	5.00	4.80
52	lin. ft.	corr. galv. metal culv. pipe, 42-in. diam.	8.00	9.00	10.00	9.00	9.00

Water Supply . . .

California—Fresno County—Corps of Engineers—Reservoir and Outlets

H. Earl Parker of Marysville, Calif., submitted the low bid of $762,895 to the U. S. Engineer Office, Sacramento, for the construction of the Big Dry Creek Reservoir and outlets to be located near Clovis. The reservoir will be an earthfill levee dam type of construction. Unit bid prices were:

(A) H. Earl Parker.....$762,895
(B) Morrison-Knudsen & M. H. Hassler 859,658
(C) Bressi & Bevanda..... 942,503
(D) L. A. and R. S. Crow & W. R. Schriver..... 978,735
(E) Fredrickson & Watson Construction Co. 981,210
(F) Haddock Engineers, Ltd. $1,063,407
(G) A. Teichert & Sons, Inc..... 1,082,705
(H) Guy F. Atkinson Co..... 1,184,760
(I) Piombo Construction Co. 1,218,594
(J) Peter Kiewit Sons Co..... 1,222,485
(K) Macco Corp. 1,360,711
(L) Engineers Estimate 986,137

(1) Lump sum, diversion and care of water during const.
(2) Lump sum, clear and grub
(3) 80,000 cu. yd. stripping
(4) Deleted
(5) 500,000 cu. yd. common excav., unclassified
(6) 15,000 cu. yd. struc. excav., unclassified
(7) 1,550,000 cu. yd. borrow excav., unclassified
(8) 1,000 cu. yd. blasting
(9) 1,350,000 cu. yd. embankment
(10) 1,200 roller hr. addnl. rolling, one tractor with one 8-ft. width tamping roller
(11) 6,000 cu. yd. compacted backfill
(12) 1,000 cu. yd. uncompacted backfill
(13) 1,400 cu. yd. struct. conc.
(14) 700 cu. yd. paving conc.
(15) 160 cu. yd. misc. conc.
(16) 270,000 lb. steel reinf.
(17) 350 lin. ft. metal water stop
(18) 1,200 sq. ft. expansion joint filler
(19) 2,600 cu. yd. gravel blanket
(20) 160 sq. yd. rock paving
(21) 160 cu. yd. grouting
(22) 2,000 cu. yd. riprap
(23) 1,300 cu. yd. quarry rock or cobbles
(24) 110 lin. ft. tile drain
(25) 5,300 cu. yd. road surfacing, graded agg.
(26) 60,000 lb. install equip. furn. by U. S.
(27) Lump sum elec. systems
(28) 10,000 lb. struct. steel
(29) 10,000 lb. misc. metal work
(30) 124 lin. ft. precast conc. pipe, 48-in.
(31) 50 lin. ft. CMP
(32) Lump sum, recorder house
(33) 175 lin. ft. staff gages
(34) Lump sum, gate house Big Dry Ck. outlet
(35) Lump sum, gate house Little Dry Ck. outlet
(36) 50,000 M gals. water for compaction
(37) 3,500 bbl. port. cement at mixing plant
(38) 1,200 roller hr. addnl. rolling each addnl. 8-ft. width tamping roller.

	(A)	(B)	(C)	(E)	(F)	(G)	(H)	(J)	(K)	(L)
(1)	$3,650	$5,000	$2,600	$6,000	$9,000	$10,000	$5,000	$15,000	$7,000	$1,500
(2)	300.00	$2,750	$2,000	$8,800	$6,000	$10,000	$6,500	$6,000	$10,000	$3,100
(3)	.12	.16	.18	.20	.28	.15	.25	.28	.30	.19
(5)	.114	.175	.23	.25	.24	.26	.35	.28	.36	.35
(6)	.90	2.00	.90	2.00	1.00	1.00	1.80	1.50	2.00	2.10
(7)	.166	.175	.23	.231	.21	.26	.245	.30	.35	.24
(8)	.90	2.25	1.25	1.00	2.40	3.00	1.25	1.50	1.00	5.30
(9)	.036	.06	.08	.06	.10	.09	.14	.13	.12	.04
(10)	8.40	15.00	8.00	8.30	10.00	8.00	9.50	12.00	10.00	9.00
(11)	1.80	2.50	2.40	3.00	2.50	2.50	3.50	3.00	5.00	2.90
(12)	1.20	.40	.90	1.25	2.00	.60	.50	1.00	1.00	.60
(13)	54.92	55.00	60.00	50.00	60.00	60.00	68.00	62.00	40.00	51.00
(14)	36.54	30.00	30.00	25.00	40.00	37.00	26.70	35.00	25.00	20.50
(15)	35.88	100.00	50.00	50.00	70.00	60.00	60.00	75.00	60.00	58.00
(16)	.12	.09	.09	.095	.09	.09	.09	.09	.12	.095
(17)	1.85	3.50	1.50	2.40	.85	4.00	2.00	3.50	2.00	2.00
(18)	.41	1.00	.40	1.00	.30	.50	1.00	.35	1.00	.60
(19)	5.65	6.70	6.00	7.00	7.50	6.00	9.50	5.50	8.00	7.50
(20)	60.00	48.00	35.00	80.00	150.00	70.00	50.00	50.00	75.00	45.00
(21)	65.00	18.00	15.00	15.00	24.00	15.00	20.00	12.00	20.00	37.00
(22)	8.00	3.25	8.00	7.00	11.00	4.50	7.00	7.00	12.00	6.25
(23)	5.00	8.00	6.00	6.25	11.00	6.00	6.50	8.00	8.00	7.25
(24)	1.45	4.50	3.00	4.00	2.40	7.00	4.50	3.00	1.00	2.50
(25)	6.25	4.60	4.50	6.00	6.00	5.00	5.00	5.50	6.00	3.25
(26)	.25	.12	.08	.20	.07	.07	.10	.20	.30	.10
(27)	$1,820	$6,500	$1,500	$2,000	$1,661	$2,000	$1,800	$1,585	$1,700	$1,700
(28)	.34	.40	.20	.20	.35	.20	.30	.23	.45	.275
(29)	.56	.65	.35	.50	.50	.40	.50	.53	.50	.35
(30)	16.50	22.00	7.00	22.00	20.00	15.00	25.00	30.00	24.00	23.00
(31)	9.60	12.00	8.00	7.50	15.00	10.00	10.00	6.60	12.00	10.50
(32)	$2,360	$1,500	$2,000	$2,500	$2,340	$2,000	$1,800	$1,464	$2,000	$2,000
(33)	5.00	4.00	10.00	3.50	3.60	5.00	3.00	3.00	3.00	2.20
(34)	$3,752	$2,000	750.00	$1,050	720.00	$1,000	$1,700	$2,090	$1,000	$1,050
(35)	$3,752	$2,000	$1,500	$2,000	$1,224	$1,500	$2,200	$2,476	$1,200	$1,250
(36)	1.25	1.50	1.20	1.40	2.00	2.00	1.50	1.40	1.80	1.35
(37)	4.00	3.80	4.00	4.30	3.80	4.00	3.40	3.50	4.00	4.60
(38)	2.40	2.00	2.50	.90	1.20	1.50	3.00	2.00	2.00	.64

McRAE BROS.

OF SEATTLE ERECT 2-STORY BUILDING WITH NEW TL-20 LORAIN MOTO-CRANE

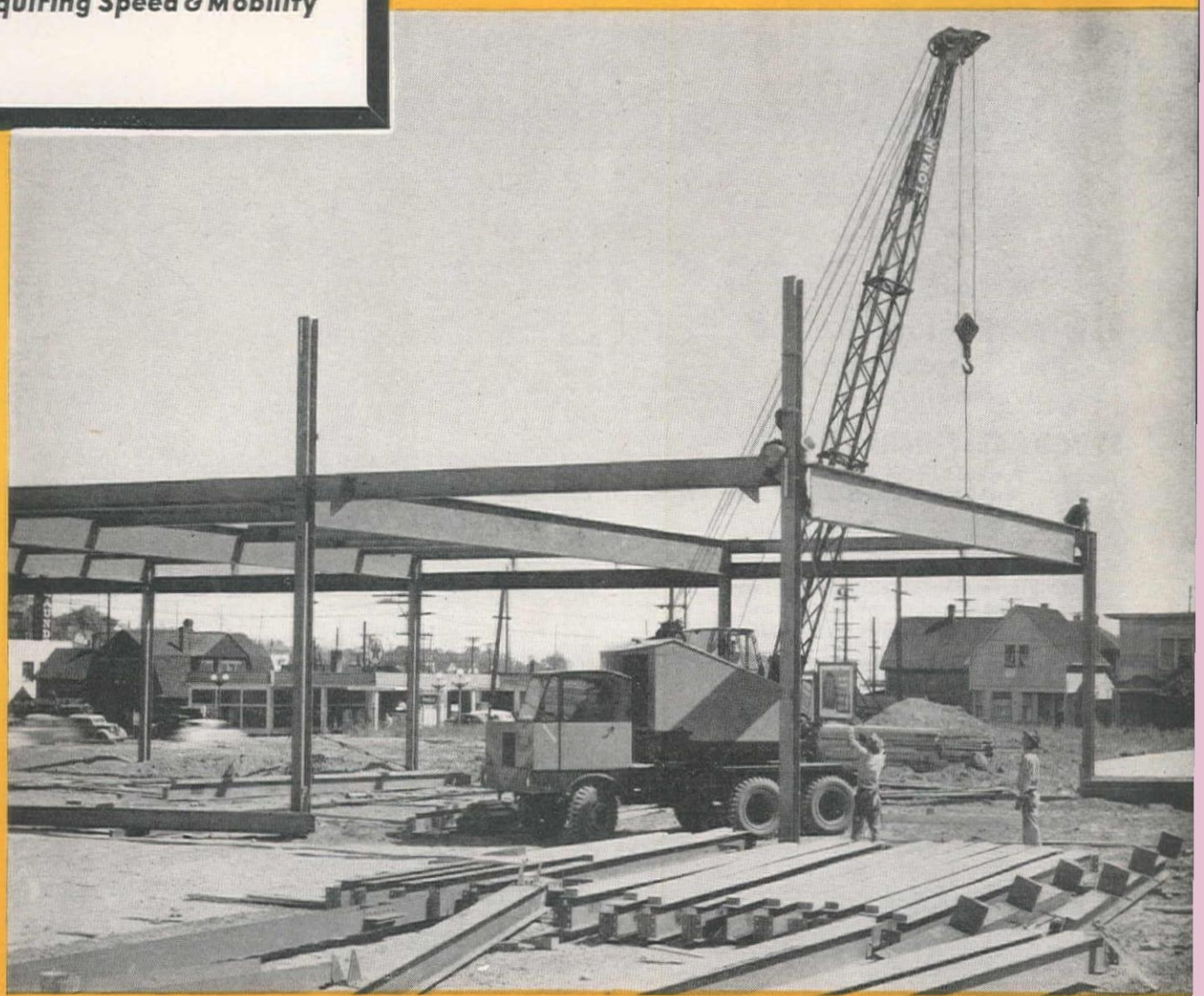
. . . McRae Selects New TL-20 For Work Requiring Speed & Mobility

Thew 20 Lorain

McRAE BROTHERS, Seattle contracting firm, recently purchased their second Lorain. This time they selected a TL-20 Moto-Crane which is shown here equipped with a 40-ft. boom, erecting steel on the two-story Canada Dry Bottling building. Accurate spotting of the large steel girders was made possible by the Lorain Steel Erector's Precision Boom Hoist, which gives positive precision power control of boom lowering.

Other popular Lorain TL-20 features that are making a hit on the West Coast include: (1) A "complete package" design which includes all necessary accessories as standard equipment; (2) "Unit Assembly" of each major component—clutch shaft, engine, hoist shaft, cab, crawler propelling mechanism; (3) 5 identical and interchangeable clutches on one shaft; (4) Oil-enclosed cut gears; (5) anti-friction bearings; (6) Crawler, single-engine and 2-engine rubber tire mountings.

THE THEW SHOVEL COMPANY, LORAIN, OHIO



See Your THEW Lorain Dealer

Reg. U. S. Trade Mark

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 3

A. H. COX & CO., Seattle 4, Washington

BUNTING TRACTOR CO., INC., Boise, Twin Falls, Gooding, Fairfield, Carey, and Burley, Idaho; LaGrande, Oregon

SANFORD TRACTOR & EQUIPMENT CO., Reno, Nevada

THE MOUNTAIN TRACTOR CO., Missoula, Montana

THE TRACTOR & EQUIPMENT CO., Sidney, Montana

MILES CITY TRACTOR & EQUIPMENT CO., Miles City, Montana

P. L. CROOKS & CO., Portland 10, Oregon

LEE REDMAN EQUIPMENT COMPANY, 610 S. 19th Street, Phoenix, Arizona

WORTHAM MACHINERY CO., Cheyenne, Wyoming
Branches: Sheridan, Greybull, Casper, and Rock Springs

California—San Diego County—City—Pipe Lines

American Pipe & Construction Co., South Gate, Calif., submitted the lowest complete bid in the amount of $692,535 to the City of San Diego for the construction of the San Vicente Second Pipe Line, San Vicente to Lakeside. Schedules I-a and I-b are alternates for the portion of the line between San Vicente Dam and Station 143+10. Schedule II covers the portion of the line between Station 143+10 and Lakeside. The following unit bids were submitted:

	Sched. I-a	Sched. I-b	Sched. II	Totals
(1) American Pipe and Construction Co.	$403,085	.....	$289,449	$692,535
(2) United Concrete Pipe Co.	421,087	.....	312,391	733,478
(3) L. E. Dixon Company	.....	$462,674	321,728	784,402
(4) McNamara & Yount	.....	487,974	.....	.....

SCHEDULE I-a
REINFORCED CONCRETE CYLINDER PIT

F. & I. = Furnishing and Installing.
L. T. & I. = Loading, Transporting and Installing.

		(1)	(2)	(3)	(4)
31,250	cu. yd. Cl. 1 trench excavation	1.84	2.00	.....	.....
21,200	cu. yd. backfill	1.10	1.20	.....	.....
100	cu. yd. sand for backfill	2.25	2.00	.....	.....
65	cu. yd. excav., Cl. 2	5.00	8.00	.....	.....
50	cu. yd. excav., Cl. 3	6.00	8.00	.....	.....
757	lin. ft. F. & I. RCC Pipe, Cl. A—48-in.	20.05	20.70	.....	.....
460	lin. ft. F. & I. RCC Pipe, Cl. B—48-in.	20.05	20.70	.....	.....
3,519	lin. ft. F. & I. RCC Pipe, Cl. C—48-in.	20.55	21.20	.....	.....
4,095	lin. ft. F. & I. RCC Pipe, Cl. D—48-in.	21.15	21.50	.....	.....
5,405	lin. ft. F. & I. RCC Pipe, Cl. E—48-in.	21.85	22.40	.....	.....
6	ea. field welded joint	36.00	45.00	.....	.....
11	ea. 20-in. access manhole	225.00	250.00	.....	.....
4	ea. L. T. & I. air inlet valve	160.00	200.00	.....	.....
4	ea. F. & I. 1-in. air release valve	75.00	85.00	.....	.....
1	ea. F. & I. 8-in. blowoff assembly, Type A	550.00	560.00	.....	.....
3	ea. F. & I. 8-in. blowoff assembly, Type B	545.00	580.00	.....	.....
12	tons L. T. & I. Venturi meter tube	55.00	80.00	.....	.....
2	ea. L. T. & I. 30-in. flanged plug valve	240.00	350.00	.....	.....
1	ea. L. T. & I. 30-in. cone valve	260.00	260.00	.....	.....
2	ea. F. & I. 4-in. flanged gate valve	150.00	125.00	.....	.....
2	ea. F. & I. ¾-in. gage con.	26.00	32.00	.....	.....
2	ea. F. & I. 1-in. corp. cock	20.00	17.00	.....	.....
10,000	lb. F. & I. steel wye and reducers	.35	.30	.....	.....
4,000	lb. F. & I. steel pipe and ftgs.	.40	.35	.....	.....
4,000	lb. F. & I. misc. steel work	.35	.30	.....	.....
600	lb. L. T. & I. valves, ftgs., etc.	.14	.10	.....	.....
4	ea. F. & I. manhole frame cover, 22-in.	45.00	38.00	.....	.....
8	ea. F. & I. valve cover	10.00	7.50	.....	.....
600	lb. F. & I. ladder rungs	.17	.15	.....	.....
65	cu. yd. reinf. conc. in chambers	60.00	48.00	.....	.....
55	cu. yd. conc. in anchors, etc.	28.00	28.00	.....	.....
1	cu. yd. misc. conc.	100.00	50.00	.....	.....
12,000	lb. reinf. steel	.11	.10	.....	.....
450	sq. ft. conc. pave., 6-in.	.90	.90	.....	.....
500	sq. ft. 4-in. plant-mix pave.	.27	.30	.....	.....

SCHEDULE I-b
STEEL PIPE AND MISCELLANEOUS ITEMS

		(1)	(2)	(3)	(4)
25,100	cu. yd. Cl. 1 trench excavation	.....	.....	1.75	2.02
18,300	cu. yd. backfill	.....	.....	.90	.85
200	cu. yd. sand for backfill	.....	.....	2.75	2.75
60	cu. yd. excav., Cl. 2	.....	.....	6.00	6.00
50	cu. yd. excav., Cl. 3	.....	.....	6.00	8.00
14,236	lin. ft. F. & I. 48-in. x ⅜-in. steel pipe	.....	.....	26.50	27.40
2	ea. F. & I. insulating joint	.....	.....	250.00	250.00
5	ea. electrical test sta.	.....	.....	20.00	380.00
20	hrs. cutting and welding in field	.....	.....	5.50	6.25
4	ea. circumf. field out	.....	.....	15.00	32.00
4	ea. circumf. field butt weld	.....	.....	60.00	80.00
11	ea. 20-in. access manhole	.....	.....	200.00	260.00
12	ea. L. T. & I. 4-in. air inlet valve	.....	.....	175.00	320.00
4	ea. F. & I. 1-in. air release valve	.....	.....	75.00	228.00
1	ea. F. & I. 8-in. blowoff assembly, Type A	.....	.....	525.00	500.00
3	ea. F. & I. 8-in. blowoff assembly, Type B	.....	.....	525.00	875.00
12	tons L. T. & I. Venturi meter tube	.....	.....	50.00	60.00
2	ea. L. T. & I. 30-in. plug valve	.....	.....	300.00	375.00
1	ea. L. T. & I. 30-in. cone valve	.....	.....	300.00	275.00
2	ea. F. & I. 4-in. gate valve	.....	.....	110.00	190.00
2	ea. F. & I. ¾-in. gage con.	.....	.....	25.00	28.00
2	ea. F. & I. 1-in. corp. cock	.....	.....	15.00	31.00
10,000	lb. F. & I. steel wye and reducers	.....	.....	.40	.40
4,000	lb. F. & I. steel pipe and fittings	.....	.....	.40	.40
4,000	lb. F. & I. misc. steel work	.....	.....	.40	.32
600	lb. L. T. & I. valves, fittings, etc.	.....	.....	.15	.50
4	ea. F. & I. 22-in. manhole frame and cover	.....	.....	40.00	45.00
8	ea. F. & I. 6-in. valve cover	.....	.....	5.00	10.00
600	lb. F. & I. ladder rungs	.....	.....	.20	.18
50	cu. yd. reinf. conc. in chambers	.....	.....	55.00	55.00
75	cu. yd. reinf. conc. in anchors, etc.	.....	.....	30.00	30.00
1	cu. yd. misc. conc.	.....	.....	45.00	40.00
10,000	lb. reinf. steel	.....	.....	.10	.12
400	sq. ft. 6-in. conc. pave.	.....	.....	1.00	1.00
500	sq. ft. 4-in. plant-mix pave.	.....	.....	.50	.40

SCHEDULE II
REINFORCED CONCRETE CYLINDER PIPE AND MISCELLANEOUS ITEMS

		(1)	(2)	(3)	(4)
21,850	cu. yd. Cl. 1 trench excav.	1.37	1.70	1.50	.....
16,450	cu. yd. backfill	.70	1.00	.60	.....
50	cu. yd. sand for backfill	2.25	2.00	2.50	.....
55	cu. yd. excav., Cl. 2	5.00	8.00	6.00	.....
10	cu. yd. excav., Cl. 3	6.00	8.00	6.00	.....
Lump sum, addtl. cost of San Diego River & San Vicente Creek crossings		$65,000	$64,000	$59,000	.....
2,112	lin. ft. F. & I. RCC pipe, Cl. E—48-in.	21.85	20.40	27.00	.....
5,237	lin. ft. F. & I. RCC pipe, Cl. F—48-in.	22.45	22.75	27.00	.....
53	lin. ft. F. & I. 48-in x ⅜-in. steel plate pipe	58.00	65.00	55.00	.....
14	ea. field welded joint	36.00	45.00	50.00	.....
6	ea. 20-in. access manhole	225.00	250.00	250.00	.....
2	ea. L. T. & I. 4-in. air inlet valve	160.00	200.00	190.00	.....
3	ea. F. & I. 1-in. air release valve	75.00	85.00	75.00	.....
1	ea. F. & I. 12-in. blowoff assembly, Type A	815.00	860.00	900.00	.....
1	ea. F. & I. 12-in. blowoff assembly, Type B	715.00	850.00	820.00	.....
1	ea. F. & I. 8-in. blowoff assembly, Type B	545.00	580.00	525.00	.....
1	ea. L. T. & I. 30-in. cone valve	260.00	350.00	300.00	.....
2	ea. F. & I. ¾-in. gage con.	32.00	26.00	25.00	.....

(Continued on next page)

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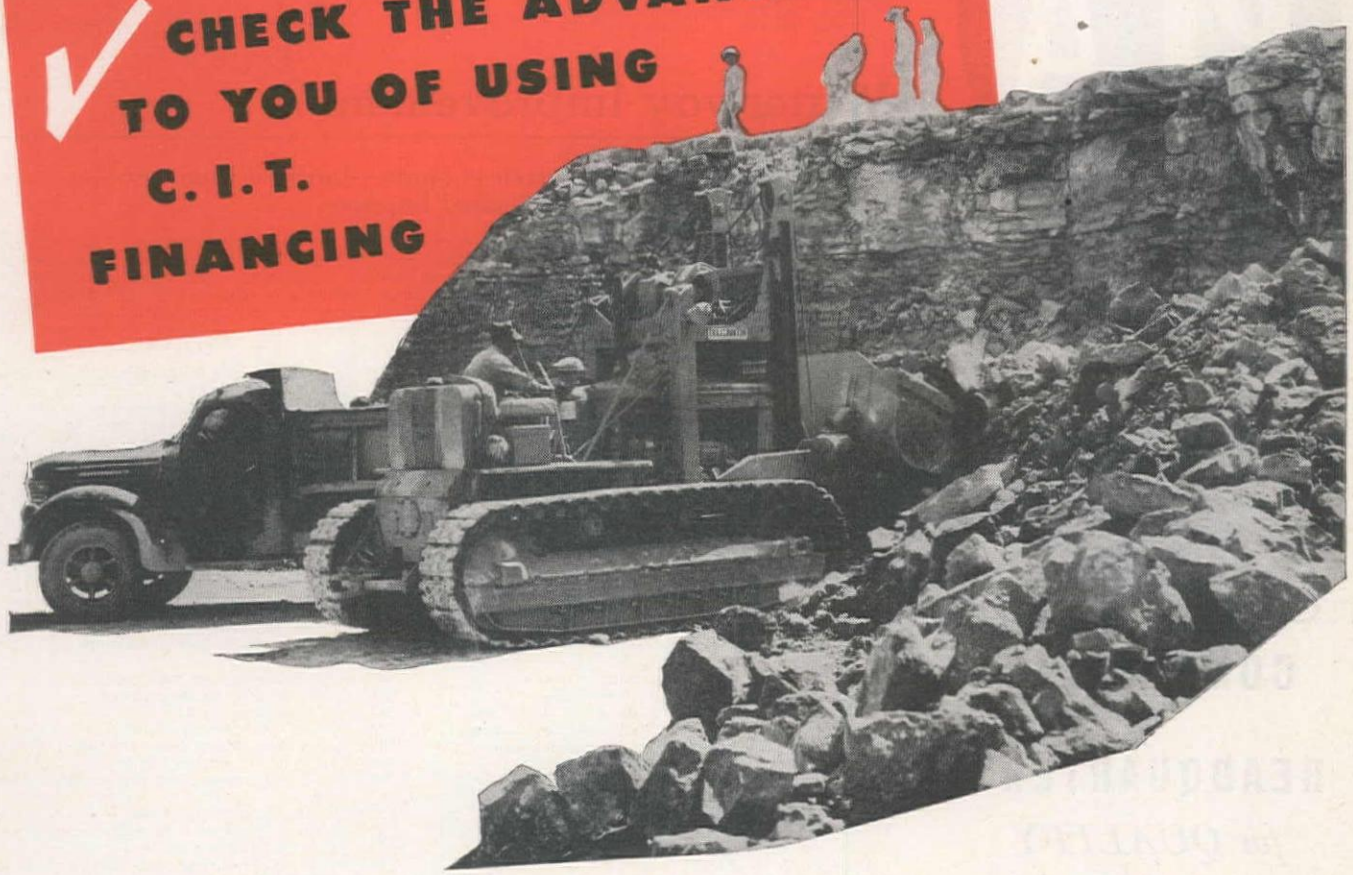

✔ MR. CONTRACTOR: When you finance your purchases of construction equipment and machinery through C.I.T., you have the advantage of dealing with an organization, firmly identified with the construction industry, which has created and developed an outstanding finance plan.

✔ C.I.T. will furnish funds in any amount—promptly and at *reasonable cost*—to finance your purchases of machinery and equipment. You need make only a moderate initial investment and can spread the balance over many months.

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NEW YORK	CHICAGO	ATLANTA	SAN FRANCISCO	LOS ANGELES

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

2 ea. F. & I. 1-in. corp. cock	17.00	20.00	15.00	.....
1,200 lb. F. & I. steel plate pipe, etc.	.35	.40	.40	.....
3,700 lb. F. & I. misc. steel work	.30	.35	.40	.....
400 lb. L. T. & I. valves, etc.	.10	.14	.15	.....
3 ea. F. & I. 22-in. manhole frame and cover	38.00	45.00	40.00	.....
6 ea. F. & I. 6-in. cover	7.50	10.00	5.00	.....
500 lb. F. & I. ladder rungs	.15	.17	.20	.....
55 cu. yd. reinf. concr. in chambers	48.00	60.00	55.00	.....
35 cu. yd. reinf. concr. in anchors, etc.	28.00	28.00	30.00	.....
1 cu. yd. misc. concr.	50.00	100.00	45.00	.....
9,000 lb. reinf. steel	.10	.11	.10	.....
16,900 sq. ft. 3-in. plant-mix pave.	.25	.90	.30	.....
1,100 sq. ft. 4-in. plant-mix pave.	.30	.27	.40	.....

Waterway Improvement . . .

California—Los Angeles County—Corps of Engineers—Channel Improve.

United Concrete Pipe Corp., Vinnell Co. and Ralph A. Bell, joint venturers, Baldwin Park, Calif., submitted the low bid of $2,469,577, (Alternates not included) to improve 9,000 lin. ft. of Los Angeles River Channel. The work consists of a rectangular reinforced concrete section with a low water channel in center, subdrainage of sand and gravel filter under the invert, bridge, removing existing downstream sheet pile cutoff and bank protection structures, fencing, installing suspended water line and timber guard rails, plant lawn, etc. The Los Angeles District Corps of Engineers received the bids. Bids submitted on the first 57 items were:

(A) United Concrete Pipe Corp., Vinnell Co. and Ralph A. Bell....$2,469,577
(B) E. B. Bishop 2,551,200
(C) Hensler Construction Co., MacDonald & Kruse, Inc., and James L. & John M. Ferry..... 2,713,581
(D) James I. Barnes Construction Co...$2,855,366
(E) Guy F. Atkinson Co..... 2,876,851
(F) Bressi & Bevanda Constructors, Inc., and Peter Kiewit Sons Co. 3,095,413
(G) Haddock Engineers, Ltd. 3,549,185
(H) Engineers estimate 2,385,661

(1) Lump sum, diver. and cont. of water
(2) Lump sum, clear site and remove exist. obstructions
(3) 3,000 cu. yd. rock excav.
(4) 408,000 cu. yd. channel excav.
(5) 200 cu. yd. structure excav.
(6) 9,400 cu. yd. levee and spillway excav.
(7) 24,000 cu. yd. excav. for removal of unsuitable soils
(8) 178,800 cu. yd. compacted fill
(9) 24,000 cu. yd. structure fill
(10) Lump sum, Rose St. detour
(11) 36,595 cu. yd. conc. in invert slabs
(12) 1,225 cu. yd. conc. in walls of low water chan.
(13) 12,900 cu. yd. conc. in wall bases and footings
(14) 12,800 cu. yd. conc. in main channel walls
(15) 325 cu. yd. conc. in substruct.
(16) 70 cu. yd. conc. in superstruct.
(17) 290 cu. yd. conc. in spillways
(18) 70 cu. yd. conc., misc.
(19) 96,385 bbl. Portland cement
(20) 6,406,000 lb. steel reinf. bars
(21) 6,200 lb. steel reinf. fabric
(22) 12,100 ea. sleeves for Type A joint
(23) 17,800 ea. sleeves for type E joint
(24) 495 lin. ft. conc. piles
(25) 3,200 lin. ft. driving steel bearing piles
(26) 150 ea. splices of steel bearing pile
(27) 128 ea. caps for steel bearing pile
(28) 2,100 sq. ft. steel sheet piles, 22 lb. per sq. ft.
(29) 1,650 sq. ft. steel sheet piles, 32 lb. per sq. ft.
(30) 68,500 lb. struct. steel
(31) Lump sum, handrailing
(32) 31,700 cu. yd. drain material
(33) 24,000 cu. yd. filter material
(34) 7,770 cu. yd. filter drain material
(35) 240 lin. ft. remov. and replace. existing 6-in. tile drain
(36) 120 lin. ft. 6-in. tile drain
(37) 32,000 lin. ft. 8-in. perforated VCP drain
(38) 1,930 lin. ft. 12-in. perforated VCP drain
(39) 150 lin. ft. 12-in. corr. metal pipe
(40) 276 lin. ft. 18-in. corr. metal pipe
(41) 223 lin. ft. 24-in. corr. metal pipe
(42) 112 lin. ft. 36-in. corr. metal pipe
(43) 83 lin. ft. 48-in. corr. metal pipe
(44) deleted
(45) 2 ea. subdrain riser and hood
(46) 2,500 sq. yds. planting grass
(47) 690 tons bitum. surf.
(48) 200 cu. yd. derrick stone
(49) Lump sum, suspended water line
(50) 17,750 lin. ft. channel fence
(51) 340 lin. ft. remov. and replac. exist. channel fence
(52) 110 lin. ft. spillway fence
(53) 40 sq. ft. brickwork in wall openings
(54) 72 lin. ft. timber guardrail
(55) 20 lin. ft. removing and relaying 10-in. CIP blowoff line
(56) 192 lin. ft. relaying 60-in. corr. metal pipe
(57) 50,000 squares (100 sq. ft.) addtl. sheepsfoot rolling

ALTERNATE FOR ITEMS NOS. 32 AND 33

(58) 55,700 cu. yd. filter drain material

ALTERNATE FOR ITEM NO. 37

(59) 32,000 lin. ft. 6-in. perf. corr. metal drain

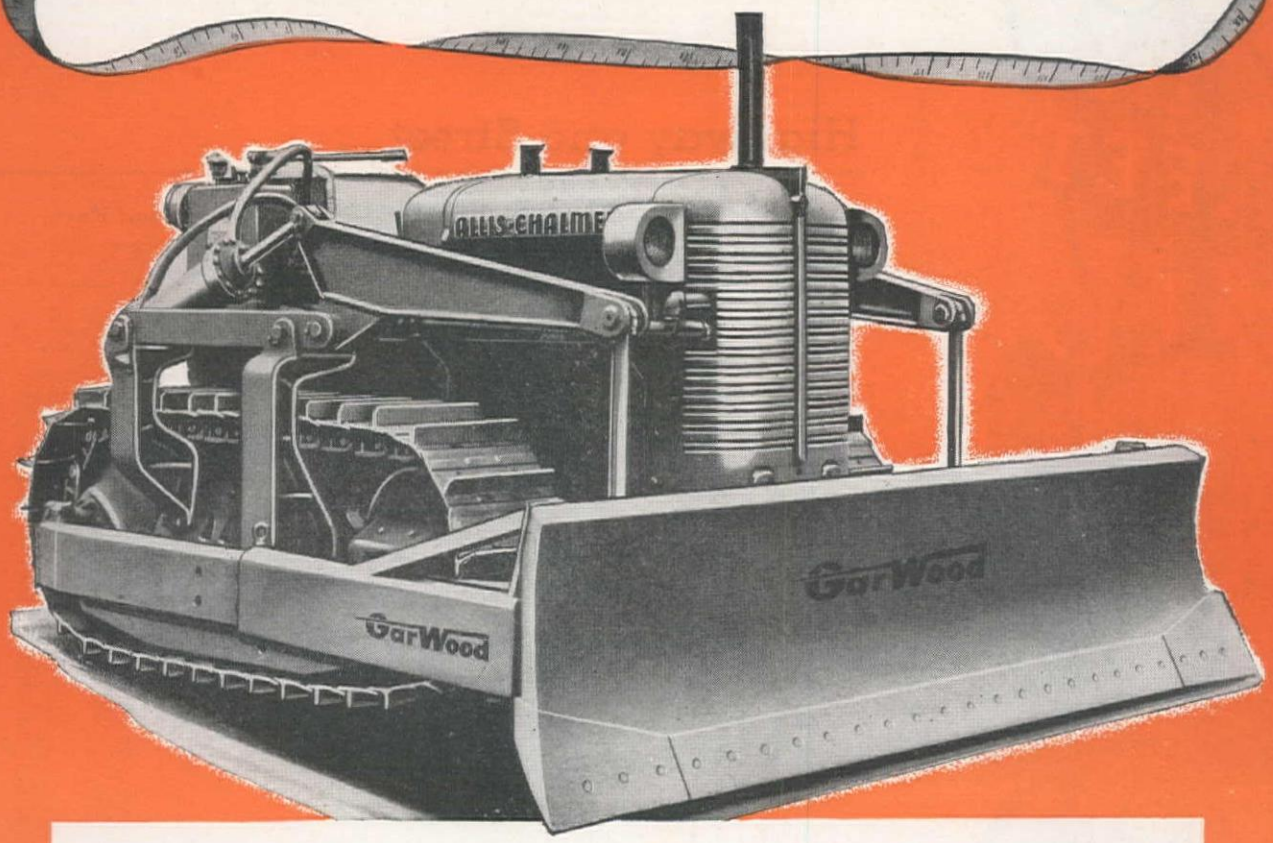
ALTERNATE FOR ITEM NO. 38

(60) 1,930 lin. ft. 12-in. perf. corr. metal drain
(61) 111,500 sq. ft. suction processing of conc.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	$130,000	$86,000	$80,000	$30,000	$100,000	$525,000	$158,600	$76,550
(2)	$50,000	$57,000	$50,000	$25,000	$60,000	$75,000	$68,000	$30,700
(3)	2.30	4.00	6.00	5.00	4.00	3.00	6.80	4.55
(4)	.48	.48	.58	.90	.41	.55	.50	.54
(5)	4.00	6.00	7.00	10.00	3.75	5.00	25.00	6.60
(6)	.25	.48	.50	.85	.35	.35	.30	.40
(7)	.80	1.30	.42	.90	1.30	2.50	1.00	1.52
(8)	.47	.60	.60	.65	.88	.60	.70	.45
(9)	.80	.40	.85	1.40	2.20	1.50	5.25	.65
(10)	$20,000	$30,271	$50,000	$20,000	$32,500	$22,000	$42,000	$13,300
(11)	11.60	9.50	12.00	12.00	9.40	10.85	17.20	8.90
(12)	27.00	36.00	60.00	29.00	45.10	46.00	75.00	34.35
(13)	12.50	9.50	12.00	13.80	12.20	12.00	16.00	10.00
(14)	17.60	26.00	20.00	35.00	32.00	21.00	42.00	22.90
(15)	34.00	40.00	40.00	49.00	47.00	42.00	60.00	45.00
(16)	60.00	67.00	65.00	77.00	70.00	70.00	80.00	57.00
(17)	45.00	16.00	40.00	40.00	21.50	32.00	22.00	14.60
(18)	70.00	62.00	75.00	80.00	70.00	65.00	75.00	30.50
(19)	2.70	2.76	2.30	2.60	2.40	2.45	2.90	2.65
(20)	.065	.075	.075	.069	.08	.07	.08	.067
(21)	.20	.15	.15	.15	.14	.13	.15	.10
(22)	.40	.60	.35	1.00	.40	.60	.50	.75
(23)	.30	.67	.30	1.20	.60	.35	.60	.50
(24)	20.00	15.00	15.00	6.00	8.80	13.00	15.00	12.10
(25)	3.00	3.40	4.00	.80	1.40	3.15	3.60	2.00
(26)	6.00	8.00	20.00	10.00	10.00	7.00	7.75	12.30
(27)	6.00	15.00	12.00	8.00	9.00	12.00	13.60	8.15
(28)	3.25	2.60	1.75	2.10	2.25	3.75	3.00	2.50
(29)	3.60	3.20	2.25	3.00	2.60	4.50	3.10	2.95
(30)	.14	.12	.11	.11	.15	.14	.15	.25
(31)	$1,500	$1,368	$1,300	$1,240	$1,300	$1,250	$1,432	$1,085
(32)	5.00	4.10	6.00	4.20	5.20	4.50	6.70	4.10
(33)	3.40	4.10	4.50	3.50	4.25	4.50	4.50	3.35
(34)	5.20	7.00	3.70	3.00	7.50	4.50	6.80	4.85
(35)	2.00	2.00	2.00	1.25	3.00	1.60	1.80	1.05
(36)	1.25	2.00	5.00	1.25	2.25	1.60	2.50	1.20
(37)	.....	.....	1.50	1.30	3.00	1.50	.....	1.25
(38)	.....	.....	2.25	1.70	3.50	2.50	.....	2.10
(39)	3.50	3.00	3.50	3.00	3.40	4.40	2.80	3.30

(Continued on next page)

Measure the Difference



Performance against performance . . . just measure the difference . . . and see for yourself just HOW FAR AHEAD OF THE FIELD GAR WOOD ROAD MACHINERY REALLY IS.

Owners all over the world and the men who operate them will tell you the same story every time. Gar Wood is ahead by miles. In mining, quarrying, lumbering, railroading and general contracting GAR WOOD ROAD MACHINERY means dependability, rugged strength, less down time, precision engineering, practical operating costs — all factors that put Gar Wood far out in front of the field.

Gar Wood Dozers, Dozecasters, Rippers, two and four wheel Scrapers are sold and serviced by Allis Chalmers Dealers everywhere.

GAR WOOD GW TRADE MARK INDUSTRIES

GAR WOOD INDUSTRIES, INC.

ROAD MACHINERY DIVISION

WAYNE, MICHIGAN

ALSO BUILDERS OF HOISTS AND BODIES . . . WINCHES AND CRANES . . . TANKS
DITCHERS AND SHOVELS . . . HEATING UNITS . . . BOATS . . . *GENERAL OFFICES:* WAYNE, MICHIGAN

ARIZONA. Allison Steel Mfg. Co., 19th Ave. and So. Pac. Tracks, Phoenix; CALIFORNIA: Gar Wood Industries, Inc., 1210 Mateo St., Los Angeles 21; Gar Wood Industries, Inc., 17th and Folsom Sts., San Francisco 10; COLORADO: Liberty Trucks & Parts Co., 690 Lincoln St., Denver 1; IDAHO: Olson Mfg. Company, 4000 Warm Springs, Boise; General Machinery Co., E. 3500 Block, Riverside Ave., Spokane 1, Wash.; MONTANA: Reymer Machine Co., Inc., 115 N. 25th St., Billings; Granite Alaska Garage, 45 W. Granite St., Butte; NEW MEXICO: Oden Equip. Co., 312-24 N. 4th St., Albuquerque; Lone Star Equip. Co., 1500 Texas St., El Paso, Texas; OREGON: Fruehauf Trailer & Equip. Co., 1138 S. E. 10th St., Portland 14; UTAH: Lundberg Equip. Co., 257 N. Main St., Logan; Cate Equip. Co., 49 East 9th South, Salt Lake City 4; WASHINGTON: Fruehauf Trailer & Equip. Co., 300-4 Michigan St., Seattle 8; WYOMING: Wilson Equip. & Supply Co., 902 W. 22nd St., Cheyenne.

(40)	5.00	4.20	4.50	4.00	5.00	6.50	3.60	3.95
(41)	7.00	7.20	7.00	8.00	8.00	9.00	5.25	6.50
(42)	15.00	15.00	16.00	12.00	17.00	16.75	10.70	13.20
(43)	24.00	20.00	20.00	17.00	24.00	25.00	6.25	16.50
(44)	.....	.....	.....	.....	.....	.....	.....	.....
(45)	250.00	336.00	350.00	200.00	250.00	240.00	210.00	200.00
(46)	.50	1.20	.35	.50	1.25	.40	.25	1.35
(47)	7.00	8.00	4.00	5.00	6.00	7.00	8.00	6.30
(48)	8.00	7.20	4.50	6.00	5.00	6.00	12.00	14.50
(49)	$7,500	$2,520	$3,700	$3,000	$4,500	$3,500	$3,050	$2,500
(50)	1.00	.80	.75	1.00	.80	.75	.80	1.00
(51)	1.00	.80	.80	.70	1.00	.85	.85	.95
(52)	9.00	7.50	8.00	8.75	8.00	7.00	7.00	7.35
(53)	10.00	3.00	2.50	2.00	5.50	6.00	3.50	3.75
(54)	5.00	4.00	4.00	3.00	2.50	4.00	5.00	2.25
(55)	8.00	12.00	4.00	5.00	10.00	10.00	6.10	3.70
(56)	10.00	6.00	9.00	10.00	3.50	10.00	2.00	4.00
(57)	.10	.09	.05	.50	.07	.07	.20	.03
(58)	3.60	4.00	3.00	3.00	4.20	4.00	5.50	3.70
(59)	1.50	1.40	1.50	2.40	1.40	1.40	2.00	1.15
(60)	2.50	2.40	2.25	2.80	2.30	2.35	3.50	1.90
(61)	.12	.12	.07	.20	.10	.15	.13	.11

Highway and Street . . .

Oregon—Multnomah County—State—Struct. and Pave

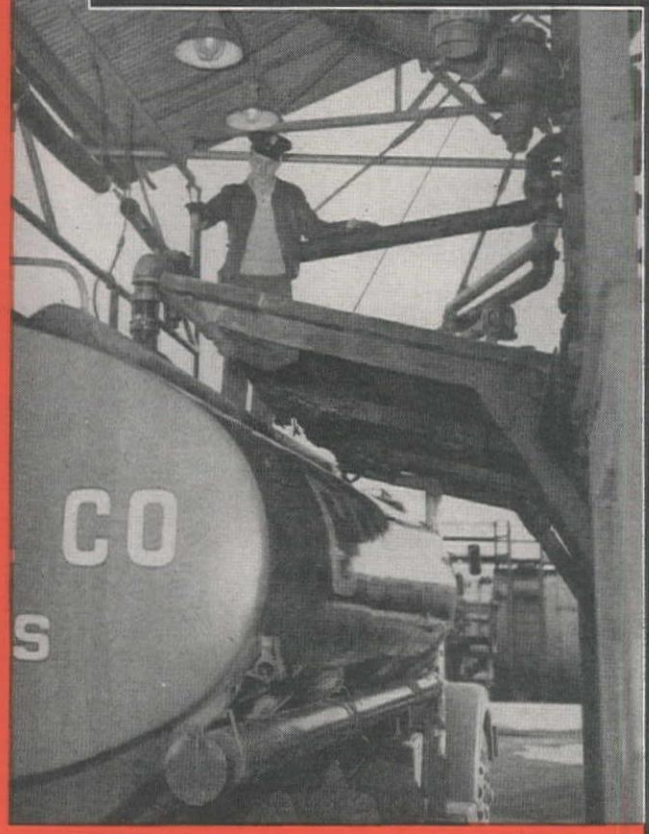
Kuckenberg Construction Co., Portland, Ore., offered the low bid of $932,753 and received the contract for grading, paving, installing water pipe and sewer pipe, manholes, lighting and 5 reinf. conc. structures in Front Ave., between Sheridan St. and Bancroft St., on Pacific Highway West. The State Highway Commission at Salem awarded the contract. Unit bids were submitted as follows:

(1) Kuckenberg Construction Co. $932,753
(2) C. J. Montag & Sons 971,746
(3) Peter Kiewit Sons' Co. $1,274,225
(4) Guy F. Atkinson Co. 1,419,489

	(1)	(2)	(3)	(4)
Lump sum, clearing and grubbing	$6,000	$50,000	$22,000	$10,500
18,000 sq. yd. removal of pavement	.25	.65	.92	1.00
6,400 sq. yd. removal of sidewalks	.10	.50	.70	.80
8,300 lin. ft. removal of curbs	.10	.20	.50	.60
52 only, removal of inlets	12.50	3.00	22.50	35.00
5 only, removal of manholes	50.00	25.00	120.00	100.00
1,000 sq. yd. removal of conc. islands and separators	.50	.65	1.85	1.75
Lump sum, removal of monument and sign post	500.00	300.00	100.00	$1,000
500 cu. yd. removal of miscl. conc. and masonry structs	5.00	3.00	5.00	25.00
1,000 lin. ft. removal of rails in car tracks	1.00	.60	1.85	2.75
1,000 lin. ft. removal of ties in car tracks	1.00	.60	.65	1.50
4,000 cu. yd. struct. excav., unclassified	4.00	4.00	7.90	23.00
84,500 cu. yd. general excavation, loc. "A", unclassified	.60	.50	.60	1.50
28,500 cu. yd. general excav., loc. "B", unclassified	.60	1.25	1.60	1.65
178,000 yd. sta. short overhaul	.02	.02	.02	.02
1,160 cu. yd. sta. long overhaul	.50	.50	5.00	1.00
1,800 lin. ft. rounding cutbanks	.25	.25	.20	.40
Lump sum, finishing roadbed and slopes	$1,000	$6,000	$9,950	$7,000
2,700 lin. ft. 8-in. perforated conc. drain pipe	90.00	1.15	1.00	1.10
580 cu. yd. rock or gravel backfill in drains	3.00	5.00	5.30	6.75
135 lin. ft. 6-in. C.I. drain pipe	2.00	2.20	3.85	5.50
30 lin. ft. 8-in. C.I. drain pipe	2.25	3.10	6.80	6.75
600 lin. ft. 6-in. sewer pipe	.75	1.10	.90	2.00
7,100 lin. ft. 8-in. sewer pipe	.90	1.10	1.15	2.10
330 lin. ft. 10-in. sewer pipe	1.50	1.25	1.45	2.75
970 lin. ft. 12-in. sewer pipe	1.75	1.65	1.70	3.00
560 lin. ft. 15-in. sewer pipe	2.00	2.25	2.00	4.00
1,000 lin. ft. extra for installing pipe under pave.	5.00	1.00	1.25	5.00
30 cu. yd. Class "C" conc.	50.00	50.00	35.00	40.00
8 only, adjustment of roof drains	25.00	30.00	60.00	35.00
12 only, adjustment of manholes	100.00	75.00	65.00	80.00
1 only, adjustment of catch inlets	50.00	25.00	40.00	55.00
10 only, reconst. manholes	150.00	60.00	565.00	200.00
30 only, Type "A" manholes, 5 to 10-ft. deep	175.00	225.00	615.00	230.00
6 only Type "A" manholes, 10 to 22-ft. deep	300.00	300.00	$1,385	300.00
2 only, drop manholes	200.00	400.00	$1,500	450.00
100 only, concrete inlets	75.00	60.00	68.35	75.00
40 lin. ft. ¾-in. copper water pipe	2.00	.45	2.25	3.00
100 lin. ft. 1½-in. copper water pipe	2.25	.80	3.00	3.50
230 lin. ft. 2-in. copper water pipe	2.50	1.15	3.50	4.00
250 lin. ft. 2½-in. copper water pipe	2.75	1.65	4.70	5.50
80 lin. ft. 3-in. copper water pipe	3.50	2.50	5.90	6.50
40 lin. ft. 3½-in. copper water pipe	4.00	3.00	7.65	8.50
950 cu. yd. conc. in curbs	30.00	45.00	53.00	54.00
100 sq. yd. conc. driveways	3.00	4.00	5.00	5.00
6,800 sq. yd. conc. walks	2.70	2.50	2.50	3.50
450 cu. yd. conc. traffic islands	50.00	40.00	55.00	65.00
30 cu. yd. conc. traffic separators	50.00	60.00	64.00	80.00
30 cu. yd. conc. stairways	50.00	75.00	68.00	100.00
320 lin. ft. pipe handrail on stairs	2.00	2.75	3.75	5.00
320 lin. ft. reinstall salvaged guardrail	2.00	2.50	1.70	4.00
970 lin. ft. spring bracket guardrail with wood posts	1.50	3.00	3.60	4.75
120 lin. ft. 3-ft. metal guard fence	1.50	1.75	1.55	1.50
210 lin. ft. 5-ft. metal guard fence	2.50	2.25	2.10	2.00
Lump sum, constructing recesses for traffic control markers	250.00	250.00	$1,050	650.00
Lump sum, shoring, cribbing, etc.	$10,000	$6,200	$12,500	$10,000
3,400 cu. yd. excav. for structs.	4.00	3.00	4.35	6.00
310 cu. yd. excav. below elevations shown	10.00	3.00	8.70	6.50
18,500 lin. ft. furnish treated piling	1.50	1.25	1.20	1.30
430 only, drive piling	25.00	40.00	60.00	60.00
5,600 cu. yd. Class "A" conc.	50.00	47.00	65.00	67.75
882,000 lbs. metal reinforcement	.08	.08	.11	.10
2,600 lin. ft. fabricated metal railing	8.00	10.00	14.50	12.50
340 lin. ft. single pipe railing	1.00	3.00	4.00	5.00
160 lin. ft. double pipe railing	2.50	4.00	6.00	6.50
1,770 sq. yd. membrane waterproofing	1.50	4.00	4.40	3.00
800 sq. yd. tile facing	16.00	18.00	22.00	20.00
Lump sum, trolley troughs complete	$3,000	$1,000	$1,300	$1,600
10 only, drain inlets	50.00	65.00	57.00	40.00
60 only, pole foundations	15.00	60.00	65.00	65.00
45 only, conc. boxes	10.00	38.50	58.00	38.00
22 only, metal pull boxes	5.00	28.50	61.00	30.00
44 only, outlet boxes	5.00	6.00	4.00	6.50
2,000 lin. ft. ¾-in. rigid conduit	.75	.55	.45	.60
1,400 lin. ft. 1-in. rigid conduit	.90	.85	.55	1.00
300 lin. ft. 1¼-in. rigid conduit	1.25	1.05	.80	1.25

(Continued on next page)

FROM REFINERY TO BULK STORAGE



Cooks Oil Company, distributors of Standard fuel oils in Central California, use two PETERBILT TRUCKS to haul oil from the Richmond Refinery to their bulk storage plants in San Francisco, Oakland, Emeryville, San Mateo, San Jose, Hayward, Gilroy, Pleasanton, Walnut Creek and Crockett. From these bulk plants the fuel oil is then distributed in smaller tank trucks to domestic users, industrials, construction projects and other users of fuel oils.

Because of their capacity to transport exceptionally large bulk loads swiftly and safely, PETERBILT TRUCKS were chosen for the first leg of the journey which fuel oil takes from the refinery to the ultimate consumer. This is exactly the kind of a job PETERBILTS were designed and built for—for hauling the big heavy loads which far exceed the capacity of delivery equipment. It is the ideal manner of using manpower and equipment to the best advantage. Yes, for the big loads—it's PETERBILT right down the line.

Peterbilt Motors Company

107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORNIA

300 lin. ft. 1½-in. rigid conduit	1.60	2.30	.90	2.00
700 lin. ft. 2-in. rigid conduit	1.80	2.05	1.10	2.25
9,500 lin. ft. 2-in. fibre conduit	1.50	1.00	.75	1.10
24 only, pedestrian tunnel lights	25.00	80.00	75.00	90.00
24 only, stair wall lights	25.00	30.00	41.00	30.00
26 only, light castings	25.00	23.00	31.00	25.00
Lump sum, wiring	$5,000	$1,700	$1,250	$2,000
10,800 cu. yds. 3-in. - 0-in. material in base	2.00	2.00	2.80	3.00
1,000 cu. yd. 1¼-in. - 0-in. material in base	2.00	3.50	3.60	5.00
1,200 cu. yd. ½-in. - 0-in. material in cushion course	2.00	3.75	3.60	7.00
270 M. gals. sprinkling	3.00	2.50	3.30	2.50
42,500 sq. yd. Portland cement conc. pavement	3.40	2.90	4.00	3.85
3,000 lin. ft. ¾-in. x 8-in. expansion joints	.25	.35	.30	.40
2,300 lin. ft. ½-in. x 8-in. expansion joints	.20	.30	.25	.45
3,000 lin. ft. ¾-in. x 4-in. expansion joints	.15	.20	.25	.35
5,300 lin. ft. ½-in. x ¾-in. expansion joints	.12	.15	.20	.35
25,000 lin. ft. contraction joints	.20	.04	.09	.07
2,000 only ¾-in. x 18-in. dowels	.50	.35	.30	.50
460 only, ¾-in. x 10-in. dowel pins	.50	.30	.25	1.30
600 only, ¾-in. x 6-in. dowel pins	.25	.30	.20	1.35
106,000 lbs. tie bars and reinforcement	.08	.0825	.12	.10
3,500 tons Class "B" asphaltic conc.	8.00	8.00	9.65	8.00
900 tons Class "C" asphaltic conc.	8.00	8.00	9.65	8.50

Arizona—Yavapai County—State—Grade and Surf.

W. J. Henson, Prescott, Ariz., submitted the low bid of $480,005 to the State Highway Department at Phoenix and was awarded the contract for approximately 7.3 miles of grading, draining, base material and plant mixed bituminous surface on the Prescott-Ash Fork Highway. The work begins about 1.8 miles south of the highway junction of U. S. 66 and U. S. 89 near Ash Fork and extends southerly about 7.3 miles. The work is to be completed on or before December 15, 1947. Unit bids were as follows:

(1) W. J. Henson $480,005
(2) Bowen & McLaughlin & L. G. Lynch 583,546
(3) Packard Contracting Co. $517,144
(4) Fisher Contracting Co. 520,332

	(1)	(2)	(3)	(4)
86,122 cu. yd. roadway excavation (unclassified)	1.05	.94	1.40	1.17
757 cu. yd. struct. excav. (unclassified)	4.50	2.50	3.00	2.03
99,224 sta. yd. overhaul	.025	.02	.02	.02
2,417 cu. yd. mi. haul	.25	.35	.30	.48
11,900 ton imported borrow	.62	.67	.54	.73
123,700 ton select material	.62	.71	.58	.76
30,500 ton subgrade seal	.62	.82	1.26	.65
33,000 ton aggregate base	1.10	1.24	1.20	1.17
57,000 cu. yd. stripping pits	.25	.25	.20	.26
8,900 M. gal. sprinkling	3.50	3.00	5.00	4.50
2,460 hr. rolling	6.00	5.50	6.50	6.40
150 hr. mechanical tamping	4.50	6.00	4.00	3.85
539 cu. yd. Class "A" concrete (including cement)	48.00	42.00	45.00	48.10
49,230 lb. reinforcing steel (bars)	.095	.13	.12	.11
1,275 lb. structural steel	.32	.40	.25	.31
270 ea. placing dowels	1.00	2.00	.75	1.30
290 lin. ft. 24-in. corr. metal pipe (CIP except excav.) (14-ga.)	4.25	4.00	4.25	4.00
208 lin. ft. 30-in. corr. metal pipe (CIP except excav.) (14-ga.)	4.75	5.00	5.25	4.95
380 lin. ft. 36-in. corr. metal pipe (CIP except excav.) (12-ga.)	7.00	7.00	7.00	8.10
654 lin. ft. salvag. exist. corr. metal pipe	1.50	2.00	1.50	2.80
Lump sum, reconst. cattle guard (CIP except excav. and conc.)	700.00	600.00	600.00	497.00
86 ea. guide posts	6.00	5.00	4.00	5.15
24 ea. right-of-way markers	7.00	7.00	5.00	6.10
34 ea. resetting right-of-way markers	2.00	3.50	5.00	3.85
19,620 ton plant mix (including haul)	3.00	3.38	2.10	2.60
1,570 ton road oil	28.00	25.10	28.00	30.70
538 ton cutback asphalt	29.00	29.15	30.00	31.48
7.134 mi. placing plantmix	500.00	350.00	850.00	400.00
2,142 ton screenings (for seal coat)	6.00	4.50	4.00	6.30
286 ton emulsified asphalt	30.00	30.20	30.00	31.50
1,008 sq. yd. placing intersections	1.00	1.00	.50	.65

Nevada—White Pine County—State—Grade and Pave.

Hoops Construction Co., Twin Falls, Idaho, submitted the low bid of $189,369 and was awarded the contract by the State Department of Highways in Carson City for the construction of a portion of Route 14, Section B, from Sacramento Pass to Baker Junction, a length of 9.3 miles. All labor and materials are to be furnished by the contractor and all work shall be completed within 130 working days after the date of the award. The following unit bids were submitted:

(1) Hoops Construction Co. $189,369
(2) Dodge Construction, Inc. 199,665
(3) A. O. Thorn & Sons Construction Co. $210,482

	(1)	(2)	(3)
Lump sum, signs	600.00	700.00	$1,000
109,350 cu. yd. roadway excav.	.45	.49	.43
1,546 cu. yd. drainage excav.	.50	1.00	1.00
293 sta. V-type ditches	6.00	5.00	7.00
118,715 yd. sta. overhaul, yd. sta.	.01	.02	.02
963 yd. mi. overhaul, yd. mi.	.20	.20	.20
1,451 cu. yd. struct. excav.	1.50	2.00	2.00
1,529 cu. yd. backfill	.60	1.50	2.00
6,745 M. gal. water	2.00	1.00	2.00
294 hr. power roller	5.00	5.00	7.00
946 hr. tamping roller	6.00	7.50	7.00
9,294 ton Type 1 gravel base	.50	.72	.90
44,712 ton Type 2 gravel base, one inch	.65	.82	.90
75 ton liquid asph., Type MC-2 (seal)	36.00	30.50	33.00
1,007 ton liquid asph., Type SC-2 or SC-3 (roadmix)	34.00	28.50	30.00
9.40 mi. roadmix	650.00	700.00	800.00
61 cu. yd. Class A conc.	50.00	50.00	60.00
103 cu. yd. Class B conc.	45.00	50.00	60.00
9,210 lb. reinf. steel	.10	.12	.10
1,084 lin. ft. 18-in. corr. metal pipe (dipped)	2.50	3.25	2.50
742 lin ft. 24-in. corr. metal pipe (dipped)	4.00	4.50	3.50
168 lin. ft. 30-in. corr. metal pipe (dipped)	5.00	5.50	4.50
180 lin. ft. 36-in. corr. metal pipe (dipped)	8.00	8.00	7.00
46 lin. ft. 48-in. corr. metal pipe (dipped)	10.00	11.00	11.00
206 lin. ft. 21½-in. x 13½-in. corr. metal arch pipe (dipped)	4.00	3.50	2.50
156 lin. ft. 30-in. x 17-in. corr. metal arch pipe (dipped)	5.00	5.00	4.00
376 lin. ft. 37-in. x 21-in. corr. metal arch pipe (dipped)	6.00	6.00	5.50
204 lin. ft. 44-in. x 25-in. corr. metal arch pipe (dipped)	7.00	8.50	8.00
88 lin. ft. 59-in. x 34-in. corr. metal arch pipe (dipped)	10.00	12.00	14.00
67 cu. yd. hand-laid riprap	10.00	10.00	15.00
363 cu. yd. grouted hand-laid riprap	14.00	16.00	20.00
126 ea. culvert markers	5.00	5.00	5.00
10 ea. guide posts	6.00	5.00	6.00
106 ea. monuments	5.00	6.00	7.00
Force account, miscellaneous work	$5,000	$5,000	$5,000

A Unique New Formula for Motor Oil

NOW COMES FROM SHELL RESEARCH

It brings together all the important qualities needed for gasoline engine protection

PREMIUM IN QUALITY . . .
NON-PREMIUM IN PRICE

Yes, in every sense this is a *premium* quality motor oil. Yet *New-Formula* Golden Shell Motor Oil costs you less than most premium oils. Order enough now for all your gasoline-powered equipment.

NEW-FORMULA Golden Shell Motor Oil achieves a goal long sought.

For now, Shell Research takes the latest and most important of many steps forward: It brings together the best of new-found components...*combines them in a unique new formula for motor oil.*

In one of the most extreme tests ever made, this *New-Formula* Golden Shell Motor Oil ranked at the top in every oil quality. With all the important compounds needed to *clean* your engines . . . to *keep* them clean . . . and to provide a protective oil film of lasting, staying strength, *New-Formula* Golden Shell assures engine protection far in excess of the demands of average operation. Shell Oil Company, *Incorporated.*

NEW-FORMULA Golden Shell MOTOR OIL

SHELL ®

CONSTRUCTION SUMMARY

The following pages contain the most complete available tabulation of construction contracts awarded in the eleven western states during the past month. Except for certain instances, contracts amounting to less than $10,000 are not listed. Space is not available to list more than a small proportion of the proposed projects. For your convenience, all items are prepared in an identical manner to provide the following information: County of job location (capital letters); name and address of contractor (bold face); bid price; brief description of work; awarding agency; and approximate date of award. More detailed information may be secured concerning employment conditions, wage rates, etc., by writing directly to the contractor. When available, the names of the supervisory personnel will be published in the "Supervising the Jobs" columns.

CONTRACTS AWARDED

Large Western Projects...

Guy F. Atkinson Co., South San Francisco, Calif., was awarded the $7,737,570 contract for the construction of the Dorena Dam in Lane County, Ore., by the Corps of Engineers, Portland.

United Concrete Pipe Corp., Vinnell Company, Inc., and **Ralph A. Bell**, all of Calif., were awarded a $2,496,202 contract by the Los Angeles Corps of Engineers for channel improvements consisting of rectangular reinf. conc. section with a low-water channel in the center in the Los Angeles River channel, Calif.

A. S. Horner Construction Co., Denver, Colo., and **Switzer Construction Co.** of Denver, were awarded the contract for construction at the Marys Lake power plant and reservoir, and the Estes power plant in Colorado. Contract price is $1,611,953, received from Bureau of Reclamation, Denver.

Austin Road Co. of Dallas, Tex., was awarded a contract for highway improvement in Tarrant County, Tex., by the Texas State Highway Department in Austin, on a bid of $1,665,245.

The General Construction Co., Vancouver, B. C., on a $1,144,770 contract from the B. C. Power Commission, Vancouver, will build the Ladore Falls dam, Vancouver, British Columbia.

Guy F. Atkinson Co., South San Francisco, Calif., was awarded a contract on the low bid of $3,722,310 for earthmoving at the San Francisco Airport. City and County Public Utilities Commission of San Francisco made the award.

J. C. Boespflug Construction Co., Seattle, will build the Health Science Center on the University of Washington campus at Seattle for the Board of Regents of the University. The contract price is $1,868,011.

Macco Corp., Clearwater, Calif., received $1,000,000 from Southern California Edison Co. of Los Angeles to construct water tunnel and intake at Redondo Beach, Calif.

H. Earl Parker, Marysville, Calif., received the contract to construct the Big Dry Creek reservoir in Fresno County, Calif., from the U. S. Engineer Office at Sacramento. The contract price is $762,896.

Dinwiddie Construction Co., Inc., San Francisco, was awarded a $3,000,000 contract for the construction of an office and store bldg. in San Mateo, Calif. Parrott Investment Co. of San Francisco made the award.

Utilities Construction Co. of Nashville, Tenn., received $458,011 from the Bureau of Reclamation at Denver, Colo., for the construction of the Brush-Sterling-Holyoke power line in Colo.

Henry George & Sons, Spokane, received a $1,847,786 contract to construct a technology building and annex on the campus at Washington State College, Pullman. The Board of Regents of the College awarded the contract.

William Simpson Construction Co. of Los Angeles, Calif., received $2,500,000 from the Don Lee Broadcasting System for erection of a radio broadcasting studio on Vine St., Hollywood.

Scheumann & Johnson Co. of Seattle, Wash., will construct outlet structures and pipelines for 16 pumping plants of the Roza Division in Wash. Bureau of Reclamation at Yakima awarded the $773,311 contract.

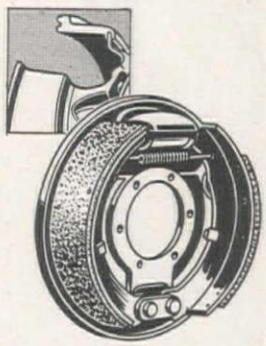
"THINK they last longer? Mister, I KNOW

FORD TRUCKS LAST LONGER!"

That's what Mr. R. G. Colvert of Ardmore, Oklahoma, wrote recently. "One of our Ford Trucks 11 years old," he added, "has gone over 250,000 miles and it's still on the job, with lots of good miles in it!"

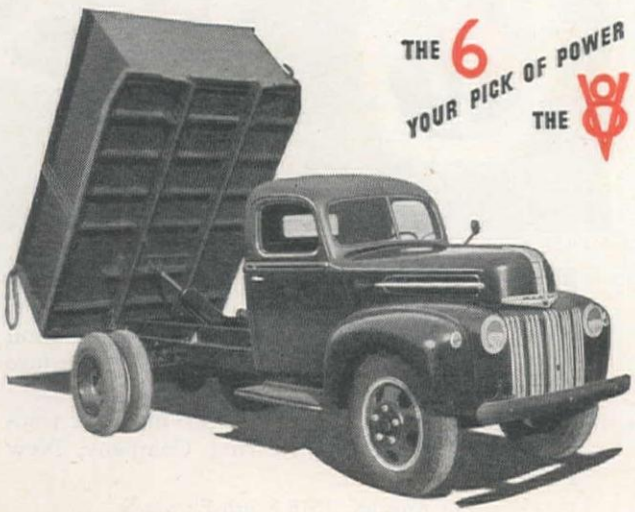
ONE big reason—FORD BRAKES STAND UP!

The wide, heavy, cast drum surfaces of Ford Brakes are non-warping and score-resistant. They are interlocked and fused with steel drum discs during casting, providing great strength and reducing weight. The two shoes are independently anchored, each shoe being actuated by its own hydraulic piston. Adjustment is extremely simple and entirely external. Brakes are exceptionally stable in adjustment. Entry of water and dust is minimized by closely fitted tongue-and-groove design, where edges of drums meet backing plates. Ford brake design promotes long lining life, consistent performance, extra-safe stopping ability and easy pedal pressure.



Ford

Bulk construction materials hauling is a field where Ford Truck stamina pays off in long life and low-cost maintenance. This heavy duty Ford Truck is equipped with a Fabco Dual Drive unit and a 6- to 8-yard dump body and hydraulic hoist by Anthony Co., Streator, Illinois.



ONLY FORD GIVES YOU *ALL* THESE LONG-LIFE FEATURES: Your pick of power—the great V-8 or the brilliant Ford Six—extra-strength frames, with siderails *doubled* in heavy duty models—new Flightlight, 4-ring, oil-saving pistons—full-floating and ¾-floating axles, with axle shafts free of weight-load . . . more than fifty such endurance-engineering features in all. It's because of this long-life construction that *of all trucks 14 years old or older on the road today, there are more Ford Trucks than all other makes combined!* More than 100 body-chassis combinations to choose from. Ask your Ford Dealer to show you!

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE!

American Pipe & Construction Co. of South Gate, Calif., will receive $683,535 from the San Diego City Council for the construction of the San Vicente pipeline in San Diego, Calif.

Nettleton & Baldwin, Inc., of Seattle, have a contract for $1,926,999 for the construction of a classroom bldg. on the campus of Washington State College at Pullman, Wash.

R. J. Sommers Construction Co., Juneau, Alaska, will reconstruct the Mendenhall bridge and section of Glacier hwy., near Juneau, Alaska, for $486,013. The Public Roads Administration of Portland, Ore., made the award.

Frank Lohse of Walla Walla, Wash., received a $1,500,000 contract from the Pacific Telephone & Telegraph Co. for construction of additions to the telephone building in Lewiston, Idaho.

James I. Barnes Construction Co., Santa Monica, Calif., received $850,000 to erect a business and economics building at the University of California at Los Angeles, Calif. The Board of Regents of the University of California at Los Angeles made the award.

Clyde W. Wood, North Hollywood, Calif., received $763,297 for highway improvement between Palomas Creek and Violin Saddle, Los Angeles County, Calif. The Division of Highways at Sacramento awarded the contract.

Carson Construction Co. of Helena, Mont., was awarded a $736,694 contract by the Seattle Corps of Engineers, to convert bldgs. into family housing units at Fort Lewis, Wash.

Highway and Street . . .

Arizona

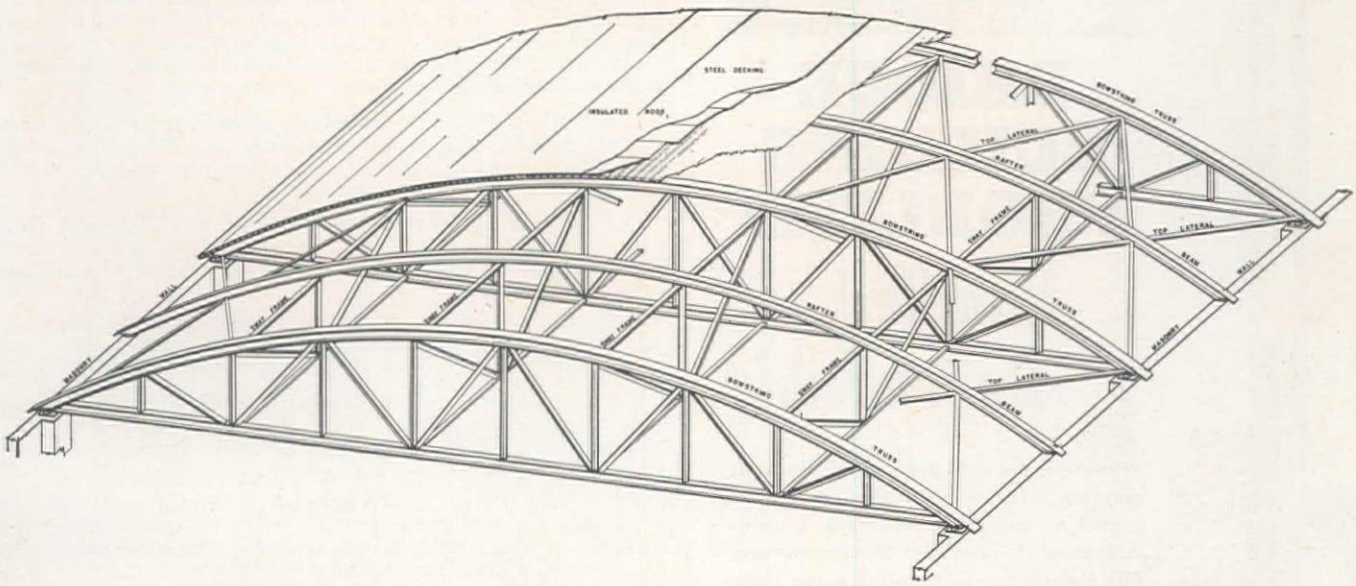
YUMA CO.—**C. P. Cansler,** Box 1828, Yuma—$103,117 for 3 mi. grade, drain, base and surf. San Luis-Yuma Hwy. from ¼ mi. E. of Gadsden and extending N.—by State Highway Department, Phoenix. 3-18

California

HUMBOLDT CO.—**Mercer-Fraser Co.,** 2nd & Commercial Sts., Eureka—$59,983 for 2.2 mi. grade and single seal coat on

Welded Bow String Roof Truss is Economical and Efficient

By Ned L. Ashton
Consulting Engineer, Iowa City, Iowa



THE arc welded bow string roof truss shown above is intended for a 72-foot clear span roof supported on masonry walls, used in combination with an insulated steel deck. This type roof is ideal for large store buildings, hangars, garages, small factories, display rooms, etc.

The bow string truss is economical —uses only 4.4 lbs. of steel per square foot of area for the truss shown—and provides wide entrance-exit openings at ends of the building.

The truss consists of curved 6″-wide flanged top chord sections, 6″ light beam section bottom chords and 3″ x 4″ T section web members joined by electric arc welding. Trusses are spaced at 18′-0″ centers and span 72′-0″. Curvature radius of the top chord is 72′, same as span length. Trusses are 9′-7¾″ deep, center to center of chords, at the middle.

MINIMIZES STRESSES

Truss weight is estimated at 3200 lbs. per truss or 45 lbs. per foot of one truss. The dead load from roofing materials is slightly less than 12 lbs. per square foot. An analysis of the dead load web stresses reveals that they are very small. In fact, the truss is designed so that, under the dead load or a uniform snow load covering the whole span, there is no beam action of the top chord, the stress in every diagonal is zero and the stress is constant throughout the bottom chord. Under half live load conditions, the stresses in the web members alternate between tension and compression going from one member to the next along the truss. Both the chord and web stresses are reversible under varying wind conditions—the same member acting either in tension or compression depending on which way the wind is blowing.

RAFTERS AUGMENT TRUSSES

In addition to the bow string trusses, the roof decking gets support from light intermediate-curved 6″ joist section rafter beams. These make the truss spacing independent of the purlin span. In longer spans, 2, 3 or more of these intermediate rafters should be used between trusses for economy.

Rafters are 5-span continuous beams supported at intervals of 14′-4¾″ by the longitudinal sway frame trusses, and supported transversely by the top lateral bracing. In turn, the rafters cut down the unsupported length of the laterals.

REQUIRES LITTLE FIELD WELDING

Both the 72-foot trusses and the sway frames are designed to be completely fabricated in the shop. Field erection welding is confined to joining the sway frames, rafter beams, top laterals and roof decking.

A detailed study of this roof and the bow string type truss is made in a new series of Plates of "Studies in Structural Arc Welding," published by Lincoln Electric. To be placed on the mailing list for these and future Studies, write The Lincoln Electric Company, Dept. 282, Cleveland 1, Ohio.

Elk River rd., betw. State Hwy. Rt. 1 and Eel River School—by Division of Highways, Sacramento. 3-28

HUMBOLDT CO.—**W. C. Railing,** 27 Lowell St., Redwood City—$98,320 for approx. 10 mi. furn. and place base material and stockpile betw. Korbel rd. and Redwood Summit—by Division of Highways, Sacramento. 3-28

INYO CO.—**Roland T. Reynolds,** Rt. 4, Box 139, Anaheim—$32,671 for 14.7 mi. grade and penetration treatment, drain fac. on State Hwy. 127, betw. Shoshone to boundary of Death Valley Natl. Monument—by County Commission, Independence. 3-18

INYO CO.—**R. T. Reynolds,** Rt. 4, Box 139, Anaheim—$11,858 for 4.7 mi. grade and applying penetration treatment, betw. Tecopa and State Hwy. 127—by County Commission, Independence. 3-26

LOS ANGELES CO. — **Ansco Construction Co., Inc.,** 2725 Atlantic Ave., Long Beach—$200,000 to surf. ½ mi. oval automobile race track and 35 acres for parking facilities, E. of Valley View Ave., betw. Center St. and Firestone Blvd., Norwalk—by Art F. Lanthier & Associates, Los Angeles. 3-6

LOS ANGELES CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$36,096 to grade and pave roadways and parking area and to constr. curbs and gutters at city airport, Santa Monica—by City Council, Santa Monica. 3-7

LOS ANGELES CO.—**Clyde W. Wood,** Box 620, North Hollywood—$763,297 for 2.6 mi. grade and plant mix surf., betw. Palomas Creek and Violin Saddle—by Division of Highways, Sacramento. 3-18

MENDOCINO CO.—**N. M. Ball Sons,** Box 430, Berkeley—$170,927 for 2.9 mi. grade of Longvale-Covelo rd., near Dos Rios—by Division of Highways, Sacramento. 3-28

RIVERSIDE CO.—**E. L. Yeager,** Box 87, Riverside—$104,799 for 2.9 mi. grade and surf. on B St., and Crestmore Rd., betw. State Hwy. 19 in W. Riverside and San Bernardino Co. line—by Division of Highways, Sacramento. 3-18

SACRAMENTO CO.—**Westbrook & Pope,** Rt. 9, Box 841, Sacramento—$47,828 for 1.6 mi. grade and surf. on Howe Ave., betw. Fair Oaks Blvd. and Arden Way, Sacramento—by Division of Highways, Sacramento. 3-25

SAN BENITO CO.—**A. Teichert & Sons, Inc.,** Box 1113, Sacramento—$137,528 for 2.6 mi. grade and plant mix surf. on crusher run base betw. Hollister and 2.6 mi. south—by Division of Highways, Sacramento. 3-28

SAN BERNARDINO CO.—**Arthur A. Johnson,** 421 Pearl St., Laguna Beach—$65,237 for 2.9 mi. grade and surf. from Red Rock bridge, north—by Division of Highways, Sacramento. 3-18

SAN BERNARDINO CO.—**Matich Bros.,** Box 390, Colton—$94,486 for 1.4 mi. grade and surf. from Victorville, east—by Division of Highways, Sacramento. 3-10

SAN FRANCISCO CO.—**The Fay Improvement Co.,** 760 Market St., San Francisco—$17,723 to remove cable car tracks and reconstr. pavement on Sacramento St., betw. Van Ness Ave. and Gough St., San Francisco—by Department of Public Works, San Francisco. 3-25

SANTA CLARA CO.—**Piazza & Huntley,** 175 S. Montgomery St., San Jose—$63,558 for 1.2 mi. grade and pave on N. Fourth St., betw. Rt. 69 and San Jose—by Division of Highways, Sacramento. 3-25

TULARE CO.—**R. M. Price Co.,** 2764 Saturn Ave., Huntington Park—$226,365 for 2.3 mi. grade and surf. on cement treated base, betw. Packwood Creek and Rt. 10—by Division of Highways, Sacramento. 3-26

Colorado

FREMONT CO.—**Brown Construction Co.,** Pueblo—$159,798 for 4.1 mi. surf. and misc. work on State Hwy. 69, betw. Texas Creek and West Cliffe—by State Highway Department, Denver. 3-10

Idaho

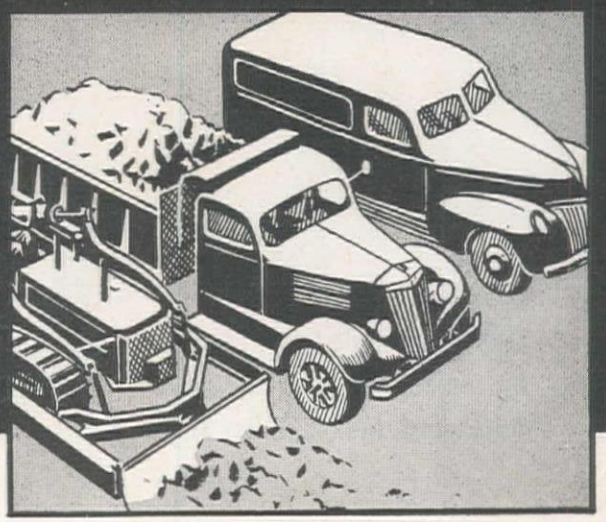
KOOTENAI CO.—**Sather & Sons,** Box 197, Spokane, Wash.—$278,631 for 3.5 mi. of roadbed constr., drain structs. and conc. pave. of U. S. Hwy. 10, betw. Post Falls and Huetter—by Bureau of Highways, Boise. 3-3

Kansas

DECATUR CO.—**D. G. Hansen,** Logan—$15,607 for 14.7 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-3

FORD CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge

for gasoline and diesel engines



Cadel AP Heavy Duty Lubricant

Here's one oil for every automotive type engine on your job—either gasoline or diesel—that gives you a *HIGH FACTOR OF LUBRICATION SAFETY.* To you this means that Cadel AP, because of its unique characteristics, keeps equipment on the job and guards against interruptions and delays.

Cadel AP is a specially treated base oil *fortified* with additives. As a result of these additives Cadel AP is a *DETERGENT, DISPERSANT* and *INHIBITED OIL.*

DETERGENT to prevent formation of lacquers on pistons and valve stems.

DISPERSANT to prevent crankcase contaminants from clogging oil lines and screens.

INHIBITED to guard against corrosion of alloy bearings and prevent deterioration of oil under high temperature heavy duty service.

Use Cadel AP Heavy Duty Lubricant on your *toughest* construction job. Your Associated Representative will be glad to give you *all* the information on this remarkable product.

Call your Associated Representative for expert help on any lubrication problem.

Tell Your Associated Dealer You Want a National Credit Card

TIDE WATER ASSOCIATED OIL COMPANY

City—$14,305 for 18.2 mi. bitum. sealing—by State Highway Commission, Topeka. 3-7

GRAHAM CO.—**San-Ore Construction Co.,** McPherson—$12,517 for 13.9 mi. bitum. sealing—by State Highway Commission, Topeka. 3-3

KEARNY CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$17,751 for 22.2 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-7

LANE CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$26,457 for 31.9 mi. bitum. sealing—by State Highway Commission, Topeka. 3-7

MEADE CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$25,833 for 30.7 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-7

NESS CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$17,148 for 20.2 mi. bitum. sealing—by State Highway Commission, Topeka. 3-7

NORTON CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$10,209 for 10.6 mi. bitum. sealing—by State Highway Commission, Topeka. 3-3

NORTON CO.—**D. G. Hansen,** Logan—$13,877 for 13.2 mi. bitum sealing—by State Highway Commission, Topeka. 3-3

PHILLIPS CO.—**D. G. Hansen,** Logan—$13,043 for 27.8 mi. resurf. material—by State Highway Commission, Topeka. 3-3

RAWLINS CO.—**D. G. Hansen,** Logan—$11,497 for 19.5 mi. resurface—by State Highway Commission, Topeka. 3-3

RAWLINS CO.—**San-Ore Construction Co.,** McPherson—$17,775 for 18.3 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-3

SCOTT CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$11,168 for approx. 8 mi. light type surfacing—by State Highway Commission, Topeka. 3-7

SHERIDAN CO.—**San-Ore Construction Co.,** McPherson—$12,838 for 15 mi. bitum. sealing—by State Highway Commission, Topeka. 3-3

SHERMAN CO.—**San-Ore Construction Co.,** McPherson—$15,315 for 16.5 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-3

SMITH CO.—**Harry Henery,** Ottawa—$18,022 for 16.9 mi. bitum. surf.—by State Highway Commission, Topeka. 3-3

THOMAS CO.—**San-Ore Construction Co.,** McPherson—$12,592 for 13.2 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-3

THOMAS CO.—**San-Ore Construction Co.,** McPherson—$11,664 for 11.4 mi. bitum. sealing—by State Highway Commission, Topeka. 3-3

WICHITA CO.—**Broce Construction Co.,** 214 S. 2nd St., Dodge City—$15,727 for 19.1 mi. bitum. seal coat—by State Highway Commission, Topeka. 3-7

Montana

POWDER RIVER CO.—**Peter Kiewit Sons' Co.,** Omaha Natl. Bk. Bldg., Omaha, Neb.—$68,886 for 1.6 mi. grade of Ashland-Broadus rd.—by State Highway Commission, Helena. 3-1

Oregon

DESCHUTES CO.—**Sleeper & Keyes,** Portland, and **Babler Bros.,** 4617 S.E. Milwaukee Ave., Portland—$59,638 to improve streets in Bend—by City Council, Bend. 3-25

Texas

BREWSTER CO.—**H. R. Henderson & Co.,** Marshall—$169,672 for .6 mi. grade, base and asph. surf. treatment—by State Highway Department, Austin. 3-6

BRISCOE CO.—**Fred Hall & Son,** Box 1188, Waco—$56,492 for 8.8 mi. grade, struct., base and asph. surf.—by State Highway Department, Austin. 3-6

CAMERON CO.—**E. B. Darby & Co.,** Pharr—$116,256 for 8.3 mi. grade, base and surf. — by State Highway Department, Austin. 3-12

DALLAS CO.—**Austin Road Co.,** Box 1590, Dallas—$318,375 for 4.5 mi. of flex. base and double asph. surface treatment—by State Highway Department, Austin. 3-6

DALLAS CO.—**Uvalde Construction Co.,** 2400 Uvalde St., Dallas—$57,951 to improve College and Swiss Aves., betw. Hall and Florida Sts., Dallas—by City Council, Dallas. 3-6

DALLAS CO.—**Uvalde Construction Co.,** 2400 Uvalde St., Dallas—$32,929 to improve Oakland Ave., Dallas—by City Council, Dallas. 3-6

DEAF SMITH CO.—**Bell & Braden,** Herring Hotel Bldg., Amarillo—$188,124 for 13.8 mi. grade, flex. base and double asph. surf.—by State Highway Department, Austin. 3-10

FOARD CO.—**L. L. Cooper,** Kirby Bldg., Dallas—$33,482 for 6.5 mi. grade, base and single asph. surface treat.—by State Highway Department, Austin. 3-10

HUTCHINSON CO.—**Wallace & Bowden,** 5513 E. Grand Ave., Dallas—$57,402 for 8.6 mi. grade, structs., base and surf. treatment—by State Highway Department, Austin. 3-10

JIM WELLS AND NUECES COS.—**J. M. Dellinger, Inc.,** 217 Leming St., Corpus Christi—$237,017 for 34.1 mi. of hot mix asph. conc. pavement — by State Highway Department, Austin. 3-6

LAMPASAS CO.—**H. B. Zachry Co.,** Box 2570, San Antonio—$63,075 for 1.1 mi. grade, flex. base and double asph. surf. treatment—by State Highway Department, Austin. 3-6

PALO PINTO AND ERATH COS.—**Grafe-Callahan Construction Co.,** 2034 Amelia St., Dallas—$42,788 for 4.4 mi. of asph. conc. pavement—by State Highway Department, Austin. 3-6

REFUGIO CO.—**D. & H. Construction Co.,** Box 160-B, Rt. 5, Dallas—$78,774 for 80.9 mi. of seal coat—by State Highway Department, Austin. 3-6

SAN SABA CO.—**McKown & Sons,** Box 151, Austin—$167,952 for 9.1 mi. grade, drain, flex. base and surf.—by State Highway Department, Austin. 3-6

TARRANT CO.—**Austin Road Co.,** Box 1590, Dallas—$1,665,245 for 2 mi. of grade and structs.—by State Highway Department, Austin. 3-12

WARD, CRANE AND PECOS COS.—**Holland Page,** Box 1181, Austin—$36,837 for 40.2 mi. of seal coat—by State Highway Department, Austin. 3-6

WILLIAMSON CO.—**Wallace & Bowden,** 5513 E. Grand Ave., Dallas—$192,070 for 5.1 mi. grade and surf.—by State Highway Department, Austin. 3-12

Washington

CLARK CO.—**Smith Bros. General Contractors, Inc.,** 29 Algona Dr., Vancouver—$41,273 for 1.9 mi. clear, grub, grade and surf. of Clark Co. Rd., near Hockinson—by Department of Highways, Olympia. 3-4

COLUMBIA CO.—**F. H. DeAtley & Co.,** Lewiston, Idaho—$86,177 for 4.2 mi. clear, grub, grade and light bitum. surf. of Touchet rd., betw. Dayton and Abels Grove—by Department of Highways, Olympia. 3-4

COWLITZ CO.—**Lynn Construction Co.,** Chehalis—$73,720 for 2.5 mi. clear, grub, and grade of Kalama river rd.—by Department of Highways, Olympia. 3-19

KING CO.—**Pacific Construction Co.,** Seattle—$61,559 to pave 40th Ave. SW. and 49th Ave. SW., Seattle—by City Council, Seattle. 3-7

KITSAP CO.—**M-B Contracting Co.,** Port Orchard—$11,255 to remove timber bridge, clear, grub, grade, drain and surf. of .3 mi.—by County Commission, Port Orchard. 3-4

LEWIS CO,—**Pacific Sand & Gravel Co.,** Box 629, Centralia—$36,578 for 2.4 mi. clear, grub, grade and surf. of part of John Koontz rd.—by Department of Highways, Olympia. 3-4

PIERCE CO.—**Consolidated Construction Co.,** 3102 N. 28th St., Tacoma—$56,387 for 1.3 mi. grade and bitum. surf. of Eatonville cutoff—by Department of Highways, Olympia. 3-19

SKAGIT CO.—**C. V. Wilder,** Bellingham—$17,080 to re-surf. N. Fourth St. from viaduct to N. city limits, Mount Vernon—by City Council, Mount Vernon. 3-1

STEVENS CO.—**F. R. Hewitt,** 420 W. 22nd Ave., Spokane—$141,946 for 7.6 mi. grade and surf. of Addy-Gifford rd.—by Department of Highways, Olympia. 3-19

STEVENS CO.—**Standard Asphalt Paving Co.,** Chronicle Bldg., Spokane—$40,201 for 17 mi. light type surf. and 10.7 mi. seal coat—by County Commission, Colville. 3-11

WHITMAN CO.—**Carbon Bros.,** Box 5025, Sta. C, Spokane—$31,825 for 4.5 mi. light bitum. surf. treatment on Steptoe Butte state park rd.—by Department of Highways, Olympia 3-20

YAKIMA CO.—**Fiorito Bros.,** 1100 Leary Way, Seattle—$184,081 to surf. and pave in various sections of the county — by County Commission, Yakima. 3-22

YAKIMA CO. — **J. W. Hardison Co.,** Yakima—$57,000 for 7 mi. heavy ballast and gravel surf. of county roads NW. of Yakima—by County Commission, Yakima. 3-7

Bridge . . .

California

BUTTE CO.—**Dey Contracting Co.,** Rt. 1, Box 871-A, Menlo Park — $94,394 for constr. of reinf. conc. girder bridge across S. fork of Feather River at Bidwell Bar—by Division of Highways, Sacramento. 3-28

CONTRA COSTA AND SOLANO COS.—**Minton & Kubon,** 200 Davis St., San Francisco—$23,924 to constr. maintenance railings, platforms and ladders on the Carquinez Bridge—by Division of Highways, Sacramento. 3-27

GLENN CO.—**Johnson Western Co.,** Box 416, Alameda — $359,151 for constr. of bridge and approaches across E. Branch Razor Slough and Sacramento River near Butte City — by Division of Highways, Sacramento. 3-5

LOS ANGELES CO.—**Oberg Bros.,** 401 W. Redondo, Inglewood — $195,993 for constr. of reinf. conc. box girder undercrossing, Santa Ana Parkway at Soto St. —by Division of Highways, Sacramento. 3-7

MADERA CO.—**Munn & Perkins,** Rt. 4, Box 1930, Modesto—$30,650 for constr. of timber bridge across Fresno River and a timber weir in Fresno River siphon wasteway, approx. 11 mi. N.E. of Madera—by Bureau of Reclamation, Friant. 3-10

MERCED CO.—**Roy Kruger,** Gustine—$18,750 to improve 5 bridges over canal No. 5 at Buhach, Livingston Canal W. of Winto, Mile Creek at Healy Rd., Chowchilla River E. of El Nido and over Childs Ave. E. of Palanda—by County Commission, Merced. 3-19

NAPA AND LAKE COS.—**Piombo Construction Co.,** 1571 Turk St., San Francisco—$218,280 for constr. of 2 bridges and approx. .8 mi. grade and surf., near Napa-Lake Co. line—by Division of Highways, Sacramento. 3-26

ORANGE CO. — **Catalina Construction Co.,** Box 385, Covian—$48,554 for constr. of 2 culverts near Irvine—by Division of Highways, Sacramento. 3-28

PLACER CO. — **Fredrickson & Watson Construction Co.,** 873 81st Ave., Oakland —$230,095 to const. underpass, widen existing bridge, 1.9 mi. grade and surf., betw. Wise Canal and Rock Creek—by Division of Highways, Sacramento. 3-18

SACRAMENTO CO. — **W. E. Thomas Construction Co.,** Box 1462, Sacramento—$18,713 for constr. of reinf. conc. slab bridge over Arcade Creek on Madison Ave., NE. of Sacramento—by Division of Highways, Sacramento. 3-7

SAN DIEGO CO.—**Fred D. Kyle Co.,** 39 Congress St., Pasadena—$23,834 to constr. reinf. conc. bridge across Escondido Creek on Midway Dr., near Escondido — by County Board of Supervisors, San Diego. 3-1

SAN DIEGO CO.—**C. B. Tuttle Co.,** 268 Belmont Ave., Long Beach—$44,333 for repair of overhead crossing over Switzer Canyon, San Diego—by Division of Highways, Sacramento. 3-17

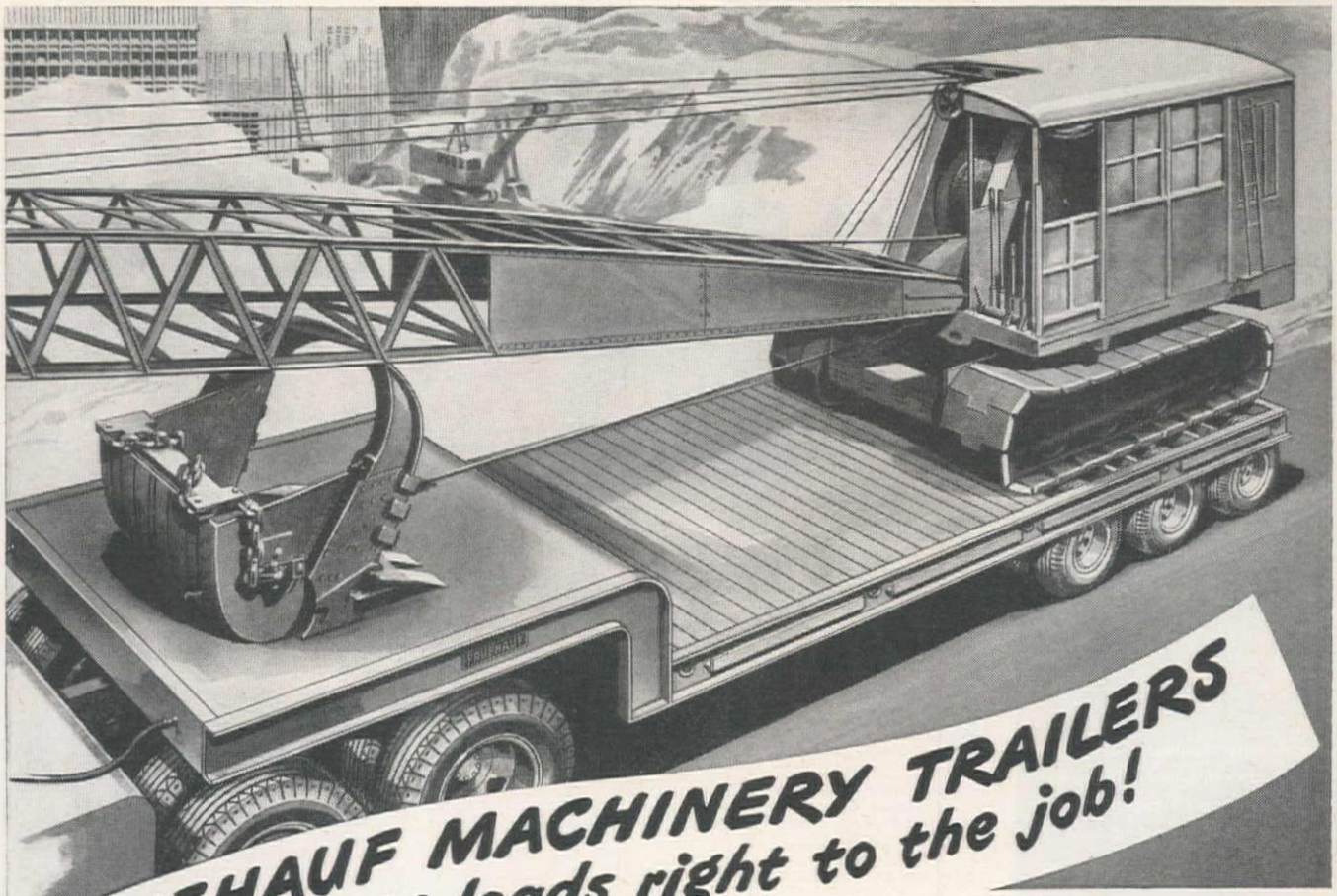
SAN JOAQUIN CO.—**Elmer J. Warner,** 1108 Sycamore St., Stockton—$73,631 for constr. of steel girder bridge and .4 mi. grade and surf., Calaveras River, approx. 8 mi. N. of Stockton—by Division of Highways, Sacramento. 3-18

SAN MATEO CO.—**Carrico & Gautier,** 365 Ocean Ave., San Francisco—$378,653 for constr. of substruct. for 4 overcrossings on Bayshore Freeway, betw. South San Francisco and Burlingame—by Division of Highways, Sacramento. 3-5

SANTA BARBARA CO.—**Macco Corp.,** 815 Paramount Blvd., Clearwater—$231,-305 for constr. of substruct. for an overhead crossing over tracks of Southern Pacific Co. at Salsipuedes St., Santa Barbara—by Division of Highways, Sacramento. 3-7

TULARE CO.—**R. M. Price Co.,** 2764 Saturn Ave., Huntington Park—$92,921 for constr. of steel beam span bridge and grade and surf. of approaches, Yokohl Creek, approx. 4 mi. N. of Exeter—by Division of Highways, Sacramento. 3-26

TULARE CO. — **Wheeler Construction Co.,** 875 Cleveland, Oakland—$29,324 for constr. of bridge and approaches across White River Sink, approx. 2 mi. N. of Earlimart—by Division of Highways, Sacramento. 3-7



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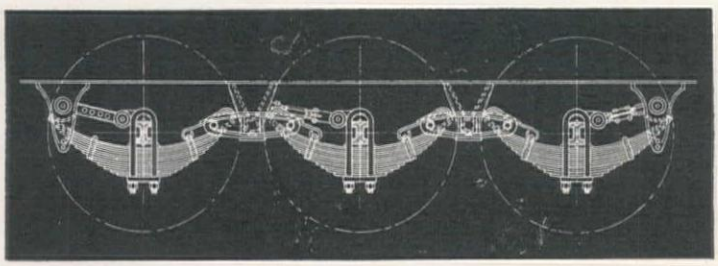

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FRUEHAUF TRAILERS "Engineered Transportation"

YOLO CO.—**Chittenden & Chittenden,** Box 246, Auburn—$70,193 for constr. of reinf. conc. slab bridge and to reconstr. existing slab bridge, across Moody Slough, 2 mi. NE. of Winters and at Cache Creek slightly N. of Copay—by Division of Highways, Sacramento. 3-12

Texas

BEXAR CO.—**Cunningham Construction Co.,** Box 115, Grayson St. Station, San Antonio—$22,261 for constr. of bridge over Alazan Creek at West Houston St., San Antonio—by City Council, San Antonio. 3-24

Washington

SNOHOMISH CO.—**American Pile Driving Co.,** Everett—$11,427 to reconstr. part of the drawrest of Snohomish River bridge No. 1-A/205 on S. State Hwy. No. 1-A—by Department of Highways, Olympia. 3-20

Wyoming

BIG HORN CO.—**Heald & Tebbs Construction Co.,** Cowley—$63,645 for constr. of bridge and 1 mi. surf., oil, and seal coat of Cowley depot road, and Deaver-Cowley rd.—by State Highway Department, Cheyenne. 3-13

Territories

ALASKA—**R. J. Sommers Construction Co.,** Juneau—$486,013 to reconstr. Mendenhall bridge and reconstr. of 6.5 mi. section of Glacier Hwy. near Juneau—by Public Roads Administration, Portland, Ore. 3-6

Airport . . .

California

SAN MATEO CO.—**Guy F. Atkinson Co.,** Orange and Railroad Aves., So. San Francisco—$3,722,310 for constr. of fills and reclamation of tidelands, adjacent to developed airport area; constr. of roadway embankment, etc. on developed area at San Francisco Airport—by City and County Public Utilities Commission, San Francisco. 3-26

Water Supply . . .

Arizona

MARICOPA CO.—**J. H. Welsh & Son,** 613 S. Central, Phoenix—$131,281 to install approx. 24,580 lin. ft. of 12-in. C. I. pipe in Phoenix—by City Council, Phoenix. 3-14

California

CONTRA COSTA CO.—**McGuire & Hester,** 796 66th Ave., Oakland—$38,845 to install water main in S. 21st St., Pullman Ave. and 21st St., Richmond—by East Bay Municipal Utility District, Oakland. 3-21

NAPA CO.—**N. P. Van Valkenburg & Co.,** Howe Ave., N. Sacramento—$119,854 to lay pipeline from Rector Creek reservoir to Veterans' home—by Division of Water Resources, Sacramento. 3-26

SAN DIEGO CO.—**American Pipe & Construction Co.,** 4535 Firestone Blvd., South Gate—$683,535 for constr. of San Vicente pipeline, betw. San Vicente and Lakeside—by City Council, San Diego. 3-19

Texas

DALLAS CO.—**Diamond Engineering Co.,** Buckner Blvd. & New Kaufman Rd., Dallas—$23,706 to relocate water main in Central Ave., Dallas—by City Council, Dallas. 3-3

HIDALGO CO.—**Flanders Construction Co.,** Edinburg—$37,350 to line canal, Edinburg—by County Water Control and Improvement District No. 15, Edinburg. 3-3

TARRANT CO.—**Glade Construction Co.,** Century Bldg., Fort Worth—$17,846 for clear well changes at the Holly Plant, Fort Worth—by City Council, Fort Worth. 3-4

Washington

SNOHOMISH CO.—**Stateside Construction Co.,** 905 10th St., Everett—$32,600 to install 19,000 ft. of 4-in. and 6-in. water pipe in Everett—by Swans Trail water district, Everett. 3-21

WHITMAN CO.—**Rushlight Automatic Sprinkler Co.,** Portland, Ore.—$176,301 to constr. 2,000,000-gal. conc. reservoir in Pullman—by Board of Regents, Washington State College, Pullman. 3-14

Sewerage . . .

Arizona

MARICOPA CO.—**Arizona Concrete Pipe Co.,** 1746 W. Fillmore, Phoenix—$5,990 to install vit. clay sewers in Gardendale Addition, Phoenix—by City Council, Phoenix. 3-14

MARICOPA CO. — **Peter J. Foskins,** Phoenix—$4,331 to install 8-in. vit. clay sewer and brick manholes in Mulberry St., Phoenix—by City Council, Phoenix. 3-14

MARICOPA CO.—**Gladding, McBean & Co.,** 2901 Los Feliz Blvd., Los Angeles, Calif.—$304,875 to furn. 8 to 10-in. vit. clay pipe and fittings to Phoenix — by City Council, Phoenix. 3-21

California

ALAMEDA CO.—**D. J. Bressi,** 305 Linden Ave., So. San Francisco—$28,555 to install pipe conduit and appurtenances, portion of MacArthur Blvd., betw. 55th Ave. and Pierson St., Oakland—by City Council, Oakland. 3-26

ALAMEDA CO.—**McGuire & Hester,** 796 66th Ave., Oakland—$38,621 to install pipe conduit and culverts, Hagenberger Rd. and 77th Ave., and San Leandro St., Oakland—by City Council, Oakland. 3-24

LOS ANGELES CO.—**Bebek & Brkich,** 238 W. Florence Ave., Los Angeles—$90,696 for constr. of sanitary sewers in Concourse Ave., Montebello—by City Council, Montebello. 3-7

LOS ANGELES CO.—**Chorak Construction Co.,** 1024A Atlantic Blvd., Los Angeles—$12,360 for constr. of sewers in Martha St., Los Angeles — by County Board of Supervisors, Los Angeles. 3-7

LOS ANGELES CO. — **Hanawalt Bros.,** 2151 D St., La Verne—$44,613 to install sanitary sewers in San Jose, Cucamonga Aves., Claremont—by City Council, Claremont. 3-14

LOS ANGELES CO.—**Steve P. Rados,** 2975 San Fernando Rd., Los Angeles — $336,088 to install approx. 16,000 ft. of 57 to 63-in. reinf. conc. pipe, joint outfall "B" sewer, Unit 1, Section 7, betw. Washington Blvd. and Florence Ave.—County Sanitation District No. 2, Los Angeles. 3-18

MARIN CO.—**Stolte, Inc.,** 9451 San Leandro St., Oakland—$152,467 for constr. of reinf. conc. pump station and equipment, Mill Valley—by City Council, Mill Valley. 3-7

ORANGE CO.—**V. C. K. Construction Co.,** 629 S. Atlantic Blvd., Los Angeles—$107,618 for constr. of sewer lines in Corona Del Mar, Newport Beach—by City Council, Newport Beach. 3-28

RIVERSIDE CO.—**O'Shaughnessy Construction Co.,** 2400 Piru St., Compton—$50,400 for constr. of 30,840 lin ft. of conc. pipe with cement joint sewer lines, Perris—by City Council, Perris. 3-1

SAN FRANCISCO CO.—**M. J. Lynch,** 2251 Revere Ave., San Francisco—$16,152 for slope repair and drainage on W. side of Bernal Ave., betw. Miguel St. and St. Mary's Ave., San Francisco—by Department of Public Works, San Francisco. 3-6

SAN FRANCISCO CO.—**M. J. Treacey,** 2731 37th Ave., San Francisco—$17,260 to install 600 lin. ft. reinf. conc. pipe sewer and one manhole, Glen Park Playground, San Francisco—by Department of Public Works, San Francisco. 3-6

New Mexico

DONA ANA CO.—**P. R. Burn,** Las Cruces—$106,000 to add to sewer system in Las Cruces—by City Council, Las Cruces. 3-21

Oregon

UMATILLA CO. — **Inland Equipment Co.,** Ellensburg—$23,680 to constr. sewers and lift station at Hermiston—by Federal Public Housing Authority, Portland. 3-20

Texas

CALDWELL CO. — **Thomas & Ratliff,** Rogers—$303,715 for 15.6 mi. grade, structs. and roadbed treatment—by State Highway Department, Austin. 3-13

DALLAS CO. — **McKenzie Construction Co.,** Transit Tower, San Antonio—$384,987 to install storm sewer in tunnel, Dallas—by State Highway Department, Austin. 3-14

DALLAS CO.—**E. H. Reeder Construction Co.,** Box 5660, Dallas—$10,592 to install sanitary sewers in Lakeland Terrace, Dallas—by City Council, Dallas. 3-17

TARRANT CO.—**Glade Construction Co.,** Century Bldg., Fort Worth—$14,994 to install storm sewer in Cockrell Ave., Fort Worth—by City Council, Fort Worth. 3-13

TARRANT CO. — **R. C. Montgomery,** 4531 E. Lancaster, Fort Worth—$12,367 to install storm sewer in Collinwood Ave., Fort Worth—by City Council, Fort Worth. 3-3

Washington

KING CO.—**Matt Malaspina & Co.,** 1901 23rd St., Seattle—$28,303 to install sewers in 27th Ave. N.E., Seattle—by City Council, Seattle. 3-21

KING CO.—**Pacific Construction Co.,** 1510 21st S., Seattle—$12,715 to install sewers in 49th Ave. SW., Seattle—by City Council, Seattle. 3-7

KING CO.—**Valley Construction Co.,** 7708 Rainier Ave., Seattle—$49,142 to install sewers in 37th Ave. S., Seattle—by City Council, Seattle. 3-7

WHITMAN CO.—**George Locken,** The Dalles, Ore.—$11,180 to improve sewers in Pullman—by City Council, Pullman. 3-21

Waterway . . .

California

LOS ANGELES CO.—**Guy F. Atkinson Co.,** 22233 S. Santa Fe Ave., Long Beach—$466,308 to transport and drive piles and constr. conc. rear apron and conc. rear wharf, Berths 179-80 at Wilmington—by Board of Harbor Commissioners, Los Angeles. 3-6

LOS ANGELES CO. — **M. H. Golden Construction Co.,** 3485 Noell, San Diego—$689,000 for const. of steel frame transit shed for Berths 179-80 at Wilmington—by Board of Harbor Commissioners, Los Angeles. 3-6

LOS ANGELES CO.—**Johnson Western Co.,** 2100 Wilmington - San Pedro Rd., Berth 115, P. O. Box 6, San Pedro—$17,100 to bucket dredge approx. 15,000 cu. yds. of material to depth of 35 ft. with overdepth of 2 ft. outside pierhead lines in front of Berths 179-80, Inner Harbor, Los Angeles—by City Board of Harbor Commissioners, Los Angeles. 3-7

LOS ANGELES CO. — **United Concrete Pipe Corp.,** Box 425, Baldwin Park; **Vinnell Company, Inc.,** 1145 Westminster, Alhambra; and **Ralph A. Bell,** 1345 Woodstock Dr., San Marino—$2,496,202 for improvement of 9,000 lin. ft. of river channel, Los Angeles river channel, betw. Lankershim Blvd. and Niagara St., Los Angeles—by Corps of Engineers, Los Angeles. 3-21

LOS ANGELES CO. — **Warren-Southwest, Inc.,** 2145 E. 25th St., Los Angeles—$232,965 to make and impregnate piles for Berths 179-80 at Wilmington—by Board of Harbor Commissioners, Los Angeles. 3-6

Idaho

CANYON CO.—**C. E. Leseberg,** Nyssa, Ore.—$24,882 for emergency flood control work on left bank of Boise river—by Corps of Engineers, Portland, Ore. 3-26

GEM CO. — **Humphreys-Ketchen Construction Co.,** Boise — $54,336 for riprap rock work on Boise river levee system betw. Emmett and Parma and Strawberry Glenn section — by Corps of Engineers, Portland, Ore. 3-20

GEM CO. — **Martin Construction Co.,** Boise—$12,711 to repair and restore levee on left bank of Payette river, Fishback area W. of Emmett—by Corps of Engineers, Portland, Ore. 3-23

Oregon

MULTNOMAH CO.—**General Construction Co.,** Box 3860, Portland—$65,634 to drive fender pile and renew apron for slip and harbor front of pier B, municipal terminal No. 1, Portland—by Commission of Public Docks, Portland. 3-20

MULTNOMAH CO. — **Gilpin Construction Co.,** 4850 N.W. Front St., Portland—$30,196 for constr. of pier, Portland—by Texas Co., Portland. 3-8

UMATILLA CO. — **Dobyns & Webb,** Salem—$13,570 for bank protection repairs on Walla Walla river at S. city limits of Milton—by Corps of Engineers, Portland. 3-12

Washington

CLALLAM CO.—**Owens Bros.,** Seattle—$80,000 to reconstr. pier at foot of Laurel St., Port Angeles—by Black Ball Ferry System, Port Angeles. 3-8

ISLAND CO.—**General Construction Co.,** 840 Iowa Ave., Seattle—$240,800 to dredge and to constr. a rubblestone breakwater in Lake Crockett—by Corps of Engineers, Seattle. 3-22

SNOHOMISH CO.—**Dawson & Hoback,** Bellingham—$17,064 for river revetment repair along Stillaguamish river, near Arlington—by Corps of Engineers, Seattle. 3-18

SNOHOMISH CO.—**L. E. Hoback,** Everett—$24,760 for levee constr., rock revet., flood gate install. and misc. constr. on left bank of Snohomish river—by County Commission, Everett. 3-25

Territories

ALASKA—**Lemon Creek Sand & Gravel Co.,** Juneau—$19,750 for constr. of 400 lin. ft. of conc. revetment on left bank of Gold Creek, Juneau—by Corps of Engineers, Seattle, Wash. 3-12

Canada

BRITISH COLUMBIA—**B. C. Bridge & Dredging Co., Ltd.,** 544 Howe St., Vancouver—$144,570 to widen and extend Port Alberni assembly wharf—by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA—**B. C. Bridge & Dredging Co., Ltd.,** 544 Howe St., Vancouver—$100,000 to erect a pier in the inner harbor at Victoria—by Black Ball Ferry Line, Vancouver. 3-3

BRITISH COLUMBIA—**B. C. Bridge & Dredging Co., Ltd.,** 455 Howe St., Vancouver—$73,500 to improve Nicomen and Gunderson's Slough, Fraser River — by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA—**Gilley Brothers, Ltd.,** Vancouver—$57,710 for channel protection, Fraser River Kirkland Island — by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA—**Gilley Brothers, Ltd.,** Vancouver—$27,450 for protection work at Lulu Island, Fraser River—by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA—**William Greenlees,** Vancouver—$61,210 for reconstr. of wharf at Gibson's Landing—by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA—**James McDonald Construction Co., Ltd.,** Vancouver, and

West Coast Salvage & Construction Co., Vancouver—$94,689 for constr. at Victoria Fishing Harborage—by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA—**Northern Construction Co.**, Vancouver, and **J. W. Stewart, Ltd.**, Vancouver—$296,123 to replace fishing harborage at Westview—by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA — **Pacific Pile Driving Co., Ltd.**, Vancouver—$58,760 for improvements of harbor at Nanaimo Commercial Inlet—by Federal Department of Public Works, Vancouver. 3-21

BRITISH COLUMBIA — **Pacific Pile Driving Co.**, Vancouver—$33,978 for breakwater constr., Alert Bay—by Federal Department of Public Works, Vancouver. 3-21

Dam . . .

California

FRESNO CO.—**H. Earl Parker**, 12th and F Sts., Marysville — $762,896 to constr. earthfill levee type dam, Big Dry Creek reservoir and outlets, near Clovis—by U. S. Engineer Office, Sacramento. 3-27

Oregon

LANE CO.—**Guy F. Atkinson Co.**, Orange & Railroad Aves., So. San Francisco, Calif. —$7,737,570 for constr. of earthfill dam, capacity of 75,000 acre ft. of water and crest length of 4,650 ft. Dorena dam on Row River approx. 2 mi. below Dorena—by Corps of Engineers, Portland. 3-28

Canada

BRITISH COLUMBIA — **General Construction Co.**, Vancouver—$1,144,770 for constr. of Ladore Falls dam at north end of Vancouver Island—by British Columbia Power Commission, Vancouver. 3-1

Irrigation . . .

California

CONTRA COSTA CO.—**M. W. Brown**, Box 222, Redding—$11,849 for constr. of earthwork and culverts, Los Nedanos wasteway extension, Contra Costa canal, Central Valley project—by Bureau of Reclamation, Antioch. 3-21

Colorado

LARIMER CO.—**A. S. Horner Construction Co.**, 118 S. Pecos, Denver, and **Switzer Construction Co.**, University Bldg., Denver—$1,611,953 for constr. of earthwork and structs. for Aspen Creek siphon, Marys Lake power plant, penstock, spillway and switchyard; Marys Lake Reservoir, dikes and road reloc.; Prospect Mt. conduit, and Estes power plant, penstocks and switchyard, work located 1 mi. E. to 4½ mi. SW. of Estes Park—by Bureau of Reclamation, Denver. 3-18

Washington

YAKIMA CO.—**C. T. Malcom**, 2336 N.E. 30th Ave., Portland, Ore. — $47,138 for constr. of pipelines, earthwork and structs., lateral dist. system, pump area No. 8, Yakima Project—by Bureau of Reclamation, Yakima. 3-10

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mann & Johnson Co., Lloyd Bldg., Seattle —$773,311 for constr. of discharge pipe lines and outlet structs. for 16 pumping plants of Roza division, work located betw. Yakima and Benton City—by Bureau of Reclamation, Yakima. 3-19

Tunnel . . .

California

LOS ANGELES CO.—**Macco Corp.**, 815 North Paramount Blvd., Clearwater—$1,000,000 for constr. of circ. water tunnel and intake, includ. 2 ten-ft. reinf. conc. intake disch. pipes, Redondo Beach—by Southern California Edison Co., Los Angeles. 3-6

Montana

LAKE CO.—**The Utah Construction Co.**, Box 1590, Salt Lake City, Utah—will bore tunnel for installation of 77,000 hp. unit for Kerr dam and constr. addition to powerhouse, approx. 6 mi. SW. of Polson—by Bureau of Reclamation, Washington, D. C. 3-4

Wyoming

FREMONT CO.—**Leach Bros.**, 332 Grand Ave., Billings, Mont.—$218,219 to enlarge tunnel on Thermopolis-Shoshone rd.—by State Highway Department, Cheyenne. 3-13

Power . . .

Colorado

MORGAN, LOGAN AND PHILLIPS COS.—**Utilities Construction Co.**, Nashville, Tenn.—$458,011 for constr. of Brush-Sterling 115-kv. line and Sterling-Holyoke 69 kv. approx. 117 mi. long—by Bureau of Reclamation, Denver. 3-6

Idaho

CASSIA AND MINIDOKA COS. — **Standard Transformer Co.**, Warren, Ohio —$44,673 to furn. outdoor type power transformers for Burley and Rupert substations, Minidoka Project—by Bureau of Reclamation, Denver, Colo. 3-7

Montana

FLATHEAD CO.—**Olson Construction Co., Inc.**, 1549 S. 2nd W., Salt Lake City, Utah—$49,155 for constr. of 12.47 kv. transmission line from Hungry Horse Dam constr. substation to Hungry Horse Govt. Camp substation—by Bureau of Reclamation, Denver, Colo. 3-26

VARIOUS COS.—**McPhail Engineering Co.**, Tacoma, Wash.—$286,080 to clear and constr. Kalispell-Kerr dam 115 kv. transmission line—by Bonneville Power Administration, Portland, Ore. 3-18

Washington

VARIOUS COS. — **McPhail Engineering Co.**, Tacoma—$68,400 for constr. of 25.5 mi Spirit-Colville 115 kv. transmission line—by Bonneville Power Administration, Portland, Ore. 3-1

Building . . .

Arizona

MARICOPA CO. — **Allison Steel Co.**, Phoenix—$136,443 to furn. struct. steel roof and galvanize 656,000 lbs. of struct. steel roof parts for 20-million gal. reservoir near Scottsdale—by City Council, Phoenix. 3-7

MOHAVE CO.—**W. S. Ford**, P. O. Box 928, Kingman—$129,965 for constr. of conc. and steel warehouse, Davis Dam Project, approx. 30 mi. W. of Kingman—by Bureau of Reclamation, Kingman. 3-10

California

ALAMEDA CO.—**Louis C. Dunn, Inc.**, Monadnock Bldg., San Francisco—$490,000 for constr. of 2-story, steel and sheet metal warehouse and office bldg. at Hollis and 65th Sts., Emeryville—by Joseph T. Ryerson & Son, Chicago, Ill. 3-26

ALAMEDA CO. — **Erbentraut & Summers**, 696 Pennsylvania St., San Francisco — $699,300 for constr. of 3-story reinf. conc. forestry bldg. at university, Berkeley —by Board of Regents, University of California, Berkeley. 3-4

ALAMEDA CO.—**Willis F. Lynn**, 1040 Folger Ave., Berkeley—$284,900 for constr. of one-story, conc. school bldg. at elementary school, W. Ave. 129, San Leandro —by City Board of Education, San Leandro. 3-11

ALAMEDA CO.—**Willis F. Lynn**, 1040 Folger Ave., Berkeley—$70,850 for alterations and additions to 2-story, wood frame naval reserve armory bldgs. at end of 5th Ave., Oakland—by Bureau of Yards & Docks, Washington, D. C. 3-26

ALAMEDA CO.—**Moore & Roberts**, 603 Mission St., San Francisco—$140,000 for constr. of 2-story, steel frame store and office bldg., Oakland—by G. Miller, Oakland. 3-21

CONTRA COSTA CO. — **Charles Mac-**


PACIFIC
SUPER STEEL
PREFORMED
WIRE ROPE
PACIFIC WIRE ROPE COMPANY
LOS ANGELES 21, CALIF., U.S.A. BRANCHES:
SAN FRANCISCO HOUSTON PORTLAND

Closky, 112 Market St., San Francisco—$165,929 to convert 16 bldgs. into 64 apartments, Section Q, Areas 3 and 4, approx. 1 mi. S. of Pittsburg—by U. S. Engineer Office, San Francisco. 3-12

CONTRA COSTA CO.—**Frank A. Payne & Son,** 8 Overhill Rd., Orinda—$41,250 for constr. of prefab. frame classroom addition to grammar school, Walnut Creek — by Walnut Creek Grammar School, Walnut Creek. 3-15

KERN CO.—**Gannon Bros.,** 3400 Union Ave., Bakersfield—$100,000 for constr. of reinf. conc. high school bldg., Bakersfield —by Roman Catholic Bishop, Fresno. 3-28

KERN CO.—**Guy E. Hall,** 1326 30th St., Bakersfield—$174,999 for constr. of 2-story reinf. conc. addition to high school bldg. at 2200 Quincy St., E. Bakersfield — by Board of Trustees of Kern County Union High School District, Bakersfield. 3-7

LOS ANGELES CO.—**Austin Co.,** 777 E. Washington Blvd., Los Angeles—$500,000 for constr. of one and part two-story, reinf. conc. studio and factory bldg. at 8723 Alden Dr., Los Angeles—by Columbia Recording Corp., Hollywood. 3-7

LOS ANGELES CO. — **James I. Barnes Construction Co.,** 119 Montana Ave., Santa Monica—$850,000 for constr. of 3-story and basement, reinf. conc. business administration and economics bldg. at university, West Los Angeles—by Board of Regents of University of California, Los Angeles. 3-4

LOS ANGELES CO.—**Buttress & McClellan,** 1013 E. 8th St., Los Angeles — $115,000 for constr. of one-story, steel frame and conc. factory bldg. at 1538 Esperanza St., Los Angeles—by Swingspout Corp., Los Angeles. 3-7

LOS ANGELES CO.—**Contracting Engineers Co.,** 2310 W. Vernon Ave., Los Angeles—$265,000 for constr. of masonry factory and office bldg., 5747 W. 96th St., Los Angeles—by Pacific Bedding Co., Los Angeles. 3-21

LOS ANGELES CO.—**H. J. Farrington,** 1649 Lakewood Blvd., Rivera—$119,000 for constr. of 2 school bldgs. at Cloverly School, Broadway and Cloverly Sts., Temple City—by South Santa Ana School District, Temple City. 3-19

LOS ANGELES CO.—**G. S. Fruehling,** 1031 S. La Brea Ave., Los Angeles—$291,500 for constr. of 55 frame and stucco, 4-room dwellings in Venice District, Los Angeles—by Southland Properties, Inc., Los Angeles. 3-7

LOS ANGELES CO.—**Garel-Labby Co.,** 14008 Ventura Blvd., Sherman Oaks—$88,200 for constr. of 12 five-room, frame and stucco dwellings, 14000 block Aztec St., Beaver and Colby Aves., Van Nuys District, Los Angeles—by self. 3-7

LOS ANGELES CO.—**Fred F. Greenfield Co.,** 1437 Norton Ave., Glendale—$309,636 for general constr. of 2-story and basement, reinf. conc. administration bldg. at 2920 Community Dr., La Crescenta—by Unified School District, Glendale. 3-26

LOS ANGELES CO. — **Herco Construction Co.,** 745 N. La Brea, Los Angeles—$170,167 for constr. of reinf. conc. standards bldg. for sealer of weights and measures, Main St. and Eastlake Ave., Los Angeles—by County Board of Supervisors, Los Angeles. 3-7

LOS ANGELES CO. — **Haddock - Engineers, Ltd.,** 129 W. 2nd St., Los Angeles—$896,000 for constr. of one-story, steel frame and reinf. conc. warehouse bldg., at 5675 Anaheim-Telegraph, Los Angeles—by U. S. Rubber Co., Los Angeles. 3-28

LOS ANGELES CO.—**J. Walter Johnson,** 5205 Hollywood Blvd., Los Angeles—$279,917 for constr. of hollow masonry office and warehouse bldg. and motor vehicle bldgs., 5898 Venice Blvd., Los Angeles—by City Water & Power Division, Los Angeles. 3-7

LOS ANGELES CO. — **National Home Improvement Co.,** 4127 S. Broadway, Los Angeles—$116,360 for constr. of 21 frame and stucco, 5- and 6-room dwellings in Norelle St., Richelieu Pl. and Druid St., Los Angeles—by self. 3-7

LOS ANGELES CO.—**W. P. Neil,** 4814 Loma Vista, Vernon—$500,000 for constr. of one-story, reinf. conc. warehouse and office bldg. at Eastern and 61st St., Los Angeles—by Market Basket, Pasadena. 3-25

LOS ANGELES CO.—**J. R. O'Neal,** 6031 Whitworth St., Los Angeles—$493,600 for constr. of 66 frame and stucco, 5-room dwellings in Venice District, Los Angeles —by Westchester Housing Co., Los Angeles. 3-7

LOS ANGELES CO.—**William Simpson Construction Co.,** 816 W. 5th St., Los Angeles—$2,500,000 for constr. of one and part three-story, reinf. conc. and steel frame radio broadcasting studio bldg. on Vine St., betw. Homewood and Fountain Aves., Hollywood—by Don Lee Broadcasting System, Los Angeles. 3-7

LOS ANGELES CO.—**Stanton-Reed Co.,** 816 W. 56th St., Los Angeles—$370,000 for constr. of 2-story and basement addition to

N. side of telephone bldg. at 3847 Cardiff Ave., Culver City—by Southern California Telephone Co., Los Angeles. 3-7

MONTEREY CO. — **E. M. Carlsen,** 16 Monterey Rd., Salinas—$334,905 to erect 6 prefab. steel bldgs., alter 143 wooden units, move and alter 8 wood units for veterans' emergency dwelling units, install sewer system, gas and water lines, Salinas —by County Housing Authority, Salinas.

MONTEREY CO.—**H. E. Rahlmann Co.,** 51 Kearny St., San Francisco—$466,320 to convert 50 bldgs. into 194 family housing units at Fort Ord—by Corps of Engineers, San Francisco. 3-27

RIVERSIDE CO.—**T. C. Prichard,** 3964 Orange St., Riverside—$156,134 for constr. of reinf. conc. school bldg. at Lime and 12th Sts., Riverside—by Board of Directors, St. Francis De Sales School, Riverside. 3-24

SAN BERNARDINO CO.—**Bear Valley Construction Co.,** Box 441, Big Bear Lake —$183,006 for constr. of 5-classroom reinf. conc. addition to elementary school bldg., Big Bear Lake—by Big Bear Elementary School District, Big Bear Lake. 3-21

SAN BERNARDINO CO. — **G. B. Thatcher,** 424 S. Sierra Way, San Bernardino—$176,740 for 3 school bldgs. at 1050 Olive Ave., Colton—by Elementary School District, Colton. 3-28

SAN FRANCISCO CO.—**Barrett & Hilp,** 118 Harrison St., San Francisco—$200,000 for constr. of 2-story, conc. addition to school bldg. at 18th Ave. and Vicente St., San Francisco—by Roman Catholic Archbishop, San Francisco. 3-24

SAN FRANCISCO CO. — **Cahill Bros.,** 606 Sansome St., San Francisco—$285,000 for constr. of 2-story, class B, meat processing plant at Fourth and Townsend Sts., San Francisco—by Kingan & Co., San Francisco. 3-24

SAN FRANCISCO CO.—**Wm. Horstmeyer Co.,** 23 Mars St., San Francisco—$75,000 for constr. of fish processing plant at N. Point and Columbus Ave., San Francisco—by La Rocca Fisheries, San Francisco. 3-24

SAN FRANCISCO CO.—**Wellnitz & DeHarde,** 316 6th St., San Francisco—$69,963 for alterations to carhouse on Geary St., San Francisco—by Public Utilities Commission, San Francisco. 3-7

SAN JOAQUIN CO.—**Thomas C. Buck,** Box 407, Stockton—$124,659 to convert barracks to officers' apartments at Stockton General Depot Annex, Stockton—by U. S. Engineer Office, Sacramento. 3-19

SAN JOAQUIN CO.—**Shepherd & Green,** National Bank Bldg., Stockton—$170,000 for constr. furniture warehouse, Linden Road, Stockton—by John Breuner Co., Oakland. 3-10

SAN LUIS OBISPO CO.—**A. Madonna,** 1028 Chorro, San Luis Obispo—$70,986 for constr. of central feed storage unit at California Polytechnic School, San Luis Obispo—by Division of Architecture, Sacramento. 3-12

SAN MATEO CO.—**Dinwiddie Construction Co., Inc.,** Crocker Bldg., San Francisco —$3,000,000 for constr. of 6-story, structl. steel and reinf. conc. office bldg. at 4th and Ash Aves., from San Mateo Dr. to El Camino Real, San Mateo—by Parrott Investment Co., San Francisco. 3-1

SANTA CLARA CO. — **Pacific Coast Builders,** 2530 18th St., San Francisco—$53,797 for constr. of school bldg. on Payne Ave. and Saratoga Rd., San Jose — by

Moreland Elementary School District, San Jose. 3-17

STANISLAUS CO.—**John Lund,** 919 E. Main St., Turlock—$95,000 for constr. of one-story, conc. block, hospital bldg. in Turlock—by Dr. M. C. Collins, Turlock. 3-7

VENTURA CO.—**A. Farnell Blair,** 7052 Santa Monica Blvd., Los Angeles—$25,000,000 for constr. of 2500 residences and business section on 500-acre site near Oxnard—by Harbor Ranch Co., Oxnard. 3-4

Idaho

ADA CO.—**Kloepfer & Gramkow,** 416 S. 6th St., Boise—$114,751 for constr. of 4-classroom addition to Washington School at Boise—by City School Directors, Boise. 3-3

BONNER CO. — **Gaasland Construction Co.,** 1161 Ellis St., Bellingham, Wash.—$79,000 to disassemble naval drill hall in Farragut—by Dept. of Public Works, Seattle, Wash. 3-20

NEZ PERCE CO.—**Frank Lohse,** Marcus Whitman Hotel, Walla Walla, Wash.—$1,500,000 for constr. of additions to telephone bldg. at Third and D Sts., Lewiston—by Pacific Telephone and Telegraph Co., Lewiston. 3-3

Montana

CASCADE CO. — **Floyd Pappin & Son,** Great Falls—$118,000 for constr. of one-story and basement, store bldg. at First Ave. N. and Second St., Great Falls—by C. C. Anderson Co., Great Falls. 3-9

CASCADE CO. — **Floyd Pappin & Son,** Great Falls—$91,500 for constr. of one-story and basement storage bldg., Great Falls—by Sick's Great Falls Breweries Inc., Great Falls. 3-

CASCADE CO.—**Sletten Construction Co** Great Falls—$75,000 to remodel and improve bldg. at First Ave. N. and Third St Great Falls—by J. C. Penny Co., Great Falls. 3-

SILVER BOW CO.—**Cahill-Mooney Construction Co.,** Box 398, Butte—$134,448 for constr. of naval reserve armory in Butte—by Bureau of Yards and Docks, Washington, D. C. 3-1

Oregon

BENTON CO.—**Halvorson Construction Co.,** First National Bank Bldg., Salem—$94,960 for constr. of 3-story, 6-room south wing for high school bldg., Corvallis—by School Board of Directors, Corvallis. 3-

JACKSON CO. — **B. & R. Construction Co.,** 110 Market St., San Francisco, Calif.—$164,382 for constr. of 3-story, reinf. conc. women's dormitory bldg., Ashland — by State Board of Higher Education, Portland 3-1

MULTNOMAH CO.—**Geo. H. Bucke Construction Co.,** Lewis Bldg., Portland—$75,000 for constr. of 2nd floor addition to brewery bldg., 615 S.W. Columbia St Portland—by Interstate Brewery Co., Portland. 3-1

MULTNOMAH CO.—**Ross B. Hammon Co.,** 1241 N. Williams St., Portland—$271,601 for general and electrical work on conc and struct. steel 2-story gymnasium and auditorium bldg. at 1608 SW Fifth Ave Portland—by Board of Trustees, St. Mary's Academy, Portland. 3-1

MULTNOMAH CO. — **Reimers & Jolivette,** Builders Exchange Bldg., Portland—$90,000 for constr. of tank storage bldg. at 1133 W. Burnside, Portland — by Blitz-Weinhard Co., Portland. 3-

MULTNOMAH CO. — **Reimers & Jolivette,** Builders Exchange Bldg., Portland—$70,000 for constr. of one-story, reinf. conc. warehouse at 2545 S.E. Gladstone St Portland—by Fowler Manufacturing Co Portland. 3-1

MULTNOMAH CO.—**E. E. Settergren** Henry Bldg., Portland — $160,000 for constr. of one-story, conc. warehouse bldg at 815 S.W. 12th Ave., Portland—by Westinghouse Electric Supply Co., Portland. 3-2

Texas

BEXAR CO.—**Portable Welding & Construction Co.,** Box 888, Texas City—$281,338 to convert exist. bldgs. to temp. apartment bldgs. at Fort Sam Houston—by Resident Engineer, Galveston. 3-1

DALLAS CO.—**Cowdin Bros.,** 411 S. Hakell St., Dallas—$84,000 for constr. of one-story, masonry bldg. at 532 W. Jefferson Ave., Dallas—by J. W. Bryant, Dallas. 3-1

TARRANT CO. — **Harry B. Friedman** 1510 W. 10th, Fort Worth—$250,000 for constr. of one-story addition to bldg. at 1307 W. 7th, Fort Worth—by Pangburn Co., Fort Worth. 3-1

WILBARGER CO.—**B.M.F.P. Construction Co.,** Lubbock—$235,000 for constr. of clothing mfg. plant, Vernon—by Vernon Industrial Association, Inc., Vernon. 3-1

WINKLER CO.—**J. W. Bateson,** Dalla — $180,000 for constr. of one-story and basement hospital bldg. and nurses home

Kermit and one-story hospital bldg. at Vink—by County Commission, Kermit. 3-12

Utah

ALT LAKE CO.—**Commercial Builders o.**, 122 East 2nd So., Salt Lake City—$75,-00 for constr. of market bldg. at Third So. nd 2nd East Sts., Salt Lake City—by Suc-ess Market Corp., Salt Lake City. 3-14

VEBER CO. — **Geo. A. Whitmeyer & ons Co.**, 2759 Grant Ave., Ogden—$150,-00 to constr. 4-story, 40 x 100 ft. bldg. at acking plant in Ogden — by American acking & Provision Co., Ogden. 3-22

Washington

ARFIELD CO.—**Busboom & Rauh**, 109 . Iron Ave., Salina, Kans.—$75,998 for eneral constr. of hospital at Pomeroy—by Iospital Board of Directors, Pomeroy. 3-25

ING CO.—**J. C. Boespflug Construction o.**, Securities Bldg., Seattle—$1,868,011 or constr. of Health Science Center con-sting of library and auditorium bldg., ental school bldg., and administration and aboratory bldg., university campus, Seat-e—by Board of Regents, University of Vashington, Seattle. 3-5

ING CO.—**S. S. Mullen**, 9th & Roy Sts., eattle—$157,442 general constr. of addi-on to Broadview school, 12515 Green-ood Ave., Seattle—by Shoreline School istrict No. 412, Seattle. 3-19

ING CO.—**Henrik Valle Co., Inc.**, 407 rd W., Seattle—$779,800 for constr. of 4-ory, reinf. conc. L-shaped physics bldg., niversity campus, Seattle—by Board of egents of University of Washington, eattle. 3-21

IERCE CO.—**Carson Construction Co.**, Helena, Mont. — $736,694 to convert 64 dgs. into 208 family housing units at Fort ewis—by Corps of Engineers, Seattle. 3-21

POKANE CO.—**Gaasland Construction o.**, 1161 Ellis St., Bellingham—$306,900 transport and re-erect naval drill hall om Farragut, Idaho on campus at Cheney -by Board of Directors of Cheney Normal chool, Cheney. 3-25

VHITMAN CO.—**Henry George & Sons**, Hutton Bldg., Spokane — $1,845,786 for onstr. of reinf. conc., 4-story technology dg. and 2-story annex, college campus, ullman—by Board of Regents, Washing-on State College, Pullman. 3-12

VHITMAN CO.—**Nettleton & Baldwin, nc.**, 1109 N. 36th St., Seattle—$1,926,999 or constr. of reinf. conc., T-shaped, 4-story nd basement classroom bldg. at college, ullman—by Board of Regents, Washing-on State College, Pullman. 3-12

AKIMA CO. — **Hall-Atwater Construc-on Co.**, Arctic Bldg., Seattle—$344,190 for eneral constr. of county hospital addition Yakima—by County Commission, Yak-na. 3-13

Canada

RITISH COLUMBIA — **Bennett & Vhite Construction Co., Ltd.**, 510 W. Hastings St., Vancouver — $138,919 for onstr. of conc., monolithic roof and sup-ort. pillars of Memorial arena, Victoria— y City Council, Victoria. 3-21

RITISH COLUMBIA—**Crowley Con-truction Co., Ltd.**, 536 Yates St., Victoria —$118,315 for constr. of Memorial Arena, ictoria—by City Council, Victoria. 3-14

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Over 600 producers and equipment manufacturers attended the conventions of the NATIONAL SAND AND GRAVEL ASSOCIATION and the NATIONAL READY MIXED CONCRETE ASSOCIATION, held jointly at the Biltmore Hotel, Los Angeles, on March 3-7.

Speakers included **Thomas E. Stanton,** Materials and Research engineer, California State Highway Department, and **Raymond E. Davis,** professor of Civil Engineering, University of California.

E. J. Goes, advertising and sales promotion manager of the Koehring Co., Milwaukee, was elected chairman of the Manufacturers Division of the National Sand and Gravel Association. **R. C. Johnson,** Simplicity Engineering Co., Durand, Mich., former member of the board of directors, was elected a vice-chairman of the group.

All officers and members of the executive committee of the association were re-elected. **Eric W. Ryberg,** Salt Lake City, Utah, is a member of this committee.

Westerners on the board of directors include: **Edmond F. Brovelli,** Napa, Calif.; **Paul C. Graham,** Los Angeles; **D. W. Kelly,** Phoenix, Ariz.; **Robert Mitchell,** Los Angeles; **John W. Murphy,** Spokane; **Eric W. Ryberg,** Salt Lake City.

New president of the National Ready Mixed Concrete Association is **Frank P. Spratlen, Jr.,** Ready Mixed Concrete Co., Denver, Colo.

Western members of the board of directors of this association include: **R. K. Humphries,** Pacific Coast Aggregates, Inc., San Francisco; **Stewart H. Moore,** San Diego Transit-Mixed Concrete Co.; **John W. Murphy,** Central Pre-Mix Concrete Co., Spokane, Wash.

In attendance at the convention for *Western Construction News*, were **Don Forster,** executive vice-president, and **Jerry Badgley,** Southern California manager, King Publications.

☆ ☆ ☆

A western division of the AMERICAN COUNCIL OF COMMERCIAL LABORATORIES, an organization composed of 32 independent testing and research organizations with 125 branches located throughout the United States, Alaska and Canada, was organized at a recent meeting. Members of the council with home offices in the western states met at the office of **Herbert Imrie,** president of Abbot A. Hanks, Inc., San Francisco. Those attending were: **Claude E. McLean,** Phoenix, Ariz.; **M. B. Niesley,** Los Angeles; **David B. Charlton,** Portland, Ore.; **Francis P. Owens,** Seattle, Wash.; **E. O. Slater,** Los Angeles; **Fred W. Twining,** Fresno; **Herbert Imrie,** San Francisco, and by invitation, **Parker Robinson,** manager of Pittsburgh Testing Laboratories, San Francisco branch; and Imrie's associates, **Prentiss Bee, Parker Dresser** and **John Martel.**

It was agreed that this division should consist of the eleven western states, as well as the territories of Alaska and the Hawaiian Islands. **Roger W. Truesdail** was elected president of the newly-formed organization, with **Herbert Imrie** vice-president, and **E. O. Slater,** secretary-treasurer.

☆ ☆ ☆

W. P. Fuller Brawner, vice-president and treasurer of W. P. Fuller & Co., San Francisco, and first vice-president of the San Francisco Chamber of Commerce, was recently named chairman of the San Francisco Chamber of Commerce Industrial Department Advisory Committee. As chairman of the committee, Brawner will coordinate and expand the diversified activities through which sound factory development is being stimulated in the Bay Region.

☆ ☆ ☆

JOSEPH T. RYERSON & SON, INC. recently opened a new west coast plant located in the Los Angeles manufacturing district. **F. A. Purdy** is manager. **Parr Sanderson** was also appointed recently as manager of the Boston plant, succeeding **Herbert C. Wills,** who is retiring.

☆ ☆ ☆

S. H. Harrison, formerly manager of machinery electrification for the WESTINGHOUSE ELECTRIC CORP., Pacific Coast District, was appointed Pacific Coast

manager of the corporation's Industrial Division, with headquarters in San Francisco. Harrison takes over the position formerly held by **G. B. Rosenblatt,** who relinquished his managerial duties to devote full time to Westinghouse industrial and marine accounts. Harrison has been with the company since 1927.

☆ ☆ ☆

Thomas G. Hofmann, San Francisco, veteran P. & F. CORBIN SALES representative, died in Los Angeles, January 7. Hofmann had been associated with the hardware business since 1900, and had been a sales representative for P. & F. Corbin since 1912 in the California-Nevada territory.

☆ ☆ ☆

A 56-acre industrial site just north of its present Richmond, Calif., plant, was recently purchased by the RHEEM MANUFACTURING CO. The land was purchased from the Parr-Richmond Terminal Corp. The company in addition to its Richmond plant, has nine others in the United States and several affiliated plants abroad.

☆ ☆ ☆

L. M. Stout, formerly district manager of P&H sales, at Los Angeles, will now take charge of the entire Southwest territory, according to announcement from the Milwaukee home office of HARNISCHFEGER CORPORATION. **A. W. Ginther,** former assistant export manager, succeeds to Stout's former position. As Southwest manager, Stout will have supervision

GINTHER

STOUT

of both Los Angeles and San Francisco regions, and will direct sales for P&H excavators, road machinery, hoists, overhead cranes, and welding equipment. He has been with the company for 13 years, and served as district manager for both Philadelphia and Washington, D. C., before coming west. Ginther has been employed by P&H for ten years, and has traveled all over Europe as well as throughout Canada, Mexico, and the Caribbean territories in connection with his work.

☆ ☆ ☆

FRUEHAUF TRAILER COMPANY representatives from throughout the western area assembled in San Francisco recently for their annual sales meeting. **R. S. Kirksey,** president of the Fruehauf Trailer Co. of California; **W. J. Pickhardt,** general manager; **L. A. Bearden,** sales manager and **D. Albert,** chief engineer, headed the western group, comprised of about 75 representatives in all. Company executives who came from Detroit for the occasion were: **L. C. Allman,** vice-president in charge of public relations; **Vern Drew,** director of research; **L. H. Thomas,** manager of the tank trailer division; and **I. F. Nelis,** manager of the accessories division. Arrangements for the meeting were made by **E. C. Henning,** manager of the company's San Francisco branch.

J. G. Bollinger, veteran of more than twenty years' service with the AIR REDUCTION SALES CO., was recently appointed district sales manager, it was announced by **Harold P. Etter,** sales manager, Pacific Coast division. In his new capacity, Bollinger will report to **Hal W. Saunders,** manager, San Francisco district, with headquarters in the new offices in Emeryville, Calif.

☆ ☆ ☆

J. T. JENKINS COMPANY, Kenworth Motors distributors in California, Arizona, Nevada and New Mexico, recently opened their $275,000 new northern California headquarters in San Francisco—one of the largest truck sales and service plants in the Bay area. Guests from throughout the west were welcomed at the formal opening by **J. T. Jenkins,** president of the company, and **L. M. Jenkins,** vice-president and manager of the San Francisco branch. Other firm members on hand were **G. K. Donnelly,** treasurer; **A. E. MacCready,** San Francisco parts manager; **Carl Hammill,** San Francisco shop superintendent; **Glen Gunderson,** sales engineer; **Shelley B. Williams,** San Joaquin Valley manager; **Jack Gamble,** Phoenix, Ariz., branch manager; **O. A. Richer,** Los Angeles shop superintendent, and **Harry Cleveland,** Los Angeles parts manager. **John Holmstrom,** vice-president and general manager of the Kenworth company, and **Vernon A. Smith,** vice-president and sales manager, represented Kenworth.

☆ ☆ ☆

STANDARD MACHINERY COMPANY, San Francisco, and GARLINGHOUSE BROTHERS, Los Angeles, have

been announced as California distributors for Dumpcrete, a specially designed utility body for hauling air-entrained concrete without agitation, manufactured by MAXON CONSTRUCTION CO.

☆ ☆ ☆

O. G. Mandt, president and general manager of the JAEGER MACHINE CO., Columbus, O., recently spoke in San Francisco before the executives, sales and service engineers of the EDWARD R. BACON CO., northern California distributors of Jaeger equipment, during a business tour of the Pacific Coast. Mandt stated that Jaeger is embarking on an expansion program in order to take care of the vast demand for their products.

☆ ☆ ☆

Expansion of their regional headquarters in Los Angeles was recently announced by the C.I.T. CORPORATION, Industrial Financing. **R. S. Wallace,** in charge of the western office, stated that the company anticipates a large volume of business in 1947, and C.I.T. is gearing their facilities to meet both present and future financing requirements of the construction industry.

☆ ☆ ☆

DEALERS WHOLESALE COMPANY, Los Angeles, has been named Richkraft distributor in Southern California, Arizona, Clark County, Nev., and Sonora and Lower Calif., Mexico. They will handle the complete line of Richkraft building and construction products, which include building papers, roof coating, plastic glazine, and reflective insulation.

☆ ☆ ☆

Charles A. Winslow, president of the WINSLOW ENGINEERING COMPANY, of Oakland, recently announced promotion of five top executives and realignment of their duties. Those included in the changes are: **L. L. Moore,** promoted to vice-president and general manager; **W. G. Nostrand,** who becomes executive engineer; **E. L. Helble,** sales manager; **J. J. Meyer, Jr.,** chief engineer; and **J. D. Sanderson,** factory superintendent. The company also anticipates the early erection of new plant facilities on a site already selected, Winslow stated.

☆ ☆ ☆

PACIFIC NORTHWEST

James P. Bates has been named chief metallurgist for the HYSTER CO. and will make his headquarters at the Portland, Ore., plant, it was announced recently by **Maurice Hooff,** production manager. He will be in charge of materials specifications and heat treating for the company's three plants—Portland, Ore., and Peoria and Danville, Ill. Bates, prior to joining Hyster, was supervisor of the materials laboratory for Pratt Whitney Aircraft Corp. of Kansas City, Mo.

☆ ☆ ☆

New Seattle headquarters of the DULIEN STEEL PRODUCTS, INC., of Washington were opened March 1, completing the latest step in their expansion program. Designed by Richard Lytel & Associates, the building stands on an 18-ac. tract and affords the salvage and liquidating concern both yard and docking facilities and spur track connections to the railroads. Officers of the company include: **Louis Dulien,** president; **Ann Dulien,** secretary; **H. G. Keisler,** general manager; **G. E. Rosenwald, Jr.,** assistant manager and assistant secretary. The firm also has a second Seattle yard on Airport Way as well as one in Portland, and offices in Butte, Mont., Bellingham, Wash., and Portland, Ore.

☆ ☆ ☆

JACKSON IMPLEMENT CO., Portland, has sold its automotive and tractor parts distribution service to a newly organized company to be known as INDUSTRIAL PARTS, INC. **Sumner W. Williams,** who was for 20 yr. before the war with Loggers & Contractors, Inc., and head of the regional office of the heavy machinery branch of the War Production Board, is president of the new company and has as his principal associate, **Vern Mullins,** who has been with Jackson for the past 10 yr. and will be vice-president. Jackson Implement Co., with **Ralph Jackson** as president and **Craig Carroll** as vice president and manager, will continue its operations in the manufacture of heavy equipment parts. Industrial Parts, Inc. will take over the distributorship for Caterpillar and International heavy tractor parts.

☆ ☆ ☆

C. A. King, president of WEST COAST SUPPLY, INC., has announced the opening of the firm's washed sand and gravel supply business in Bremerton, Wash. Company plans also include erection of a warehouse for building supplies to be erected in the future. Other officers of the new company include **Monroe Pineo,** vice-president, and **A. H. Parker,** secretary.

☆ ☆ ☆

INLAND EMPIRE STEEL BUILDINGS CO., with headquarters at W. 41 Third in Spokane, has been appointed a distributor for the GREAT LAKE

STEEL CORP., manufacturers of Quonset buildings. **John M. Moore** is general manager for the Spokane organization.

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New additions to the list of dealers handling SILVER BOOSTER MANUFACTURING CO. equipment for finger-tip steering of tractors and Quick-on track tension bolts for repair of tension bolts on Caterpillar Model D-8 include: INTERSTATE TRACTOR & EQUIPMENT CO., Portland, Eugene, Roseburg, and Salem, Ore.; HOWARD COOPER CORP., Portland, Albany, Eugene, Ore., Seattle, Wash.; JONES TRUCK & IMPLEMENT CO., Colfax, Wash., THE WHITE BROS., Walla Walla, Wash., JACKSON IMPLEMENT CO., Lexington, Ore.; PENDLETON GRAIN GROWERS, INC., Pendleton, Ore.; MOTY & VAN DYKE, INC., Bend, Ore.; SCHNELL TRACTOR CO., Moscow, Ida.; EVERETT ROBINSON, Grants Pass, Ore.; WORTHAM MACHINERY CO., Cheyenne, Wyo., and Sheridan, Wyo., and TONY GOSSELIN, Eureka, Calif.

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H. M. Gustafson, formerly assistant manager of the GENERAL ELECTRIC CO's Apparatus Department in Seattle, Wash., has been appointed manager, according to a recent announcement by **J. R. Murphy,** Northwestern district manager. Gustafson, who has been with the company since 1917, succeeds **H. E. Plank,** who died January 10. He will be responsible for the apparatus department commercial activities in Washington and Alaska.

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T. E. Satra, assistant sales manager in the Western sales office of LIMA LOCOMOTIVE WORKS, INC., has been appointed manager of Western sales for the company with headquarters at Seattle. Satra succeeds **H. C. Hammack** who has retired after 50 yr. of service with Lima.

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INTERMOUNTAIN

L. S. Combe, head of COMBE'S OIL EQUIPMENT CO., Denver, Colo., has been named representative of the BLACKMER PUMP CO., Grand Rapids, Mich., for the entire state of Colorado and part of Wyoming, it was announced recently by **A. E. Jacobs,** Blackmer vice-president and sales manager. Combe, widely known among the major and independent oil marketers in Colorado and Wyoming, was a successful oil jobber for 15 years before entering the equipment field in 1945.

☆ ☆ ☆

CENTRAL MACHINERY CO., Great Falls, Mont., has succeeded the CONNELLY MACHINERY CO. as distributor of CATERPILLAR equipment in 17 counties of north central Montana. Officers of the new Caterpillar distributor are **Henry Sheffels,** president; **Fred Lively,** vice-president and general manager, and **Jerry Lane,** secretary-treasurer.

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A. C. Lanham, former INTERNATIONAL HARVESTER COMPANY retail sales manager at Indianapolis, Ind., motor truck branch, was recently appointed assistant branch manager at Salt Lake City, Utah. Other company changes in branch management in the intermountain area included appointment of **H. E. Broadwell,** former retail motor truck manager at Spokane, Wash., to the position of assistant branch manager at Billings, Mont. **A. F. Jackson,** formerly assistant manager of the Richmond, Va., truck branch, has been transferred to Tulsa, Okla., in the same capacity.

☆ ☆ ☆

Ralph Nance, formerly general foreman of the Litchfield Park, Ariz., plant of the GOODYEAR TIRE AND RUBBER COMPANY, has been appointed superintendent, replacing **L. T. Ostergren,** who moves to the newly acquired Homes plant in East St. Louis, Ill., as production superintendent. **Arthur Steger** has been promoted to department foreman at Wingfoot, Ariz., and **Bob Estes** becomes works accountant, replacing **M. M. Pentecost** who also moves to the new plant at St. Louis. Nance is a graduate of the Goodyear apprentice school and came to the Wingfoot Homes organization from a position of general foreman in Goodyear Aircraft Corp. in Akron.

AMONG THE MANUFACTURERS

Gordon Stuart McKenty recently joined THE HEIL CO., Milwaukee, as merchandising manager of the company's Road Machinery Division. McKenty was formerly associated with R. G. LETOURNEAU, INC., in the capacity of general sales manager.

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The retirement of **Luke H. Sperry,** member of the board of directors and director of engineering for HERCULES POWDER COMPANY, Wilmington, Del., was announced recently. Sperry entered the ex-

NEW OFFICERS and directors of the Associated Equipment Distributors for 1947 include: front row, l. to r., H. L. BURLESON; WILLIAM A. DANNER, president and director of Region 1; A. F. GARLINGHOUSE, Los Angeles; and C. F. HALLADAY. Second row, l. to r., MAXWELL J. LYONS; ELDON M. FARNUM; C. F. WINCHESTER; HARRY J. HUSH; and FRED M. VILES, Spokane, Wash. Third row, l. to r., JAMES W. BELL; J. WALKER WILSON; EDWARD J. CROSBY; GEORGE W. SWART; and R. L. ARNOLD, Salt Lake City, Utah.

plosives industry 41 years ago, and has been associated with Hercules Powder Company for 31 years. He has been director of engineering since 1944. **Ernest S. Wilson,** now chief engineer, takes Sperry's place as director of engineering, while **Ray N. Wheelock** will become assistant director. Wilson has been with the engineering department in Wilmington since 1923.

☆ ☆ ☆

Price reductions which are estimated to save INTERNATIONAL HARVESTER CO. customers approximately $20,000,000 a year were announced recently by the company. Harvester's price reductions will apply to a selected list of products in the company's line of tractors, farm machines, motor trucks and industrial power equipment.

☆ ☆ ☆

New Western Division parts manager of the CATERPILLAR TRACTOR CO., Peoria, Ill., is **Eldon L. Mason,** according to recent announcement by **M. T. Deames,** "Caterpillar's" assistant general parts manager. Mason succeeds **C. M. McKnight,**

who resigned from that position to become associated with BRIZARD-MATTHEWS MACHINERY CO., "Caterpillar" distributor at Eureka, Calif. Prior to Mason's appointment, he served as assistant manager of the central division of the parts department.

☆ ☆ ☆

The widely-publicized concrete housebuilding Tournalayer unit is being added to the sales line of R. G. LETOURNEAU, INC., it has been announced. At the same time announcement was made of the formation of the Tournalayer Sales Division, with **Richard L. LeTourneau** named manager of the newly created division. Le-

Tourneau was associated with the company for five years prior to the war. Since his release from the Corps of Engineers, he has been serving as manager of Tournalayer experimentations and market research at the Texas plant. The October, 1946, issue of *Western Construction News* carried a complete article on the huge housebuilding unit.

☆ ☆ ☆

The WHEELCO INSTRUMENTS COMPANY of Chicago, Ill., makers of electronic instruments for measurement and control of industrial processes, recently completed an agreement with Ether, Ltd., of Birmingham, England, whereby their instruments will be manufactured and marketed throughout the British Kingdom. New line will be a combination of Wheelco instruments such as Capacitrols, Potentio-

H. A. STEVENSON, manager of Ether, Ltd.

trols, and Flame-otrols, and the Ethermade indicating, recording, optical and radiation pyrometers, servo mechanisms, and electrically and hydraulically operated valve gears. Arrangements were made between **Chas. L. Saunders,** Wheelco executive vice-president and **H. A. Stevenson,** managing director of Ether, during the latter's visit to this country.

☆ ☆ ☆

M. O. Stockland, Jr. was appointed recently to head the newly consolidated Sales Promotion and Advertising departments of the FOUR WHEEL DRIVE AUTO COMPANY. Stockland has served as sales promotion manager since the organization of that department early in 1946. Consolidation of the two departments resulted from the retirement of **Francis M. Higgins** as advertising manager in order that he might devote all of his time to his work as president of the Wisconsin Central Airlines. Stockland has been connected with the company since 1922, and has been located at the home office in Clintonville, Ohio, since 1936.

☆ ☆ ☆

Gold recognition pins were awarded seven officials and employees recently, signifying completion of at least 25 years of consecutive service with the CUMMINS ENGINE COMPANY, INC., Columbus, Ind. Those receiving awards were **C. L. Cummins,** president; **H. L. Knudsen,** vice-president in charge of engineering; **Don J. Cummins,** quality manager; **Harry Voelz, Frank Fischvogt, Joe E. McCoy,** and **Ray Hammond.** Pins marking 20 years of service went to 12 employees, 15-year pins to 24, 10-year pins to 100, and five-year pins to more than 300 employees.

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Net profit of the GARDNER-DENVER CO. for the year 1946 was $1,599,576.46, as compared with $877,414.44 for the year 1945, it was declared in the firm's annual report. Profits for the year 1946 on the 656,049 shares of common stock outstanding at the end of the year were $2.44 per share compared with $1.39 per share in 1945 on 563,286 shares of common stock after providing for dividends on preferred stock. Increase in earnings for 1946 as compared with the previous year was due largely to an adjustment in sales prices, since factory costs and operating expenses remained at a high level.

☆ ☆ ☆

Floyd Jones, formerly northeastern district manager for the DAVEY COMPRESSOR CO., was recently appointed sales manager of the firm's portable compressor division, according to **Paul H. Davey,** company president. Jones possesses more than 30 years of construction equipment experience. Prior to his affiliation with Davey, he was New York manager of the LIDGERWOOD MFG. CO.

NEW EQUIPMENT

MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, California.

Auto-Railer with Truck Shovel

Manufacturer: International Harvester Co., Chicago, Ill.

Equipment: Dual purpose vehicle for operation on railroad tracks and highways.

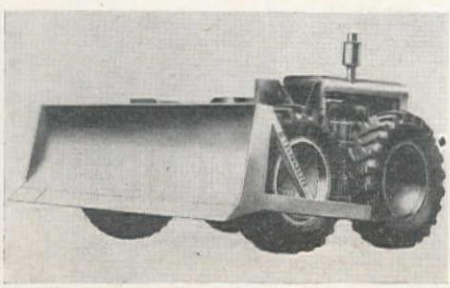
Features claimed: The Evans Auto-Railer, with Quick Way ¼ cu. yd. truck shovel, powered by an International Harvester 4-cylinder engine, is mounted on an International 147-in. wheelbase Model KB-5 chassis. It is not necessary to tie up large sections of track with this versatile vehicle, built to go quickly and do a job where heavier equipment is not practicable or profitable. Attachments fasten to universal boom foot connection for quick conversion from shovel to trench hoe, crane, dragline, clamshell, orange peel and pile driver. The Auto-Railer can be run over the highway to the railroad crossing nearest the point of work and then run on the track. Flanged steel pilot wheels, both front and back, mounted on large tapered roller bearings, hold and guide the vehicle on the rails. In driving off the track at a road crossing, it is not necessary to come to a complete stop, because the pilot wheels and axles are raised as soon as the road crossing is approached, at which time the vehicle is driven directly on the highway.

High-Speed Earth Mover

Manufacturer: R. G. LeTourneau, Inc., Peoria, Ill.

Equipment: High-speed, rubber-tired Tournadozer.

Features claimed: Powered with a 160 hp. diesel engine, the Model C Tournadozer, latest addition to the LeTourneau line of rubber-tired earthmoving equipment, has four forward speeds ranging up to 12 m.p.h., and the same four speeds in reverse. Other features are the Tournamatic constant-mesh transmission, which enables the operator to select any gear ratio or change from forward into reverse with no shifting of gears and no loss of momentun, and the taper bead tires which give more ground-gripping traction and flotation. Tires and rim design permit operation at low air pressures, minimizes equipment maintenance, and increases operator comfort, since the soft tires act as a cushion for shocks and vibration. Overall specifications are: wheelbase, 5 ft., 11⅝ in.; length, 15 ft., 2 in.; height, 7 ft., 11 in.; width of blade, 11 ft., 3 in.; height of bowl, 44 in.; height blade can be raised above ground 44 in.



Brick Tongs-Plasterer's Hawk

Manufacturer: The Dow Chemical Co., Specialty Products Division, Bay City, Mich.

Equipment: Lightweight magnesium brick tongs and plasterer's hawk.

Features claimed: Magnesium, industry's lightest structural metal, is the material used for manufacture of both lightweight brick tongs and a new lightweight plasterer's hawk. Weight of the magnesium tongs is 2¼ lb., whereas a comparable steel tongs weighs about 6½ lb. Tension spring

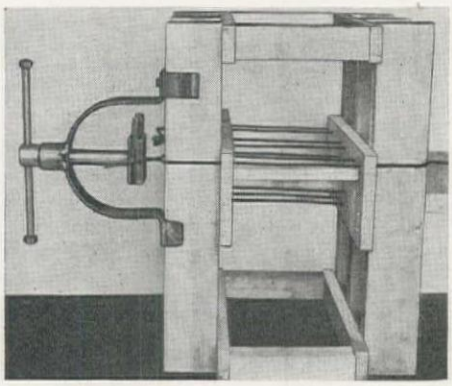
and tooth gears permit quick and easy adjustment for all types of bricks and insure safer handling. Worker fatigue should be greatly reduced by the use of the lightweight plasterer's hawk, which weighs 1 lb., 11 oz. A sponge rubber hand cushion is bonded to the wooden handle, making for greater comfort of the worker.

Concrete Form Tool

Manufacturer: B. J. Bradley, Boise, Idaho.

Equipment: Twistite, the concrete form tool.

Features claimed: Of rugged construction, Twistite is designed to make efficient use of common soft iron wire ties for concrete forms on work where this tie material is suitable. Approximately 30 seconds is required to complete a tie with this tool, which weighs approx. 8 lb. Tie wire (any size from No. 12 to No. 6 single) is threaded through form at points where ties are to be made. Loose ends of each tie are crossed over stud or waler. Tool is placed on form with head directly over tie and loose ends of wire are inserted in holding device. Operation is completed by turning handle of tool until tie is secure, then tapping clamps with hammer slightly so wire can be released and tool moved to next tie.



Self-Contained Gate Unit

Manufacturer: Rodney Hunt Machine Co., Orange, Mass.

Equipment: Gate hoist unit.

Features claimed: This simple, practical unit is an easily installed arrangement consisting of a wood gate and control. No costly shut-downs occur with application of a Rodney Hunt Gate Hoist design, and installation time is cut to the minimum. A positive, self-locking, easily operated control, it may be installed for either hand or direct-connected electric operation. Wood gates are designed for thrust loads imposed and can be furnished to suit most requirements.

All Purpose Highway Spreader

Manufacturer: Highway Equipment Company, Inc., Cedar Rapids, Iowa.

Equipment: New all purpose highway spreader.

Features claimed: Speed, safety and versatility are three claims of the new Highway Model "E" spreader, which is designed to get out on slippery, icy pavements and spread a protective coat of sand or cinders quickly. Distributor disc is mounted low enough to the highway to

cast the material low, eliminating interference with traffic. Material is cast ahead of the rear wheels, providing traction for the truck also. Spread may be controlled from the driver's seat to cover full width of either 2 or 4-lane highways, and thickness of spread is also controlled. The large hopper can be filled with material in advance and held in readiness for emergencies. Built in four lengths to mount on any truck chassis, the Model "E" is driven by power take-off from truck transmission. Drive gears operate in oil and are protected from dust and weather. The new unit may also be used for dust control with calcium chloride in summer, and for applying seal coats on oil. By removing the distributor disc, it may also be used for hauling different types of material including crushed rock.

LITERATURE FROM MANUFACTURERS . . .

Copies of the bulletins and catalogs mentioned in this column may be had by addressing a request to the *Western Construction News*, 503 Market Street, San Francisco 5, California.

GUNITE BUILDINGS — **Johnson Western Company** of Los Angeles, Calif., has published a 4-page folder on Gunite Building Construction. It discusses the process of constructing stores, theaters and medium size buildings with solid reinforced Gunite. The efficient methods used by the company are shown, illustrated in logical steps. It describes, with photographs and drawings, the single wood form employed by the Gunite method, instead of the double form normally used in poured reinforced concrete units. Plain as well as architectural design buildings are illustrated.

CONTRACTORS AIR TOOLS — **Ingersoll-Rand Company,** New York, N. Y., has released a 24-page, 2-color bulletin copiously illustrated with photographs showing air tools in action and demonstrating their versatility. A 2-page spread features some of the many uses of the impact wrench and will be of particular interest to contractors. A sectional view of the impact wrench is also shown. Additional pages are devoted to various air-operated tools such as sump pumps, tampers, hammers, vibrators, drills, grinders,

hoists and other air tools. A complete line of portable compressors from the small 2-wheel job to the large 500-CFM type is also shown.

TRUCK SERIES—**International Harvester Company** of Chicago, Ill., has a series of ten Sales-Engineering Bulletins that have been published from March, 1945 through November, 1946. They deal with the general application of the Model K-8, K-7, KR-11, CT-100, K-10, KR-12, Coal and Coke Delivery Trucks, Cement Mixers. The February, 1946 release gives in detail "The Point System of Rating Motor Trucks," the October, 1946 issue deals with "Load Distribution." Pictures, diagrams and tables of specifications are found in the bulletins in profusion. These 8½ by 11 in. bulletins are punched to be readily placed in sales or reference books.

HIGH PRESSURE, LOW VOLUME PUMPING—**Byron Jackson Co.** of Los Angeles, Calif., has recently issued a 12-page, 3-color bulletin "The Hydropress Pump." This bulletin covers technical data, application pictures, cross section drawings of parts, operation and design features, dimensional sketches and assembly procedure of the Hydropress centrifugal pump. Pump sizes covered are 10, 12 and 15 in., with capacities of 20 to 300 gpm., and head range 55 to 250 ft. per stage (to pressures of 5,000 psi.). Featured and illustrated is the unusual pump application at the rim of Arizona's Grand Canyon where four Hydropress Pumps lift water 3200 ft. from the reservoir at Indian Garden Springs to supply the needs of Park and El Tovar Hotels on the canyon's rim.

BUTLER TRUCKLOADERS—**Butler Engineering & Manufacturing Co.**, Los Angeles, Calif., recently issued a bulletin concerning types of truckloaders and methods of installation. Photographs illustrate action of the clam type shovel. Truckloaders may be used for truck loading operations in cities and municipalities, state and federal highway departments, on railroads, coal yards, crushed rock operations and many more. Diagrams show principal dimensions and clearances for both Model "L" and model "H" truck loaders.

MAINTENANCE TIME TABLE FOR SUPER "C" TOURNAPULLS—**R. G. LeTourneau, Inc.**, Peoria, Ill., has recently offered for maintenance and servicemen's convenience a new preventive maintenance wall chart, prepared especially for use as a quick guide in servicing and lubricating the Super C Tournapull. 17 by 22 inches in size, it is designed to hang on field office or shop wall, shows at what intervals the Super C Tournapull should be serviced and lists the points to be checked or adjusted at each servicing. In addition, lubrication points are illustrated by 32 labeled photographs, and the chart carries recommendations as to what kind of lubricants to use and how often.

DIRECTORY OF LUMBER FABRICATORS — **Timber Engineering Co.**, Washington, D. C., has issued a directory which tells where to buy fabricated lumber and timber using the Teco system of construction and glued laminated construction. The firms listed, which appear in order of the states, have advised the Timber Engineering Co. that they are equipped for and interested in the fabrication of lumber for types of structures marked opposite each firm's name and address. Types of structures indicated are roof trusses, bridges

and heavy lumber, poles, crossarms, glued construction, and prefabricated housing. Number of companies interested, according to the pamphlet is: roof trusses and structural framing, 53; bridges, towers and heavy lumber fabrication, 39; power line poles and crossarms, 21; glued laminated construction, 25; and prefabricated housing, 45.

MOTOR GRADER REMOVES SNOW — **Caterpillar Tractor Co.,** of Peoria, Ill., has released a new folder describing the attachments which convert motor graders into snow removal units. The illustrated color folder focuses attention on the "Caterpillar" V-type snow plow, mast-type snow wing and reversible one-way plow and bulldozer again in production for exclusive use with the "Caterpillar" Diesel No. 212 motor grader. Basic specifications are given and principal features of the attachments are treated editorially and pictorially.

LIGHTING RESEARCH AND TESTING—**Benjamin Electric Mfg. Co.** of Des Plaines, Ill., has just published a well illustrated booklet covering the activities of its new laboratory. Dedicated to the Science and Art of Illumination, the booklet covers and describes the laboratory's Electrical Section, where measurement of electrical characteristics and experimental work are conducted; the Physical Test Section which includes the Weather-Ometer, Temperature Control Chamber, Salt Fog Machine, Humidity Chamber, and other devices for testing lighting equipment quality; the Photometric Section where light distribution curves are checked; the Acoustical Test Section, Model Shop and other activities of the laboratory. This booklet has been published in connection with the company's forty-fifth anniversary and is entitled "45 Years of Progress in Lighting."

WELDERS BY WESTINGHOUSE—**Westinghouse Electric Corp.,** Pittsburgh, Pa., has sent off the press a 16-page, color booklet giving construction details, electrical specifications and application data on the complete line of A-C transformer type welders. Detailed information is given on the 500 and 400-ampere industrial welders for fast, steady production; the 300-ampere welder for heavier-than-average work; and the general duty welders ranging from 20 to 250 amperes. Electrical specifications and performance data are presented in chart form for easy reference. The booklet is fully illustrated with interior views and close-ups of special features, as well as exterior views of each model. General application information concerning recommended electrodes is also included.

SKULLGARDS — **Mine Safety Appliances Company,** Pittsburgh, Pa., has published a colorful new bulletin describing the complete line of M.S.A. Skullgards for protection against all head hazards encountered in industry. The skullgards are made in a wide variety of shapes and styles to suit the special needs of men in construction work, oil fields, chemical plants, steel mills, mines, pit and quarry operations and all other industrial activities where head-injury hazards exist. They are high-pressure molded from a tough, hard laminated bakelite material which has high dielectric strength and unusually high fracture resistance, providing effective deflection of falling and flying objects.

APRON FEEDERS — **Pioneer Engineering Works, Inc.,** Minneapolis, Minn., has sent out a new bulletin designed to present factual information concerning apron feeders for the pit, mine and quarry industries. It contains complete specifications on 69 various models, types and sizes of standard Pioneer feeders available. Feeders can be furnished without sideboards, with straight sideboards or with flared sideboards; for drive by gear motor, by conveyor tailshaft, or by crusher. Lengths from 6 ft. to 14 ft. are standard in widths from 30 in. to 48 in. Besides describing the feeders in detail, data are given on capacities, dimensions, weights and horsepower. Of special interest is information on how to order to insure the right feeder for the job.

FLAME CUT STEEL—**Joseph T. Ryerson & Son, Inc.,** Chicago, Ill., steel distributors, have issued a new illustrated bulletin on flame cutting which describes their facilities for producing plain and intricate shapes from steel plates. A number of typical flame cut sections are shown together with information regarding the use of irregular shaped steel plates in both production and maintenance work.

OPPORTUNITY SECTION

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★ IN THIS ISSUE ★