WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXII, No. 6

JUNE • 1947

35 CENTS A COPY
$4.00 PER YEAR

LOWERING A SECTION of 30-in. pipe along the Blythe-Santa Fe Springs section of the 1,200-mi. Texas-California natural gas pipeline, now progressing across the desert at the rate of about 1½ mi. a day. Southern California Gas, Southern Counties Gas Co., and El Paso Natural Gas Co. are constructing the line.

THE LUBRICANT THAT CUTS YOUR MAINTENANCE COSTS

AND FOR *ENGINE* ECONOMY

Lubricate heavy-duty gasoline and Diesel Engines with *Texaco Ursa Oil X★★*. It's fully detergent . . . dispersive . . . highly resistant to oxidation. *Ursa Oil X★★* keeps engines clean . . . assuring peak efficiency, great fuel economy, and savings all along the line on maintenance and repairs.

NOTHING beats *Texaco Marfak* for "lubricating persistency". It's tough—holds together—and *stays in bearings* despite the squeeze of heavy loads and the pounding of rough service. *Marfak* also prevents dirt and moisture from getting in — gives longer-lasting protection that cuts maintenance costs.

In wheel bearings, use *Texaco Marfak Heavy Duty*. Its long lasting protection comes from its unique ability to provide a fluid lubricating film inside the bearing while retaining its original consistency at the outer edges — thus sealing itself in, sealing out dirt and moisture.

More than 250 million pounds of Marfak have been used to date! You couldn't ask for better proof of quality and performance.

Contractors everywhere gain many time- and money-saving advantages by using the Texaco Simplified Lubrication Plan. Ask about it. Call the nearest of the more than 2500 Texaco distributing plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, N. Y.

TEXACO

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.

"BOP-its a real Rock Shovel!"

—it has everything a real Rock Shovel needs. Cast steel bases and cast steel machinery side frames are built for rock service. They keep shafts in alignment and save wear on bearings and gears under the strain of hard rock digging.

The Dual Independent Crowd—Independent plus Automatic—utilizes force other shovels waste. The Northwest Welded Boom has been proved in rock digging. The double dipper sticks, tied at the inner end with a cap casting, reduce twisting strains on the dipper and boom, and work as a unit.

The Cushion Clutch eliminates the effect of shock overload to parts under power when the dipper hits an immovable rock.

The "Feather-Touch" Clutch Control increases the daily output by assuring easier operation and the feel of the load when handling the "big ones."

Here is a unit proved in rock by the Nation's leading contractors and if you have a real Rock Shovel you'll never have to worry about output in easy digging. Follow the Northwest Crowd.

NORTHWEST ENGINEERING COMPANY
135 SOUTH LA SALLE STREET CHICAGO 3, ILLINOIS

INDEPENDENT CROWD plus AUTOMATIC CROWD
FOR GREATER DIGGING POWER
The DUAL CROWD

cal 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.

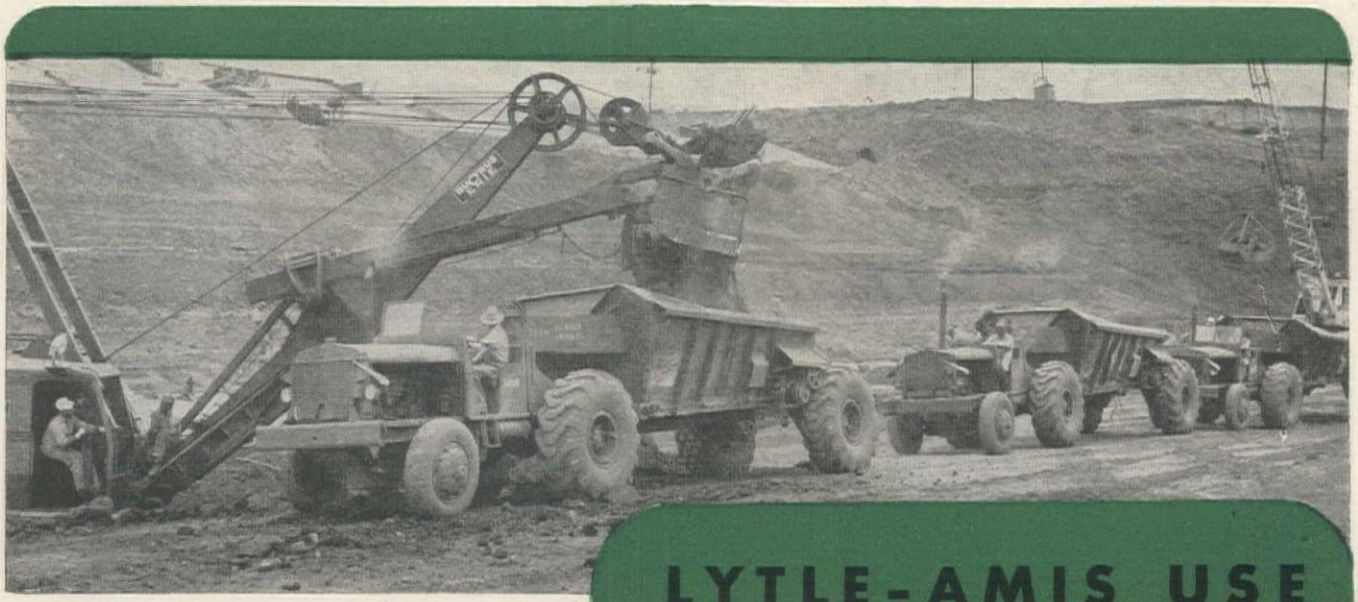
PORTLAND, OREGON
Balzer Machinery Co.

NORTHWEST SALES OFFICES:

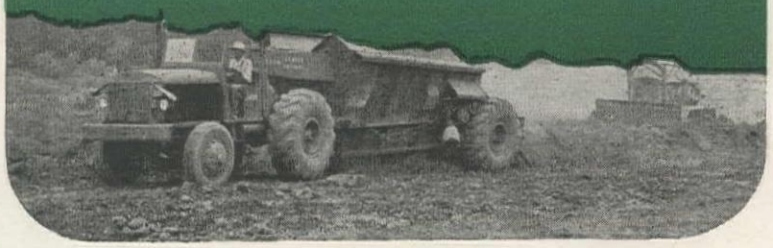
LOS ANGELES, CALIFORNIA
3707 Santa Fe Avenue

SAN FRANCISCO, CALIFORNIA
255 Tenth Street

SEATTLE, WASHINGTON
1234 Sixth Ave., South



LYTLE-AMIS USE 25 "EUCS" ON CANTON DAM



● Canton Dam, a U. S. Bureau of Reclamation flood control and irrigation project in Oklahoma, will be 14,300 ft. long, containing about 5,300,000 cu. yds. of rolled earth-fill.

Prior to suspension of work during the war, a large fleet of Bottom-Dump Euclids was used by T. L. James & Co. and Guilliams Bros. When work was resumed in 1946 by C. F. Lytle Co. and Amis Construction Co., Euclid equipment again was selected for this big dirt moving job.

During peak operations more than 20,000 cu. yds. of material a day were placed on the fill by a fleet of 20 Bottom-Dump and 5 Rear-Dump Euclids. Material ranging from blow sand to hard red clay was loaded by two 2½ yd. shovels, two 1½ yd. draglines and a Euclid Loader. Hauls varied from 3,300 to 8,000 feet in length.

Reliable performance and the ability of the Euclids to stay on the job day after day, working two ten-hour shifts much of the time, enabled the contractors to keep well ahead of their earth moving schedule. Your Euclid Distributor or Representative will be glad to show you why Euclid off-the-highway equipment is the choice of many leading contractors and industrial users.

A Euclid Loader working with Bottom-Dumps averaged 525 cu. yds. hourly production despite delays caused by lack of sufficient hauling units.

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; P. L. Crooks & Co., Portland 10, Oregon. REPRESENTATIVE: M. H. Johnson, W. 2411 Crown Avenue, Spokane, Washington.

Editor
J. M. SERVER, JR.

Associate Editors
D. F. Stevens
2611 Franklin Ave., Seattle 2, Wash.
Telephone MInor 0910
Arnold Kruckman
1120 Vermont Ave., NW.,
Washington 5, D. C.
Telephone DIstrict 8822

News Editors
K. M. Blamey
B. V. Bealer

Staff Correspondents
A. E. Niederhoff
N. R. Love
M. W. Anderson
R. E. Carter, Jr.

Published monthly by
KING PUBLICATIONS
503 Market Street
San Francisco 5, California
Phone YUKON 6-1537

Arthur F. King . . . . . President
Donald F. Forster . Exec. V.-Pres.
L. P. Vrettos . . . . . Treasurer
L. B. King . . . . . Secretary
Ralph P. Dillon . Circulation Mgr.
R. C. Williams . Production Mgr.

Please address all communications to the San Francisco office

Advertising Offices

NEW YORK OFFICE
Ralph E. Dorland, District Manager
2225 Coles Ave., Scotch Plains, N. J.
Telephone Fanwood 2-8112

CHICAGO OFFICE
A. C. Petersen, District Manager
5833 S. Spaulding Ave., Chicago 29
Telephone PROspect 1685

SAN FRANCISCO OFFICE
Harry W. Bucknell, District Manager
503 Market St., San Francisco 5, Calif.
Telephone YUkon 6-1537

LOS ANGELES OFFICE
J. E. Badgley, District Manager
3835 Wilshire Blvd., Los Angeles 5
Telephone FItzroy 9462

ABC

Subscription Rates

The annual subscription rate is $4 in the United States and foreign countries where extra postage is not required. To Canada and to foreign countries where extra postage is necessary the annual rate is $5. Single copies, 35 cents.

Entered as Second Class Matter at the Post Office in San Francisco, California under the Act of March 3, 1879.

WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Volume 22 JUNE • 1947 Number 6

TABLE OF CONTENTS

Covering the Western Half of the National Construction Field

NO OTHER AT ANY can match the profit- a modern LAPLANT-

LaPlant-Choate scrapers are the only job-proved, completely modern, postwar models with all these profit-making features: 25% easier loading — lower horsepower requirements — faster, cleaner, smoother spreading — positive forced ejection — open bowl — no useless dead weight — low center of gravity — modern, high strength alloy steel — modern, high natural rubber content tires — sturdy construction — low maintenance cost and high trade-in value. As the result, operating records on hundreds of tough earthmoving jobs, working in all kinds of materials, prove that LaPlant-Choate scrapers outperform other leading scrapers by wide margins.

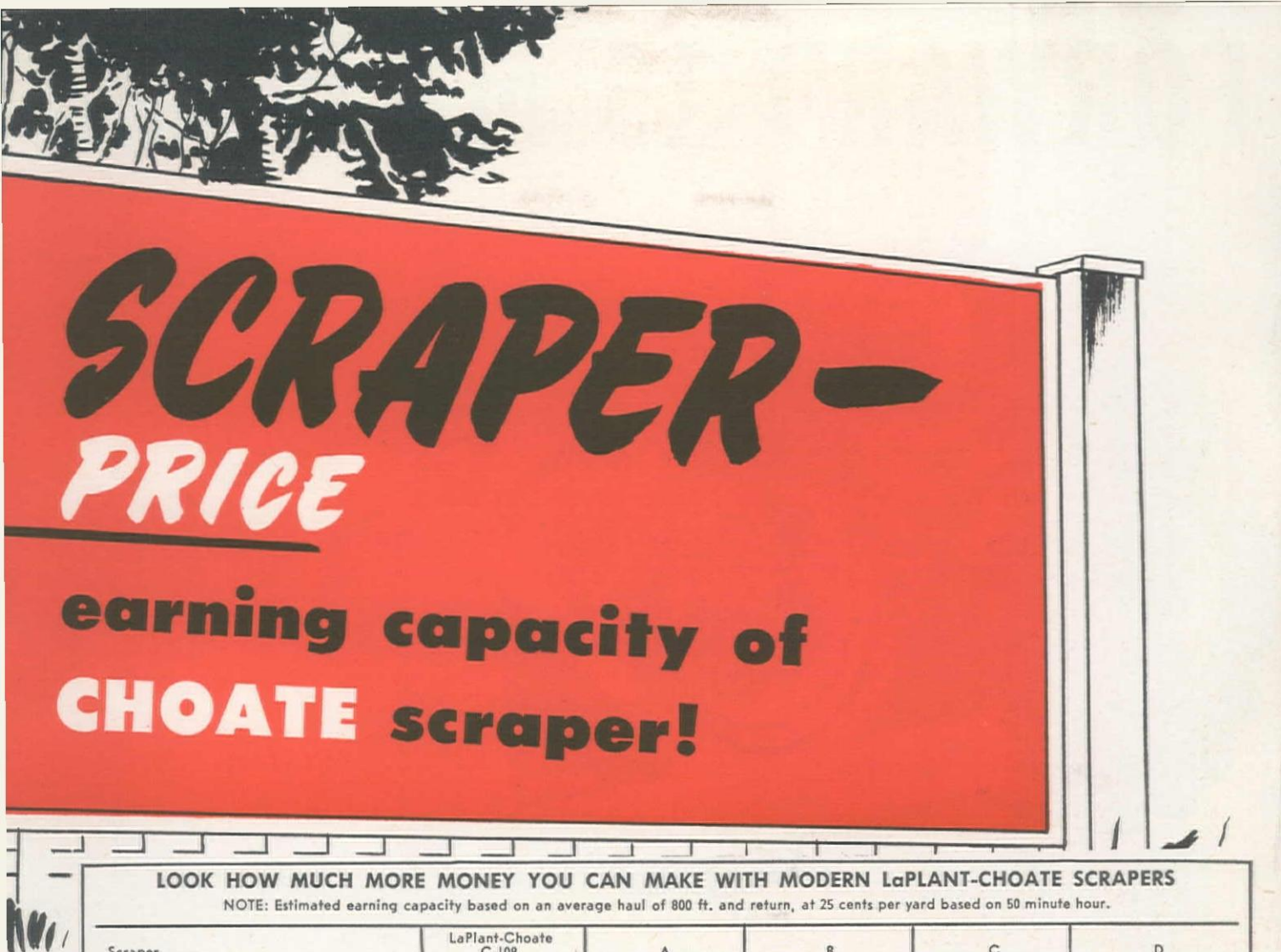
Now, look what this performance means in dollars and cents. Even if you were able to obtain other scrapers at half price, within six months you would have been way ahead by buying a new LPC scraper. Within a year, you would be better off even if you got the other as a gift. Then, for thousands of hours, your profits will roll in still faster.

Any way you look at it, no matter what kind of scrapers you are using now, you'll be money ahead by replacing them with modern, job-proved LaPlant-Choate units. Another advantage, too, is the fact that LPC scrapers in most sizes (from 2 to 14 yd. struck measure) are ready for *immediate delivery*. Your nearest LPC distributor can tell you how hundreds of contractors are using "higher income" LaPlant-Choate scrapers to bid lower and still make profits. LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Iowa; 1022 77th Ave., Oakland, Calif.

LaPLANT-CHOATE

Positive **FORCED EJECTION SCRAPERS**

FIRST in Value because they're FIRST in Performance!



SCRAPER-PRICE

earning capacity of CHOATE scraper!

LOOK HOW MUCH MORE MONEY YOU CAN MAKE WITH MODERN LaPLANT-CHOATE SCRAPERS

NOTE: Estimated earning capacity based on an average haul of 800 ft. and return, at 25 cents per yard based on 50 minute hour.

Scraper	LaPlant-Choate C-108 (Struck 8.4 yds.)	A (Struck 8.2 yds.)	B (Struck 8.7 yds.)	C (Struck 8 yds.)	D (Struck 8.5 yds.)
No. of yds. per hr.	74	63*	65*	64**	61***
Estimated earning capacity per hr.	$18.50	$15.75*	$16.25*	$16.00**	$15.25*
Estimated earning capacity for 1000 hrs.	$ 18,500	$ 15,750	$ 16,250	$ 16,000	$ 15,250
3000 hrs.	55,500	47,250	48,750	48,000	45,750
5000 hrs.	92,500	78,750	81,250	80,000	76,250
10000 hrs.	185,000	157,500	162,500	160,000	152,500
15000 hrs.	277,000	236,250	243,750	240,000	228,750

*Manufacturer's own figures. **Estimated. ***Government tests.

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

FORWARD 15 m.p.h. four speeds

TOURNADOZER.

PRODUCTION TABLE — PUSHER LOADING			
Haul One-way	Tournapulls served	Haul One-way	Tournapulls served
300′	2	5,000′	7
1,000′	3	6,000′	8
2,000′	4	7,000′	9
3,000′	5	8,000′	10
4,000′	6	10,000′	13

PRODUCTION TABLE — DIRTMOVING		
Haul	Yards in 1 Hour	Yards in 8 Hours
50′	184	1472
100′	118	944
200′	66	528
300′	46	368
400′	35	280

Above production based on good working conditions, negligible grades, level cuts, efficient management and 60-minute-per-hour operating efficiency.

LETOURNEAU LET EQUIPMENT

See your Le Tourneau Distributor NOW for complete information

REVERSE 15 m.p.h. four speeds

Dozer travel is 50% forward, 50% reverse, so the revolutionary new four-wheel-drive Tournadozer gives you approximately double the fastest crawler's forward speed and full range of FORWARD SPEEDS IN REVERSE.

Dozer work involves lots of shifting, so the high-speed Tournadozer has constant-mesh Tournamatic transmission . . . gives you instantaneous change of gear ratios forward or reverse, any time . . . any place. Just move lever to any gear selection you want and you're in it and ON YOUR WAY . . . RIGHT NOW.

Dozer duty is hard on tracks, so the new Tournadozer rolls on rubber . . . big tough tires 21.00 x 25. That cuts out a lot of track repair delays and materially CUTS MAINTENANCE EXPENSE.

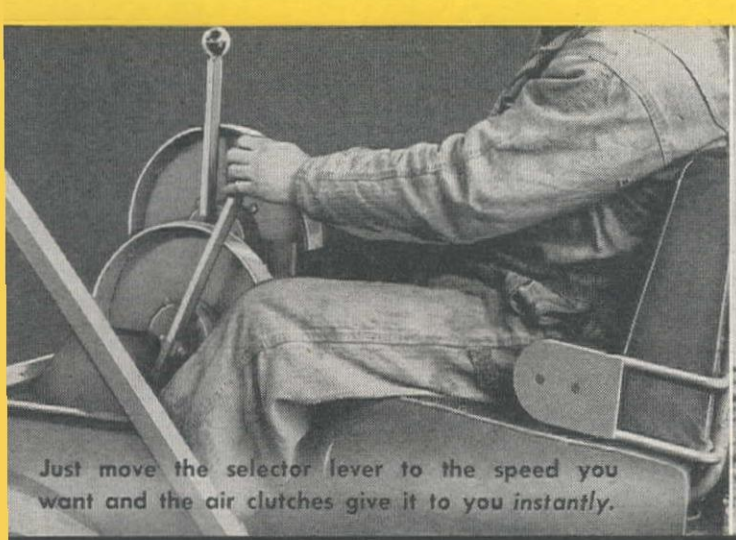
Dozer jobs often get into soft going, so the big Tournadozer tires have tapered beads. That means low tire pressure . . . extra flotation . . . and lets you use extra low pressure to get PLENTY OF TRACTION IN SAND AND MUCK.

Dozer work has always been tough on the operator . . . Tournadozer operators ride easy on low pressure pneumatic tires . . . sit easy on hydraulic suspension seat . . . take it easy because air-actuated finger-tip controls TAKE LABOR OUT OF OPERATING.

Dozer travel often involved slow on-job moves and expensive haul from job to job. But the new Tournadozer goes anywhere on the job or DRIVES JOB-TO-JOB FAST . . . AT 15 MPH.

Check your LeTourneau Distributor for delivery. **Order NOW.**

4 wheel drive on rubber



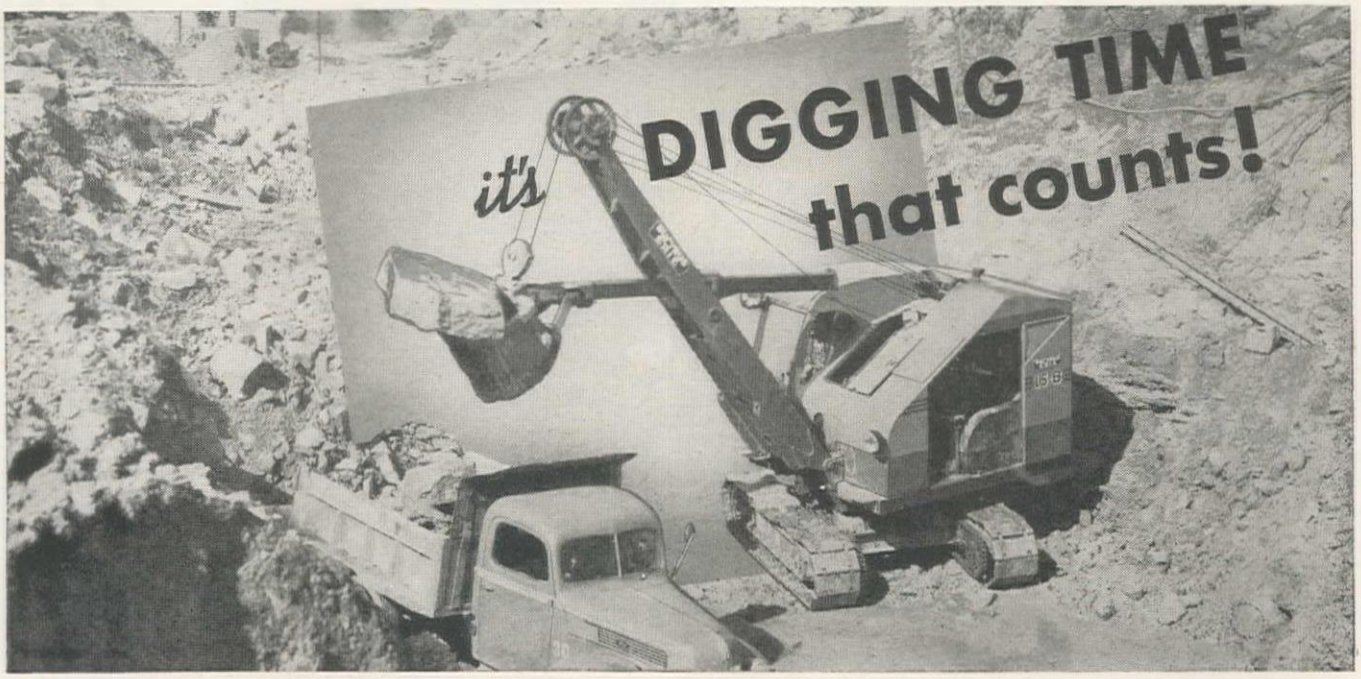
Just move the selector lever to the speed you want and the air clutches give it to you *instantly.*

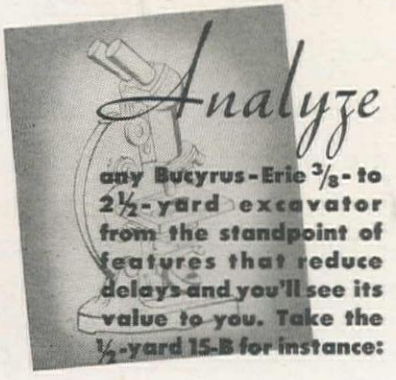
4-wheel drive plus big, low-pressure tires give plenty of traction and flotation to move big loads of abrasive, loose sand.

LETOURNEAU PEORIA, ILLINOIS — HIGH-SPEED RUBBER-TIRED **TOURNADOZERS**

Tournadozer, Tournamatic — Trade Mark Reg. U.S. Pat. Off.

FIRST MACHINE DESIGNED FOR DOZING AND PUSHING





MOBILITY: The 15-B is easy to steer in sharp or gradual turns and there's plenty of power to climb grades up to 30%. Time spent in moving is cut to a minimum.

MATERIALS: Only controlled-quality materials, properly treated, are used.

WEIGHT: The lightest weight consistent with ample strength is maintained throughout so that stresses on all parts of the machine are kept at a minimum. The 15-B, like all other Bucyrus-Eries, is individually designed for its work.

PERFORMANCE: The smooth, quiet performance of the 15-B—obtained with widespread use of anti-friction bearings, oil enclosed gears and accurate alignment—means less maintenance, reduces operator fatigue, and increases digging time.

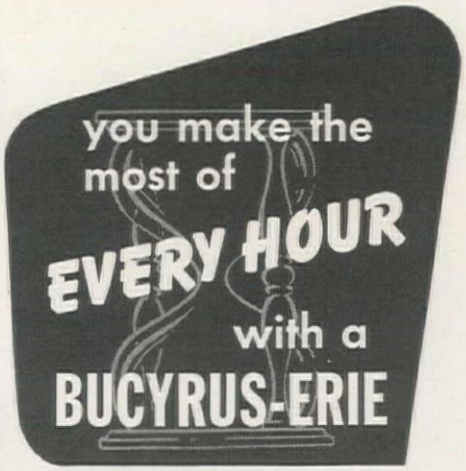
ADJUSTMENTS: All adjustments, including singlepoint adjustments on clutches and brakes are easily made and stay put for long periods.

ACCESSIBILITY: Parts are large, simple, few in number, easy to get at for replacing. Lubrication fittings are easy to reach, hard to miss.

CONTROL: All operating levers, including lever for positive digging lock, are grouped at the operator's position. There are no time-wasting delays caused by the operator's having to leave his normal position.

CYCLE: All functions are balanced and synchronized so that there is no overstressing of any part or parts to cause too-frequent adjustments and excessive wear. 65E46

BUCYRUS-ERIE COMPANY • SOUTH MILWAUKEE, WISCONSIN

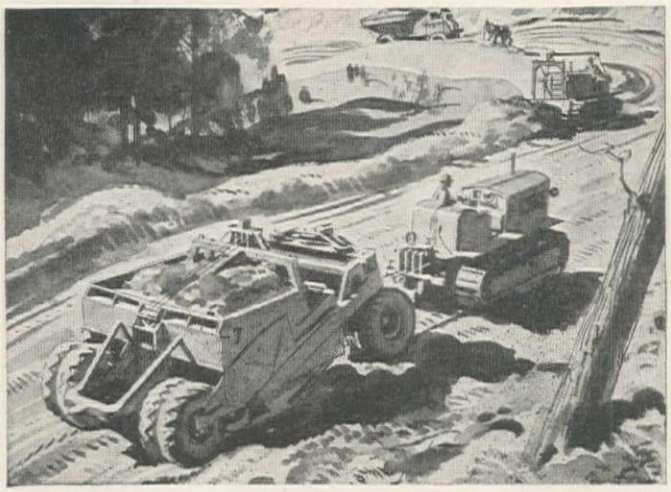


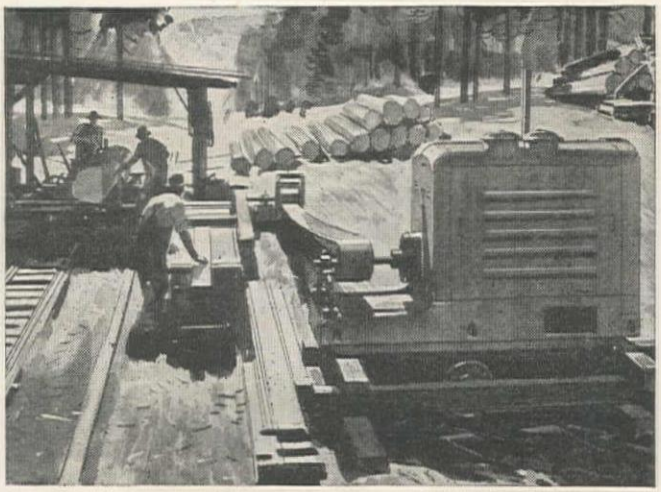
SEE YOUR BUCYRUS ERIE DISTRIBUTOR

EXC-2

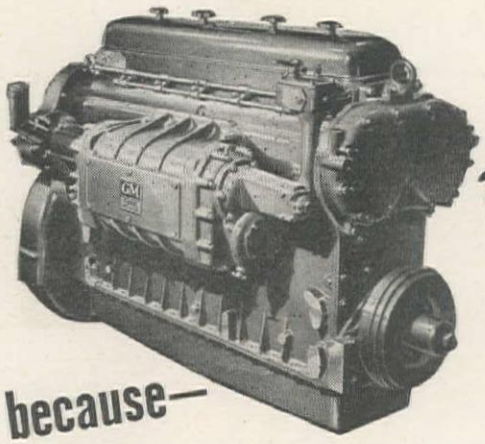
SOULÉ EQUIPMENT COMPANY	Oakland — Sacramento
CROOK COMPANY	Los Angeles
CLYDE EQUIPMENT COMPANY	Portland — Seattle
INTERMOUNTAIN EQUIPMENT CO.	Boise — Spokane — Walla Walla
THE LANG COMPANY	Salt Lake City
THE O. S. STAPLEY COMPANY	Phoenix
R. L. HARRISON COMPANY, INC.	Albuquerque
BROWN TRUCK & EQUIPMENT COMPANY	Reno

Shovels • Dragshovels • Draglines • Clamshells • Cranes • ⅜ to 2½-yd.



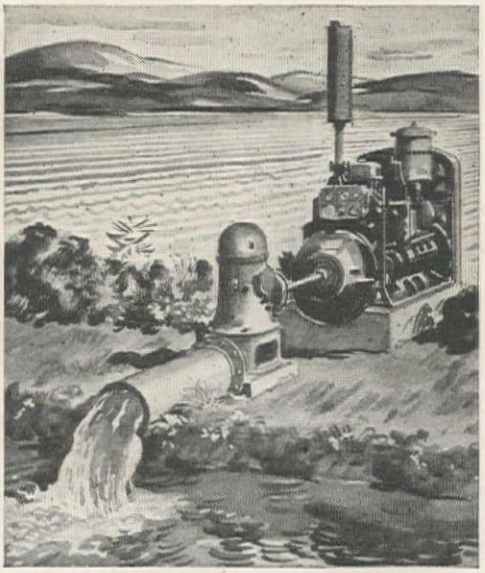


Bring on the hard work



Here's the Engine for it!

because—



there's power at every downstroke

No matter where a General Motors Diesel engine goes to work, you can count on a smooth, steady flow of power. Because each piston downstroke is a power stroke, there are twice the number of power impulses for each turn of the shaft. A "six" is as smooth as a "twelve" in an ordinary engine.

Besides there's better acceleration under a load—and starting's quicker.

So it's easy to see why GM Diesels are "naturals" wherever a steady, sturdy, smooth source of power is required—why they are top-notch for lumbering, fishing, construction, well drilling and for every job where tough, compact, dependable power is needed.

So, no matter what your requirements might be, if you want sturdy, money-making, safe power, be sure to look into General Motors Diesel engines.

DETROIT DIESEL ENGINE DIVISION

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

GENERAL MOTORS

GM GENERAL MOTORS DIESEL POWER

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.

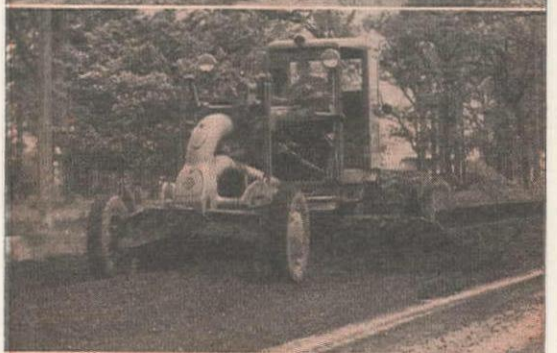
Gunderson Bros. Equipment Corp.
PORTLAND 9, ORE.

Olson Manufacturing Co.
BOISE, IDAHO

Capitol Tractor & Equipment Co.
SACRAMENTO, CALIF.

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

MORE WORK-POWER



With owners and operators, it's Performance that Counts! The capacity of a Motor Grader is measured by the work it accomplishes.

Here's why the Allis-Chalmers AD Motor Grader more than meets their requirements:

TRAVEL SPEEDS smoothly synchronized with OPERATOR CONTROLS . . . All the needed power applied as required.

BIG WORKING CLEARANCE. 28″ throat clearance handles bigger windrows without interference.

"ROLL-AWAY" MOLDBOARD. Requires less power to handle bigger loads at faster speeds. Material is *rolled,* not pushed.

21,500 LBS. EFFECTIVE WEIGHT. Balanced for maximum traction and control.

FULL CIRCLE REVOLVING BLADE. Swings *ahead* of platform with plenty of end clearance.

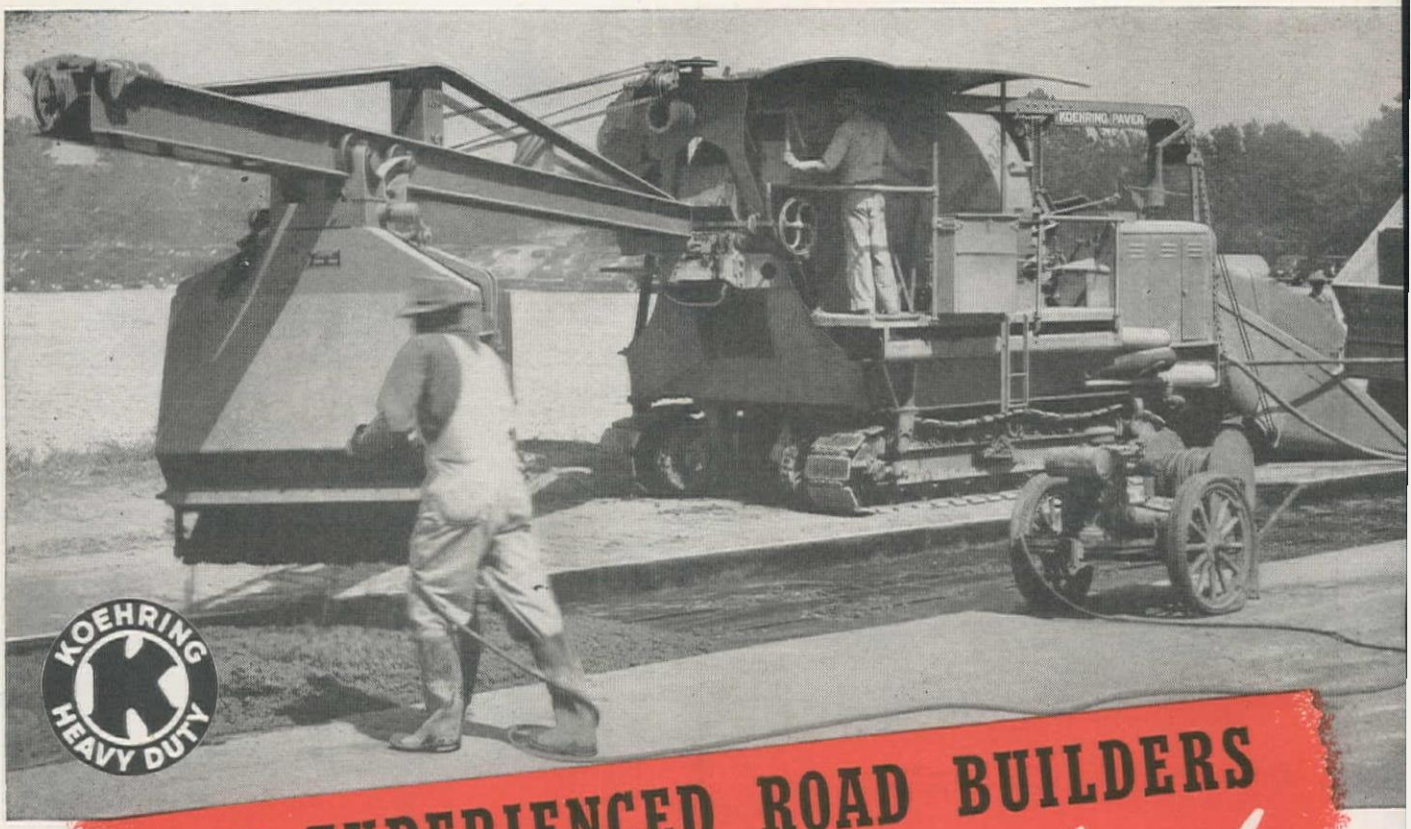
EXCLUSIVE TUBULAR FRAME. Strong, shock-absorbing, protects control rods inside frame.

ELECTRIC BRAKES. Control positive, operate with less effort than auto brakes.

FAMOUS 2-CYCLE DIESEL POWER. Dependable, economical, instant-starting.

Users appreciate these features that definitely lessen fatigue — that keep efficiency at a high level — that pay off in more work accomplished.

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



WHY EXPERIENCED ROAD BUILDERS INSIST ON KOEHRING *twinbatch*

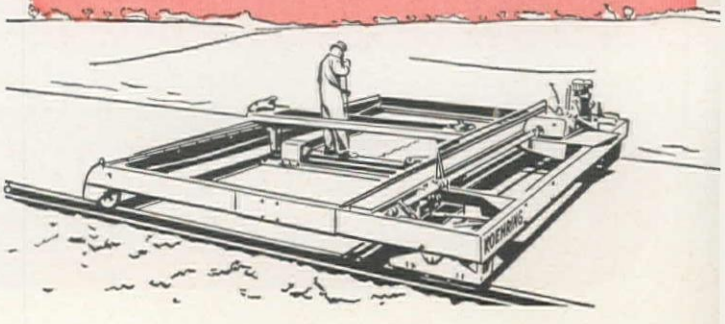
Because high output is safe-guarded by time-tested, job-tested Heavy-Duty construction, Koehring *twinbatch* Paver sets an efficient, money-making pace for the crew. At the customary 60-batches-an-hour clip, the *twinbatch* works smoothly, effortlessly. Easy on the operator, easy on the crew. When rains cause delays, top output of 86.7 batches per hour gets the job back on schedule — fast.

Because it's built right for on-schedule service, the Koehring *twinbatch* is a 60,400-lb. machine. Sixteen-inch 78-lb. steel I beams make up the main frame. Heavy 2-compartment drum has extra replaceable alloy steel liners. Drum roller paths are the heaviest and thickest on any paver. Skip is fully 10-feet wide, easy for batch trucks to back into. Bucket dumps efficiently even on super-elevated curves, because boom oscillates to keep bucket vertical. Elevating boom now available as optional equipment.

KOEHRING COMPANY
MILWAUKEE 10, WISCONSIN

KOEHRING HEAVY-DUTY

Koehring Longitudinal Finisher finishes slab mechanically, accurate to specifications.



Columbia Equipment Co., *Portland*
Harron, Rickard & McCone Co. of Southern California, *Los Angeles*
Kimball Equipment Co., *Salt Lake City*
McKelvy Machinery Co., *Denver*
Moore Equipment Co., *Stockton*
Neil B. McGinnis Co., *Phoenix*
Pacific Hoist & Derrick Co., *Seattle*
The Harry Cornelius Co., *Albuquerque*
Western Machinery Co., *Spokane*

KWIK-MIX

It's a KWIK-MIX DANDIE

New 3½-S End Tilter

Dandie quality in every detail. Modern high strength welded construction. Thorough mixing action. End discharge saves labor — you don't back and turn loaded wheelbarrow. Approach mixer from either side or from the front. Spotting area is unobstructed. Trails fast, safely, because it rides on leaf springs. Wheels run on anti-friction bearings. Air-cooled engine won't freeze in winter, heat up in summer. Big hand wheel makes it easy to tilt loaded drum for discharge.

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

JOHNSON

ALL-WELDED BUCKET

Extra Yardage Every Shift

Johnson All-Welded Clamshell Buckets work fast. Sealed needle bearings on closing sheaves plus balanced all-welded construction are combined to get extra speed in any material. Digging power is improved because all-welded construction lowers center of gravity. Teeth bite in straight and deep. Angle-mounted lower sheave block maintains natural cable alignment. Available in all sizes ranging from ⅜ yard to 2½ yard. Three types: Heavy Duty Digging, Wide Rehandling and General Purpose.

Cramer Machinery Company	Portland
Edward R. Bacon Company	San Francisco
Harron, Rickard & McCone Co. of So. Calif.	Los Angeles
McKelvy Machinery Company	Denver
Moore Equipment Company	Stockton
Neil B. McGinnis Company	Phoenix
Pacific Hoist & Derrick Company	Seattle
The Harry Cornelius Company	Albuquerque
Western Machinery Company	Spokane
Western Machinery Company	Salt Lake City

PARSONS

221 TRENCHLINER REGISTERED TRADE MARK

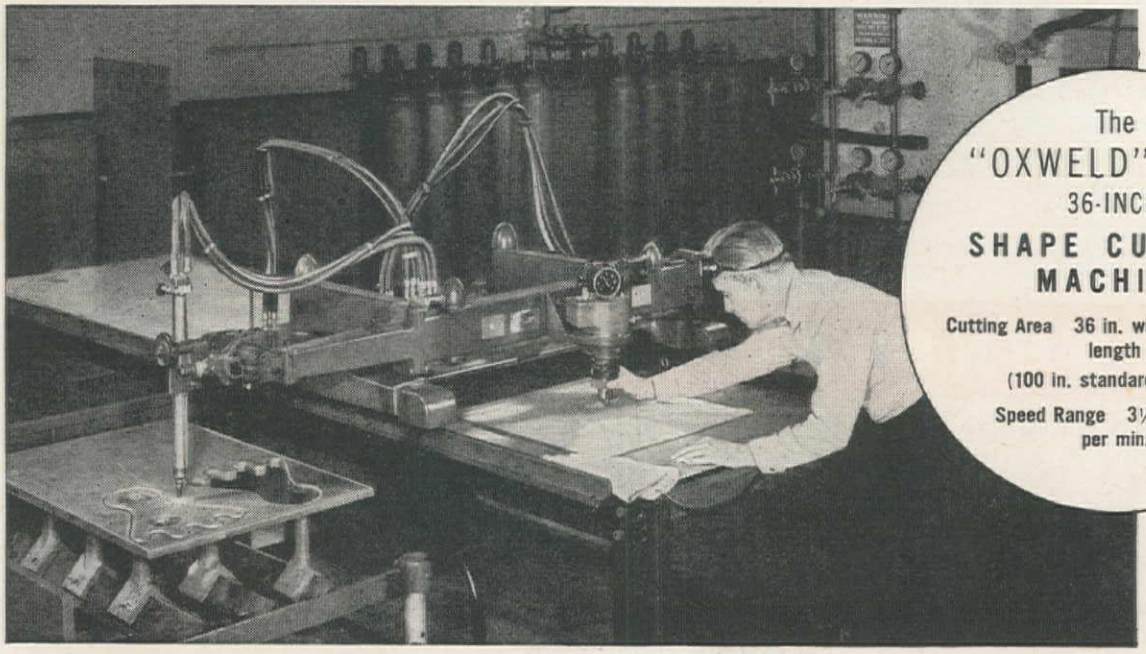
Ideal for City Work

Digs trench within 10 inches of side obstructions, gets close to walls, fences, trees. Boom telescopes to dig over and under pipes traversing trench, virtually eliminating costly hand work. Arched frame improves travel safety, because it permits boom to be raised for travel without dangerously raising machine's center of gravity. Digs up to 8' deep, 16" to 36" wide. Power flow is direct and simple. Short, large diameter shafts in a rigid gear case hold perfect alignment. Arc type conveyor discharges at 6'-9"

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

a new HIGH-PRODUCTION tool for SHAPING steel parts

. . . a new high-speed, high-capacity oxy-acetylene flame-cutting machine for mass production of steel shapes up to 36 inches wide.



The "OXWELD" CM-15 36-INCH **SHAPE CUTTING MACHINE**

Cutting Area 36 in. wide by unlimited length (100 in. standard length)

Speed Range 3½ to 28 in. per min.

Line Tracing — Shapes to be cut can be traced from full-scale blue prints or drawings.

Strip Templet Tracing — Many parts of the same shape can be cut automatically by using a strip templet.

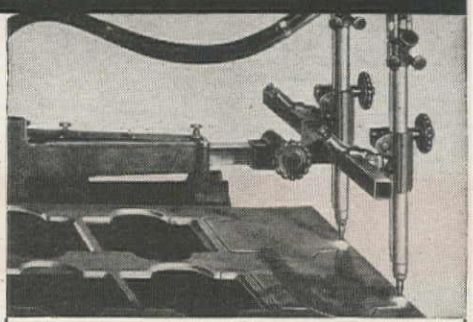
Magnetic Tracing — For repetitive cutting of complicated shapes with close tolerances, a magnetic tracing unit can be readily attached to the machine.

Call or write any Linde office for a descriptive folder. Ask for Form 6021.

BUILT FOR CUTTING PRODUCTION CORNERS

DOUBLE-ENDED OPERATION

Dual controls and blowpipe mountings provide for mounting blowpipes on either or both sides of the machine, and permit cutting on both sides simultaneously or cutting can be done on one side of the machine while plate is being set up on the other.



MULTIPLE OPERATION

Two free-moving pivoted arms mounted on the free-rolling carriage give blowpipe motion in any direction within the limits of the work area of the machine. An extension bar is available, for mounting more than one blowpipe on either side of the machine.

LINDE OXYGEN
PREST-O-LITE ACETYLENE
UNION CARBIDE
OXWELD, PUROX, PREST-O-WELD, HELIARC, AND UNIONMELT APPARATUS
OXWELD, HELIARC, AND UNIONMELT SUPPLIES

THE LINDE AIR PRODUCTS COMPANY

UNIT OF UNION CARBIDE AND CARBON CORPORATION

30 EAST 42nd STREET - NEW YORK 17 - N.Y. UCC OFFICES IN OTHER PRINCIPAL CITIES

IN CANADA: DOMINION OXYGEN COMPANY, LIMITED, TORONTO

The words "Heliarc," "Linde," "Oxweld," "Prest-O-Lite," "Prest-O-Weld," "Purox," "Union," and "Unionmelt" are trade-marks of Union Carbide and Carbon Corporation or its Units.

Barber-Greene presents . . .

the "545"—heavy duty pneumatic-tired Bucket Loader . . .

Here's a Bucket Loader that hits right at today's needs for mobility, high capacity and all-round usefulness. The 545 is B-G engineering at its finest and is way ahead with advanced performance features that include: two-wheel drive for fast maneuvering in cramped quarters and road speeds up to 5 m.p.h. It has the power and traction you want, too—three forward speeds and a fast reverse. Finally, it has the best of the B-G features proved on its companion crawler-mounted model such as: synchronized spiral feed that keeps the buckets full and the horizontal nesting boom for road travel or transport. And, of course, it has the B-G stamina that minimizes maintenance. See your Barber-Greene distributor or write 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.

THE *New* GRADALL

One machine

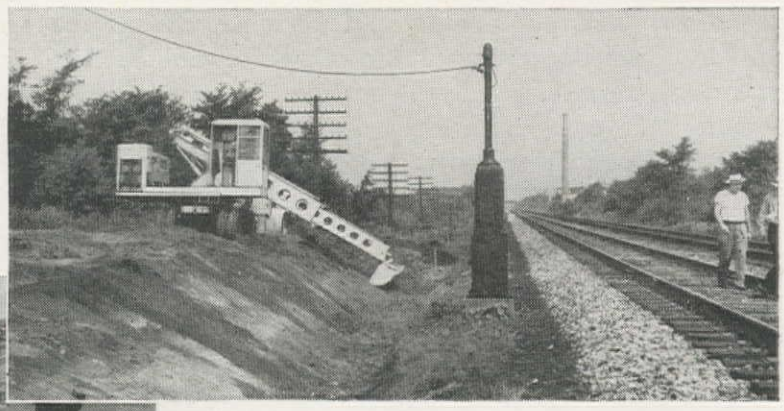
THAT DOES THE WORK OF *Many . . .*

SECRET OF GRADALL'S ABILITY to do fast, accurate work on a wide variety of jobs is a unique, new application of hydraulic power. The sturdy Gradall boom works with "Arm-Action". It reaches and pulls, turns and tilts—cuts sheer, clean walls or perfectly graded slopes.

In many cases, Gradall eliminates the necessity for investing in several different types of costly machinery. Mounted on a heavy-duty chassis, Gradall can be driven from job to job at truck speed.

Investigate Gradall—learn how it can do better work at lower cost for you.

GRADALL PRECISION results in clean, neat ditches like this one. Perfect drainage and free water flow is assured by Gradall's accurate grading of ditch sides and bottom.



GRADALL DEXTERITY makes possible working in close quarters—under low-hanging wires, against walls and curbing, or around switch and signal control boxes.

GRADALL VERSATILITY makes it a truly multi-purpose machine. Here is accurate, clean-cut work in ripping up old paving, which can be neatly stacked, or loaded directly into trucks. No costly clean-up labor is necessary with Gradall on the job.

Gradall Reg. U S. Pat. Off.

SEND FOR

GRADALL BOOKLET

showing many job applications, specifications, complete facts.

GRADALL DIVISION
WARNER & SWASEY
Cleveland

WARNER & SWASEY
Cleveland 3, Ohio

Please send the new GRADALL Book to:

Name .....

Address .....

City ..... *State* .....

J-647

SALES AND SERVICE:

GOLDEN STATE EQUIPMENT CO.
4770 Valley Blvd.
Los Angeles 32, California

BAY EQUIPMENT CO.
3254 East Shore Highway
Richmond, California

BREAK IT UP FASTER WITH BLUE BRUTES

Your bids for jobs involving paving breaking carry extra profit margins when you have Blue Brute Compressors and Air Tools lined up for the work. Utility pipe lines . . . street construction and repair . . . are "naturals" for these Blue Brute Teams.

Look at Blue Brute Compressors — hard-muscled "portable cyclones" that take the roughest going . . . and come back for more. They develop full rated output right through the grind . . . and have plenty of reserve for the hard pulls. Yes, Blue Brute stamina is *built* in . . . full force-feed lubrication in engine and compressor . . . Feather* Valves for efficient air control and less maintenance . . . 3-point suspension of engine and compressor in a unitized housing cushions shocks and vibration . . . New Fuel Saver accurately regulates fuel according to demand — gives you the most air from each gallon of fuel.

Investigate Blue Brute Paving Breakers, matched partners for Blue Brute Compressors: WB-50 — a fast middleweight for the lighter jobs; WB-81 — a rapid fire heavyweight that packs terrific power; WB-85 — a super slugger that tears into *anything*.

For a combination that will keep you consistently ahead of schedule — and competition — go to your Blue Brute distributor. He'll show you the models best suited to your jobs . . . and prove to you *there's more worth in Worthington-Ransome.* H7-4

*Trade Mark Registered

KNOW YOUR

BLUE BRUTES

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

RANSOME EQUIPMENT

Pavers, Portable and Stationary Mixers, Truck Mixers, Pneumatic Placing and Grouting Equipment and Accessories.

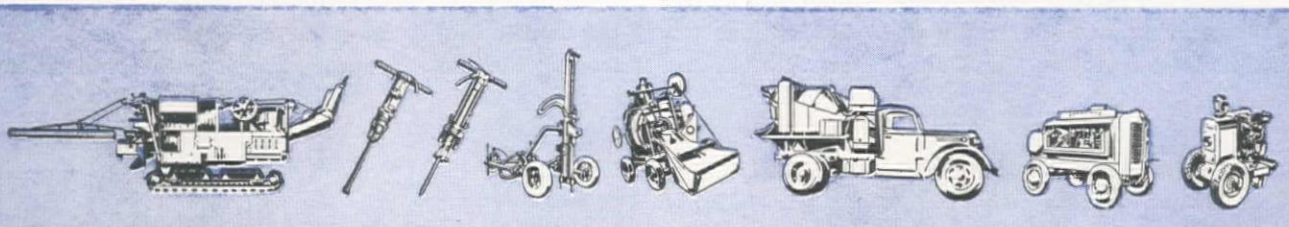
WORTHINGTON EQUIPMENT

Gasoline and Diesel Driven Portable Compressors, Rock Drills, Air Tools, Self-Priming Centrifugal Pumps and Accessories.

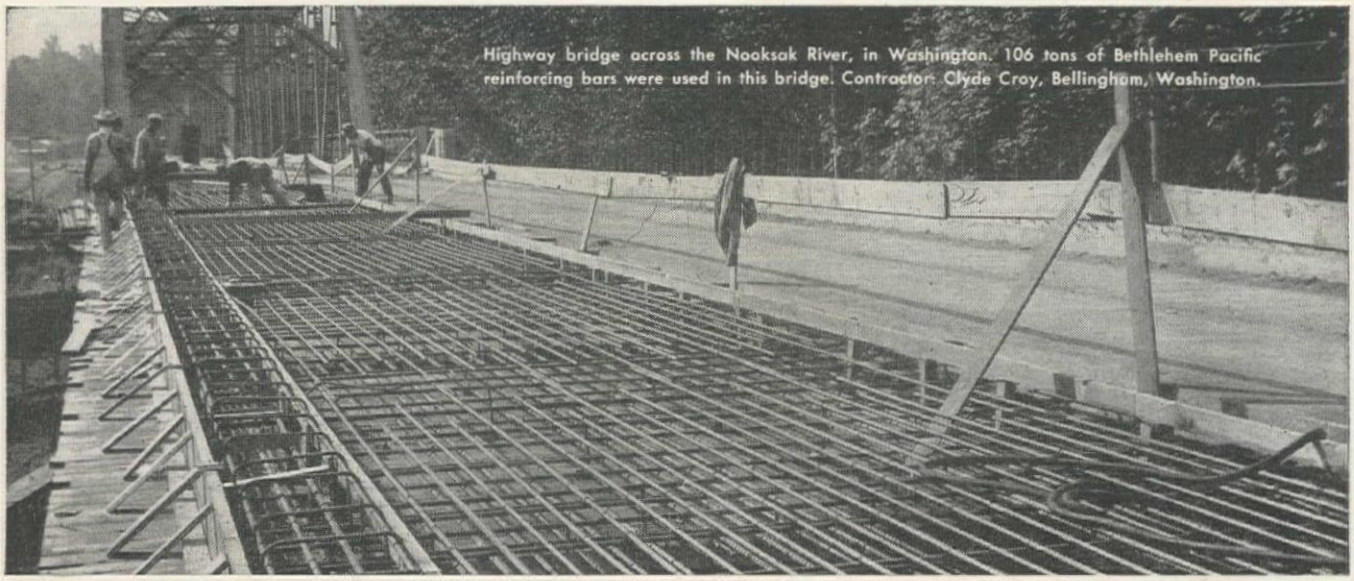
WORTHINGTON

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

BUY BLUE BRUTES



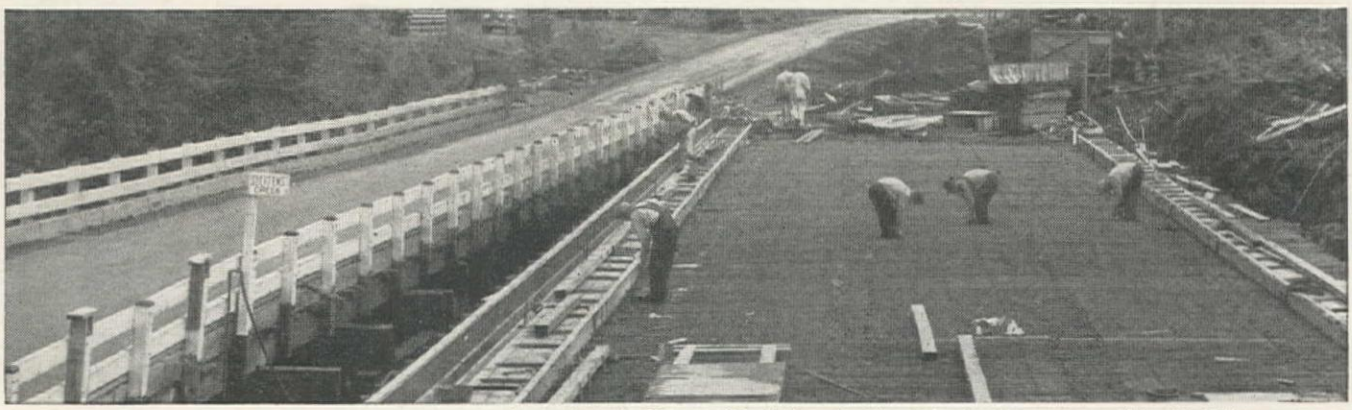
IF IT'S A CONSTRUCTION JOB, IT'S A BLUE BRUTE JOB



Highway bridge across the Nooksak River, in Washington. 106 tons of Bethlehem Pacific reinforcing bars were used in this bridge. Contractor: Clyde Croy, Bellingham, Washington.

Washington State Highway Bridges

REINFORCED WITH BETHLEHEM PACIFIC STEEL



Approximately 90 tons of Bethlehem Pacific reinforcing bars were used in this highway bridge across Steffens Creek in Washington. Contractor: Rumsey and Company, Seattle.

In Washington State, Bethlehem Pacific reinforcing steel is being used in the concrete floor construction of various bridge-building and improvement projects.

In the shadow of Mt. Rainier the old bridge across Steffens Creek is being replaced with a concrete-deck structure containing 90 tons of Bethlehem Pacific reinforcing steel. On Primary State Highway No. 1 the bridge crossing the Nooksak River just east of Bellingham is getting a new, wide concrete roadway reinforced with 106 tons of Bethlehem Pacific steel. Different contractors handled these jobs but each used reinforcing steel from Bethlehem Pacific's Seattle mills.

A convenient, dependable source of steel means a saving in time and money as well as considerably less worry for most builders. That is one reason Bethlehem Pacific mills at Los Angeles, South San Francisco and Seattle are favored by many successful Western contractors. Another important reason is that each of these mills cuts and bends bars to the user's specifications.

When you estimate a highway contract, a bridge job or any kind of reinforced-concrete project bear in mind Bethlehem Pacific as a source for your steel requirements.

BETHLEHEM PACIFIC COAST STEEL CORPORATION

Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Salt Lake City, Honolulu

BETHLEHEM PACIFIC ★ BETHLEHEM STEEL ★

"CATERPILLAR" DIESEL TEAMWORK ON THE SAN DIEGO AQUEDUCT

On a 22-mile section of the U. S. Navy's new San Diego Aqueduct, north of Escondido, Calif., J. S. Barrett has combined several types of "Caterpillar" Diesel equipment to do an effective job.

In building haul roads by which trucks could bring sections of concrete pipe to the aqueduct site, three "Caterpillar" Diesel D8 Tractors took care of the ripping and 'dozing, and a "Caterpillar" Diesel No. 12 Motor Grader did the finishing. On the same job, a "Caterpillar" Diesel D13000 Engine powered the compressor.

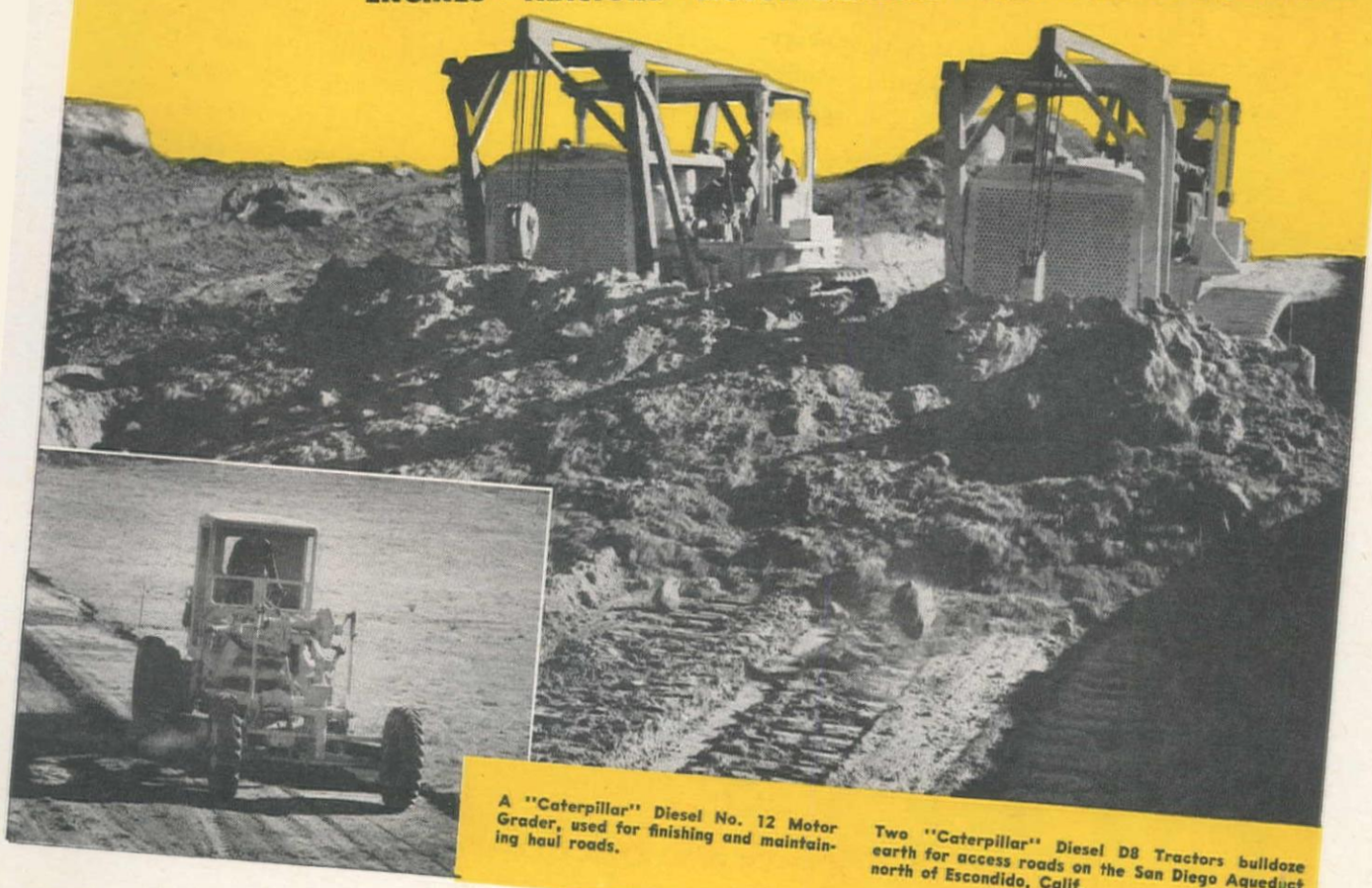
The advantages of standardizing on dependable "Caterpillar" Diesels have been proved on hundreds of earth-moving contracts. Operators do better work when they are handling these familiar machines. And the prompt service of one experienced dealer for all equipment means maximum output with minimum loss of time.

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

CATERPILLAR DIESEL

REG. U.S. PAT. OFF.

ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT



A "Caterpillar" Diesel No. 12 Motor Grader, used for finishing and maintaining haul roads.

Two "Caterpillar" Diesel D8 Tractors bulldoze earth for access roads on the San Diego Aqueduct north of Escondido, Calif.

ATLAS ROCKMASTER BLASTING SYSTEM

The original milli-second delay system

Introduced in 1945 . . Now Widely Acclaimed for Four Outstanding Reasons

1 MORE ROCK READY FOR SHOVEL

2 BETTER FRAGMENTATION
Less secondary blasting. Shovel efficiency increased as much as 30%.

3 FAR LESS "BACK BREAK"
behind your shots.

4 MINIMUM NOISE AND VIBRATION
even though more holes are fired.

No question about it—Atlas Rockmaster, the sensational blasting system introduced in 1945 after extensive study, is now enthusiastically accepted by blasters everywhere. Rockmaster very definitely muffles noise and vibration, even when more holes are fired. It blasts more rock ready for the shovel. It assures better fragmentation. It reduces "back break." *Two years of experience prove it!*

Day after day—in quarries, strip pits, on construction work, even in underground mines—Rockmaster is increasing production. Doubters have been so thoroughly convinced that more than 2,000,000 Rockmaster Electric Detonators were sold in 1946 alone.

Rockmaster is more than a detonating device—it is a whole new method of blasting, tailored to fit each individual job. It enables the blaster to time the delay elements of his shot to within thousandths of a second, an accomplishment never possible before.

Insist on the genuine Atlas Rockmaster, developed by the pioneers of split-second time delay. It has given results on hundreds of jobs that might easily be duplicated on yours. Call in the Atlas representative.

Less Bark . . . More Bite

Offices in Principal Cities

"ROCKMASTER"—Trade Mark

ATLAS EXPLOSIVES
"Everything for Blasting"

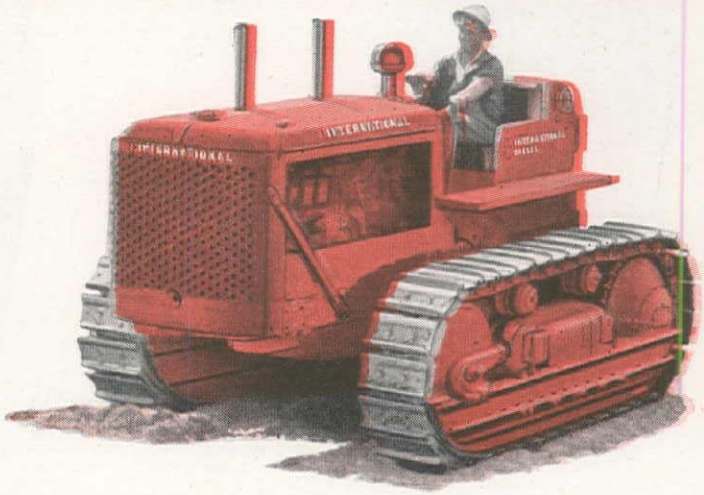
CHEMICALS ATLAS EXPLOSIVES

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

The Unbeatable Combination

INTERNATIONAL Diesel Crawlers

with Allied Manufacturers' Matched Equipment



WHEREVER International Crawler Tractors do the earth moving, road building or excavating with *matched* bulldozers, you'll find them unbeatable!

These tractors and their matched equipment are *mated*. They are made for each other and designed to work together as a unit. Each is the product of engineering skills possessed by the leaders in their fields. Each is the product of companies that know how to build superior performance and durability into their machines. Together they produce results that mean operating economies and better profits for users everywhere, day after day . . . year after year.

Depend on the International and allied manufacturer's package as supplied by International Industrial Power Distributors. *It's the unbeatable combination.*

INTERNATIONAL HARVESTER

Industrial Power Division

INTERNATIONAL HARVESTER COMPANY

180 North Michigan Avenue Chicago 1, Illinois

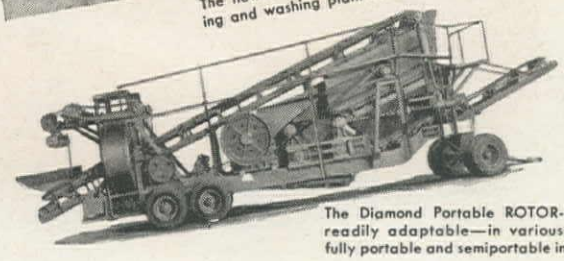
INTERNATIONAL POWER

CRAWLER AND WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS

DIAMOND DYNAMICS

The new Diamond-equipped, gravel crushing, screening and washing plant of King Brothers, Dayton, Ohio.

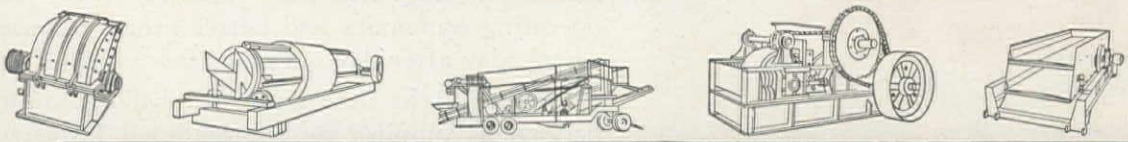
in action



The Diamond Portable ROTOR-LIFT Plant, readily adaptable—in various sizes—to fully portable and semiportable installations.

• • • Producing crushed gravel economically at or near the site of a job is one of the tough problems construction engineers have to lick. That's where the *portability* of the Diamond Rotor-Lift gravel crushing and screening plant can save time and cut haulage costs. Here in a completely *portable* plant, is all equipment needed to process gravel from its raw state to the exact size needed for the job . . . and as close to the job site as possible! Learn how Diamond Dynamics can work for you. Call your Diamond dealer today!

"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

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

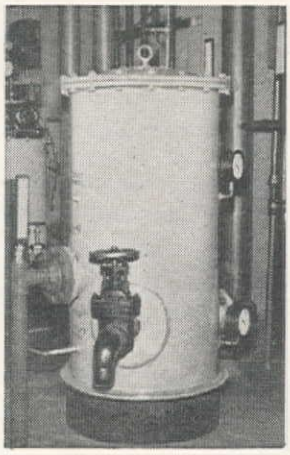
1. Strain 2. Filter 3. Condition YOUR DIESEL FUEL in One Operation with WINSLOW FUEL FILTERS

1. Large particles of scale and other heavy impurities are cast into the settling sump by the Winslow Element's double fabric outer covering, which serves as a highly efficient primary strainer.

2. Smaller and smaller particles are permanently trapped as fuel passes through more and more tightly compressed curly fibers, with final ultra-fine filtration through the closely knit double fabric at the center.

3. *Moisture* is stopped at the surface or absorbed by fibers within the element; *gums, varnishes* and *resins* are trapped within the element.

Winslow makes over 100 complete units and over 200 different sizes and types of replacement elements engineered to fit any standard filter—in the marine, industrial or automotive field. For more than a quarter of a century Winslow has been pioneering the principle of "efficiency in depth" filtration. In offering the complete line of fuel filters and lubricating oil conditioners, Winslow presents a product evolved through years of scientific research. Be sure to clip the coupon below for complete details.



In addition to Winslow Fuel Filters on engines to catch pipe-scale, dust and moisture, it is recommended that all fuel be passed through a Winslow batch-type filter when pumping from storage tanks into operating tanks. Maximum fuel efficiency—whether Diesel or gasoline—will thus be attained. Shown here is Model 38-1645-AF Winslow batch-filter, which handles up to 90 gpm.

WINSLOW
ENGINEERING COMPANY
4069 HOLLIS STREET, OAKLAND 8, CALIFORNIA

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

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

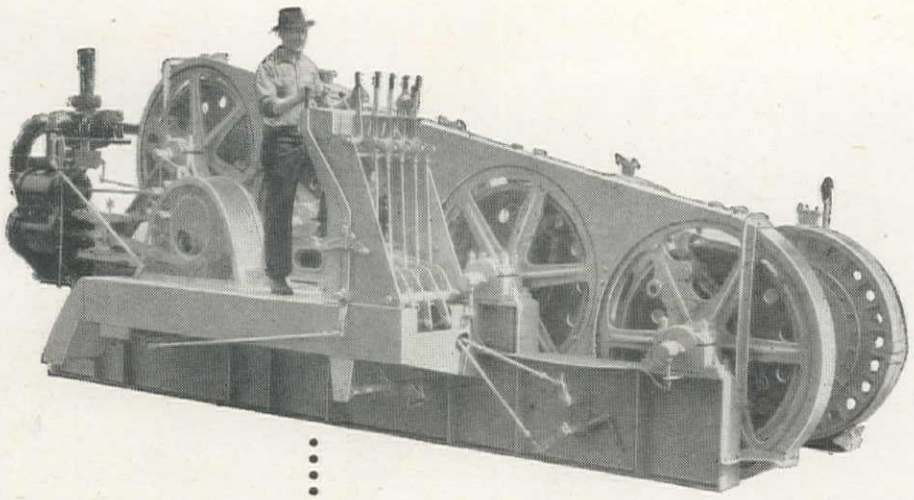
*Name*_____

*Company*_____

*Street*_____

*City*_____ *Zone*____ *State*____

TBC-4703



For Hair-line Spotting of Heavy Loads use AMERICAN AIR-CONTROLLED HOISTS!

WHEN you're fitting flanged pipe, setting huge steel girders or placing a 200 ton cracking still to a hairline position, the tight limits of the job may call for the spotting of loads within fractions of inches. That's when any contractor appreciates the precision of AMERICAN Air-Controlled Contracting Band Friction Hoists!

Perfected air-control, plus the time-tested soundness of AMERICAN engineering, puts this great line of hoists in a class by itself. Use our services fully and freely in planning any program.

Diesel, Steam, Gasoline and Electric Hoists . . . All Types, All Sizes From 2,500 to 40,000 Lb. Single Line Capacity.

743

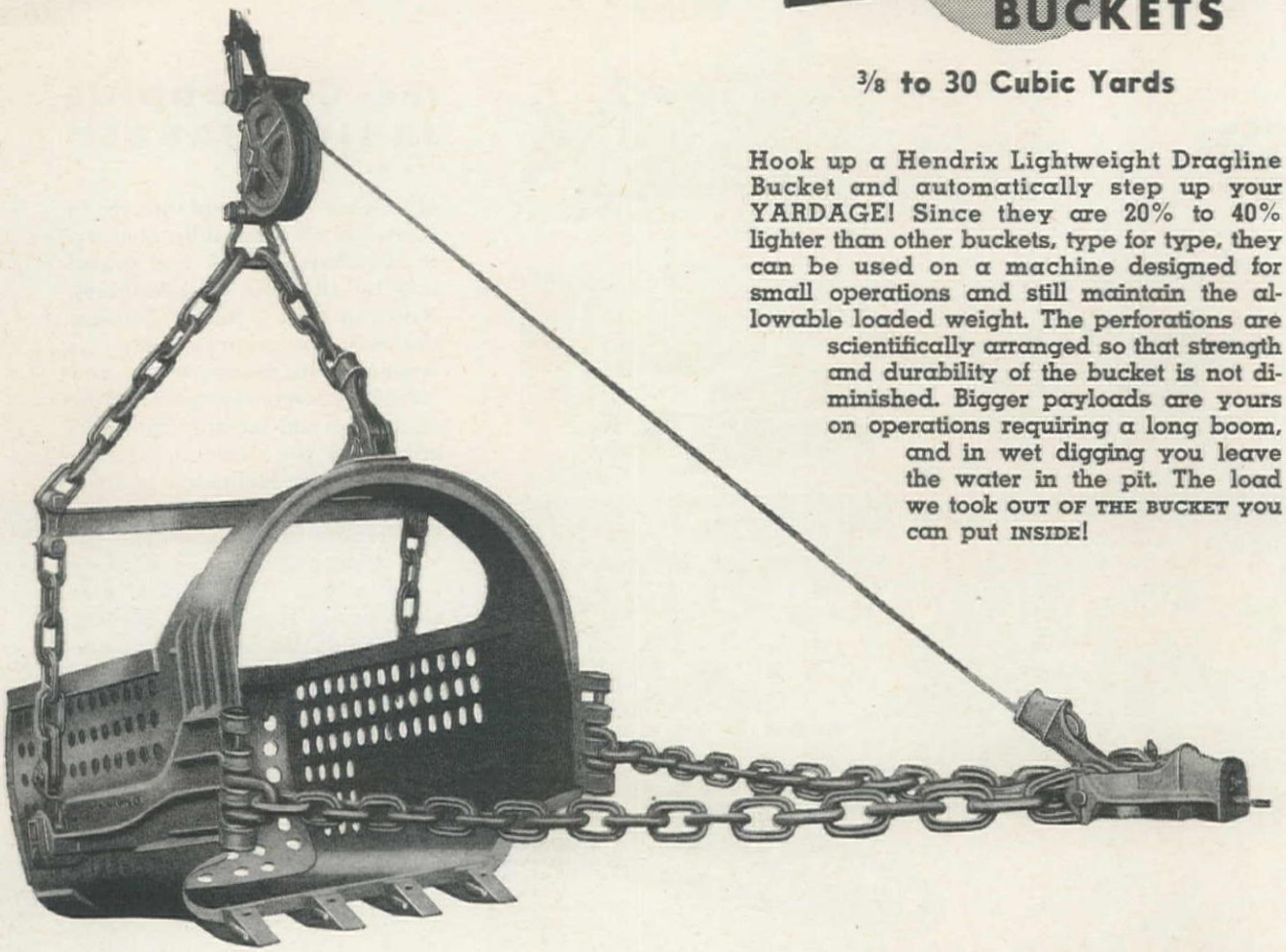
American Hoist
and DERRICK COMPANY
Saint Paul 1, Minnesota

Plant No. 2: SOUTH KEARNY, NEW JERSEY
Sales Offices: NEW YORK • PITTSBURGH
CHICAGO • NEW ORLEANS • SAN FRANCISCO

Durable WITH A CAPITAL "DO"

HENDRIX Lightweight DRAGLINE BUCKETS

3/8 to 30 Cubic Yards



Hook up a Hendrix Lightweight Dragline Bucket and automatically step up your YARDAGE! Since they are 20% to 40% lighter than other buckets, type for type, they can be used on a machine designed for small operations and still maintain the allowable loaded weight. The perforations are scientifically arranged so that strength and durability of the bucket is not diminished. Bigger payloads are yours on operations requiring a long boom, and in wet digging you leave the water in the pit. The load we took OUT OF THE BUCKET you can put INSIDE!

WHY HENDRIX BUCKETS ARE YOUR BEST BET

- ★ **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

Discharging 100 ft. straight up and over 1000 ft. away

Standard Jaeger 4P Pump with 4" pipe handled this job at Westlake Quarry, St. Louis, Mo. for 27 days pending permanent pump installation.

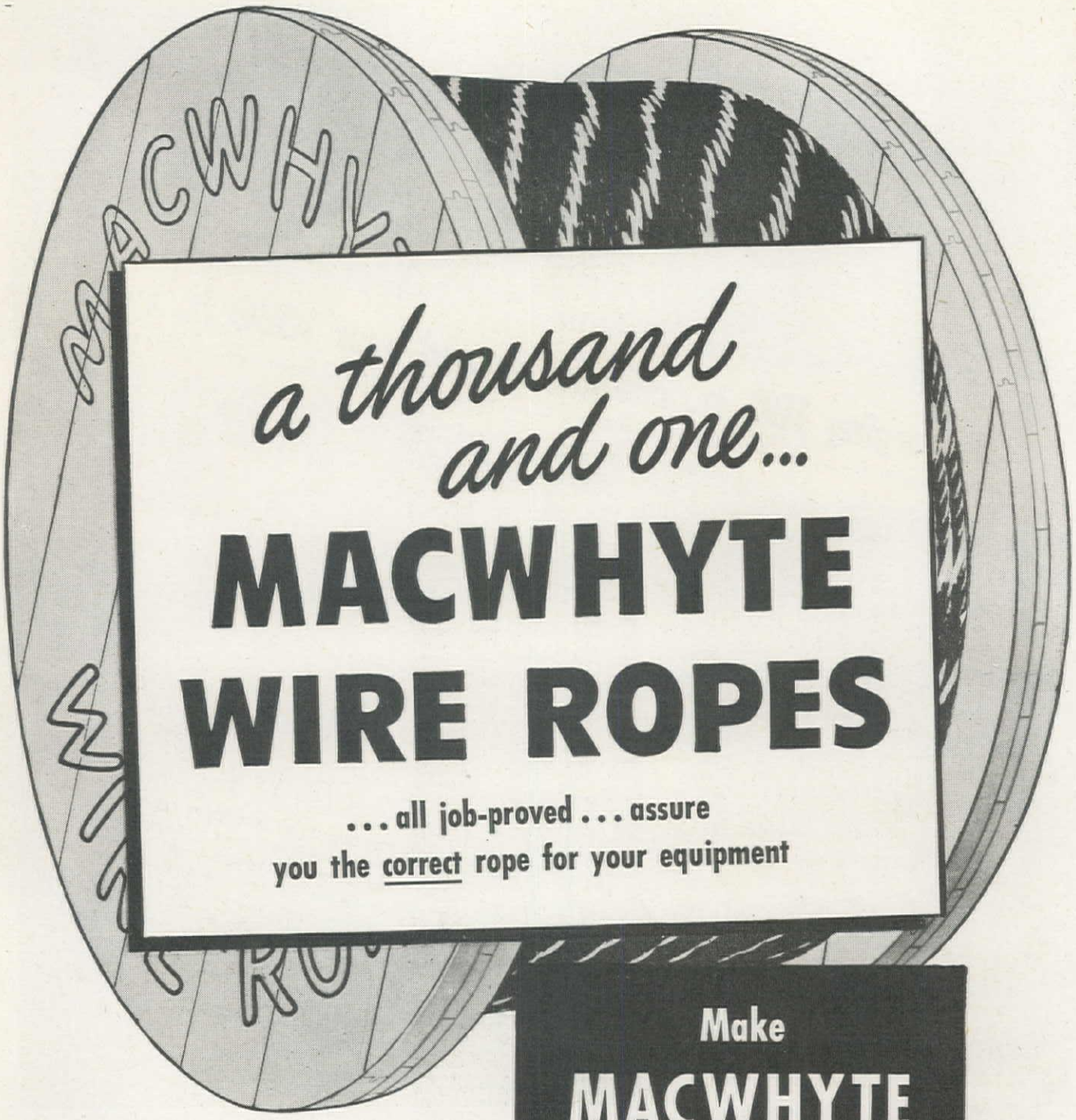
TOP QUALITY AT BEDROCK PRICES: Tripled factory output and latest high speed production tools are keeping Jaeger prices far below cost levels of materials and labor.

1½" Bantam, Pumps 3000 Gallons an Hour.

2" to 10" models are fully enclosed for sustained efficiency, longest engine life.

A standard Jaeger 4" Pump was able to handle this job (after two other well-known pumps had tried and failed) because Jaeger "Sure Primes" are built and powered beyond their guaranteed performance. That's why contractors buy more Jaeger Pumps than any other make — and get more for their money in doubly-sure and faster priming, high efficiency and long-life, low-cost service under the toughest job conditions.

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



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 Avenue, 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

NO. 918

Make MACWHYTE your headquarters for WIRE ROPE and SLINGS

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. Macwhyte also makes Atlas Braided Wire Rope Slings, Hi-Fatigue Aircraft Cables, Assemblies, Tie-Rods. Catalogs on request.

FULLER BRANCHES:

ARIZONA
Phoenix
Tucson

CALIFORNIA
Alameda
Alhambra
Bakersfield
Berkeley
Beverly Hills
Compton
Eureka
Fresno
Glendale
Hollywood
Huntington Park
Long Beach
Los Angeles
Modesto
Oakland
Pasadena
Pomona
Riverside
Sacramento
San Bernardino
San Diego
San Francisco
San Jose
San Pedro
Santa Ana
Santa Barbara
Santa Monica
Stockton

IDAHO
Boise

MONTANA
Billings
Butte
Missoula

OREGON
Portland

UTAH
Ogden
Salt Lake City

WASHINGTON
Bellingham
Seattle
Spokane
Tacoma
Vancouver
Walla Walla
Yakima

Definitely West-*wide!* That's Fuller Service—with 44 branches stocking architectural and maintenance finishes, and with factories and branches so located that, no matter where your job may be you can be sure of getting the Fuller products you've specified—and fast! Yes, you can depend upon the West's oldest and best-equipped (in equipment and technical personnel) makers of architectural and maintenance finishes. W. P. Fuller & Co., San Francisco 19, California.

FULLER FINISHES

Don't get caught with your lines down... play it smart...

Keep an extra line on hand and be sure it's TIGER BRAND

Down lines mean down profits. And smart construction men know the two basic rules for keeping line equipment working. *First:* Rig at the start with an *extra good* wire rope... with U·S·S American TIGER BRAND Wire Rope. *Second:* Keep an *extra line* on hand... ready for emergency replacement. Following these two simple rules on the job can sometimes mean the difference between profit and loss on the balance sheet.

TIGER BRAND... made of high-tensile U·S·S steel... is extra tough, extra flexible... behaves at all speeds. Its Excellay Preformed construction assures even distribution of load among each wire and strand... keeps crown wires flat in place, even when broken. *Don't keep working for your equipment... keep your equipment working for you.* Rig up with TIGER BRAND and find out for yourself why, among construction men, THE BIG DEMAND IS FOR TIGER BRAND.

COLUMBIA STEEL COMPANY
San Francisco · Los Angeles · Portland
Seattle · Salt Lake City

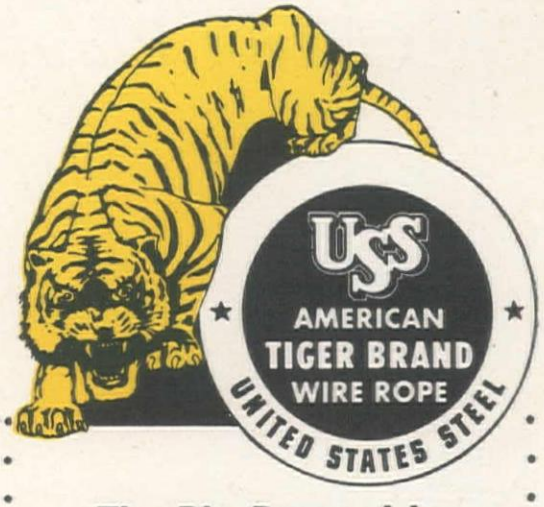
AMERICAN STEEL & WIRE COMPANY
Cleveland, Chicago and New York

Tennessee Coal, Iron & Railroad Company, Birmingham
Southern Distributors

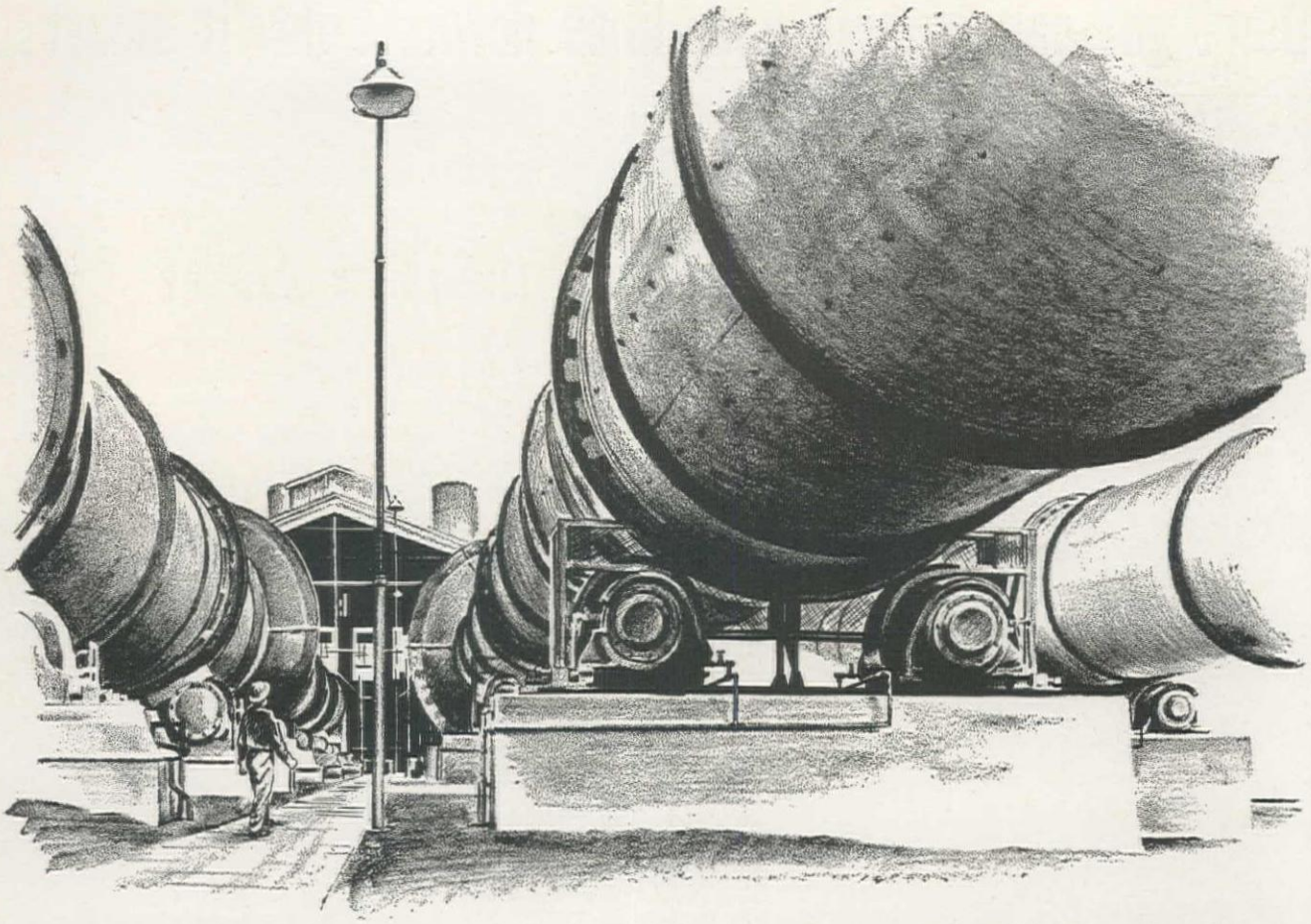
United States Steel Export Company, New York

UNITED STATES STEEL

Excellay Preformed



The Big Demand is for Tiger Brand



463 foot Rotary Cement Kilns at Permanente.
The Cement Industry's largest installation.

Permanente Operates the World's Largest Cement Plant

Built by Henry J. Kaiser and his Associates in 1939, Permanente became the world's largest cement plant in 1941 when it doubled its capacity to meet the critical needs of war.

Now Permanente has again increased production to meet post-war needs of Western construction. Present yearly output totals 5,500,000 barrels of cement.

Modern laboratory and production practice introduced by Permanente engineers, plus an integrated system of fast distribution, have made Permanente a competitive force which has helped improve standards throughout the entire cement industry.

For all regular or special purposes, order PERMANENTE High Quality CEMENT... Delivered to the job ON TIME!

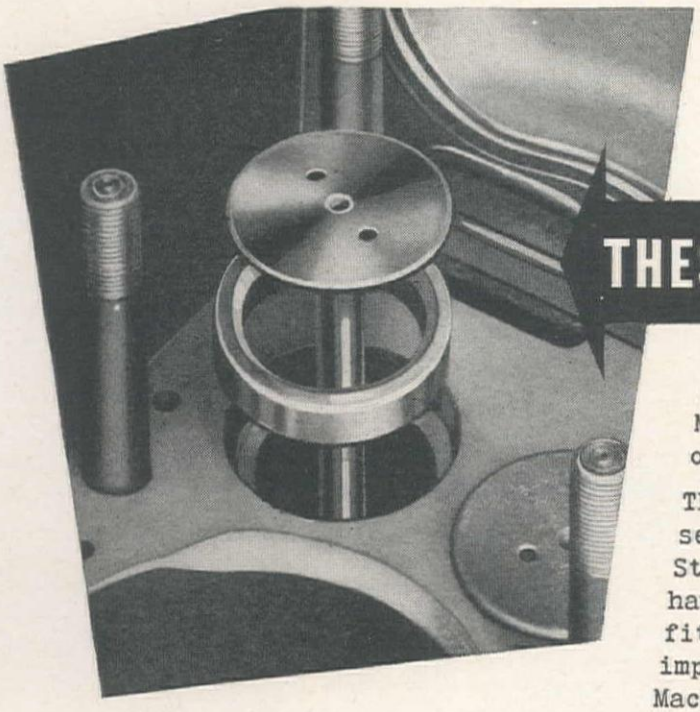
PERMANENTE CEMENT COMPANY

On 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



THESE INSERTS STAY PUT

... which is one more reason why Mack trucks click off extra thousands of trouble-free miles.

They're Mack Permafit exhaust valve seat inserts. They're faced with Stellite and copper plated. They have exceptional depth and are shrink-fitted into their pockets. Most important of all -- they're made of Mack's exclusive Niferrite alloy.

This secret alloy has the unique property of retaining a permanently firm fit within the pocket regardless of temperature variations between the insert and cylinder block. Thus, distorted and loose valve seat inserts are prevented.

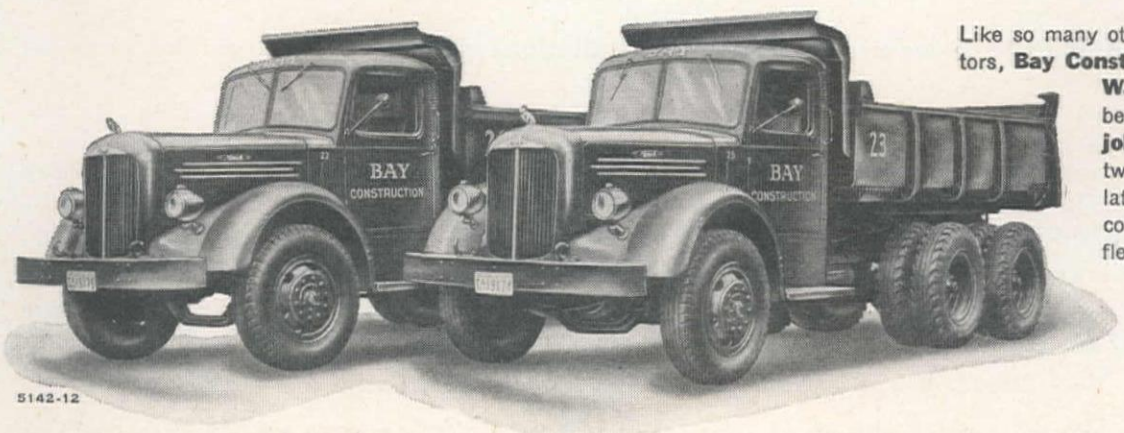
To Mack owners this means lower maintenance costs and more profitable mileage. Inserts have unequalled resistance to wear. Valve life is prolonged. There's less need for grinding. Engines maintain peak performance longer -- stay more economical longer.

This exclusive Mack alloy is a good example of the extra something that goes into every part of a Mack truck. You get more work out of Macks because we put more work into them.

Mack **since 1900, America's hardest-working truck**

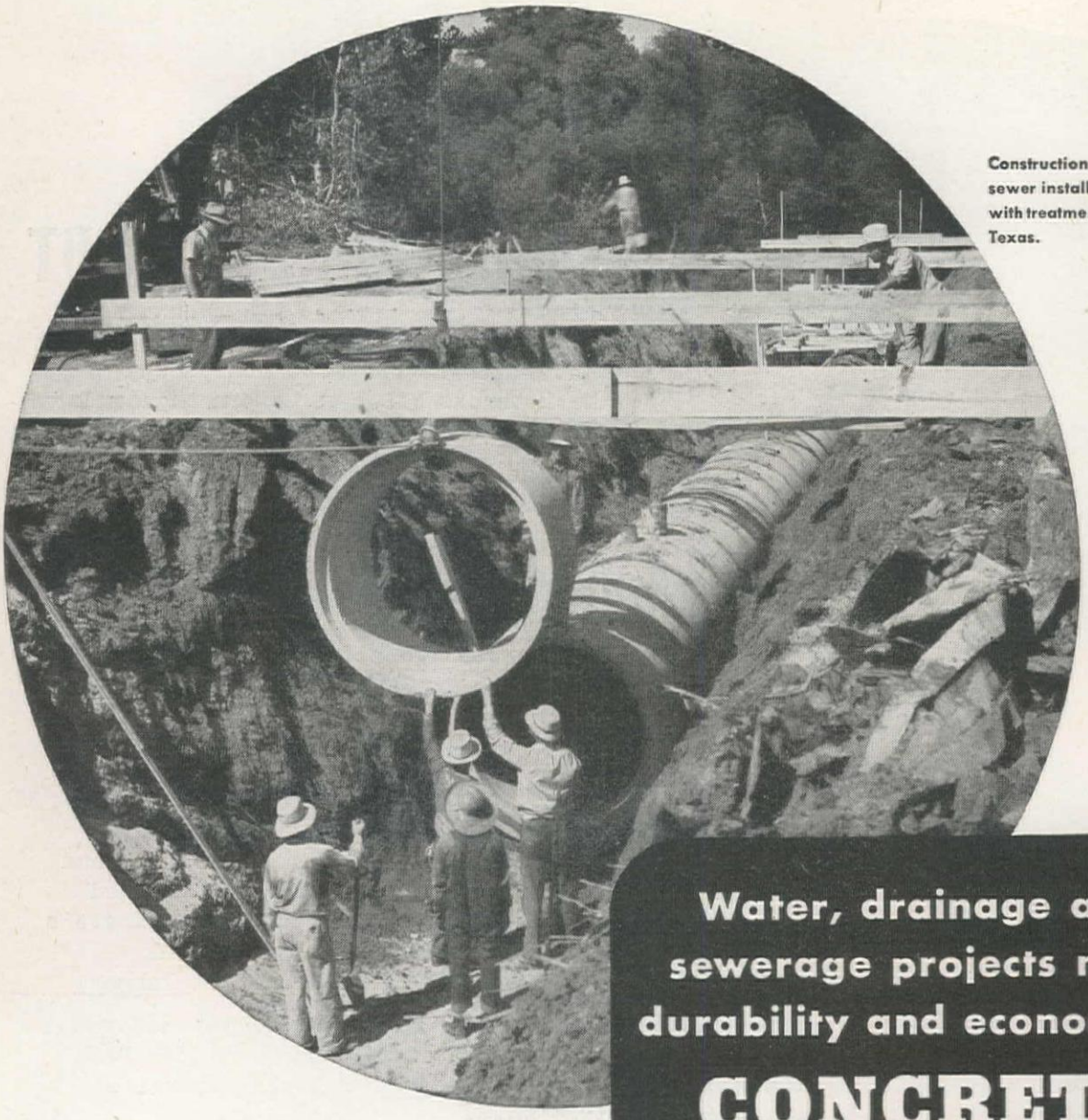
Mack-International Motor Truck Corp. — Los Angeles
Sacramento • San Francisco • Seattle • Portland
Salt Lake City • Factory branches and dealers
in all principal cities for service and parts.

Trucks for every purpose



5142-12

Like so many other successful contractors, **Bay Construction Co., Seattle, Wash.,** knows you can't beat Macks for **on-the-job performance.** These two six-wheelers are the latest additions to this company's hard-working fleet of 14 Macks.



Construction view of concrete sewer installation connecting with treatment plant in Dallas, Texas.

Water, drainage and sewerage projects need durability and economy of

CONCRETE PIPE

THE strength and durability of concrete pipe for sewerage, drainage and water lines has been proved on a vast scale with installations which have served half a century or more.

Concrete pipe meets all the requirements of moderate first cost, structural strength and soundness, minimum infiltration and leakage, and maximum hydraulic capacity.

These advantages mean that concrete pipe installations give many years of service at low maintenance expense, resulting in *low annual cost*—the true measure of economy in pipe lines.

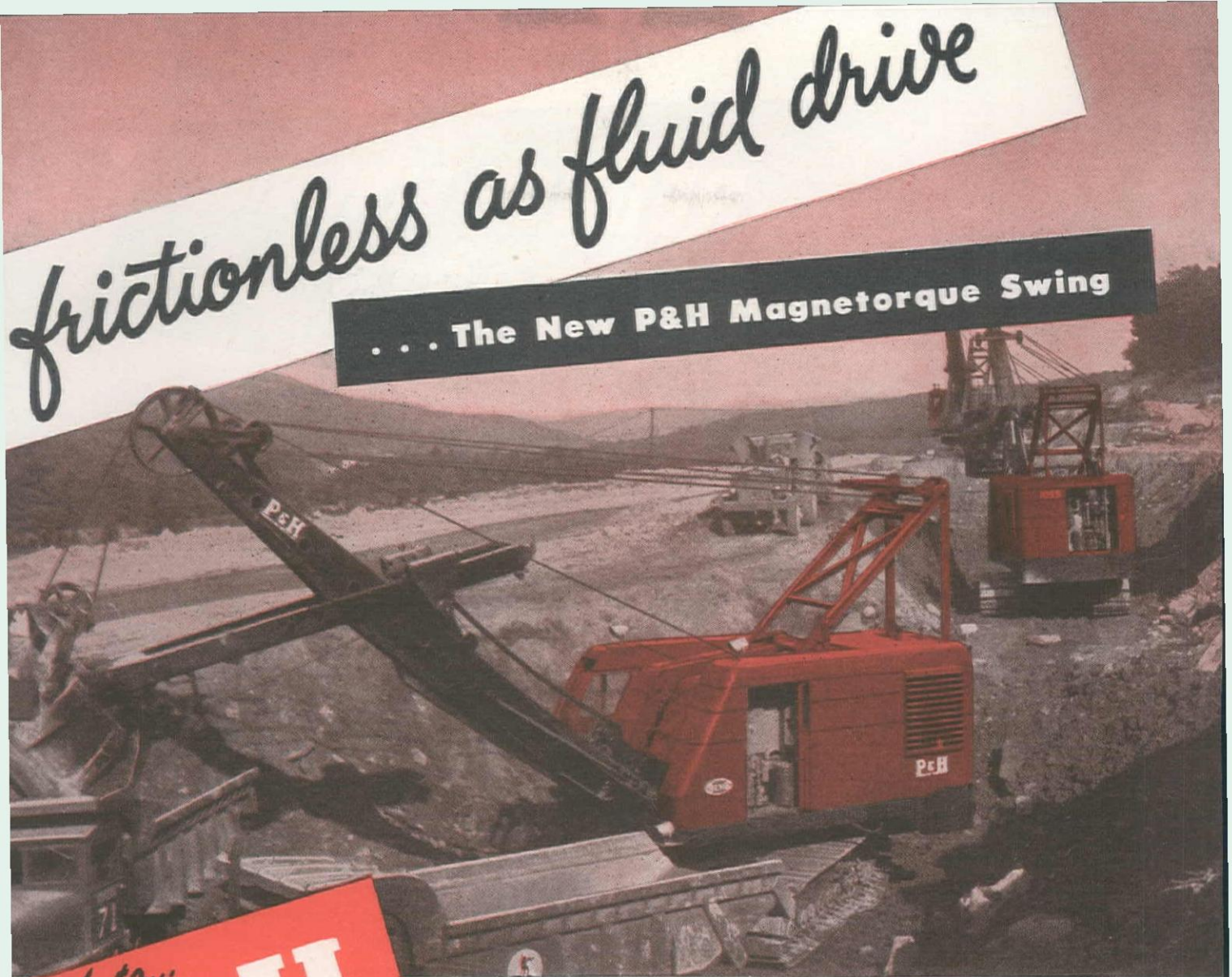
PORTLAND CEMENT ASSOCIATION

Dept. I 6-3, 816 W. Fifth St., Los Angeles 13, Calif.

A national organization to improve and extend the uses of concrete . . . through scientific research and engineering field work

frictionless as fluid drive

. . . The New P&H Magnetorque Swing



look to...

P&H

for added values

Wherever you find the P&H Model 1055 on the job, you'll hear owners singing its praises for the new Magnetorque swing which marks the end of swing friction trouble and costly maintenance.

No Friction . . . No Friction Problems

The new Magnetorque solves the problems of old style swing clutches . . . by completely eliminating friction.

Without mechanical linkage . . . without friction . . . without wear — the Magnetorque transmits power for both swing and propel motions — and does it better.

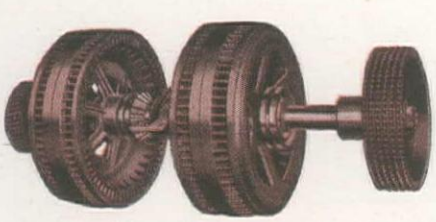
Makes Production Purr

Because it's smoother, faster, more responsive . . . because it permits quicker, more accurate stops and starts — the Magnetorque swing cuts wasted operating time, increases daily production and lowers yardage costs.

The Swing of a Lifetime

The Magnetorque is built to last the life of the machine. And during this time not so much as a single hour will be required for its repair, replacement, or maintenance.

It's one of the most important improvements in the past twenty-five years . . . users all over the country say so . . . performance has proved it. Write for complete information.



The New P&H Magnetorque Swing

Power for swing and propel transmitted by electro-magnetic forces. Operated by small generator on main engine; controlled from operator's station. Swing motions, slow or fast, have cushioned acceleration and deceleration. Because there is no friction swing, there are no friction problems. One more in the long list of P&H Added Values.

P&H EXCAVATORS

4490 West National Avenue
Milwaukee 14, Wisconsin

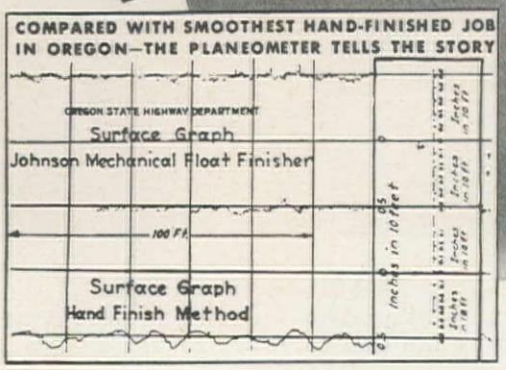
HARNISCHFEGER CORPORATION

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

ARNISCHFEGER CORPORATION: SAN FRANCISCO, Calif., 82 Beale Street

Warehouses Service Stations: SEATTLE, LOS ANGELES, SAN FRANCISCO

ORTLAND, Oregon, Loggers & Contractors Machinery Co., 240 S.E. Clay St.; ILLOWS, Calif., Willows Motor Sales Co.; BAKERSFIELD, Calif., Kern Tractor Equipment Co., 24th & N. 99 Highway—P. O. Box 1695; NAPA, Calif., Berglund actor & Equipment Co., 1016-18 Soscol Ave.; SALT LAKE CITY, Utah, National uipment Co., 101 West Second St., So.; BOISE, Idaho, Olson Manufacturing Co., 23 Fairview Ave.; EL CENTRO, Calif., Faure Tractor & Equipment Co., 1414 ain St.; FRESNO, Calif., Allied Equipment Co., 1824 Santa Clara St.; SAN EGO, Calif., Southern Equipment & Supply Co., 668 Third Ave.; SPOKANE, ashington, F. M. Viles & Co., East 124 Trent Ave.; NORTH SACRAMENTO, lif., Capitol Tractor & Equip. Co., 1001 Del Paso Blvd.; RENO, Nevada, Den-ion Tractor & Supply Co., 559 East Fourth St.; SEATTLE, Washington, Glenn rrington & Co., 91 Columbia St.



SMOOTHNESS TEST

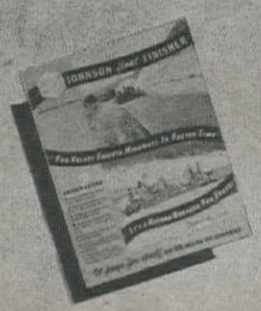
Illustrating the remarkable finishing done by the Johnson Float Finisher, these graphs, made by the Oregon State Highway Commission, show a variation of less than .05 of an inch per 10 feet—.02 less than state requirements.

JOHNSON *float* FINISHER

INCREASE DAILY PRODUCTION of your paving crew with a Johnson Float Finisher by eliminating the bottleneck of finishing operations. Here is a mechanical finisher that completely *float finishes* pavement and makes it ready for edging and jointing. No voids or pockets are left! No high spots! No low spots! And no float finishing to do by hand.

Two men—one to operate the Johnson Float Finisher and one to edge and joint—can turn out 2000 to 3000 feet of road surface to a tolerance of .05 of an inch in the length of a 10-foot straight edge.

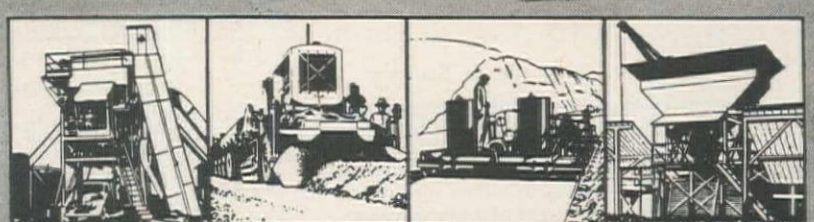
Authentic data from past performances prove conclusively that the savings in time and labor will pay for a Johnson Float Finisher in less than 25 miles of highway finishing. Standard specifications of many states require the Johnson Float Finisher. Get the facts today! Write for illustrated catalogue.



Write for Catalog

MADSEN IRON WORKS

HUNTINGTON PARK • CALIFORNIA



ASPHALT PLANTS • ROAD PUGS • CEMENT FINISHERS • BATCHERS • COMPACTORS

DISTRIBUTORS: Birmingham, Alabama, Armstrong Equipment Co. • Des Moines, Iowa, Herman M. Brown Co. • Seattle, Washington, A. H. Cox & Co. Portland, Oregon, Cramer Machy. Co. • Albuquerque, N. M., Harry Cornelius Co. • Houston, Texas, R. B. Everett & Co. • Denver, Colo., Elton T. Fair Co. Omaha, Neb., Fuchs-Clayton Machy. Co. • San Francisco, Cal., C. H. Grant Co. • Atlanta, Ga., J. W. Grass Eq. Co. • Chicago, Ill., Hillsman Eq. Co. Alaska, Lomen Equipment, Inc. • Dallas, Texas, Martin Machy. Co. • Spruce Pine, N. C., Mitchell Dist. Co. • Phoenix, Arizona., Smith-Booth Usher Co. Lansing, Michigan, Telford Equipment Co. • Charleston, W. Virginia, W. Va. Tractor & Equipment Co. • Minneapolis, Minnesota, Wm. H. Ziegler Co., Inc.

A SLOW, POWERFUL PISTON-PUNCH

GIVES YOU LOW-COST AIR POWER!

Get the New

SULLIVAN

Series 80

PORTABLE AIR COMPRESSORS

2-Stage Compression

Automatic "ECONO-MISER" Load Control

Consult a Joy Engineer

Write for bulletin today!

100 P.S.I. WORKING PRESSURE IN THE MOST COMPACT PORTABLE AIR PLANT YOU HAVE EVER SEEN

SULLIVAN

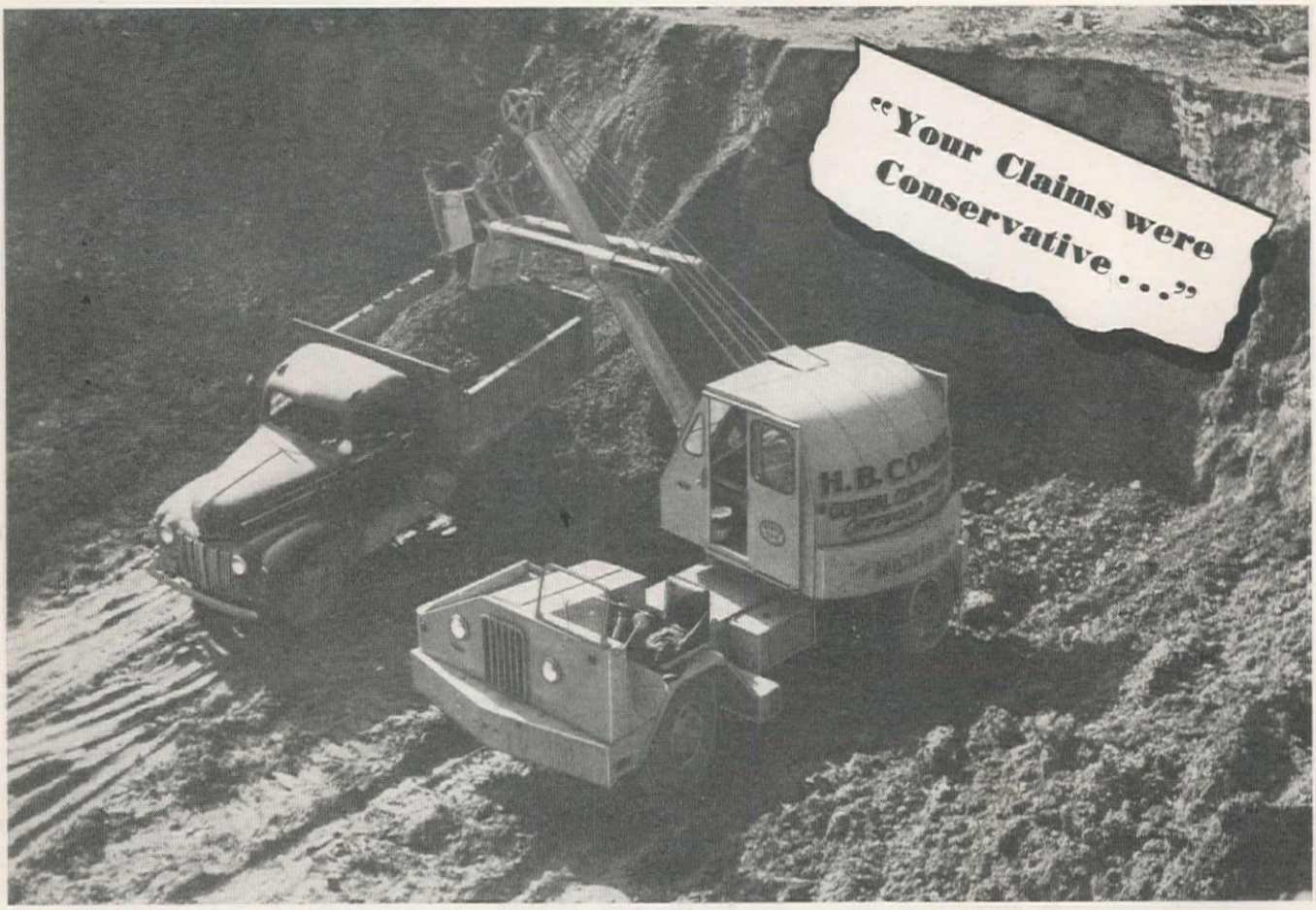
PORTABLE AIR COMPRESSORS FROM 60 TO 630 CFM

SULLIVAN DIVISION

JOY MANUFACTURING COMPANY

General Offices: Henry W. Oliver Bldg., Pittsburgh, Pennsylvania

W&D C492



says Combs Construction Company, Chattanooga, *about* MICHIGAN

This MICHIGAN owner, in a letter to Nixon Machinery & Supply Co., Chattanooga, goes on to say

". . . we have never gone wrong buying equipment that you recommend. Your claims were, if anything, conservative.

"We have used our MICHIGAN as shovel, back hoe, clam, dragline and in steel erection as a crane. In all operations it has proven a very efficient and economical machine. Operating and maintenance costs have been extremely low. Its mobility and flexibility, plus its other features has convinced us that it is an essential part of our equipment fleet.

"We recommend the MICHIGAN Model T-6-K, without reservations, for any work within its capacity."

Full details about the complete line of 3/8 yd. and 1/2 yd. convertible MICHIGAN Mobile SHOVEL-CRANES are available on request.

MICHIGAN
POWER SHOVEL COMPANY
BENTON HARBOR, MICHIGAN

NOVO NEWS

JUNE, 1947 **EXTRA**

FLASH! Novo Introduces Mechanized Wheelbarrow!

SCOOTRUK *Releases 5 to 8 Men for Other Work*

It carries a full ton of wet concrete . . . or sand . . . or bricks . . . or almost any material! It scoots along at 15 per . . . skims over soft ground . . . climbs steep grades with a full load . . . shoots through four-foot doors . . . turns on a dime in tight places . . . is light enough for scaffold work.

It's the Scootruk—the eye-opening Novo mechanized wheelbarrow which enables one man to do the work of 5 to 8 without back-breaking lifting and hauling.

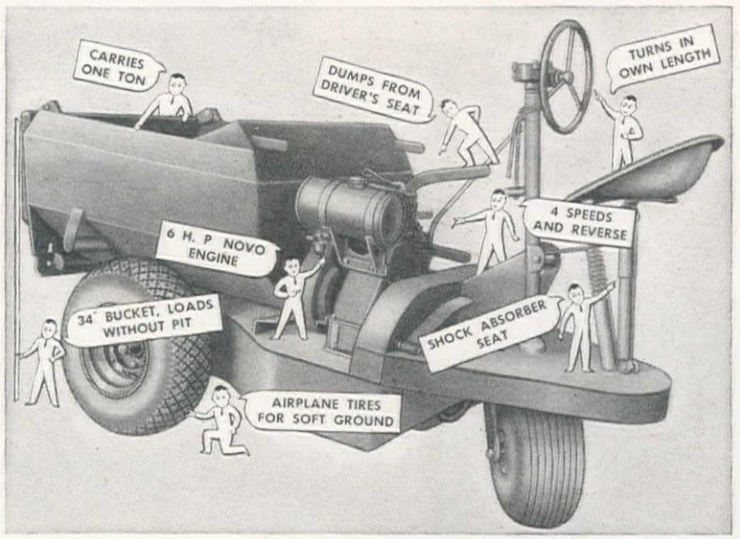
The Scootruk is a natural for all sorts of construction jobs. In pouring floors and slabs, for example, loading is usually done without a pit or special platform because the bucket is only 34 in. high; dumping is controlled from the driver's seat. Since the Scootruk handles a full ton load on each trip, more mixer loads can be run per day.

The Scootruk is ruggedly built to withstand rough service. It is powered by a 6 horsepower, air-cooled Novo engine and equipped with a heavy duty, 4-speed and reverse transmission.

The Scootruk pays for itself in no time at all. See your nearest Novo distributor or write direct for complete information.

Many Uses

You'll find dozens of uses for the Scootruk—transporting concrete, sand, bricks, mortar, blocks, and many other items including tools and small equipment.



DISTRIBUTORS

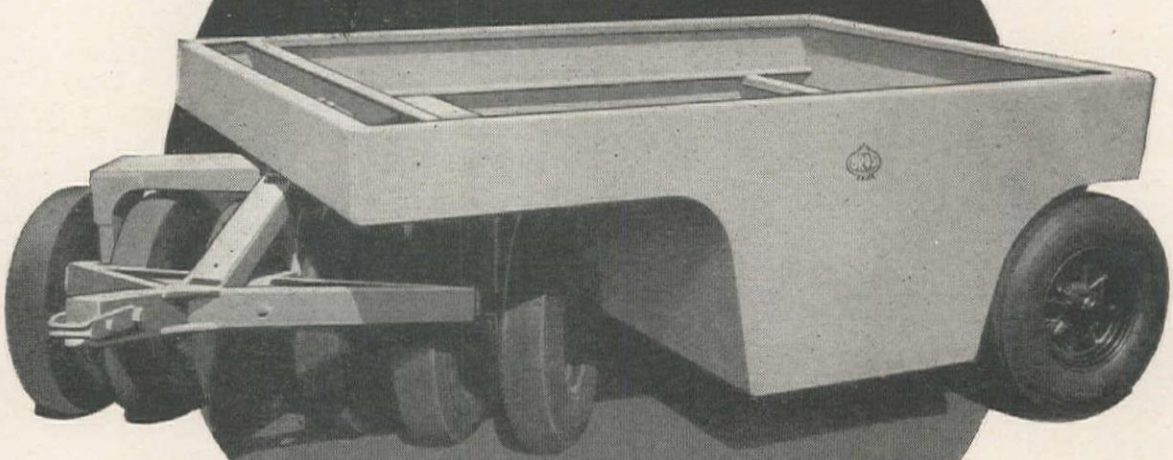
ALABAMA
Birmingham—YOUNG & VANN SUPPLY CO.
ARIZONA
Phoenix—MINE & SMELTER EQUIP. CO.
ARKANSAS
North Little Rock—STANDARD EQUIP. and SUPPLY CO.
CALIFORNIA
Oakland and Eureka—BURAN EQUIP. CO.
Los Angeles—GARLINGHOUSE BROTHERS
COLORADO
Denver—GUNDERSON-KRINGEL CO.
CONNECTICUT
Stamford—M. F. TAYLOR CONSTRUCTION EQUIPMENT & SUPPLIES
FLORIDA
Jacksonville—FARQUHAR MACHINERY CO.
Miami—GENERAL EQUIP. & SUPPLY CO.
Tampa—EPPERSON & CO.
GEORGIA
Atlanta—GILL EQUIPMENT CO.
ILLINOIS
Chicago—CENTRAL CONTRACTORS SERVICE
Mt. Vernon—ED MEYER TRACTOR COMPANY
Springfield—ILLINOIS ROAD EQUIPMENT CO.
Rock Island—WESTERN EQUIP. & SUPPLY CO.
INDIANA
Indianapolis—BOCK EQUIPMENT CO.
Rochester—DEEDS EQUIPMENT CO.
IOWA
Cedar Rapids and Des Moines—GLOBE MACHINERY & SUPPLY CO.
KENTUCKY
Louisville—NATIONAL EQUIPMENT CO.
Paducah—HENRY A. PETTER SUPPLY CO.
LOUISIANA
Baton Rouge, Monroe and New Orleans—DUNHAM-PUGH CO., INC.
MAINE
Portland—EASTERN TRACTOR & EQUIP. CO.
Presque Isle—ROY C. THOMPSON CO.
MARYLAND
Baltimore—MARYLAND SUPPLY & EQUIP. CO.
MASSACHUSETTS
Boston—PERRIN, SEAMANS & CO., INC.
MICHIGAN
Detroit—W. H. ANDERSON COMPANY, INC.
Grand Rapids—E. K. S. EQUIPMENT CO.
Marquette—MARQUETTE PUBLIC SERVICE GARAGE, INC.
MINNESOTA
Duluth and St. Paul—BORCHERT-INGERSOLL, INC.
MISSISSIPPI
Jackson—WATKINS-ALDRIDGE EQUIP. CO., LTD.
MISSOURI
Kansas City—CONTRACTORS SUPPLY CO.
St. Louis—MISSOURI-ILLINOIS TRACTOR & EQUIPMENT CO.
MONTANA
Butte and Great Falls—MONTANA HARDWARE CO.
NEBRASKA
Omaha—FEHRS TRACTOR & EQUIP. CO.
NEVADA
Reno—NEVADA TRUCK SALES
NEW JERSEY
Union—SMITH TRACTOR & EQUIP. CO.
NEW MEXICO
Albuquerque—HARRY CORNELIUS CO.
NEW YORK
Albany—SLADE TRACTOR & EQUIPMENT CO.
Buffalo—FOX EQUIPMENT CO.
New York—H. O. PENN MACHINERY CO.
Rochester—HAVERSTICK & CO.
Utica—CREDLE EQUIPMENT CO.
NORTH CAROLINA
Charlotte—CONTRACTORS SERVICE, INC.
NORTH DAKOTA
Fargo—MYHRA EQUIPMENT CO.
OHIO
Cincinnati—THE FINN EQUIPMENT CO.
Cleveland—PATTERSON EQUIPMENT CO
Columbus—BLAKE EQUIPMENT CO.
Marietta—NORTHWEST SUPPLY & EQUIP. CO.
Toledo—EDMUND SUPPLY CO.
OKLAHOMA
Oklahoma City—THE BOARDMAN CO.
OREGON
Portland—COLUMBIA EQUIPMENT CO.
PENNSYLVANIA
Clearfield—CLEARFIELD EQUIPMENT CO.
Philadelphia—METALWELD, INC.
Pittsburgh—BRINKER SUPPLY CO.
Wilkes Barre—STANDARD EQUIPMENT CO.
SOUTH CAROLINA
Columbia—TIDEWATER SUPPLY CO., INC.
TENNESSEE
Knoxville and Nashville—DEMPSTER BROS.
Memphis—HOWELL EQUIPMENT CO.
TEXAS
El Paso—DON A. CARPENTER CO.
Houston—SOUTH TEXAS EQUIPMENT CO.
Lubbock—FRED BERRYHILL EQUIP. CO.
San Antonio—TOWERY EQUIPMENT CO.
Waco—CONTRACTORS EQUIPMENT SALES & SERVICE, INC.
UTAH
Salt Lake City—THE LANG CO., INC.
VERMONT
White River Junction—NOBLE-BELISLE MACHINERY CO.
VIRGINIA
Norfolk and Roanoke—TIDEWATER SUPPLY CO.
Richmond—INDUSTRIAL SUPPLY CO.
WASHINGTON
Seattle and Spokane—COLUMBIA EQUIP. CO.
WEST VIRGINIA
Charleston—CLYDE W. BECKNER, INC.
WISCONSIN
Milwaukee—STONE MANUFACTURING CO.
Park Falls—STEIGER MOTOR SALES
ALASKA
Anchorage—NORTHERN ENGINEERING & EQUIPMENT CO.

Allied Member of A.E.D.

NOVO
ENGINE COMPANY
LANSING 9, MICH. U.S.A.
CONTRACTOR'S EQUIPMENT
· GRAY IRON CASTINGS ·
ENGINES

ONLY BROS MAKES THE WOBBLE WHEEL*

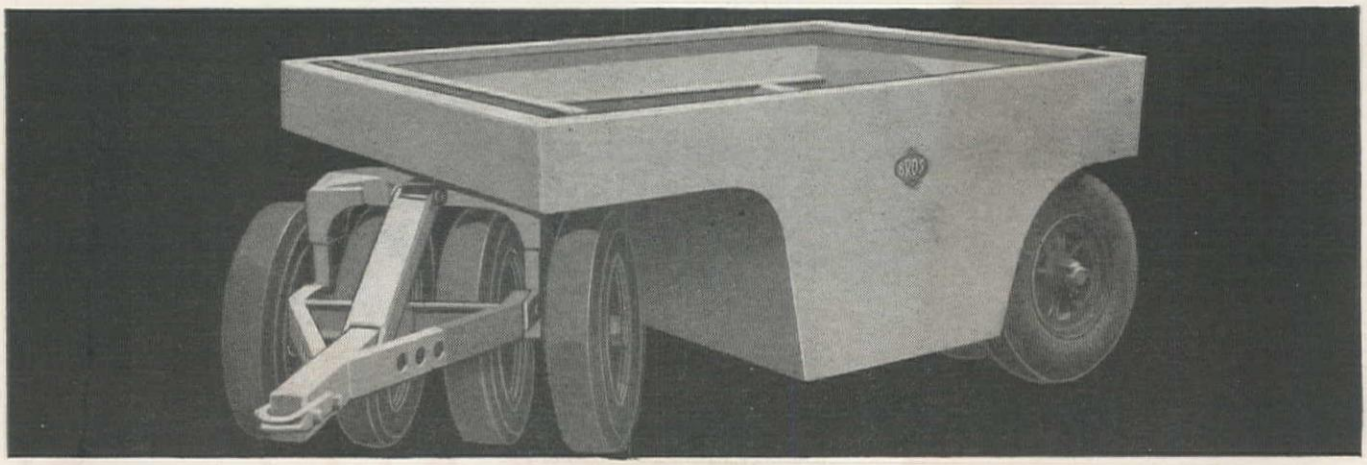
PNEUMATIC ROLLER
For Fluid Pressure Compaction



*Patented

Only the original *Bros* Wobble-Wheel roller applies uniform fluid pressure for faster, firmer compaction. Working and kneading materials together, the wobbling rubber tires eliminate voids, build durable foundations. Efficient compaction is easily and economically obtained at speeds up to 15 miles an hour. *Bros* Wobble-Wheel rollers are recommended for packing earth fills, rolling crushed rock bases, compacting stabilized roads, rolling bituminous surface airport construction and maintenance and turf surfaces.

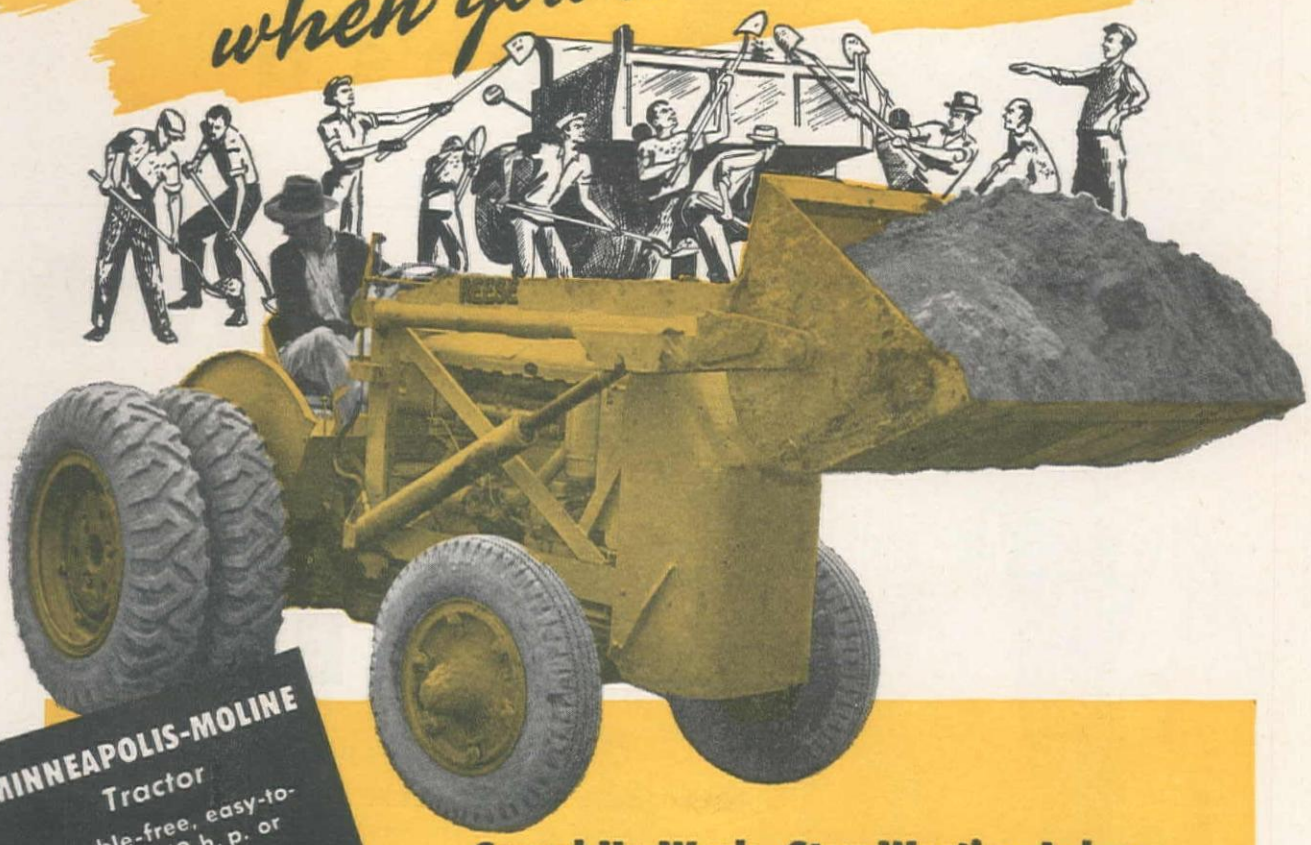
***Bros* Pneumatic Tire Rollers—available in straight and Wobble-Wheel models**—meet varied compaction requirements. Model 67W, above, has 6 front tires and 7 in the rear, supporting a recommended load of 7 tons and a maximum of 11 tons. Model 45W shown below uses 4 front and 5 rear tires for a 4 ton recommended load and an 8 ton maximum.



BROS

WM. BROS BOILER AND MANUFACTURING COMPANY • MINNEAPOLIS 14, MINNESOTA

COSTS DECREASE *when you load with* REESE



MINNEAPOLIS-MOLINE
Tractor
Trouble-free, easy-to-handle, 49 h. p. or 27 h. p. unit.

LOW PRESSURE
Hydraulic System
Large volume pump provides constant power.

UNOBSTRUCTED
Vision
See-Ability design lets operator watch his work at all times.

Speed Up Work, Stop Wasting Labor— Move in a Fast Reese Hydraulic Loader

One man does the work of many "hand shovel wavers" if he's operating a Reese Hydraulic Loader on a powerful Minneapolis-Moline tractor. Work moves smoothly, speedily. Wasted labor costs evaporate.

Operators like Reese's extra maximum lift made possible by high pivot point and long side-arm construction. With a Reese you can heap loads on most trucks because the bucket's dumping clearance is over 90".

You'll like Reese's simplified design. No unnecessary moving parts to wear out. No extra weight. Two models, ½ yard and ¾ yard.

For more information about the Minneapolis-Moline powered Reese loader with attachments (including fork lift and back-fill blade), contact your nearest Industrial Equipment Co. office. We'll help you to a big bite of loading economy.

IECO

INDUSTRIAL EQUIPMENT COMPANY

10911 RUSSET ST., OAKLAND 3, CALIF. • 4441 SANTA FE AVE., LOS ANGELES 11, CALIF.

PHOENIX • SAN DIEGO • FRESNO • SACRAMENTO • RENO • SAN FRANCISCO

a man's a giant

with a

BARCO

Barco is the accepted tool on thousands of hurry-up jobs all over the world. Foremen know that a worker gets powerful muscles of steel when you team him with a Barco Portable Gasoline Hammer. He works harder and faster with this tireless tool. The toughest going—even in hard-to-reach spots—becomes easy. Eleven special attachments make a Barco useful on dozens of *different* jobs.

BREAKING • DRILLING • DRIVING • TAMPING

BARCO

PORTABLE GASOLINE HAMMERS

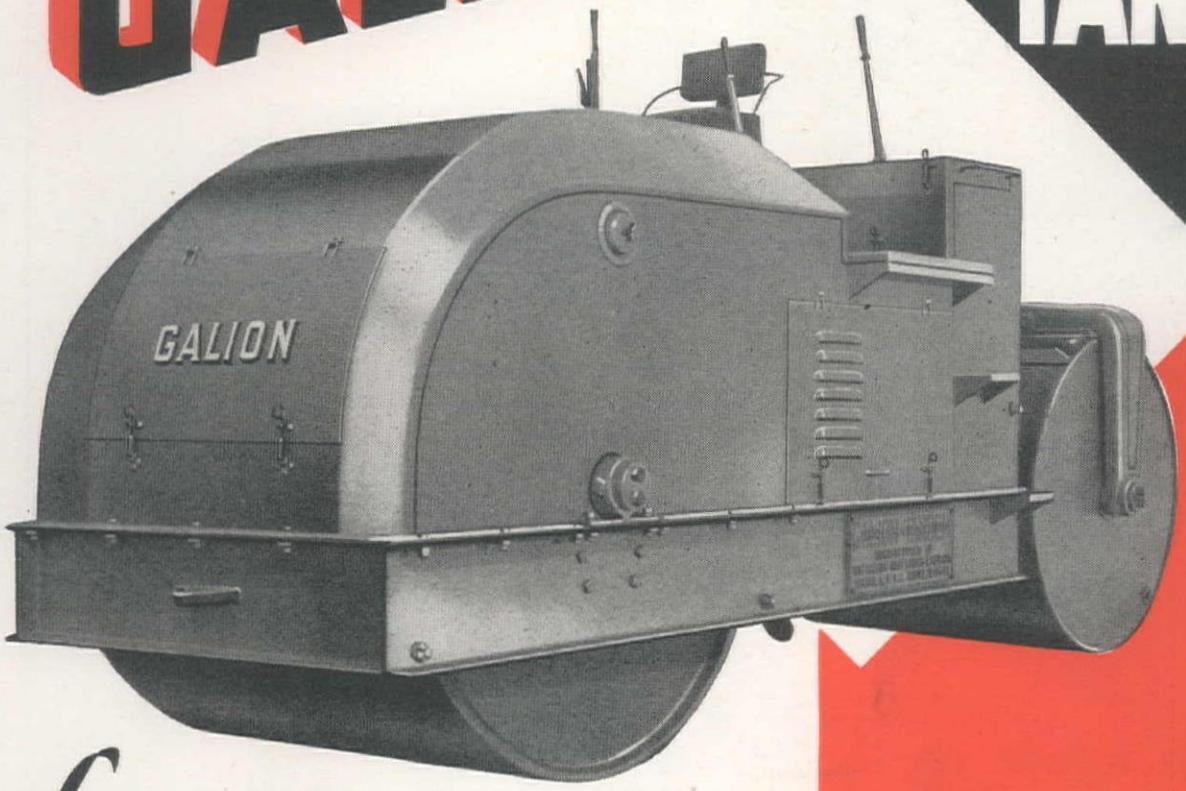
FREE ENTERPRISE—THE CORNERSTONE OF AMERICAN PROSPERITY

BARCO MANUFACTURING CO., NOT INC., 1819 WINNEMAC AVENUE, CHICAGO 40, ILLINOIS

IN CANADA: THE HOLDEN CO., LTD., MONTREAL, CANADA

GALION

VARIABLE WEIGHT TANDEM



Leadership the world over

VARIABLE WEIGHT SIZES

5 TON.....water ballasted to 8 ton
8 TON.....water ballasted to 12 ton
10 TON.....water ballasted to 14 ton

FEATURES

- Hydraulic steering.
- All-welded frame.
- Timken roller bearings.
- Heavy-duty transmission.
- Smooth, long-wearing clutches.
- Easy maneuverability.
- Simplified controls.
- Good visibility.
- Dependable, ample power--gasoline or Diesel.

Write for name of nearest GALION Distributor and copy of Catalog No. 296.

The GALION IRON WORKS & MFG. CO.
General and Export Sales Offices
GALION, OHIO, U. S. A.

GALION DISTRIBUTORS

ARIZONA:
Phoenix.....Brown-Bevis Equipment Co.
Tucson.....F. Ronstadt Hardware Co.

CALIFORNIA:
Los Angeles 11.....Brown-Bevis Equipment Co.
San Francisco.....Western Traction Co.

COLORADO:
Denver 1.....H. W. Moore Equipment Co.

IDAHO:
Boise.....Nelson Equipment Co.

MONTANA:
Butte.....Hall-Perry Machinery Co.

NEVADA:
Reno.....General Equipment Co.

NEW MEXICO:
Las Vegas.....Las Vegas Truck & Equipment Co.

OREGON:
Portland 14.....Nelson Equipment Co.

UTAH:
Salt Lake City 1.....Arnold Machinery Co.

WASHINGTON:
Seattle 14.....Nelson Equipment Co.
Spokane.....Nelson Equipment Co.

GALION IRON WORKS

hydraulic

GRADERS · ROLLERS

"I told 'em that Rex had a fast discharge!"

Yes, Rex Moto-Mixers have the fastest discharge of any truck mixer . . . *even with lowest slump mixes.* The big 34-inch discharge opening is unrestricted.

Rex Moto-Mixers are the only truck-mixers that mix in the discharge direction so that the batch is always right up at the opening . . . ready to come out in a hurry the second the discharge is opened. There is no hesitation . . . no segregation. Deep spiral scoops get the batch out *fast.* Combine this exclusive high-speed discharge with the other outstanding Rex Moto-Mixer features . . . fast charge, Hi-Lo mixing, accurate water system, chain drum drive . . . and you'll see why you'll get more trips per truck per day.

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 CO.	*Oakland 3, California*
INTERMOUNTAIN EQUIPMENT CO.	*Boise, Idaho*
LOGGERS & CONTRACTORS MACHINERY CO.	*Portland, Oregon*

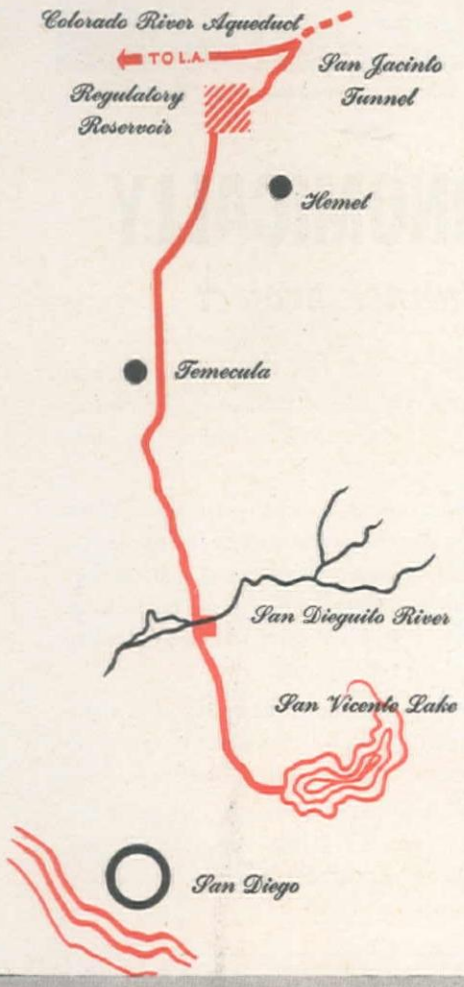
REX

CONSTRUCTION MACHINERY

PUMPS PAVERS PUMPCRETES MOTO-MIXERS MIXERS

Fabricating reinforcement cages
Joint bands in left foreground.

ANOTHER MILESTONE IN WATER SUPPLY LINE CONSTRUCTION



Lock Joint Concrete Pressure Pipe will be used in over 90% of San Diego's great new 71.3 mile Aqueduct. It will combine high initial and sustained carrying capacity with long life, at low cost.

The last miles of pipe are now being poured for this vital supply line that will connect San Diego with the Colorado River Aqueduct. With diameters ranging from 48" to 96", this line provides another demonstration of advantages obtained by using Lock Joint Concrete Pressure Pipe for main water supply lines. Ample strength for higher operating heads (up to 550 feet in this aqueduct) water-tightness, permanence and low maintenance costs are proven by performance here and throughout the country. Economies in first cost, installation and operation have been shown under the full range of operating conditions.

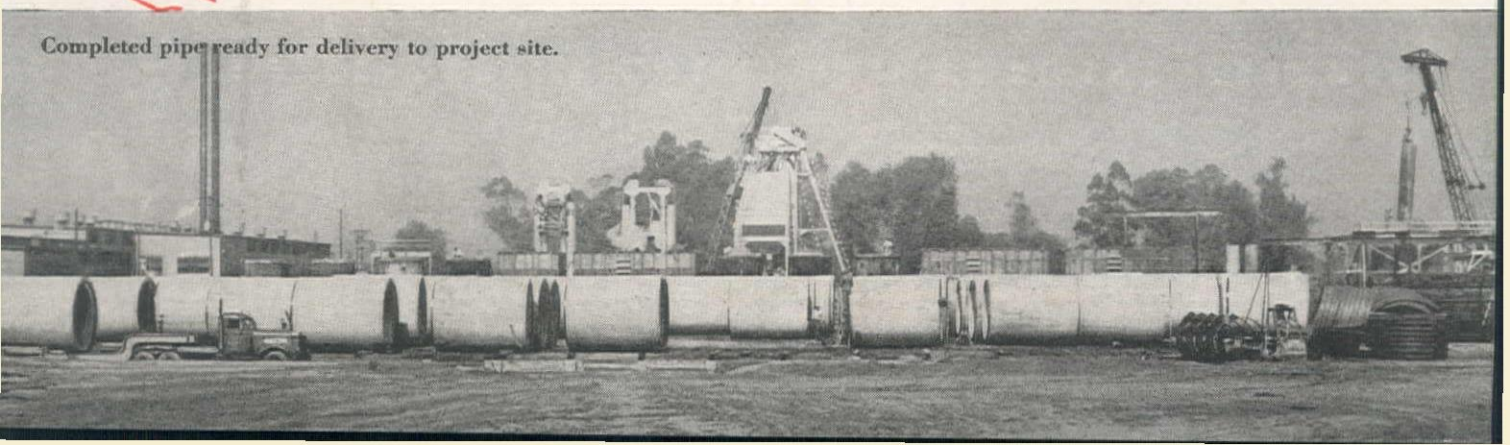
This Company has enjoyed a wide experience in the field of water supply line engineering and construction over a long period of years and this experience and training is available to water works officials and engineers. Information available upon request.

American
PIPE & CONSTRUCTION COMPANY

Concrete Pipe for Main Water Supply Lines, Storm & Sanitary Sewers, Subaqueous Pipe Lines

P. O. Box 3428 • Terminal Annex • Los Angeles 54, California
Main Offices and Plant—4635 Firestone Blvd. • South Gate, California
District Offices and Plants—Oakland • San Diego • Portland, Oregon

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



Completed pipe ready for delivery to project site.

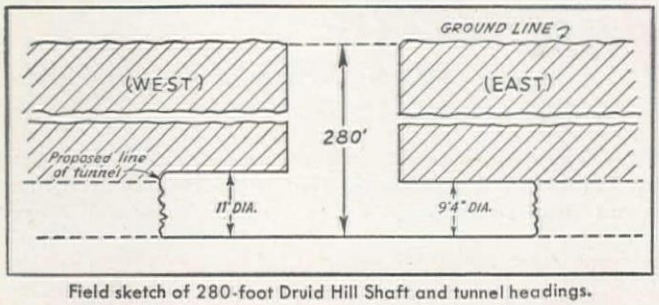
Good fumes permit early return to tunnel heading after "Gelex" shot. Note well-fragmented rock in foreground.

GOOD FRAGMENTATION—ECONOMICALLY

"Gelex" used on tough-shooting water-tunnel project

The Stiers Bros. Construction Co. of St. Louis, Mo., used economical Du Pont "Gelex" No. 1 exclusively to sink three shafts and drive adjoining tunnel headings for the Liberty Road-Montebello Water Tunnel Project in Baltimore, Md.

"Gelex" gave consistently good fragmentation. Its high strength and good spreading qualities were well adapted to this relatively soft but tough mica schist containing no natural cleavage planes. The water resistance of "Gelex" was ample for this moderately wet work.



Field sketch of 280-foot Druid Hill Shaft and tunnel headings.

"Gelex" semi-gelatinous dynamite can be a cost-cutter for contractors. In many instances it equals the performance of special gelatin grades on a stick-for-stick basis—and it has a higher stick count. Fumes are good. Perforated cartridges eliminate need for slitting . . . thus greatly reducing headaches.

Ask any Du Pont explosives representative for complete information about "Gelex." Like many contractors you may find it a time-and money-saver.

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

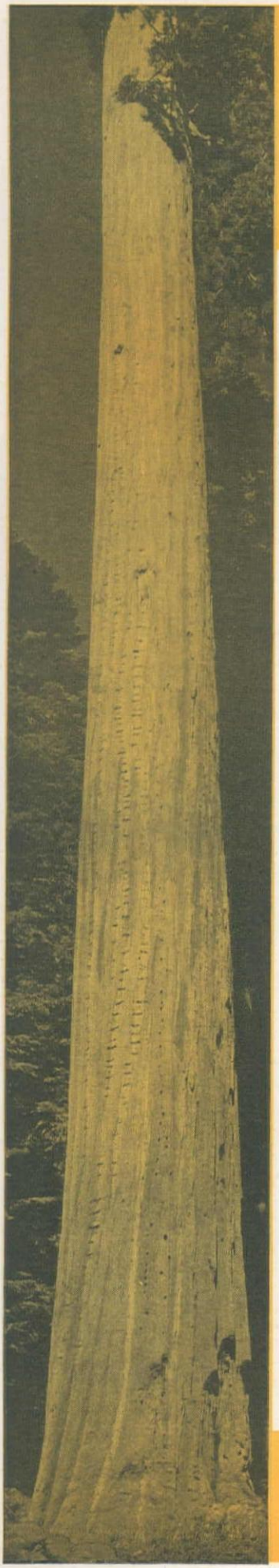
*Stick count based on 1 1-8 x 8 inch cartridges varies within limits of 3 per cent.

DU PONT "GELEX"

A Product of Du Pont Explosives Research

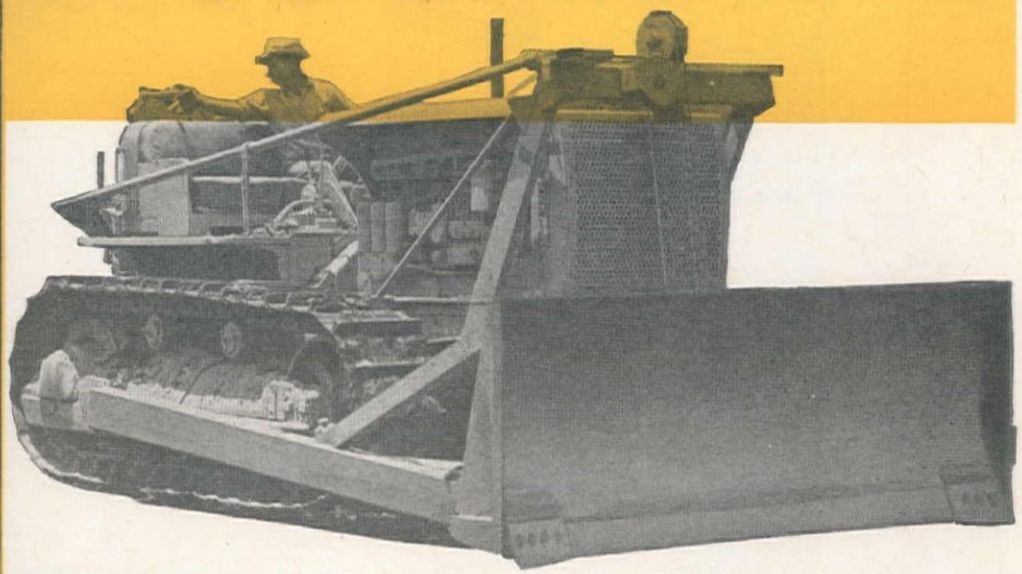
DU PONT

BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY



K-B BULLDOZERS

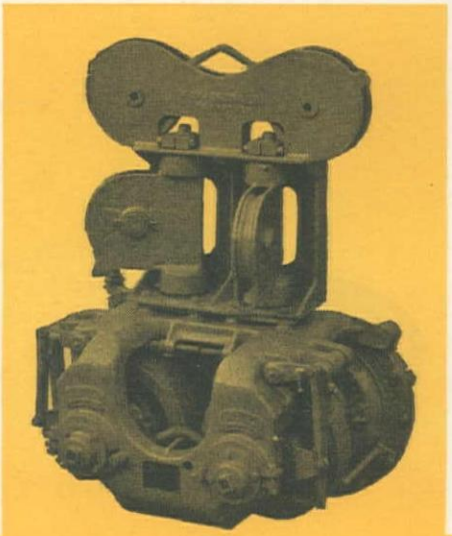
"BY TEST—BEST FOR THE WEST"



Years of experience in earthmoving on countless western jobs has gone into the sturdy design of K-B Bulldozers. Out of that experience has been developed the practical features that give K-B Bulldozers their *extra* performance. Blade design that really rolls the dirt, with mounting at the proper angle to fit the job. Ample clearance and maximum lift and drop for handling all types of dirt. A welded box-type frame that gives utmost strength with minimum weight. Extra digging ability in hard shale and rock that saves ripping and blasting. All these things and many others make the K-B Bulldozer ideal in logging road construction or any other job.

Hydraulic or Cable Control

The Kay-Brunner Model 78 double drum power control unit is built for heavy duty work on tractors up to 113 h.p. All working parts are easily accessible—all movable sections are bolted—no welded parts. Simple to maintain, one adjustment takes up clutch—one adjustment tightens or loosens brakes. Precision built of cast steel sections machined to insure complete parts interchangeability.

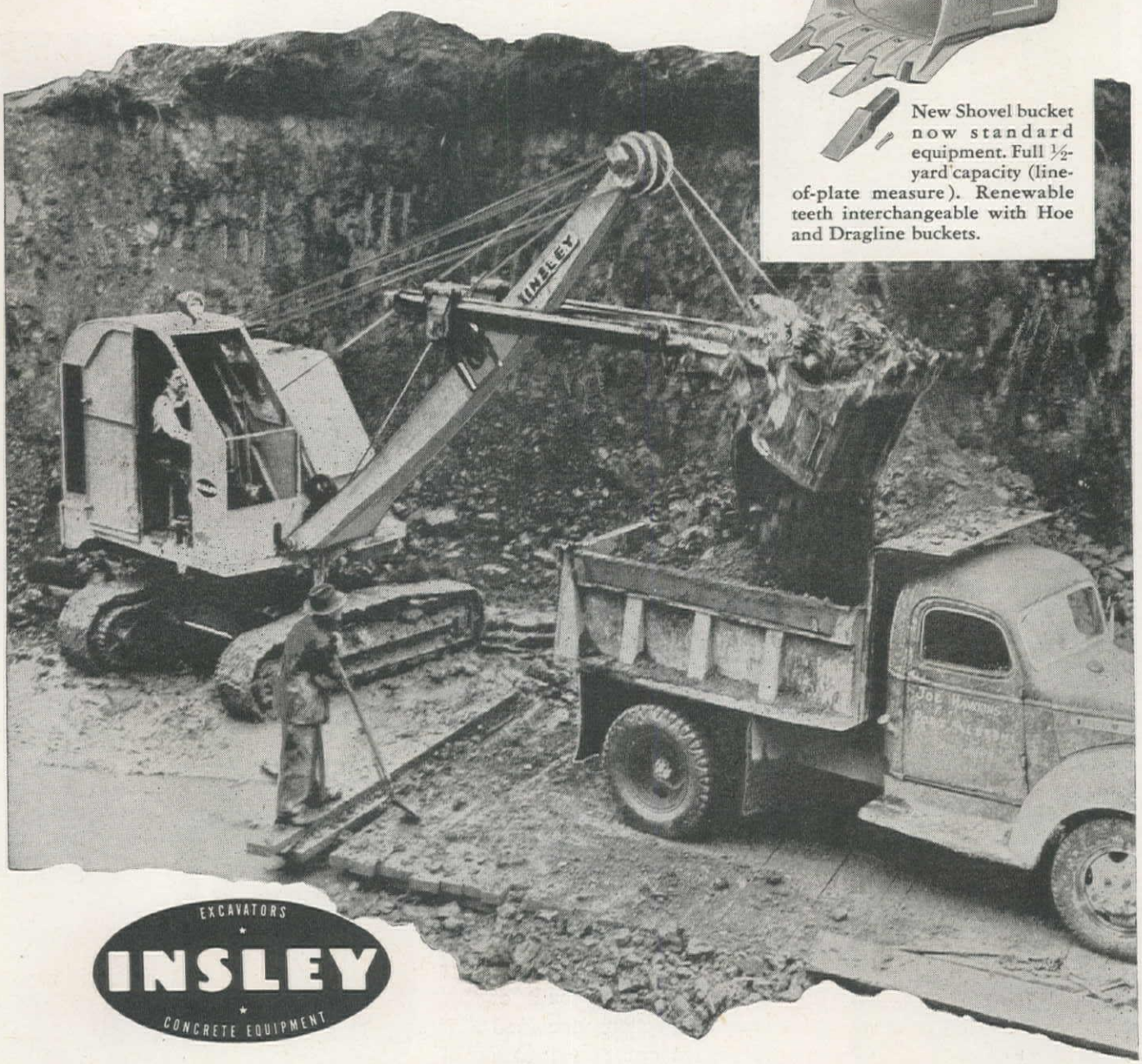


***Equipment Division*, Kay-Brunner Steel Products, Inc.**
2721 ELM STREET, LOS ANGELES, CALIFORNIA

Evidence

Yes, evidence that an Insley is built for the *tough job.* This is what we mean when we say, "Let your distributor show you an Insley at work."

New Shovel bucket now standard equipment. Full ½-yard capacity (line-of-plate measure). Renewable teeth interchangeable with Hoe and Dragline buckets.



EXCAVATORS
INSLEY
CONCRETE EQUIPMENT

INSLEY MANUFACTURING CORPORATION • INDIANAPOLIS 6, INDIANA

FOR INSLEY SERVICE AND SALES IN YOUR TERRITORY

ANDREWS MACHINERY.....404 N. W. Broadway, Portland 9, Oregon
ANDREWS EQUIPMENT SERVICE.....126 South Walnut St., Spokane 9, Washington
CONSTRUCTORS EQUIPMENT CO.....3707 Downing St., Denver 4, Colorado
M. & F. EQUIPMENT CO.....Route 1, Box 246A, Albuquerque, N. M.
H. H. NIELSEN COMPANY.....541 W. 2nd Street, Salt Lake City 1, Utah
SERVICE EQUIPMENT CO.....300 Aurora Avenue, Seattle 9, Washington
SHAW SALES AND SERVICE CO., 5100 Anaheim-Telegraph Rd., Los Angeles 22, Calif.

Seeing is believing

. . . watch reliable Le-Roi-Cleveland Sinkers at work

—actually see why their surprising speed reduces rock-drilling costs

Even the workmen on the job find it difficult not to watch Le Roi-Cleveland Sinkers go to town. The amazing way these drills eat hungrily into the hardest kind of rock must be seen to be believed.

Speed isn't the only advantage in using Le Roi-Cleveland Sinkers. Drill runners like them — they say these tools are easy to hold. Contractors, mining men, and quarry operators find that this feature enables drill runners to put down more feet of hole per shift with less effort—less fatigue. Here are a few additional design details that mean lower drilling costs for Le Roi-Cleveland users:

Efficient, long-life valve

— the patented Le Roi-Cleveland valve meters the air so effectively that you get more work out of your air compressor. End seating, this valve actually improves with use.

Dynamic, fighting rotation

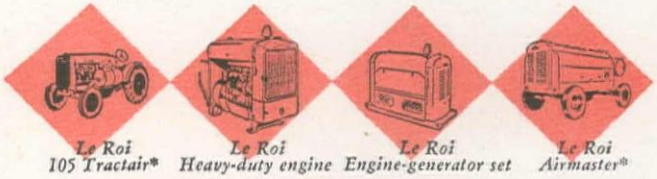
— the sturdy 4-pawl rifle bar and unique arrangement of parts keep the bit turning in the toughest going. Less time is lost because of stuck steel so that over-all drilled footage is considerably greater.

Thorough, positive lubrication

— the highly efficient lubrication system devised for Le Roi-Cleveland Sinkers thoroughly bathes all working parts with a protective coating of oil. Part life is increased many shifts.

Le Roi-Cleveland's line is complete. In addition to the widely used, fast-drilling 45-lb. class H-10 and 55-lb. H-111, there are other sinkers ranging in size from 32 to 83 lbs. Let your Le Roi distributor help you select the right machine for your job.

Write for latest literature. *Reg. U. S. Pat. Off.



*Le Roi 105 Tractair** *Le Roi Heavy-duty engine* *Le Roi Engine-generator set* *Le Roi Airmaster**

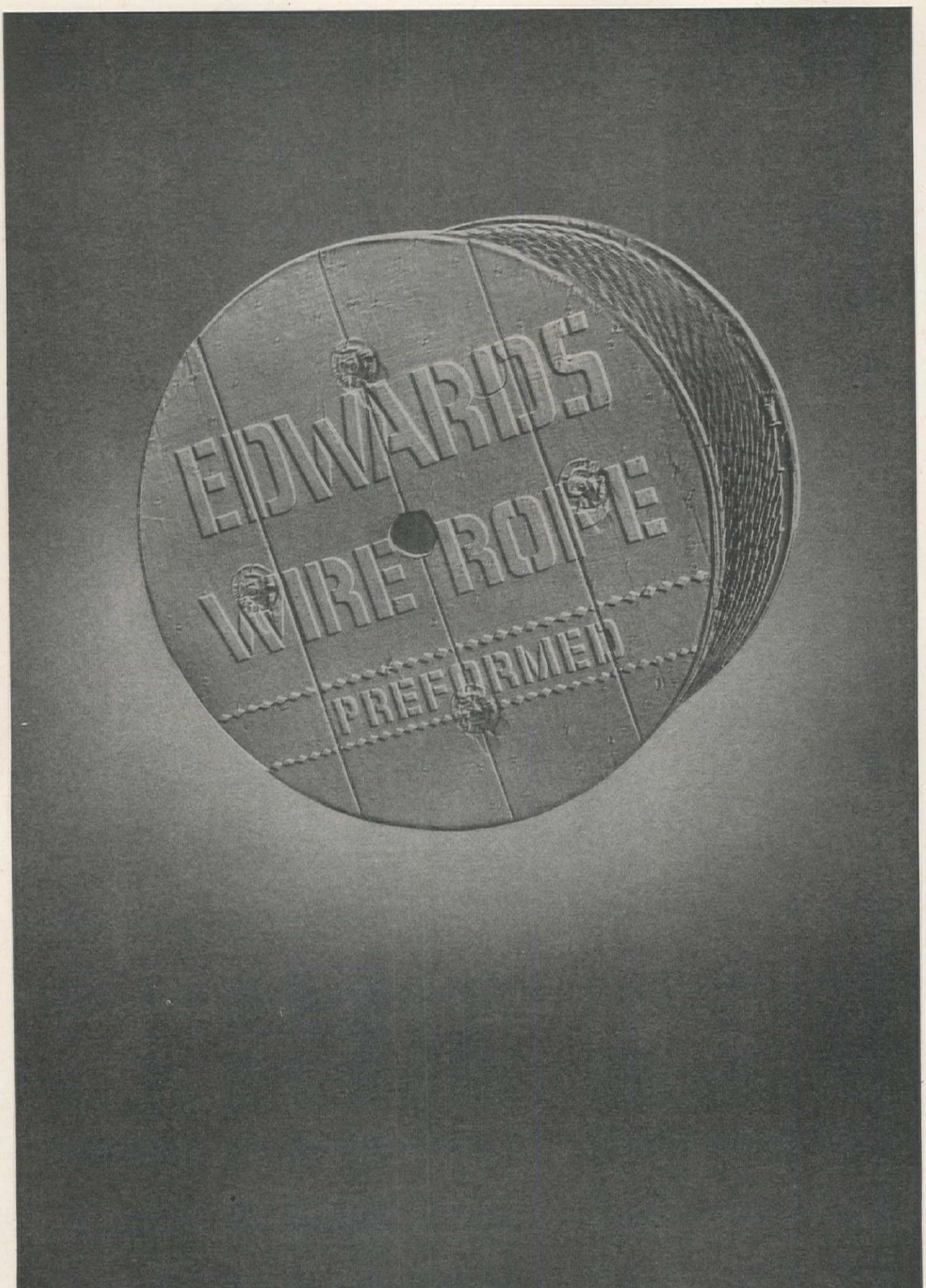
LE ROI COMPANY

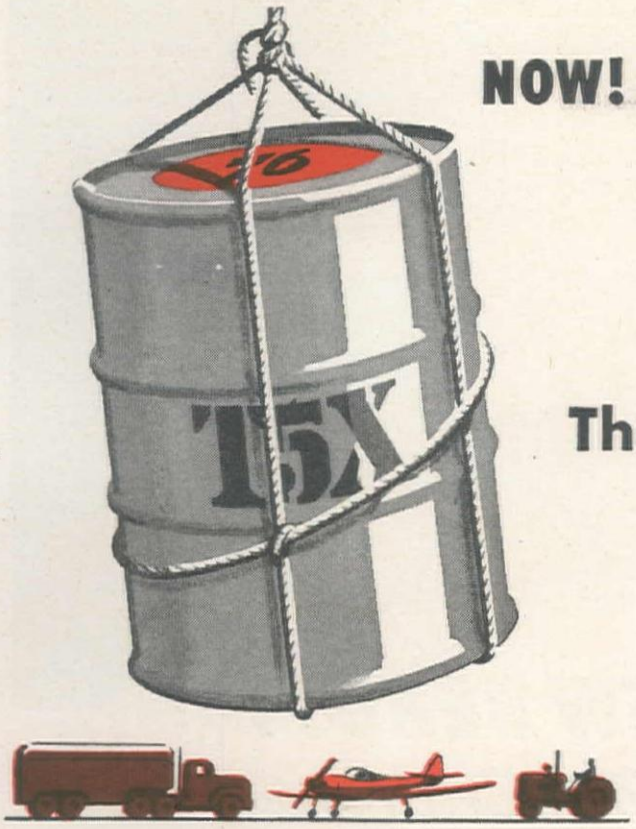
CLEVELAND DIVISION
Manufacturers of Cleveland Rock Drills
Cleveland 11, Ohio

LE ROI COMPANY, General Offices, Milwaukee 14, Wisconsin

NEW YORK • WASHINGTON • CLEVELAND • MILWAUKEE
BIRMINGHAM • TULSA • BUTTE • SAN FRANCISCO

RD-2





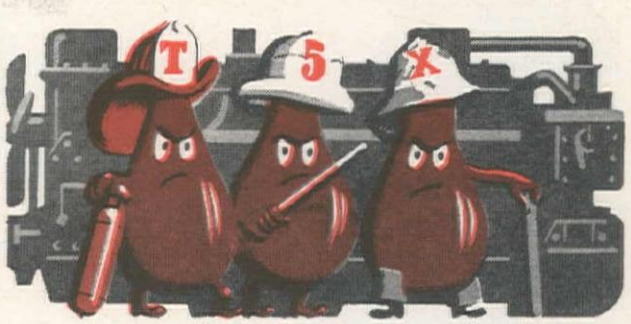
NOW! AVAILABLE IN QUANTITY!

T5X

The Royal Purple Motor Oil

1. For the first time since its development, T5X—the sensational new purple oil for Diesel, gasoline, natural gas and butane-powered engines—is available in quantity. T5X is a fully compounded, detergent-type oil. Its unusual purple color comes from an exclusive ingredient which helps give the oil its remarkable stability.

2. T5X is so outstanding that it easily passed the grueling 500-hour continuous-run Diesel engine test—considered the most exacting test of all for Diesel lubricants! In the "L-4" Coordinating Research Council tests for gasoline engine lubricants, T5X lasted *double* the length of time required for top lubricating performance!

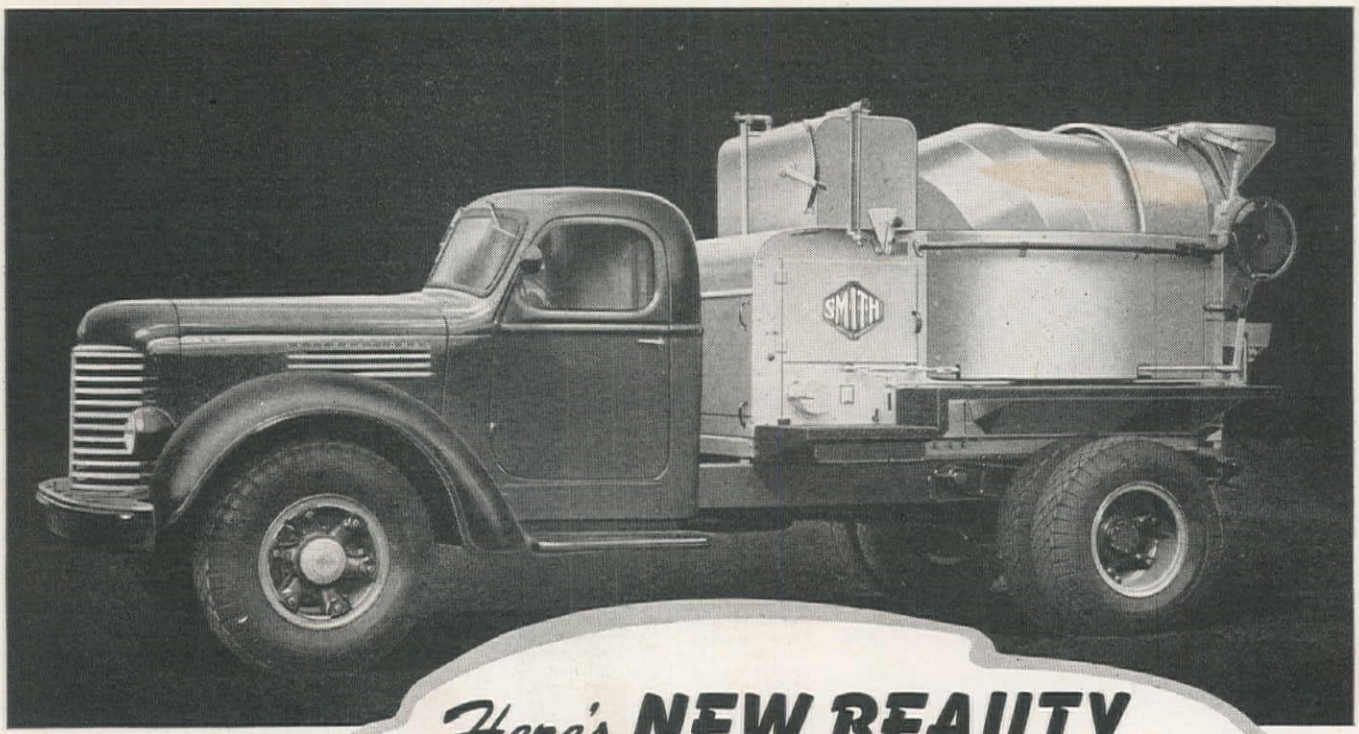


3. T5X keeps engines clean! It contains a new detergent compound that holds unburned fuel residues and other impurities suspended harmlessly in the oil, preventing sludge formation. Thus oil lines, pistons and ring grooves stay clean!

4. T5X reduces wear! It contains an inhibitor which minimizes oil oxidation, gives high stability against heat. Another additive protects against corrosion and rust. A third ingredient retards foaming even under the most adverse conditions.

T5X is *so high in quality, so versatile in its uses,* that it gives outstanding protection and performance in *any* internal combustion engine in *any* industrial operation. This sensational *purple* oil is now available for immediate delivery. Phone your local Union Oil Representative, or wire Sales Dept., Union Oil Company, Los Angeles 14, California, for full information.

ANOTHER **UNION OIL** SUCCESS-TESTED PRODUCT



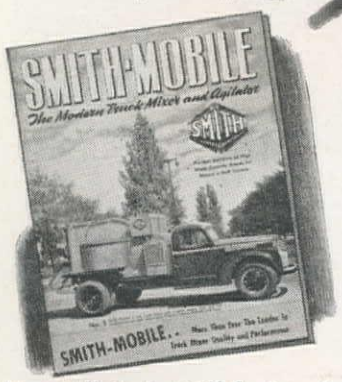
Here's NEW BEAUTY That Helps Me Sell Concrete!

"Yes, Sir . . . on every trip, the new 1947 Smith-Mobile's handsome appearance helps advertise my business . . . virtually acts as my concrete salesman."

Smith-Mobile's beauty is achieved largely by functional styling. Mixer engine, transmission, water pump, valve system and all moving parts are completely enclosed in a streamlined housing. And these improved Smith-Mobiles are easy to keep handsome . . . easy to "hose off" between trips. The roomy charging chute prevents spilling of dry aggregates or cement. And the perfected drum closing door seals batch in drum . . . keeps concrete from seeping out in transit.

Improved performance goes along with new beauty. Drums are larger, yet overall weight is materially decreased. Dual water injection system prevents freezing in cold weather. Direct-connected motor has 3-point suspension. Simple, lightweight transmission is foolproof. Drum rides on Timken Roller Bearings in rubber-cushioned case.

Four popular sizes. The demand for these improved Smith-Mobiles is still much greater than the supply. But deliveries are being stepped up by greatly increased production. Get the complete Smith-Mobile story — today!



New Bulletin Just Off the Press!
Gives you all the facts, dimensions and specifications of the improved SMITH-MOBILE models. If you haven't already received yours, be sure to ask for a copy.

THE T. L. SMITH COMPANY, 2871 N. 32nd Street, Milwaukee 10, Wisconsin, U. S. A.

SMITH MOBILE

The Original High Discharge Truck Mixer and Agitator

A 5162-1P

LESS THAN 10c PER TON MIXING COSTS

with the WOOD ROADMIXER model 36

Actually, under ideal conditions, mixing costs with the self-propelled Wood Roadmixer Model 36 are much less than 10¢ per ton. For example, on a 3 cu. ft. windrow with a travel speed of 19.6 ft. per minute the Model 36 will produce 153 tons of mix per hour. Operating expenses, including depreciation, labor, payroll insurance, repairs and maintenance, and fuel for mixer will approximate $8.00 per hour. Divide this by 153 tons per hour and you have a mixing cost of 5.2¢ per ton. So when we say "Less Then 10¢ Per Ton Mixing Costs" we are being conservative.

These figures are not pulled out of a hat. They come from actual operating records taken from typical jobs everywhere. They prove conclusively that the self-propelled Wood Roadmixer Model 36 will do any type of bituminous or soil-cement mixing faster and at less cost (from 40% to 60% less) than by other means.

Write for Bulletin 36 or see your Wood Roadmixer Distributor 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.

Only ADNUN BLACK TOP PAVERS give you these *Extra* Job possibilities!

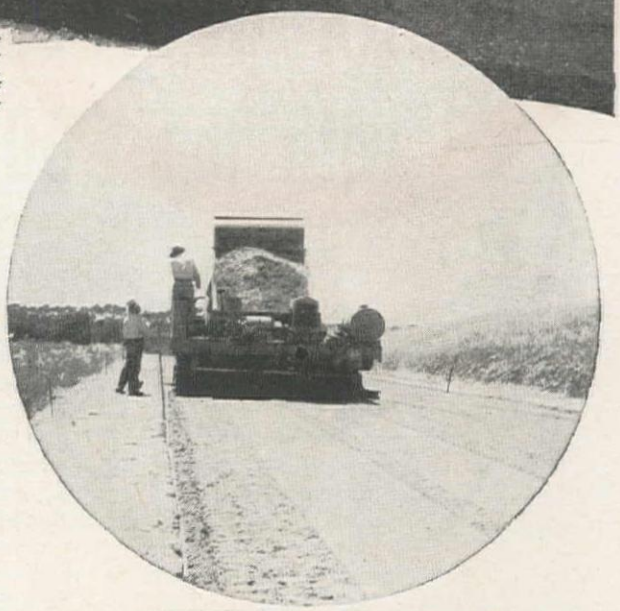
ABOVE—*Laying a four-inch course of No. 1 rock with an Adnun. Rock passes 4-inch screen, retained on 2-inch . . . An extra, profitable job for any Adnun!*

ABOVE—*Putting down base course for another smooth, Adnun-laid highway. Only Adnun has Continuous Course Correction feature for smoothing subgrade irregularities out of succeeding courses. Note retractable wheels for fast, easy between-jobs travel.*

ADNUN Black Top Paver ability goes far beyond precision laying of all types of black-top mixes at big volume rates. With an Adnun you can add extra job possibilities that mean more machine time on profitable work for you: Laying stone, slag or gravel courses . . . Laying soil cement and all types of built-up subgrade material.

In action, on any of these materials, Adnun hydraulic controls of all main paver functions, four-wheel-drive, power cutoff, and powerful six-cylinder engine make it easy for one man to get real paving results on a high output basis.

Adnun's rugged, cross-braced construction is made to take the pounding of heavy trucks for years of low-cost operation and maintenance. For the complete Adnun story, call your Adnun Representative, or write direct for illustrated Adnun Bulletin.



IN CIRCLE—*Laying a 10-inch course of subgrade aggregate to finished surface accuracy. A fast Adnun operation that makes finishing easier; completed roads smoother, longer-lasting.*

THE FOOTE CO., INC.

1940 State Street Nunda, New York

ADNUN

TRADE MARK REGISTERED

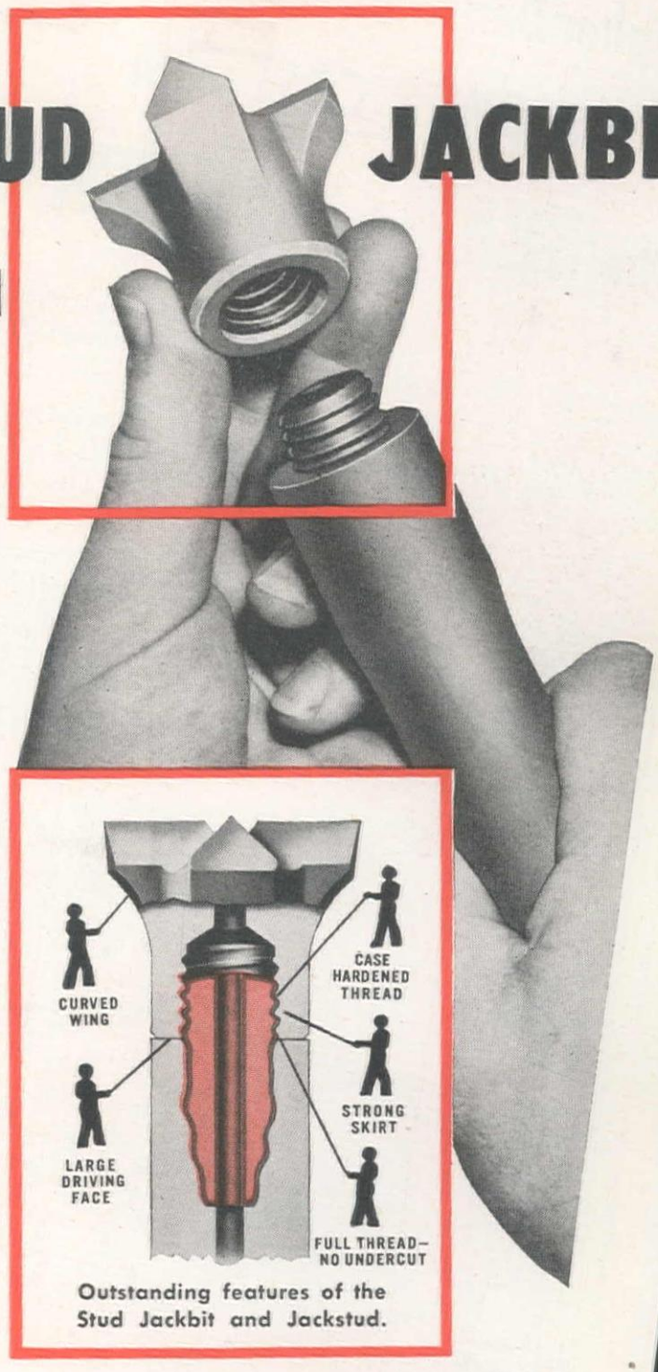
BLACK TOP PAVER

Browning-Ferris Machinery Co., Dallas and Houston, Texas; Francis Wagner Co., El Paso, Texas; LeRoi-Rix Machinery Co., Los Angeles, Calif.; C. H. Grant Co., San Francisco, Calif.; Hall-Perry Machinery Co., Butte, Montana; Western Equipment Co., Boise, Idaho, and Spokane, Wash.; The Colorado Builders' Supply Co., Denver, Colo.; Lively Equipment Co., Albuquerque, N. Mex.; The Lang Co., Inc., Salt Lake City, Utah; Howard-Cooper Corporation, Portland, Albany, Eugene, Central Point and Roseburg, Oregon, and Seattle, Washington.

HERE IT IS

THE STUD JACKBIT

ANOTHER LEADER IN THE JACKBIT LINE



Outstanding features of the Stud Jackbit and Jackstud.

The Stud Jackbit is a new addition to our widely used line of Jackbits. It drills faster, has longer life, and is easier to detach. This bit and the revolutionary Jackstud have many new features and advantages.

The outstanding performance of the Stud Jackbit is due in part to its extra strong construction. More metal has been placed in the bit skirt. This added strength prevents breakage and reduces upsetting to a minimum.

The newly designed curved wings of the Stud Jackbit insure new bit performance during its entire life...the length of the gauge face remains constant with successive resharpenings.

The Jackstud design permits the use of the best possible alloy material for the attachment thereby providing strength and durability unobtainable in a one-piece drill rod.

The Jackstud has uniform factory-perfect threads that run right up into the driving shoulder. There is no undercut into which bits can upset and lock on. Also the Jackstud is carburized and case hardened. These features result in longer thread life of both rod and bit.

The driving of the cold Jackstud into the heated end of a Jackrod is a simple matter, especially when using an I-R sharpener with which most shops are already equipped.

Ask our sales engineers to discuss with you the applications and advantages of the Stud Jackbit.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y. 2-15

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

Higher Densities in Earth Fills at LOWER COST with the SEAMAN MIXER

In processing for high-density compaction in earth fills, proper soil pulverization and the proper mixture of soil and water is just as important as the rolling.

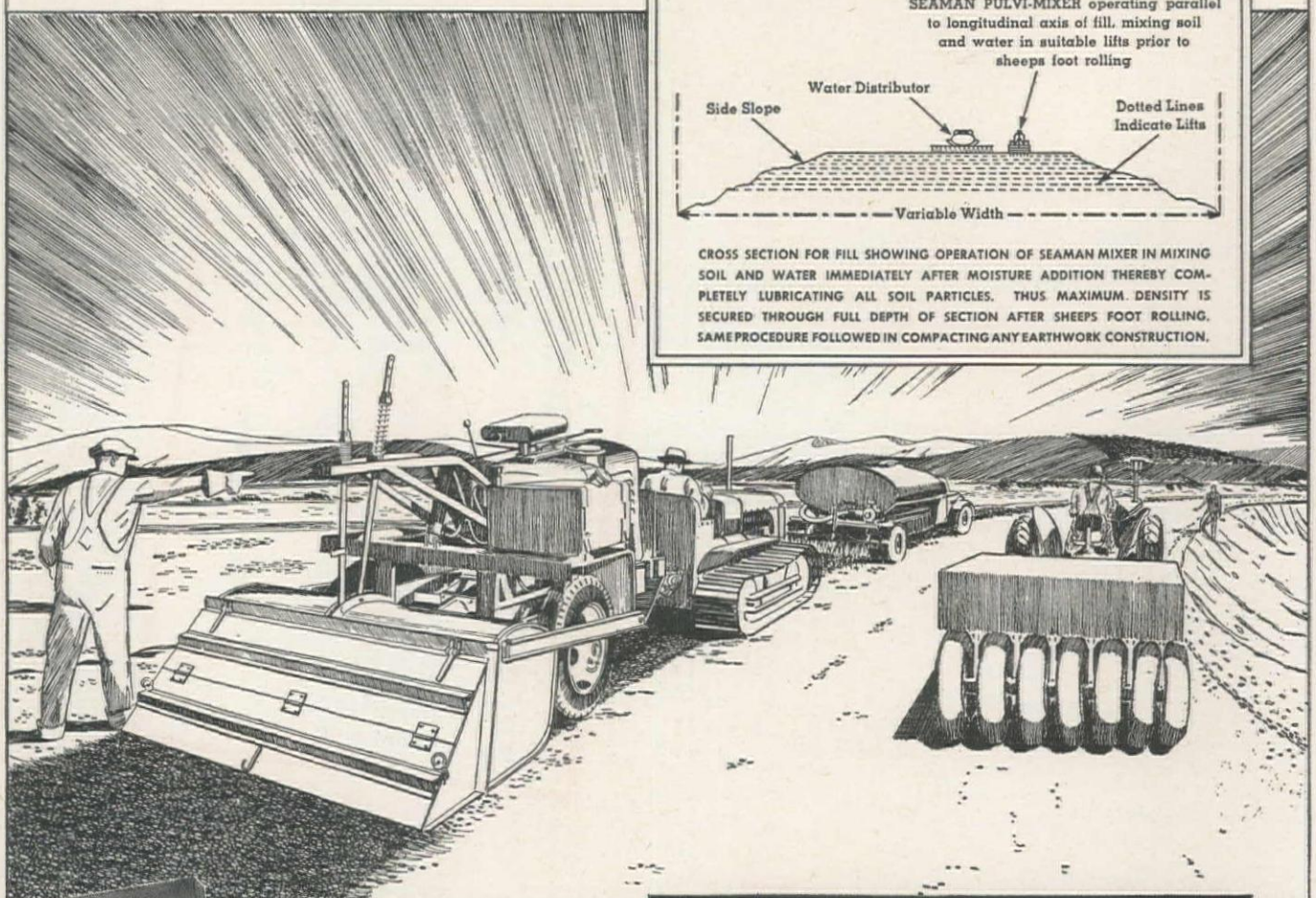
Good proof of this is shown in the construction of the Santa Monica (Calif.) Municipal Airport where all embankments and subgrades under runway and taxiway pavements were required to be highly compacted by a pneumatic roller ballasted to 100 tons. A scarifier was used to precondition the soil.

As the work progressed, densities were unsatisfactory, averaging about 92%, despite a great increase in the passes made by the roller.

Then the contractor bought a SEAMAN MIXER. Where 7 passes of the water distributor had been made to add 9% of moisture, the full 9% was put into the lift at once and the SEAMAN effected a thorough, completely uniform mix. And, after rolling, densities soared to 98.5% with many at 100% of maximum. Later, roller passes were reduced from 16 to 8 yet densities held at those levels.

The secret is the SEAMAN with its ability to pulverize, blend, mix, cross-mix and turn so that moisture, the essential soil-particle lubricant, is distributed evenly throughout the lift.

CROSS SECTION FOR FILL SHOWING OPERATION OF SEAMAN MIXER IN MIXING SOIL AND WATER IMMEDIATELY AFTER MOISTURE ADDITION THEREBY COMPLETELY LUBRICATING ALL SOIL PARTICLES. THUS MAXIMUM DENSITY IS SECURED THROUGH FULL DEPTH OF SECTION AFTER SHEEPS FOOT ROLLING. SAME PROCEDURE FOLLOWED IN COMPACTING ANY EARTHWORK CONSTRUCTION.



MORE POPULAR THAN EVER!

Pocket size but packed with useful practical facts, — "Soil Stabilization Methods," — a book compiled by Seaman engineers. Yours on request. Ask for Bulletin WN-25.

SEAMAN MOTORS, INC.

MILWAUKEE, WISCONSIN

Peerless Equipment Co., Los Angeles, Calif.; Buran Equipment Co., Oakland, Calif.; Contractors' Equipment Corp., Portland, Ore.; Service Equipment Co., Seattle, Wash.; Fred M. Viles & Co., Spokane, Wash.; Intermountain Equipment Co., Boise, Idaho; Sanford Tractor & Equipment Co., Reno, Nev.; Diesel Motor & Equipment Co., Phoenix, Ariz.

THE tougher the job the more you need a Baker . . . for only a Baker Bulldozer gives you the rugged power, sturdy construction, and dependable performance that means low cost yardage on any job.

A Baker's rigid, sturdy construction gives you the heft that is necessary for tremendous down pressure, and terrific pushing power — its simplicity means less linkage, fewer points of wear, less down time—and new machine rigidity throughout the life of the unit.

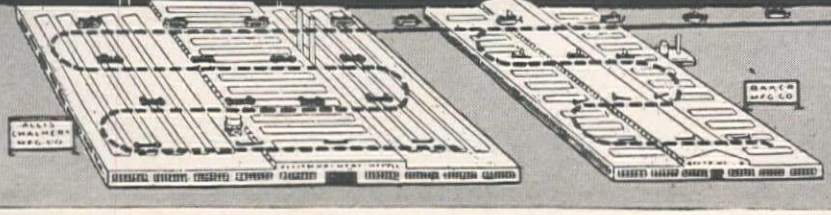
When there's yardage to move and the going is rough — call on a tractor-bulldozer team that has the speed, hitting power and balance you need to lick it — see your nearby A-C Baker distributor today.

BAKER MFG. CO. · Springfield, Ill.

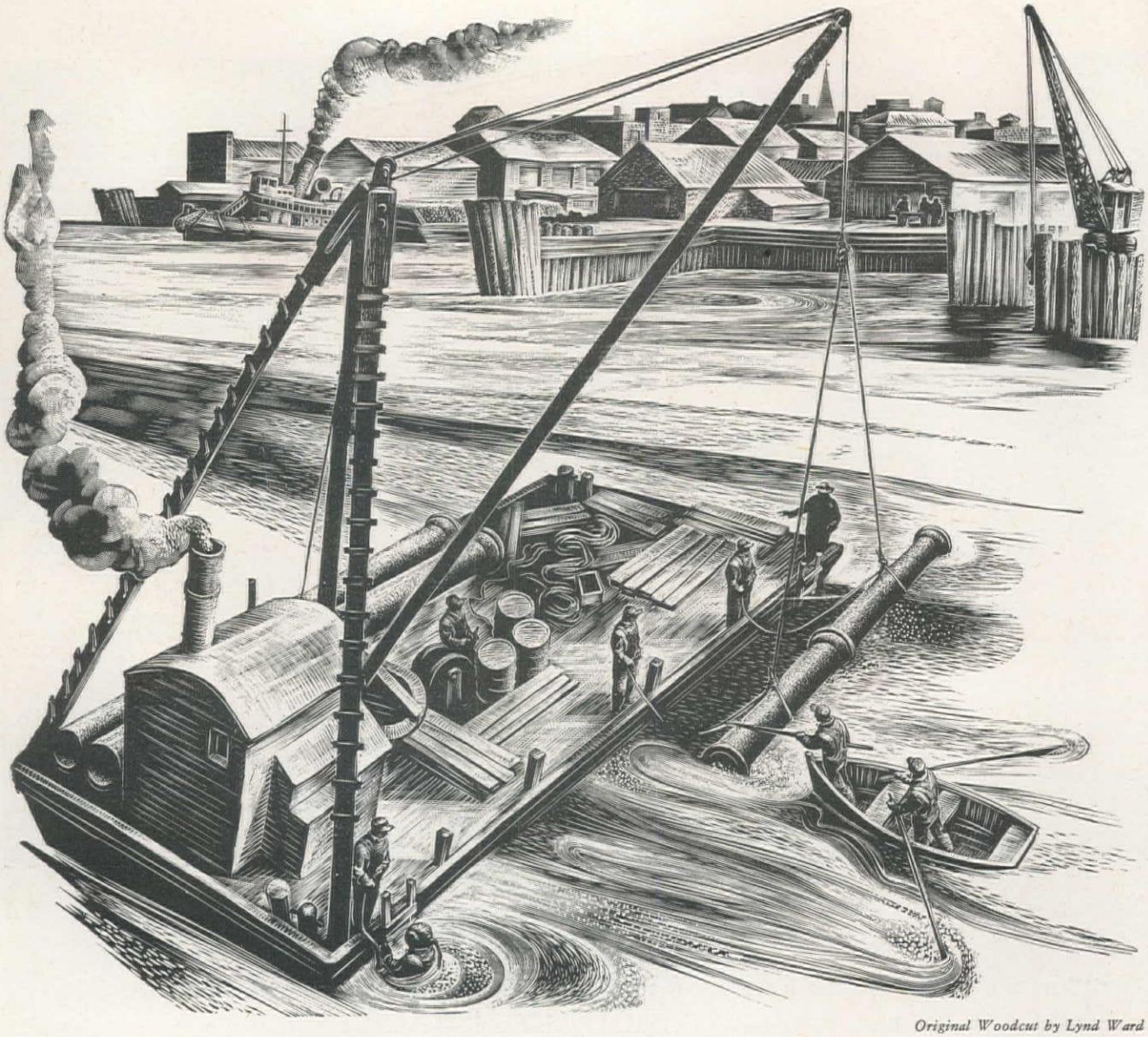
BAKER

They Go Together! LD AC

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



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



Original Woodcut by Lynd Ward

Underwater installations, for which large quantities of cast iron pipe have been used through the years, frequently present special and sometimes difficult problems. Pipe design or installation methods, or both, may be involved. If you have such a problem, we shall be glad to share our extensive knowledge of how others have met similar conditions—an experience acquired in nearly fifty years of supplying U. S. Cast Iron Pipe for river-crossings and other subaqueous jobs.

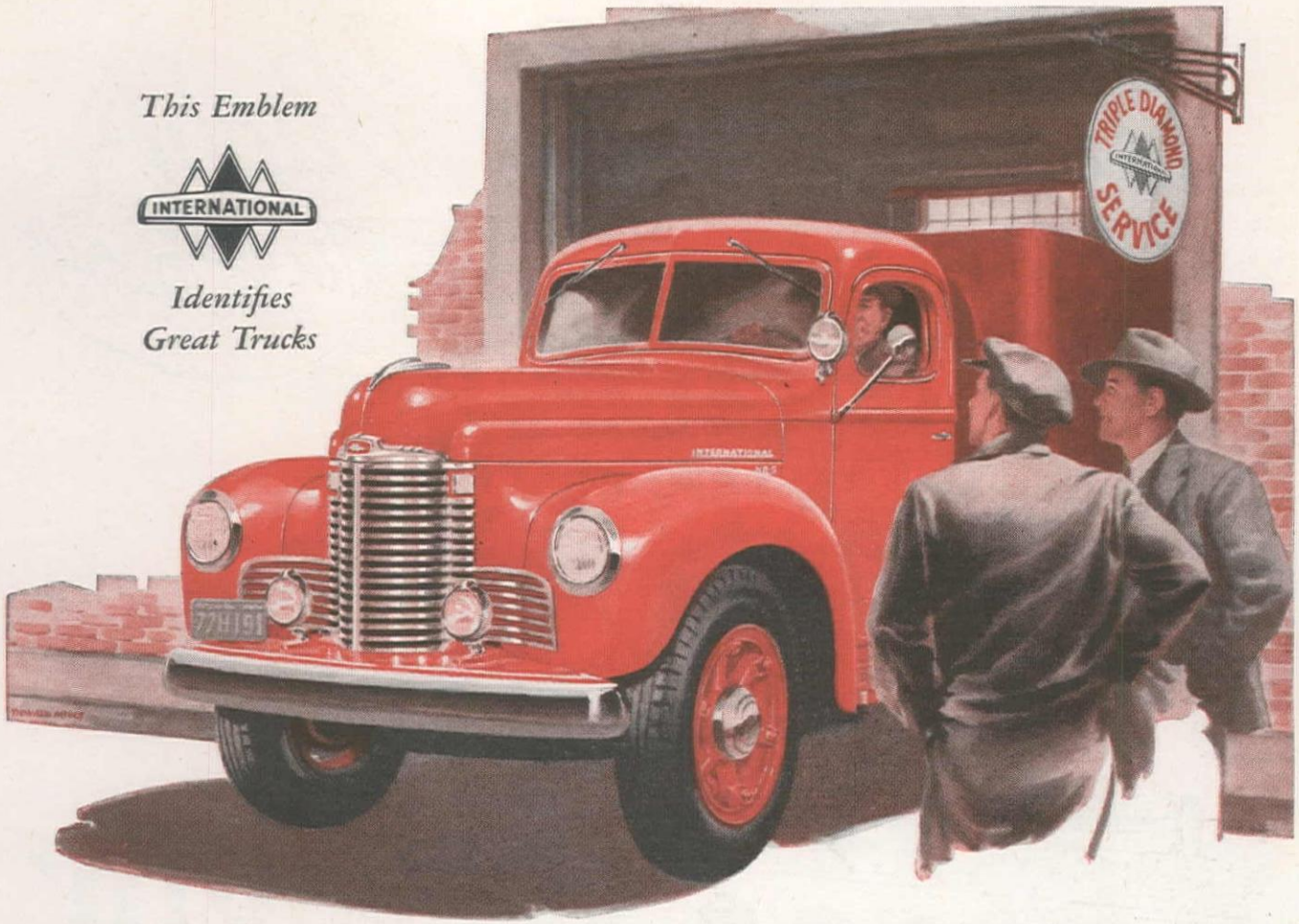
U.S. cast iron PIPE

U. S. PIPE & FOUNDRY CO.
General Offices: Burlington, N. J.
Plants and Sales Offices throughout U.S.A.

This Emblem

INTERNATIONAL

Identifies Great Trucks



BACK OF THE TRUCK – THESE 3

International TRUCK SERVICE • International ENGINEERED PARTS • International APPROVED ACCESSORIES

Rugged stamina! Long mileage! Economy of operation!

International Trucks provide all three in such abundance that for 16 years more heavy-duty International Trucks have served American commerce and industry than any other make.

And to make sure that every operator gets every profitable mile and every available economy from every International Truck, this is the *Three-Part Service* International provides:

MAINTENANCE AND SERVICE

Quickly available everywhere from thousands of International Dealers and the nation's largest company-owned truck-service organization – International Branches.

ENGINEERED PARTS

Precision-made, like the originals in International Trucks—wear better and last longer.

APPROVED TRUCK ACCESSORIES

A complete line for every truck need. Triple-checked against the most rigid standards to assure efficient, trouble-free performance.

Yes, International *Three-Part Service* makes sure that operators get the extra mileage, the dependable stamina and the low operating cost built into all International Trucks.

Motor Truck Division
INTERNATIONAL HARVESTER COMPANY
180 N. Michigan Ave. Chicago 1, Ill.

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

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

40TH ANNIVERSARY OF INTERNATIONAL TRUCKS

1907-1947—Forty years of International Truck Service to Industry, Commerce, Agriculture

INTERNATIONAL

INTERNATIONAL Trucks

Manufactured Right

in your own District

REINFORCED CONCRETE PIPE CULVERTS

for

STRENGTH-
CAPACITY-
PERMANENCE-

Reinforced concrete pipe culverts are economical because of their durability and low maintenance cost. They are convenient because they are manufactured *right*—in your own district and delivered at the trench ready for installation. Their construction gives you extra strength. Their smooth interior provides additional capacity.

Culverts made by members of California Associated Concrete Pipe Manufacturers are built in strict compliance with the standard specifications of the American Society for Testing Materials and the American Association of State Highway Officials.

On your next job, be sure you get all the advantages of concrete pipe at its best. Write for specifications, literature or special information on any of *your* problems. Ask for the names of your nearest manufacturer members of

CALIFORNIA ASSOCIATED
CONCRETE PIPE
MANUFACTURERS

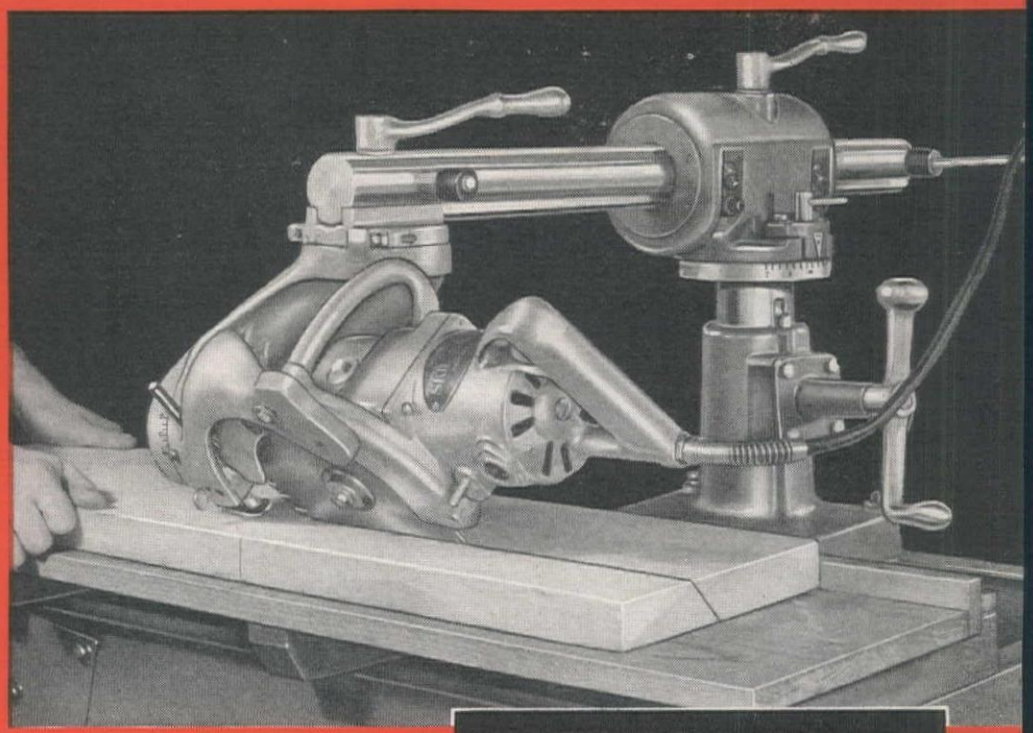
CALIFORNIA ASSOCIATED TESTED-GUARANTEED AMAROC CONCRETE PRODUCTS CONCRETE PIPE MFGRS.

P.O. BOX 152 FRESNO 7
CALIFORNIA

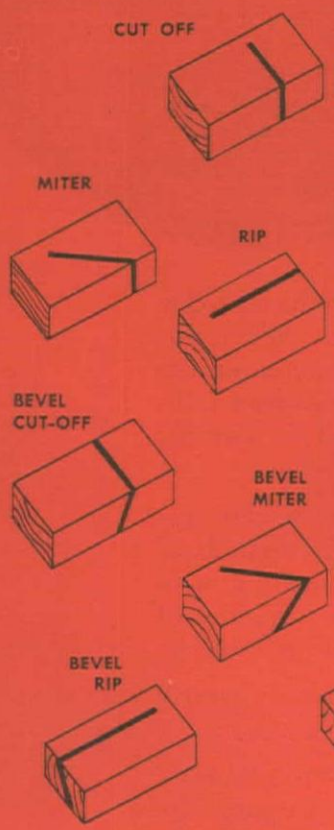
NEW LOW PRICE!

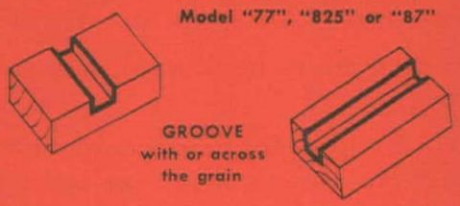
SKILSAW RADIAL SUPPORT

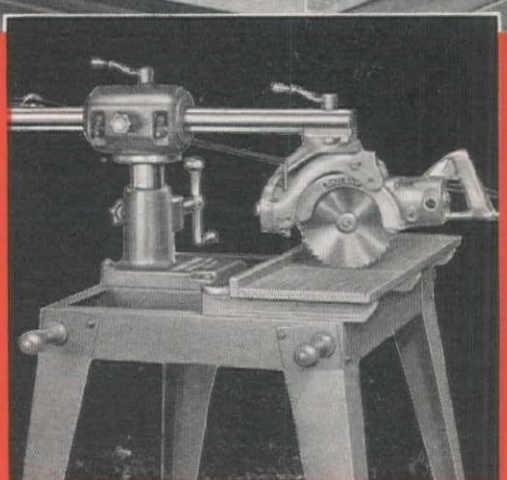
quickly converts Portable SKILSAW into an Efficient RADIAL SAW



MAKES ALL THESE CUTS







• Greater acceptance, increased production and economies in manufacturing make possible a substantial reduction on SKILSAW Radial Arm. The new low price is in line with SKILSAW'S policy of always bringing you the lowest prices on top-quality SKILTOOLS . . . the tools that always save you time, effort and money on every job!

SKILSAW, INC., 5033 Elston Ave., Chicago 30, Ill.

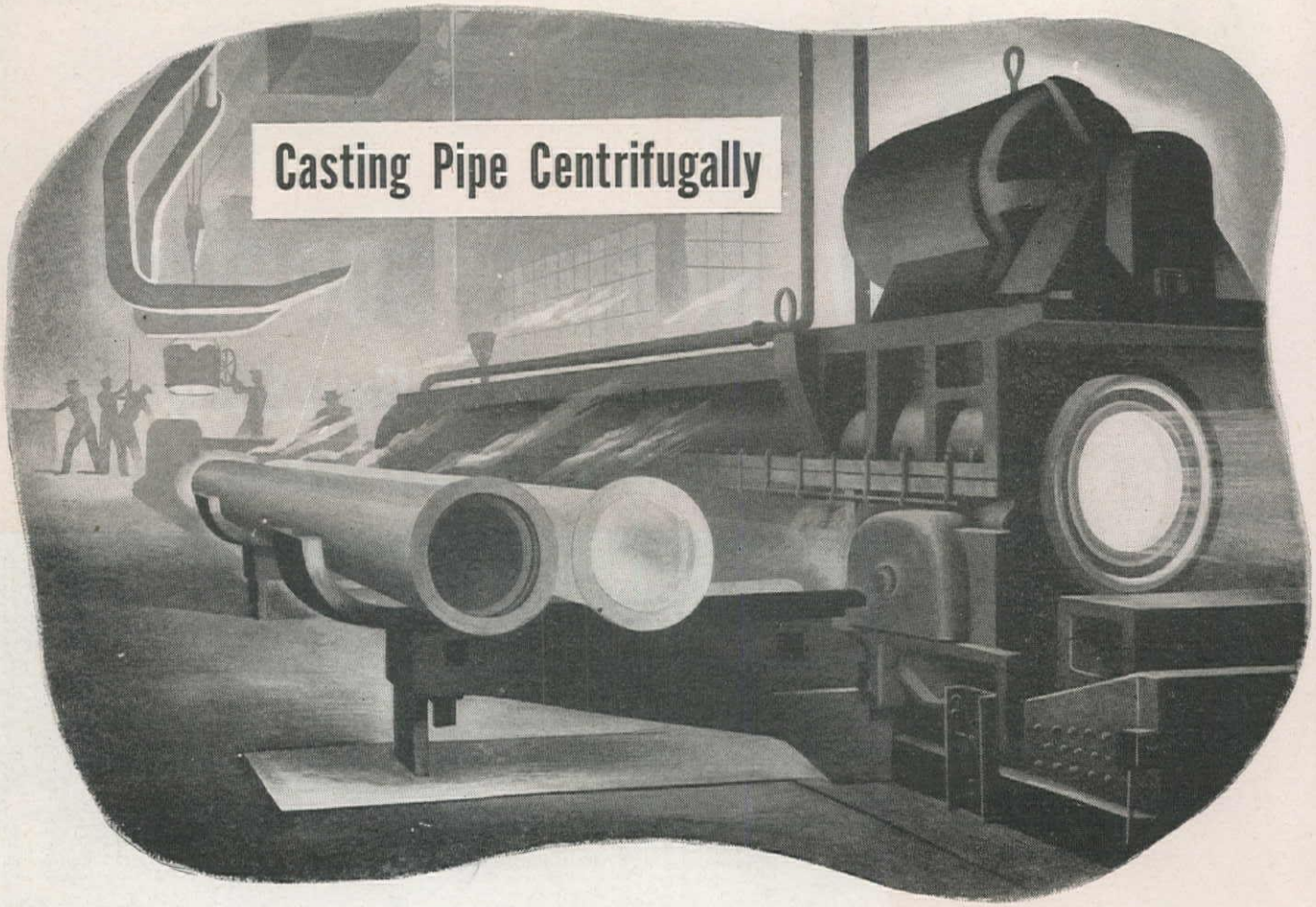
Factory Branches in Principal Cities

In Canada: SKILTOOLS, LTD., 66 Portland St., Toronto, Ontario

ELECTRIC PNEUMATIC

SKILTOOLS

MADE BY SKILSAW, INC.



THE great majority of cast iron pressure pipe produced today is cast centrifugally in metal or sand-lined molds. When this mechanized process was introduced 25 years ago, its potentialities for improved production controls were evident. For human fallibility was largely replaced by machine accuracy based on scientific principles.

The improved production controls made possible by the centrifugal casting process have long since been realized. Hundreds of millions of feet of centrifugally-cast-iron pressure pipe are now in service. All of this pipe is more uniform in metal structure, in wall thickness, and in concentricity, than pipe not centrifugally cast.

Better production control means better pipe; it results in greater uniformity of quality.

Production controls in cast iron pipe foundries start almost literally from the ground up with inspection, analysis and testing of raw materials; continue with constant control of cupola operation by metal analysis; and end with rigid tests of the finished product.

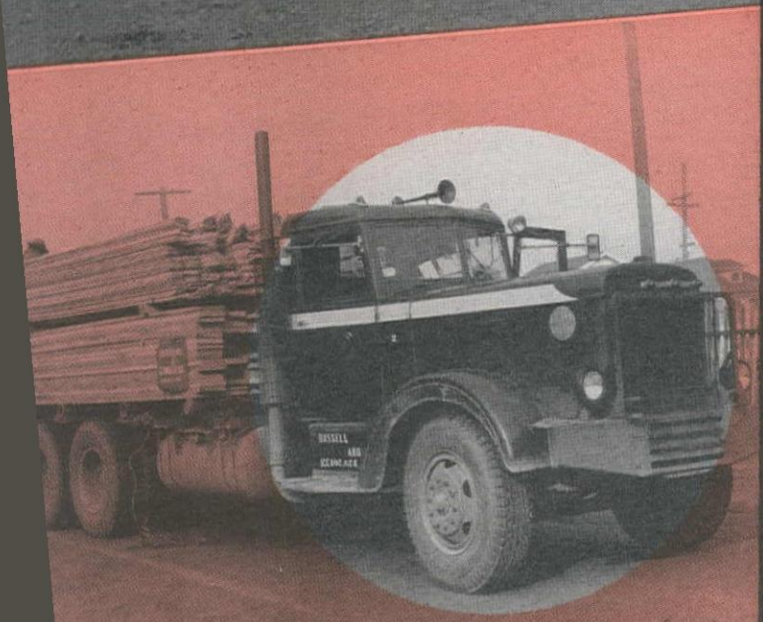
It must be obvious that this is vastly better pipe than cast iron pipe made by the rule-of-thumb methods of a century ago, even though most of that pipe is still in service.

CAST IRON PIPE

SERVES FOR CENTURIES

LOOK FOR THIS MARK IT IDENTIFIES CAST IRON PIPE

BOUGHT 2—
Liked 'em—
ORDERED 2 MORE



For many years, PETERBILT TRUCKS have done an outstanding job in the lumber industry, both in truck logging and in hauling finished lumber from the mills direct to wholesale and retail outlets.

Russell & Walsh of Oakland are one of the lumber haulers whose experience with PETERBILTS is running true to form. They bought two PETERBILTS to haul lumber from Southern Oregon to points in Central California. Each truck pulls a trailer and they make the 800-mile round trip every 24 hours, operating six days a week.

In this continuous service they found that PETERBILTS had just exactly what they wanted in heavy duty trucks, so they did just what many other fleet operators have done—they ordered more PETERBILTS. Standardization of rolling stock has distinct advantages—whether you operate two trucks or 200. Those who have standardized on PETERBILTS usually started out with two or three, liked their performance—and from then on they ordered more PETERBILTS.

Peterbilt Motors Company

107th AVENUE AND MacARTHUR BOULEVARD · OAKLAND · CALIFORNIA

★ "100% SATISFIED IN EVERY PARTICULAR"...LUTHER SHERBURN

There are TRAILMOBILE trailers for almost every application in the forest products and construction industries. If you are hauling logs or finished lumber, you want TRAILMOBILE logging dollies and TRAILMOBILE flatbeds. If you are moving construction equipment, you need TRAILMOBILE low beds. If you are hauling sand and gravel or fill, you will like TRAILMOBILE dump trailers. If fact, if you have any need for a trailer, it's always a good idea to see what TRAILMOBILE has to offer.

Luther Sherburn is a lumber hauler of Willits, California, who hauls finished lumber from the Ford mill at Laytonville to points in Northern California. Mr. Sherburn has previously operated other makes of trailers, and recently bought TRAILMOBILES because of their light weight and great strength which permits him to haul greater pay loads. He now hauls a pay load of 50,000 pounds with 76,000 pounds gross.

After operating TRAILMOBILES for a couple of months, Mr. Sherburn expresses his opinions thus: "The performance of these trucks and trailers is really astounding. There is plenty of power for the hills and a road speed of better than 50 miles per hour on the highway. In action, the TRAILMOBILES track perfectly with absolutely no sway. I am 100% satisfied in every particular."

THE TRAILMOBILE COMPANY

BERKELEY, CALIFORNIA

TRAILMOBILE

LOS ANGELES • BERKELEY • SACRAMENTO • SANTA ROSA • FRESNO • SAN JOSE • BAKERSFIELD • STOCKTON • OGDEN • SEATTLE
HONOLULU • SANTA BARBARA • PORTLAND • EUREKA

Important Notice to Our Readers!

WESTERN CONSTRUCTION NEWS

Abandons Newsstand Distribution!

No Magazines for Sale at Newsstands after July 1st

It is with sincere regret that the publisher of WESTERN CONSTRUCTION NEWS announces that the June issue—the one you are now reading—will be the last sold on newsstands anywhere. During the past 24 months, paid mail circulation has increased to the point where there is not enough paper available to print the large number of additional magazines needed for newsstand outlets. Publishers everywhere are in the same situation—paper stocks must be conserved to take care of regular subscribers. Therefore, after the June issue, WESTERN CONSTRUCTION NEWS will be for sale

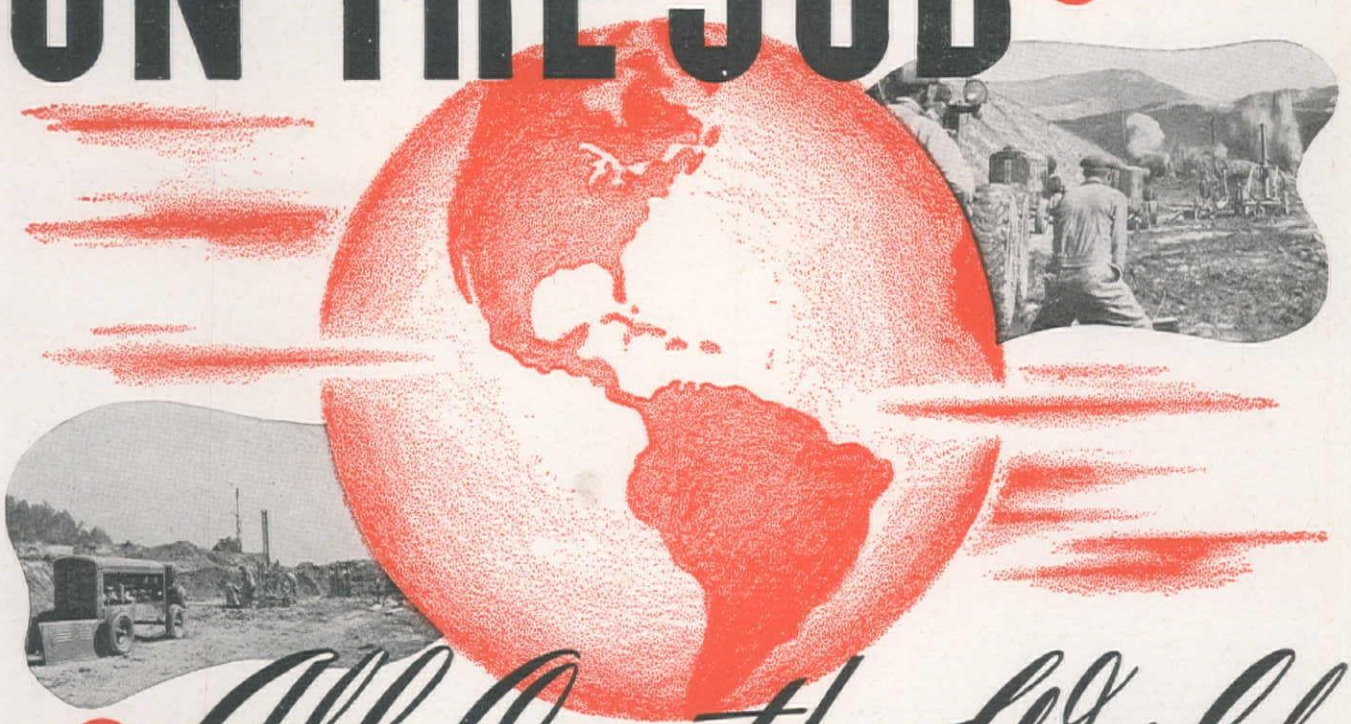
BY SUBSCRIPTION ONLY!

Place your subscription order through your favorite dealer or agent, or write direct to this office. A convenient post-paid order card is enclosed in this issue of WCN. Regular subscription rates are $4.00 per year, two years for $7.00 or three years for $10.00—a real saving over the price you have been paying for copies on the newsstands. Order yours today—avoid missing a single issue!

WESTERN CONSTRUCTION NEWS

503 Market Street • San Francisco 5, California

ON THE JOB

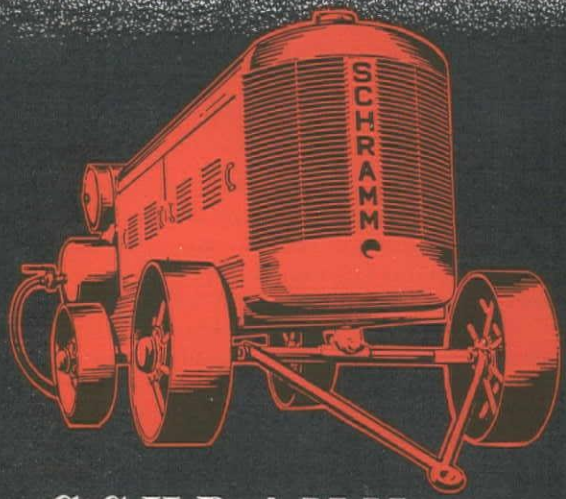


All Over the World

No location is too remote or job too tough for a rugged *Schramm Air Compressor*. Construction and maintenance industries throughout the world today, rely on *Schramm* built units.

Precision manufacturing, quality materials and modern design are combined to give you a dependable trouble free unit. Unfaltering air delivery is certain even under the most adverse conditions of climate or locality.

Our engineering staff is at your service—ask them for recommendations concerning your air problems.



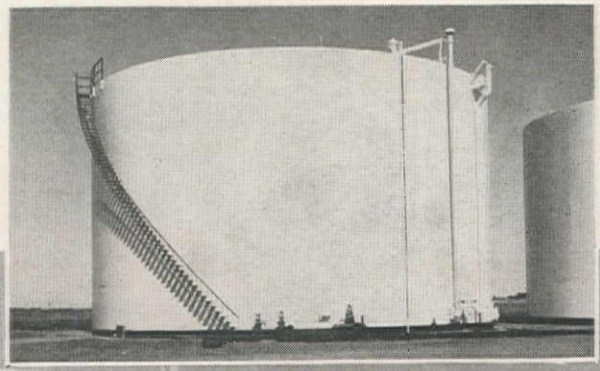
SCHRAMM INC.

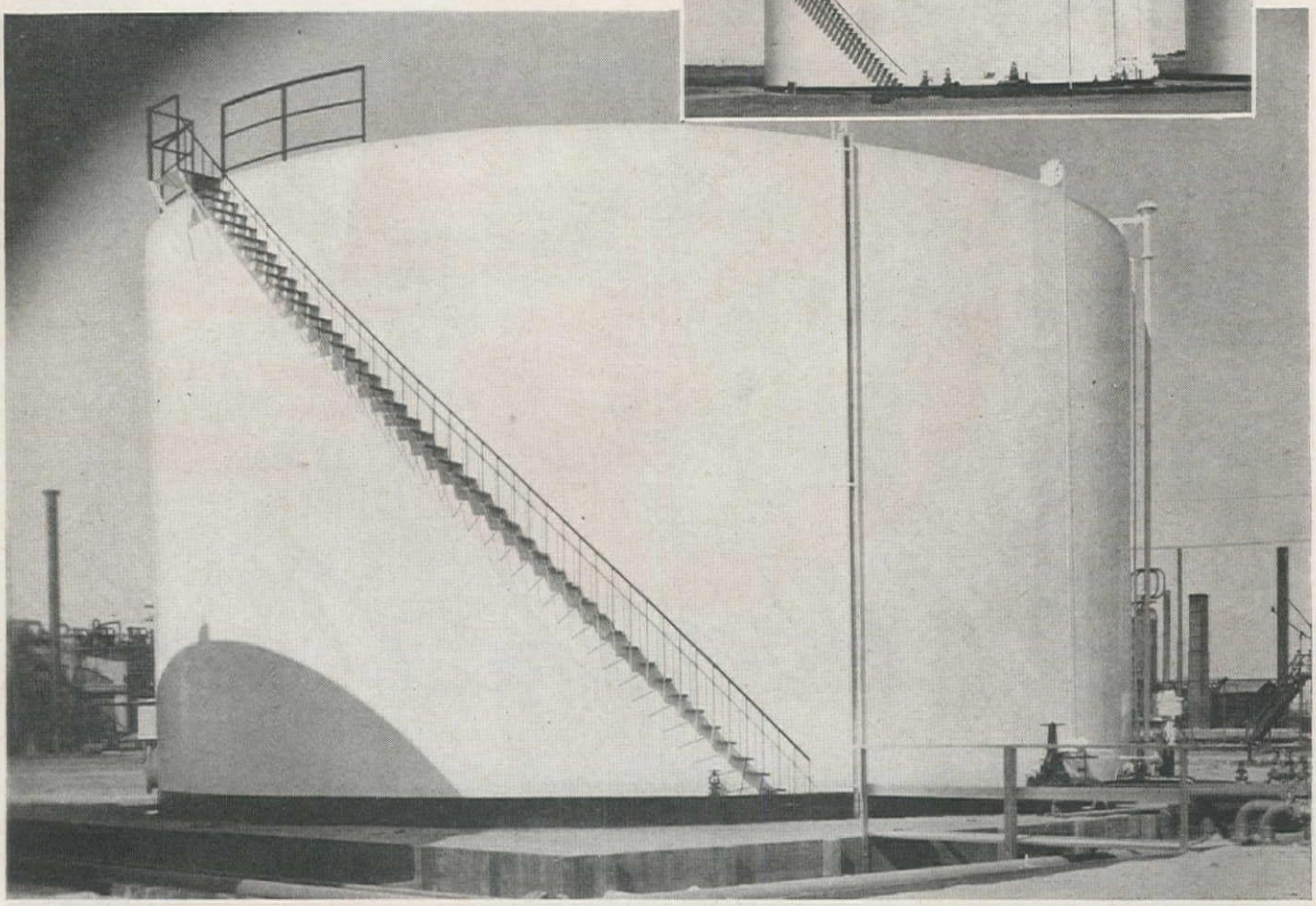
THE COMPRESSOR PEOPLE
WEST CHESTER
PENNSYLVANIA

Air WHERE, WHEN AND AS MUCH AS YOU NEED.

When you need storage tanks

...SPECIFY HORTON WELDED STEEL TANKS





EVIDENCE OF the widespread use of Horton steel tanks is found in many industries throughout the West. The above photos, taken at the Tide Water Associated Oil Company's Avon, California, refinery, show two of the many CB & I-built tanks at this location. The one in the large view is 60 ft. in diam. by 32 ft. high and the other one is 70 ft. in diam. by 40 ft.

Most Horton flat-bottom tanks at refineries are built in accordance with API specifications. We are, however, equipped to build tanks of this type to meet special requirements. Standard sizes range from 500 bbls. to 150,000 bbls. as shown in the table at the right. When tanks are to be used for volatile liquids, they are usually equipped with Horton Double-Deck Floating Roofs or Horton Liquid Seal Lifter Roofs.

When providing storage facilities for oil, water, molasses, alcohol and other industrial products get quotations on Horton steel tanks from nearest office.

STANDARD WELDED STORAGE TANK CAPACITIES

Capacity in Barrels	Tank Dimensions in Feet and Inches		Capacity in Barrels	Tank Dimensions in Feet and Inches	
	Diam.	Height		Diam.	Height
500	15-0	18-0	24,000	60-0	48-0
1,000	20-0	18-0	20,000	67-0	32-0
1,500	25-0	18-0	25,000	67-0	40-0
2,000	25-0	24-0	30,000	67-0	48-0
2,500	25-0	30-0	30,000	73-4	40-0
3,000	30-0	24-0	28,500	80-0	32-0
4,000	30-0	32-0	35,000	80-0	40-0
5,000	30-0	40-0	42,500	80-0	48-0
5,000	35-0	30-0	44,500	100-0	32-0
7,500	36-8	40-0	55,000	100-0	40-0
7,500	40-0	34-0	67,000	100-0	48-0
8,300	40-0	40-0	64,000	120-0	32-0
10,000	42-6	40-0	80,000	120-0	40-0
10,000	45-0	36-0	96,000	120-0	48-0
10,000	48-0	32-0	87,500	140-0	32-0
12,450	45-0	44-0	100,000	134-0	40-0
12,500	48-0	40-0	100,000	150-0	32-0
15,000	48-0	48-0	109,500	140-0	40-0
15,000	52-0	40-0	125,000	150-0	40-0
16,000	60-0	32-0	131,500	140-0	48-0
20,000	60-0	40-0	150,000	150-0	48-0

CHICAGO BRIDGE & IRON COMPANY

San Francisco 11.....1213-22 Battery Street Bldg.
Chicago 4.....McCormick Bldg.
New York 6.....165 Broadway Bldg.
Cleveland 15.....Guildhall Bldg.
Los Angeles 14.....1444 Wm. Fox Bldg.
Philadelphia 3.....1700 Walnut Street Bldg.
Tulsa 3.....Hunt Bldg.
Detroit 26.....LaFayette Bldg.
Birmingham 1.....1598 North Fiftieth St.
Atlanta 3.....2183 Healey Bldg.
Havana.....402 Abreu Bldg.
Houston 1.....Clinton Dr.

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

June, 1947 Vol. 22, No. 6

"Sorry, No Contracts"

EVERYBODY likes to make more money. If we could sell Western Construction News for $10 a copy, we'd probably do it. But we know that very few copies would be sold. We would be "pricing ourselves out of the market."

This is not an unusual situation. Various makers of automobiles have done that very thing in times past, and, numerous manufacturers seem to be doing it right now. It is a short-sighted policy, hoping to grab large immediate returns with no regard for long range business stability. Similarly, John L. Lewis, by winning wage payments of $70 per week for his miners, when the national average of earnings is less than $50 per week, has priced his men right out of work. Railroad, industrial, and private home users of coal are converting to electricity, gas, petroleum, or other energy sources as rapidly as equipment is available. Coal consumption is taking a serious tumble, and with it, of course, coal mining employment.

The University of Chicago "Round Table" a few weeks ago, in discussing business prospects, listed construction as one of the two or three whole industries now "pricing itself out of the market." Unemployment in construction is rising rapidly in various areas of the nation. Florida was the first to feel it. Next New York City, now several middle western cities and areas. It is not very marked in the West yet, because available facilities became so far short of requirements during the war and since. But even here, in the residence and light industrial building fields, construction is falling off.

Now we cannot blame any contractor for making just as large a profit as he can. At the start, we granted that everyone wants to make more money. Nor can we blame any construction craftsman for getting just as much for his hour's work as he can. Yet we feel constrained to warn BOTH PARTIES that it's better to work steadily at a slightly lower income figure than it is to have a high scale, but no returns from that scale. This is not intended solely as a reprimand to the contractor's employees. Frankly, **we do feel** that some of their demands are exorbitant, since they are already among the highest paid workers in the country, but our statement is also made to contractors and contracting firms whose books are showing greater profit margins than ever before.

The country **needs** the services of the builders. But the country can not and will not pay $12,000 for a $3,000 house. The industry can be a light guiding all business and industry back to normal conditions of production and pricing. Or it can be the bell wether of the depression which economists are commencing to fear.

The time of decision on this question is NOW. And it must be answered by everyone connected with construction —AGC, union leaders, contractors, craftsmen, even manufacturers and suppliers of equipment and materials.

An Orchid to Colorado

WE ARE LATE in expressing public appreciation to the Colorado State Highway Department (though we have expressed it personally to Mark Watrous, State Highway Engineer) for the splendid and helpful construction bulletin map which it issues every two weeks to tourists and highway users.

While many other valuable bits of information are also listed in the bulletin, the principal feature is a road map of the state showing each highway improvement project under way at the time, and indicating the traffic and detour conditions that travellers will find. The length of the improvement and type of work are indicated. Another smaller map indicates the full highway program, with costs, and the present status of each individual project.

Also given are small street maps of the principal cities of the state, interpretation of the highway signs found along the roads, state speed limits, data on mountain passes, hunting seasons, and other helpful information.

These maps are distributed through oil stations, chambers of commerce, and other agencies for the use of all motorists in planning trips in the state. New bulletins are issued every two weeks, so that the information is always timely.

We don't know what the cost of these bulletins amounts to, but we believe it is public relations money well spent and want to say this word of praise and appreciation to Mr. Watrous and his department. It is a service that might very well be copied by other states, we believe.

Incidentally, it is worth noting that the Bureau of Reclamation office in charge of the Columbia Basin Irrigation Project has started periodic distribution of a somewhat similar map, to keep the press and public aware of progress on the gigantic irrigaton project. An orchid to them, also!!

"Well Done"

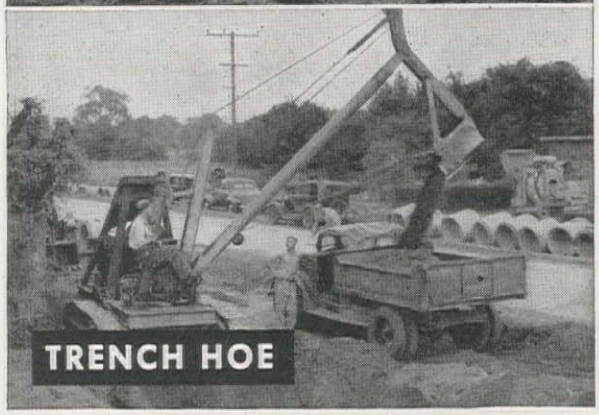
IN THE SUDDEN and utterly unexpected death of Leon H. Nishkian on June 2, the West has lost one of its most outstanding engineers, and the door of one of the greatest storehouses of practical engineering knowledge has been permanently shut.

At the age of but 65, an untimely heart attack without any warning took his life before he had arisen. On the day previous he had indulged in various phases of the full life he enjoyed, including golf and the theater.

As chief engineer of the Golden Gate Bridge Authority, he had proudly participated in the tenth anniversary celebration of that monumental structure just a few days before his death. Nishkian had done most of the engineering on the Reber plan, the finest proposal for overall development of the San Francisco Bay area, and in recent months had designed a land crossing between San Francisco and Oakland which is the best solution yet proposed to meet the crucial traffic problem of the two cities. By coincidence, an article on his proposal is appearing on page 90 of this issue.

He was a graduate of the University of California, and had been in consulting practice since 1918. A few months ago his son Byron L. Nishkian was taken into partnership in the firm. Nishkian is said to have been responsible for design of over 1,000 of California's largest and most impressive buildings and other structures.

The ways of God are truly inscrutable. Earthbound mortals must feel grief and loss at the departure of such a talented and lovable man. Yet we receive comfort from the knowledge of the hearty "Well Done" with which he must have been greeted by the Great Architect of the Universe, and accept the challenge to carry forward the important works he has begun, and now laid down.



• With the Badger, only the bucket, boom, turntable and mast swing. The heavy main deck, engine, transmission and main frame are STATIONARY—to counterbalance heavier loads and avoid objectionable tail-swing.

The Badger makes more swings per minute, day, month and year . . . wastes no fuel or power swinging extra weight . . . digs the hardest "diggable" material . . . can work in closer quarters.

Profits are made by working fast and saving time. Clipping a few seconds off each dig-swing-dump cycle means more yardage at the close of the day.

Before you take delivery of another shovel, ask your nearby A-W Distributor to tell you the whole story of the convertible Badger.

AUSTIN-WESTERN COMPANY, AURORA, ILLINOIS

Also Convertible to
CRANE, PILEDRIVER, ETC.

ARIZONA—SMITH BOOTH USHER COMPANY.....*Phoenix*
CALIFORNIA—EDWARD R. BACON COMPANY.....*San Francisco 10*
CALIFORNIA—SMITH BOOTH USHER COMPANY.....*Los Angeles 54*
COLORADO—LIBERTY TRUCKS & PARTS COMPANY.....*Denver 1*
IDAHO—COLUMBIA EQUIPMENT COMPANY.....*Boise*
MONTANA—WESTERN CONSTRUCTION EQUIPMENT COMPANY.....*Billings*
MONTANA—WESTERN CONSTRUCTION EQUIPMENT COMPANY..*Missoula*
NEVADA—C. D. ROEDER EQUIPMENT COMPANY.....*Reno*
NEW MEXICO—N. C. RIBBLE COMPANY.....*Albuquerque*
OREGON—COLUMBIA EQUIPMENT COMPANY.....*Portland 14*
UTAH—WESTERN MACHINERY COMPANY.....*Salt Lake City 13*
WASHINGTON—COLUMBIA EQUIPMENT COMPANY.....*Seattle*
WYOMING—WILSON EQUIPMENT & SUPPLY COMPANY.....*Cheyenne*

WESTERN CONSTRUCTION NEWS
JUNE • 1947

Power From Pumped Water

Engineer suggests Western installations to conserve flood runoff water and convert it into firm power, outlining principal requirements and engineering features of such programs — One similar plant in East discussed

By A. E. NIEDERHOFF
Inyokern, Calif.

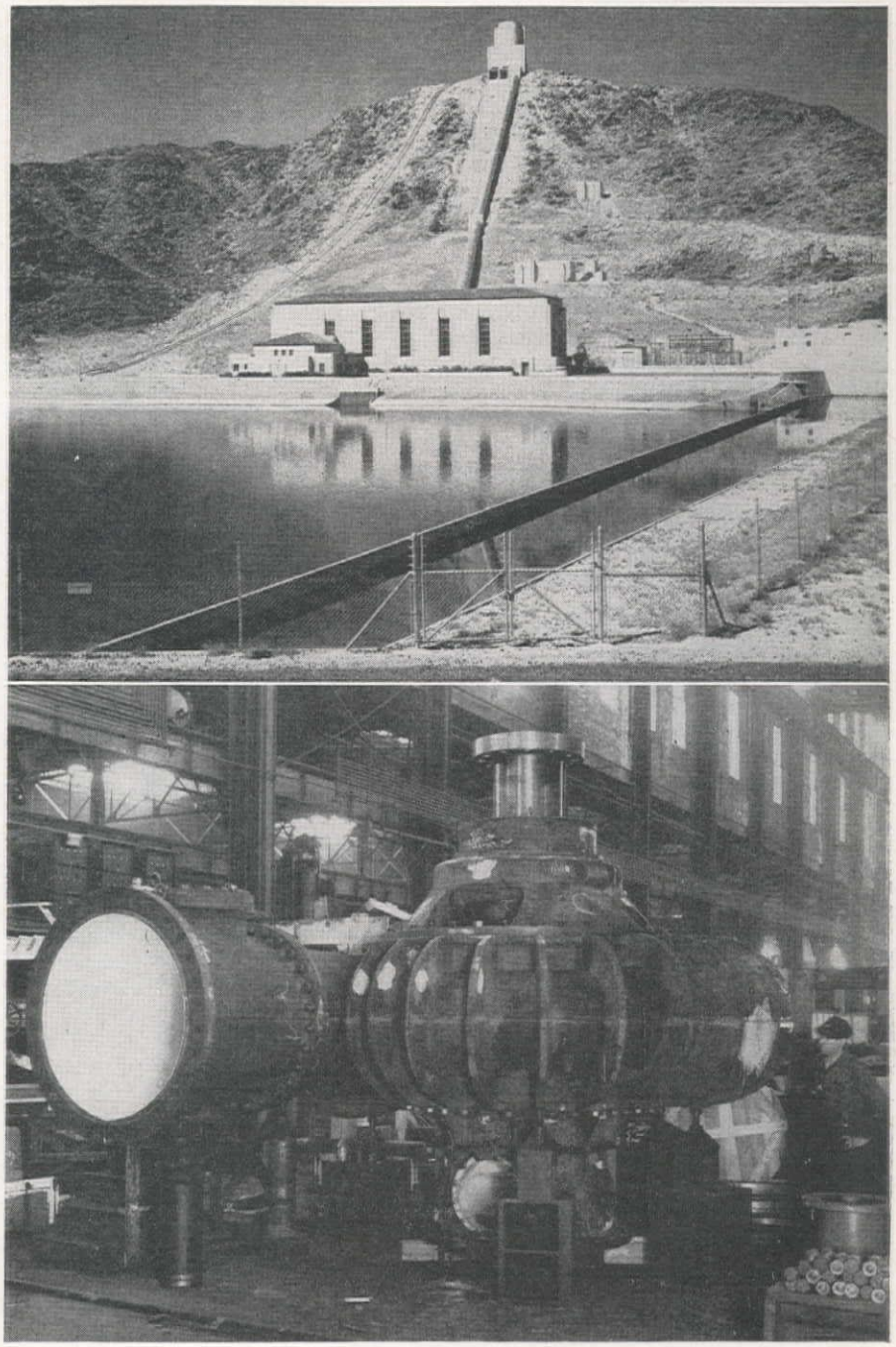
HYDROELECTRIC power generation from pumped storage water has been found feasible and economical under certain conditions both in United States and in foreign countries. One of the existing American installations is located at New Milford, Connecticut, and consists of two 8,100-hp. pumps and one 33,300-hp. turbine.

In the Western states, there are two projects proposed for utilizing secondary power to pump excess water to a high level for later release through turbines to generate primary power. These projects are being designed by the Bureau of Reclamation at Granby Station, Colorado, and at Grand Coulee Dam in Washington. Although the generation of electric energy by virtue of these pump installations is incidental and of minor importance to the primary purpose of the two installations, nevertheless it is the closest approach in this section of the country to obtaining power from pumped water held in storage.

Western projects

It must be remembered that the production of hydroelectric power by utilization of water pumped at the Grand Coulee Plant is a future development, having little bearing on the economics or feasibility of the project features now under construction. The pumps at Grand Coulee are now being manufactured and are of unprecedented size. Water from the Columbia River will be pumped about 300 ft. above the river level to a storage basin for later release for irrigation. A part of this water will be used for generating power at several "drops" in the irrigation canal system.

The Granby Station will pump Colorado River water from Granby Reservoir on the Western slope of the Continental Divide to Shadow Mountain Lake, 186 ft. higher in elevation. From there the water will be diverted through a long tunnel to the eastern slope where it will eventually pass through a series of power plants to generate electricity. While the increased hydraulic head provided by pumping is of minor importance, every gallon of the water thus pumped (except for normal losses) drops approximately 2,800 ft. in flowing down the eastern slope to the foothills. A power plant now in operation at Green Mountain Dam on the western slope will furnish secondary power to operate the 121,000-g.p.m. pumps at Granby Station. Interconnection between existing and proposed power plants will produce about 600,000,000 kwh. of firm power per annum for the integrated system.



Photos courtesy Metropolitan Water District (top) and Allis-Chalmers Mfg. Co.

PUMPING PLANT of Metropolitan Water District of Southern California. This type plant could be used for pumped storage power plant by converting steel pipe to penstock. Below, 54 x 48-in. 90,000 GPM. pump under construction for Metropolitan.

Conserving waste power

Hydraulic engineers of national reputation have recognized the possibilities

of increasing the production of firm power from existing hydroelectric stations located on the Columbia River by means of pumped storage. Water from the annual spring or summer freshet is largely wasted over spillways because generation of secondary power would glut a market that has never been very large or profitable and there is no installation to permit full development of this energy. Bonneville dam and power station may be taken as an example. During May and June of each year a freshet on the Columbia River discharges between 400,000 and 500,000 c.f.s. The ten hydraulic turbines in the Bonneville powerhouse could use about 119,000 c.f.s. of this flow for the generation of 740,000 hp. However, during low water periods only 80,000 c.f.s. is available which limits firm power generation at Bonneville Dam to approximately 440,000 hp. The difference between 740,000 hp. and 440,000 hp. represents dump power worth only ½ to 1 mills per kwh. The 440,000 hp. is firm power and is worth about 8 mills per kwh., depending upon load factor and maximum demand per year.

The problem, then, is to pump surplus floodwater, after it passes the powerhouse, into a natural elevated reservoir, using a part of the 300,000 hp. of secondary energy generated at the dam. Later, as the flow of the Columbia River recedes, this stored water could be released through the same pipeline that was utilized to pump water into the reservoir to supply new hydraulic turbines mounted alongside of the pumps. Power generated by these turbines, when added to the present 440,000 hp. of firm power before mentioned, could increase the possible revenue derived from sale of power by upwards of fifty per cent.

That the above scheme is feasible and has the benefit of precedent can be proved by examination of foreign projects or a similar arrangement near New Milford, Conn.

Existing plant

The Rocky River development of the Connecticut Light and Power Co. near New Milford, has been in operation since 1928. It utilizes two electrically operated 8,100-hp. Worthington centrifugal pumps to lift water from the Housatonic River some 230 ft. to an elevated storage basin on the tributary Rocky River. Excess hydraulic energy and secondary steam-generated electrical energy is used for pumping purposes. The water flows up to the elevated basin through a steel penstock and when required to firm up power from other river plants it flows back through the same penstock into a 33,300-hp. vertical shaft turbine, located alongside the pumps in the same pumphouse. Before the elevated basin and pumped storage was used the plants on the Housatonic River generated only 10,000 kw. of firm power from an installed capacity of 26,000 kw. The pumped storage and regulation above described made possible 16,000 kw. of firm power which formerly could not be obtained.

The centrifugal pumps are mounted on a vertical shaft, have a discharge diameter of 54 in. and a capacity of 250 c.f.s. against a total head of 240 ft. The shafts are of one piece forged steel with a Kingsbury and combined upper guide and thrust bearing mounted on the upper spider designed to support the total weight and thrust. Lubrication of all bearings on each unit is automatic from a motor driven gear pump, with a similar pump as a spare for each unit.

In the discharge line of each pump is a hydraulic-cylinder-operated pivot valve to shut off the line to the pumps when water is flowing to the turbine. The intake to each pumping unit can be shut off by a self-closing gate, and each intake is equipped with vertical trash racks and provision for stop logs.

The *Worthington Industrial Bulletin* of August, 1928, from which the above description was taken, relates that the pumping system is arranged so that whenever anything is out of order or fails to function properly the operation is immediately stopped automatically. Experience has proven that operation is smooth and water is delivered by the pumps to the elevated basin in a quiet, unnoticeable flow at the end of the penstock.

Design of pumped storage project

Many improvements have been made in centrifugal pumps since 1928 with an increase of pump capacity, increase in total head for operating pumps, and increase in efficiency. New materials, better design, closer tolerances on workmanship, and improved production methods now result in centrifugal pumps that are more economic than they were when the Connecticut plant was installed.

In planning a pumped storage project for generating electrical energy the engineer does well to review some of the large pump installations now in operation or soon to be constructed. A few guiding dimensions, capacities, and maximum head figures will aid the engineer in his decision of whether or not his project is feasible. The table below lists pertinent data on several large capacity, high head pumps. Cost figures for the pumps and motors are actual costs at the time of purchase and as such are based upon both prewar and current costs without any attempt at making them comparable by application of a cost index figure. This discrepancy is ironed out for purposes of approximate estimates in Item 8 below.

Economic conditions, of course, must warrant a plant to be used for generating power from pumped storage. If a market exists for firm power up to 75 per cent of the installed capacity of a river hydroelectric station, and if secondary energy is relatively worthless but available during certain seasons of the year because of high river discharges, the conditions are ripe to consider a pumped water storage project. Terrain must be suitable and flowage costs negligible at the site for the proposed elevated basin. Such conditions are believed to exist along the Columbia River. It is only necessary to awaken engineers to the fact that recoverable energy is being wasted in floods passing over the spillways of dams to obtain benefits from a pumped water storage project.

	Metropolitan Water Dist. So. California Intake	Metropolitan Water Dist. So. California Gene	Metropolitan Water Dist. So. California Iron Mountain	Metropolitan Water Dist. So. California Eagle Mountain	Metropolitan Water Dist. So. California Hayfield	Connecticut Rocky River	Bureau of Reclamation Granby, Colo.	Bureau of Rec. Grand Coulee, Wash.	City of Detroit	Bureau of Rec. Glendive, Mont.	Office of Ind. Affairs, Flat Head, Mont.
1. Manufacturer of Pump	Byron Jackson	Byron Jackson	Allis-Chalmers	Worthington	Worthington	Worthington	Newport News	Byron Jackson and Pelton Water Wheel	Allis-Chalmers	Worthington	Worthington
2. No. of Stages of Pump	1	1	1	1	1	1	1	1	1	1	1
3. Single or Double Suction	Single	Single	Single	Single	Single	Single	Single	Single	Single		
4. Rated Capacity in G.P.M.	90,000	90,000	90,000	90,000	90,000	112,500	121,000	605,000	118,000	49,500	30,000
5. Rated Head in Feet	294	310	146	440	444	240	150	310	31	103	335
6. Maximum Operating Head				452	476		186	365			
7. Rated Speed in R.P.M.	400	400	300	450	450		327	200	112.5	400	900
8. Peripheral Speed, Ft. Per Second	132.5	125.5	97.6	161	161		111	146.5	52.5	90	143
9. Specific Speed (G.P.M. Units)	1,690	1,624	2,140	1,403	1,395		2,653	2,100	2,930	2,780	2,000
10. Horizontal or Vertical Mounting	Vert.	Vert.	Vert.	Vert.	Vert.	Vert.	Vert.	Vert.	Vert.	Vert.	Vert.
11. Diam. of Shaft from Motor to Pump (In.)	22	22	20	24	24		15	27		6½	11
12. Diam. of Pump Impeller (In.)	76	72	74½	81⅛	81⅛		77½	168	107	51½	36½
13. H.P. of Motor	9,000	9,000	4,300	12,500	12,500	8,100	6,000	65,000	1,750	1,500	3,000
14. Pump Efficiency in %	90.9	90.9	91.3	89.6	89.9		88.5	87	87	89	88.4
15. Wire to Water Efficiency %								83.5			
16. Spacing of Pumps, C. to C. (Ft.)	25	25	25	25	27		22	45			
17. Closest C-C Spacing Possible (Ft.)							19	45	20		
18. Inside Diam. Pump Discharge (In.)	42	42	42	40½	40½	54	57½	144	72	36	24
19. Cost Pump F.O.B. Factory	$37,579.00	$37,579.00	$32,767.00	$44,667.00	$50,333.00			$175,000.00 Delivered			
20. Cost Motor F.O.B. Factory	$115,625.00	$115,625.00	$96,133.00	$124,094.00	$124,094.00						
21. Suction Lift in Feet	None	None	None	None	None		None	None		1 to 2	None

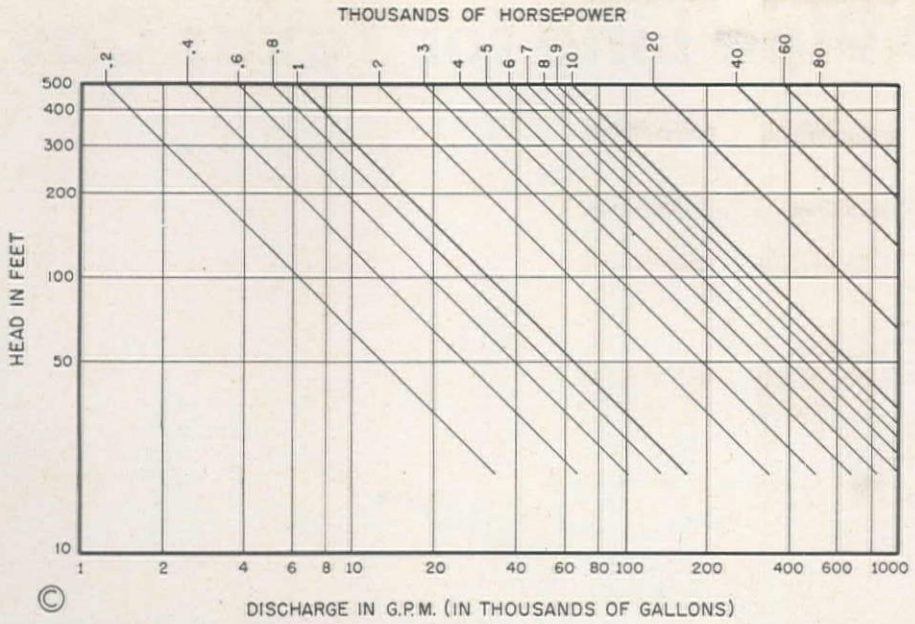


CHART SHOWING horsepower required to pump water, based on head, capacity, and 80 per cent overall efficiency, according to formula at head of column to the right.

Essential facts

In the preliminary design of a project involving pumped storage water the planner must have a basis for his preliminary layout and a knowledge of the limitations and costs for pumping. Speaking only of single stage centrifugal pumps of large capacity working against high heads, the following ten facts should be kept in mind:

1. Specific speed is important since it describes the type of impeller and the operating conditions under which the pump can work efficiently. It is defined as the rpm. against one foot head. The lower the specific speed, the higher the head that can be developed. Low specific speeds range from 500 to 1,000; medium specific speeds range from 1,500 to 4,000; and higher specific speeds range up to 20,000. The specific speed of a pump is obtained from the formula:

$$n_s = \frac{n\,(\text{g.p.m.})^{1/2}}{H^{3/4}} \quad -\ (1)$$

where n equals revolutions per minute, g.p.m. equals gallons per minute at greatest efficiency, and H is feet of head at maximum efficiency. The specific speed of Grand Coulee pumps is 2,100 r.p.m. and indicates an impeller diameter of 168 in., an operating head of 310 ft., capacity of 605,000 g.p.m. at 87 per cent efficiency. High specific speeds indicate pumps with small diameter impellers and large entrances to waterways, capable of practically no suction lift because of cavitation dangers.

2. Actual speeds of pumps vary from 100 to 900 r.p.m. Speeds are intimately related to the materials and dimensions of pump shafts and rotors. Assuming that the rotor is in both static and dynamic balance, then the critical speed of the pump shaft (speed at which excessive vibration occurs producing deflections greater than internal clearances at bearings) is the r.p.m. corresponding to the natural period of vibration of the material of which the shaft is made. For high speed pumps the planning engineer does well to assume that special materials must be used and that the pump will be a custom-built job costing much more per horsepower than stock models. For a given pump, the capacity, head, and water horsepower varies directly, as the square, and as the cube of the speed, respectively.

3. Peripheral speeds of pump impellers vary from 50 to 160 ft. per sec. For bronze impeller the centrifugal stresses produced by high peripheral speeds may stretch the impeller hub, causing looseness, and water cutting of the shaft. An interesting relationship exists between the impeller's diameter, the operating speed, and the head that a pump can develop. Roughly, this relationship is expressed by the formula:

$$H = \frac{(D \cdot n)^2}{(1900)} \quad -\ (2)$$

where H is feet of head, D is diameter of impeller in inches, and n is operating speed in r.p.m.

4. The total design head for single stage pumps of large capacity is about 480 ft. Because of the loss of efficiency and other complications it is important to mount pumps so that no suction lift occurs. However, it is not impracticable or uncommon to have suction lifts as much as 15 ft. The other items that go to make up the total design head are: entrance and exit losses, pipe friction losses, and the difference in elevation between the intake pool surface and the water surface in the discharge pool, assuming both ends of the penstock to be submerged.

5. Guaranteed pump efficiencies of 89 per cent are not unusual. Higher efficiencies for pumps, up to 92 per cent, have been demonstrated under test conditions. The wire to water efficiency, or overall efficiency, should not be assumed higher than 84 per cent. The load factor is an important consideration in the selection of a pump. For intermittent service, efficiency can well be sacrificed to obtain a low first cost.

6. Horsepower required for pumping water is given by the formula:

$$\text{H.P.} = \frac{(\text{g.p.m.})\,H}{3960 \times E} \quad -\ (3)$$

where g.p.m. is gallons per minute, H is total head in feet, and E is overall efficiency. The largest motors known are those to be installed at Grand Coulee where 65,000 hp. electric motors will be used. The accompanying chart shows the horsepower required to pump various quantities of water based on a wire to water efficiency of 80 per cent.

7. The diameter of the connecting shaft between motor and pump depends upon the torque exerted, material in the shaft, and the spacing of guide and thrust bearings. Grand Coulee pumps utilize the largest shaft, being 27 in. in diameter.

8. The cost of machinery for pumping water is roughly about $25.00 per installed horsepower. There is some variation depending upon location, national economic conditions and other factors but for a first guess the above figure seems to answer. About 55 per cent of the cost is the electric motor cost, 18 per cent is the pump cost, and the remaining 27 per cent is the cost of controls and installation.

9. Spacing center-to-center of vertical shaft centrifugal pumps depends upon horsepower and speed. From the data contained in the table it appears that for pumps requiring 6,000 to 12,000 hp. the spacing is about three feet per 1,000 hp. In the case of Grand Coulee pumps operated by 65,000-hp. motors, the center-to-center distance is reduced to 0.7 ft. per 1,000 hp.

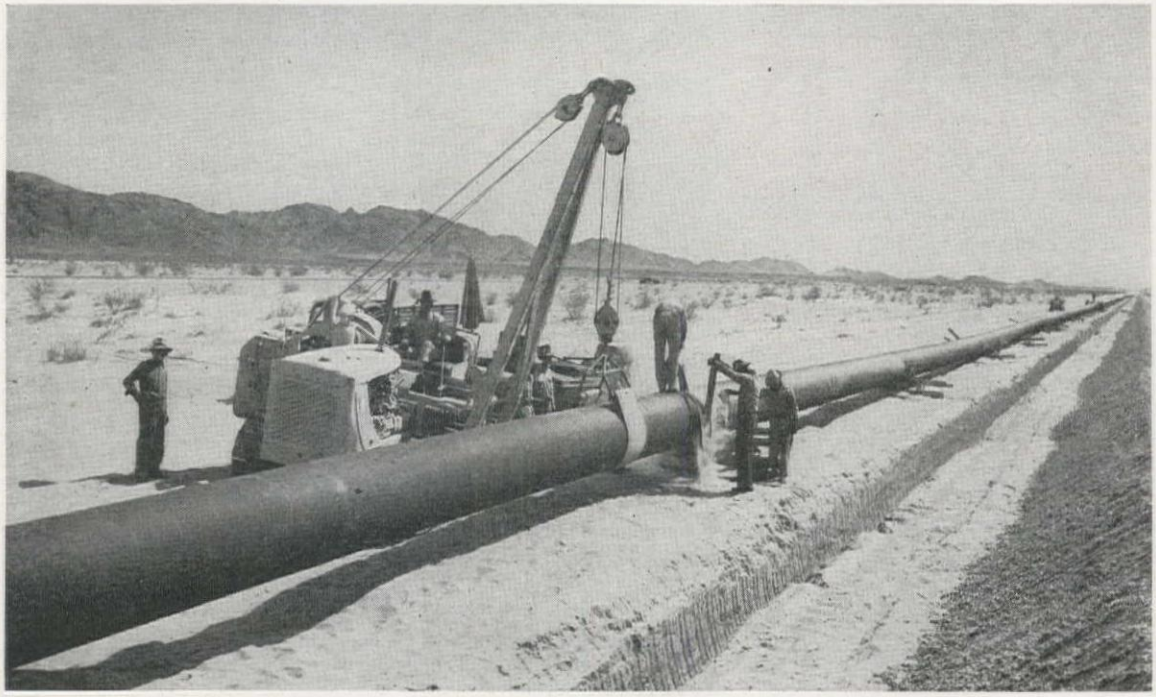
10. The cost of steel pipe used as a discharge line for pumps, and later used as a penstock for turbines can be roughly assumed as $.40 per inch of diameter per linear foot of pipe for heads up to 500 ft. This estimating figure would be for a steel pipe installed, including excavation, backfill, or anchors as required.

The above conditions should be helpful as a starting point from which studies can progress with a view of determining the economic feasibility of producing firm power from pumped storage water at river damsites.

Acknowledgments

Data has been collected from various sources for the preparation of this paper. Pump manufacturers such as Worthington, Allis-Chalmers, and Byron-Jackson gave data, photographs and line drawings of large pump installations. The Bureau of Reclamation, Corps of Engineers, and Metropolitan Water District of Southern California contributed information that was helpful. Special thanks for review of the above article is given to: Stephen H. Poe, Engineering Information Officer of the Bureau of Reclamation; L. E. Rydell and Ben Torpen, Head Engineer for U. S. Army Engineers at Portland, Oregon; Julian Hinds, Chief Engineer for the Metropolitan Water District of Southern California; and H. J. Meeker, Assistant to Vice-President for Worthington Pump Co. To all of the above the author acknowledges deep gratitude.

$70,000,000 Pipe Line for Texas Gas



JOINT INSULATION CREW wrapping tar paper to be fastened with hot tar around welded joint. Side boom tractor hauls tar kettle and lifts the pipe when joint is too near wood shoring. West Coast is using 30-in. pipe for first time in large quantity.

Twelve hundred mile steel pipe line under construction across the desert to bring wasting Texas natural gas to fuel-needy southern California — Thirty inch welded line is advancing across the California desert at the rate of 1½ mi. per day, with a fifty mile section already completed

CONSTRUCTION progress on the 1,200-mi. gas pipeline to connect the Texas midcontinent oil fields with the Pacific coast is well under way, with over 50 mi. of the 214-mi. Blythe-Santa Fe Springs section of the Southern California Gas Co.-Southern Counties Gas Co. already completed by the H. C. Price Co. of Bartlesville, Okla., contractors. Deliveries of gas through the new line are scheduled to begin in November. El Paso Natural Gas Co. of El Paso, Tex., is the third company in the union, organized to construct and operate facilities designed to meet a developing shortage in the Southern California natural gas supply for 3½ million persons.

The heaviest construction equipment is being utilized on the installation of the big pipe, which is 30 in. in diameter and being used in 59-ft. sections, each one weighing 7,000 lb. When visited a few weeks ago, virtually all of the pipe had been fabricated and most of it strung out across the California desert. Over 60 mi. of pipe had been trenched at that time, with 55 mi. welded, and 50 mi. lowered into the trench. The contract for installation of the pipeline was awarded to the H. C. Price Co. near the first of the year, and work started in February.

No unusual methods of pipe-line installation are being used on the $70,000,000 job, except for the fact that heavy equipment is necessitated by the size of the pipe. Light grading is first done along the right of way to make the area passable for trucks and tractors hauling pipe. Bulldozers are used for the grading, and tractors with long side booms are being used for unloading the trucks on which the pipe is hauled from the Consolidated Steel Co. plant in Maywood, Calif., to the construction site. Consolidated expects to have finished enough of the 30-in. pipe for the section it is supplying for El Paso Gas Co. by October, in addition to completing the supply for the California gas companies in June. Trucking across the desert is all done at night.

Construction techniques

Large quantities of dirt must be moved in order to grade the rough country traversed by the line sufficiently to provide right of way for a trenching machine and other construction equipment. In general, this is performed by bulldozers.

A trench 42 in. wide and 8 ft. deep may be dug by the trenching equipment being used on the project, although a 5-ft. trench is generally being used. In cultivated sections, however, the line is being laid at depths up to 10 ft. to protect it against possible washouts.

The shielded arc welding process is being used in field welding to insure perfect welds and develop the full strength of the pipe. Ten per cent of the welds, or about one weld per welder per day are being X-rayed, to check on the workmanship, the first time this method has ever been used on a gas transmission line. Instead of the wrinkle process usually used for making pipeline angles in the field, welded ell sections are being used.

When finished, this section of 30-in. pipeline will furnish 52,000 mcf. per day of linepack storage in addition to the rated delivery capacity of 305,000 mcf. daily. Total cost of the California segment of the line will be approximately $16,225,000. It will provide Southern Californians with a large supply of natural gas, which serves for more than 95 per cent of the water heating, cooking, and space heating in that area.

The 30-in. pipe used, which constitutes the first major application of large-diameter, high-strength pipe on the West Coast, is being manufactured by Consolidated Steel Corporation of Los Angeles, and is being worked cold by pulling it in the die. This increases its transverse strength and also releases locked-up pressures.

Progress in California

Construction on the Blythe-Santa Fe Springs section is progressing at the rate of from 1¼ to 1½ mi. per day, and is being supervised by W. B. Williams. Lining and tacking is done with the aid of tractors with side booms, which line and hold the pipe sections in place while they are tack welded.

The welding crew uses 12 Lincoln welders. When a weld is completed, a tractor moves the outfit to the next section to be welded. Twenty-four portable welders are in use on the whole job.

The joint insulation crew wraps tarpaper around the weld joint and fastens it with hot tar. A tractor with side boom hauls the tar pot and lifts the pipe when the joint is too near the wood shoring. When an electric inspector finds any weak spots in the insulation, the crew applies hot tar patches where indicated.

Finished pipe is lowered into the ditch by tractors with side booms. The ditch is then filled by a tractor with a drag line attached to a side boom. This unit fills the ditch at the rate of 3,000 ft. per hour.

Five crews at work

Five crews are at work at this time on various sections of the mammoth California-Texas natural gas pipeline. Numbering over 1,000 men, they are at work on locations between Tucson, Ariz., and the California desert below Indio. Intense heat is the biggest detriment to the job, with temperatures as high as 120 deg. at midday to be expected in the near future in some sections. Bare hands cannot be rested on the pipe in such heat, and each joint must be shaded while being welded to equalize stresses as much as possible.

In addition to the two California Gas company crews working west of Blythe, two more crews of El Paso Gas Co. men are working on sections east of the Colorado river, with one an El Paso contract crew.

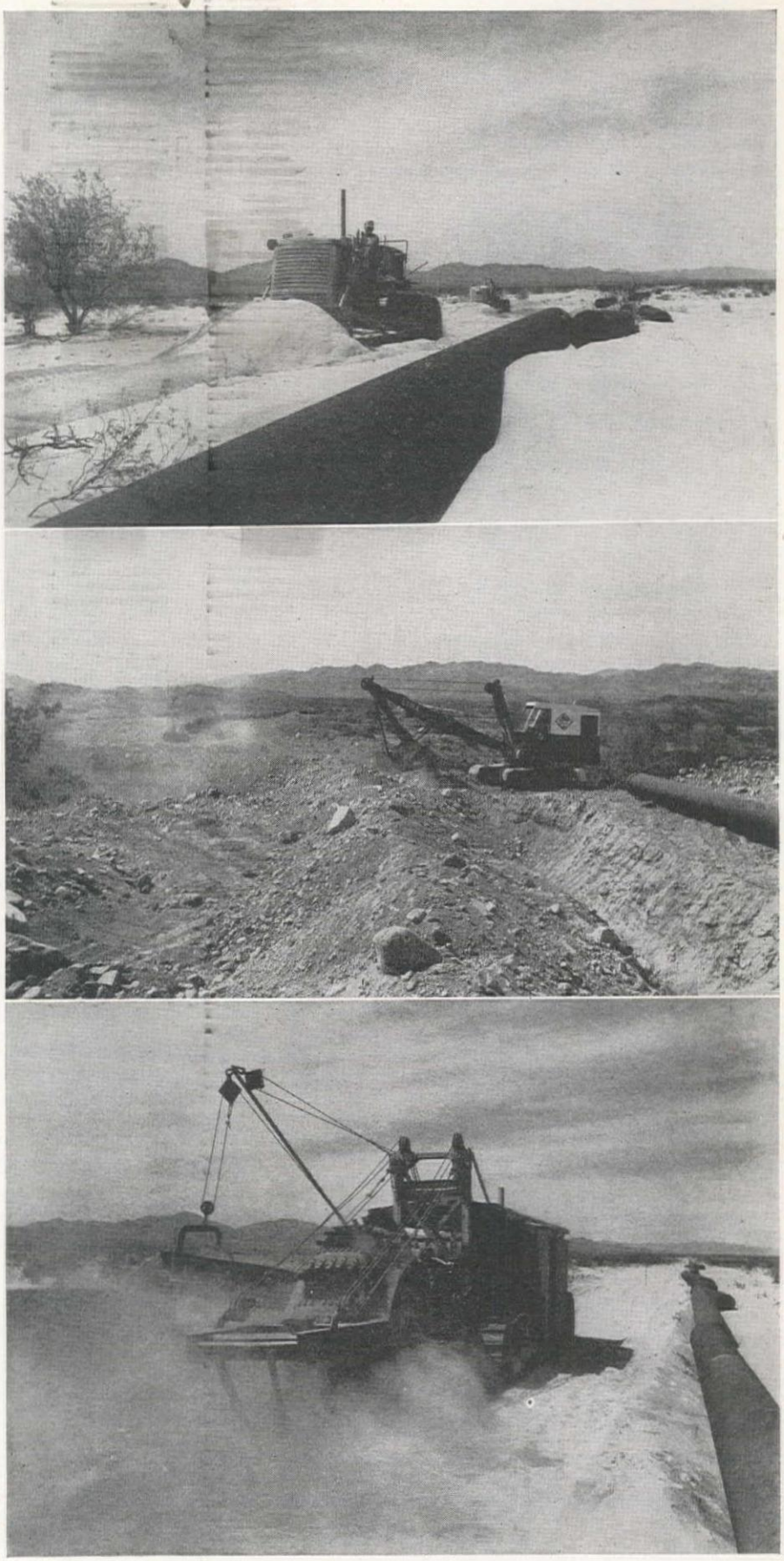
Final step in financing the project is Southern California Gas Co.'s $12 million bond issue. Southern Counties Gas has already sold $6 million worth of bonds. The bond issues had no trouble in selling, as the natural gas is felt to be urgently needed in the Southern California area.

El Paso is constructing 737 mi. of 26-in. pipeline extending from Eunice, Lea County, N. Mex., to the California-Arizona state line near Blythe. Another 251-mi. extension of 24-in. transmission line from Dumas, Tex., to the Eunice plant in New Mexico is being built, as well as compressor stations with an aggregate in the final state of 129,800 hp. Five connecting lateral lines in the Permian basin in New Mexico and Texas, three gas purification and dehydration plants and one gas dehydration plant, and appurtenant facilities comprise the $53,800,000 total El Paso pipeline system.

Important supplemental supply

Up to this time the gas supply in Southern California has been based mostly on recovery of residue gas generated in the operation of the oil fields. The necessity for drawing crude petroleum more swiftly from the ground in war time resulted in the removal of more gas than would otherwise have been necessary. Without the new pipeline, the supply of natural gas was estimated to fall short in 1950 by some 150 million cu. ft. of total daily requirements.

Pressures in the pipeline will range from 35,000 lb. per sq. in. in the desert and sparsely settled sections to 25,000 lb. in populated areas. Protection against unusual pressures is offered in the section between Blythe and Los Angeles by three pressure-limiting areas which can reduce wall thickness of the pipe from



ROUGH COUNTRY to be traversed must first be graded sufficiently to provide right of way for trenching machines. This dirt moving task is performed in general by the bulldozers, top. The hoe is used to dig the ditch in rock sections, center. A 6-ft. deep and 40-in. wide ditch is being dug in bottom picture. Each ditch digger can operate at a speed of 18 ft. per minute. The depth of the trench varies from 5 ft. to 10 ft. depending upon the condition and location of the land being traversed.

AFTER THE FINISHED pipe has been lowered into the ditch a tractor with drag line attached to the side boom fills the ditch at the speed of 3,000 ft. per hour. Approximately 1¼ to 1½ miles per day of construction is being completed on the job.

11/32-in. to 9/32-in. If the pressure is too high, the valves will close, and the line will be protected from bursting. The valve will automatically close in case of a break in the line, and seal off any escaping fuel.

The Permian basin and the Hugeton and Panhandle fields of southwest Texas and New Mexico, where the $70,000,000 pipeline starts, contains more than 40 trillion cu. ft. of gas, geologists have estimated. Before instigation of the giant pipeline, there was no recovery of natural gas brought to the surface from the 4,000,000 ac. of underground reservoirs. Wasted gas, estimated at 383 million cu. ft. per day, would be enough to load the new pipeline for years.

Southern California, with the highest saturation of gas appliances in the U. S., will be supplied with more than enough gas upon completion of the line. The 305 million cu. ft. capacity will be equivalent to 75 per cent of the supply received from local sources of gas now.

All possible attention is being given to preventing breakage on the new line which might later cause a serious outage of service to Southern California users. Three main types of crossings are being made in river and flood areas—cable suspensions, caissons sunk to bedrock, and submerged crossings. The latter type is thought to be most satisfactory and is being used in many places, although river suspension crossings are also used.

Road Link Being Built From Pacific Northwest to Alaska

INVOLVING EXPENDITURE of six million dollars the British Columbia government is building the new Pine Pass Highway, to be known as the Hart Highway, to connect the present provincial highway system with the Alaska Highway. The new highway will provide direct connection between Vancouver and the Peace River country, as well as with Alaska. The project also involves the construction of three major bridges. Of these the Pine River bridge is the largest. It spans the Pine River at East Pine, and will be 700 ft. in length from abutment to abutment, with a concrete deck 18 ft. wide from curb to curb. The center span will be 280 ft. in length flanked on each side by a 160-ft. span with a 50-ft. span at each approach. The design is of the Pratt Truss type throughout.

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

The sub-structure of the bridge is being undertaken by the Northern Construction Co. and J. W. Stewart Ltd., while the super-structure is to be built by Dominion Bridge Co.

The cold weather of the north country, where the temperature goes down to 40 below zero, makes the actual work hazardous, costly and difficult. Aggregate materials, for instance, have to be kept heated and the concrete held at a temperature of not less than 50 deg.

Other bridges on the new Pine Pass Highway are over the West Pine River and a 578-ft. span across the Parsnip River.

Contractors' representatives at the site are Brig. N. Lambert, J. D. A. Keay and Al. Foley; resident engineer for the Department of Public Works is J. U. Copeman.

The new highway will cut 1,000 mi. from the present road route between Seattle and Alaska and offer an alternative route in event of disruption of steamship services between United States Pacific Northwest ports and the northern territory. It is also contended that owing to existing steamship rates it may be possible for ships in Seattle to forward goods to interior Alaskan points by rail and truck at a cost not exceeding, and possibly lower than the present freight charges by coastal steamer.

The present highway route via Helena, Mont., and Edmonton is 1,865 mi. from Seattle to Dawson Creek. The combined rail and truck route from Seattle to Dawson Creek via Vancouver, Quesnel, Prince George and the new highway is 853 mi., a saving of over 1,000 mi.

Main contracts on the new Hart Highway construction are being carried out by the Campbell Construction Co., Vancouver; and the Fred Mannix & Co., Ltd., Vancouver and Calgary.

The Campbell firm is building section "A"—94 mi. from Summit Lake to Azouzetta Lake—for $1.8 million; and the Mannix company is building section "B"—57 mi. from Azouzetta Lake to Commotion Creek—for $1,309,000.

Jointly, these two firms also have the contract for the southern and northern approaches. The southern approach—Prince George to Summit Lake, 28 mi.—is costing $524,000; the northern approach, from East Pine to Progress, will cost about $330,00 when it is gravel surfaced.

Construction involves heavy rock work through the Pine Pass. All grades are under eight per cent and the curvatures are comparatively easy. The roadbed will be 30 ft. wide, with crushed gravel surface and an overall right-of-way of 88 ft.

When the Hart Highway is completed more than five million yd. of excavation will have been carried out, including 450,000 cu. yd. of rock cut. Six miles of culverts will have been laid.

Columbia Basin Project Office Bids All Rejected

ALL BIDS for construction of an office building to house the irrigation division of the Bureau of Reclamation's Grand Coulee project at Ephrata, Wash., have been rejected as being about 50 per cent above the engineers' estimate. Low bid of two submitted for the building was that of Lease & Leighland, Seattle, whose figure was $759,301. The engineers' estimate was about $500,000. Offices of the irrigation division in Ephrata are now located in a war-built emergency housing project. It is expected that bids for the office building will be called again at a later date.

Revisions Small in Water Forecast

Final snow surveys show few changes from May — Serious shortages still apparent in West, particularly the southwestern water supply, with progressive improvement from south to north

FINAL SNOW surveys for 1947, made throughout the West as of May 1, showed insignificant changes in the water-supply forecast reported in these pages last month. As announced by the Division of Irrigation and Water Conservation, U. S. Soil Conservation Service, the state-by-state prospects still indicate serious shortages in the Southwest but a progressive improvement from south to north. The revised state-by-state forecast follows:

Arizona

No change from the April forecast. An acute water shortage exists throughout the major irrigated areas.

California

Owing to a state-wide deficiency of April precipitation, the streamflow forecast has been reduced from 54 per cent of normal to 49 per cent. However, while some local irrigation shortages may occur, it is still expected that, with careful use, most areas in the Central Valley will have enough water for normal irrigation needs, while such shortages as may curtail hydro-electric power development can be made up by steam generation. Sierra reservoirs are fairly well filled.

Colorado

South Platte River prospects now about 10 per cent better, with reservoir storage above last year. Clear Creek and South Platte above Denver will have a summer runoff about 50 per cent above normal. Rio Grande and Arkansas River conditions are unchanged, except that April precipitation has improved the soil moisture conditions in San Luis Valley. Colorado River tributaries: Yampa, White and Colorado itself will discharge about 10 per cent more water than was indicated April 1; Animas and San Miguel about 10 to 15 per cent less; Roaring Fork, Gunnison, San Juan and Dolores unchanged.

Idaho

April forecasts unchanged. Normal or better than normal runoff will occur in all drainage basins except those in the southwestern portion.

Montana

Better than normal runoff is still expected on both sides of the Continental Divide. Reservoir filling has shown some variation and water in storage is slightly below that of last year, but soil-moisture conditions are highly satisfactory.

Nevada

Previous forecast of short runoff is unchanged, and the chief encouraging factor is still the fairly satisfactory condition of reservoir storage.

New Mexico

No snow measurements were made May 1, but Rio Grande flow at Otowi Bridge is now expected to be only 65 per cent of normal, while Taos River flow will not exceed normal. Elsewhere no change is reported, and supplies generally will be subnormal.

Oregon

Immaterial changes are made in the April forecasts, which showed 72 per cent of irrigated lands had prospects of good to fair supplies. These areas are chiefly served from stored water. Most lands dependent upon unregulated stream flow will have deficient to only fair supplies.

Utah

No material change in the April forecast, which reported prospects of satisfactory irrigation supplies for most areas, with the possible exception of the Price River basin.

Washington

Normal or better than normal supplies are still generally in prospect for both irrigation and power.

Wyoming

Discharges will be above average, and generally a little better than previously forecast, except for the Powell area on Shoshone River. Buffalo Bill reservoir storage is about one-fourth less than last year, and other storages are down slightly. Soil moisture conditions are favorable.

British Columbia

The outlook is unchanged, with above-normal runoff indicated for Columbia and Kootenai rivers and average runoff to Okanogan Lake.

Twin Falls Airport Named as First Construction in Seven-Year Program

THE FIRST project approval under the Federal Airport Act has been signed by T. P. Wright, Administrator of Civil Aeronautics, opening the construction phase of the seven-year airport building program.

The approval will permit Twin Falls, Idaho, to start work immediately on a new Class III airport, badly needed so that the rich irrigated area of Southern Idaho can be served by the United Airlines transcontinental route, by Empire Air Lines feeder service, and by non-scheduled cargo and passenger operators.

The Federal Airport Act of 1946 authorizes Federal expenditure of $500,000,000 for construction of new airports and modernization of existing fields. This sum, under the act, is to be matched by a nearly-equal amount provided by the municipalities sponsoring the airports. Western projects authorized for construction during the first year were tabulated in *Western Construction News* for Feb., 1947.

The Twin Falls project, first to reach the construction stage, will cost $647,221, of which the federal share is $384,000. The sponsor's share of $263,221 was raised by a local bond issue and airport tax levy. The money will be used for land acquisition, drainage, seeding, paving of taxi-ways, aprons, parking areas, and access roads, and for construction of paved runways 4,900 and 3,200 ft. long. Ultimate plans call for extending the runways to 6,500 and 4,900 ft., lighting the field, and erecting an administration building.

With the signing of the necessary papers, Twin Falls can proceed immediately to award contracts on bids already open, and start construction work.

Twin Falls got an early start in the airport program, but most sponsors waited for publication of the 1947 Airport Plan before beginning the necessary work of making surveys, preparing engineering drawings, and raising funds. As a result, less than three per cent of the projects are now in CAA hands for final approval.

Booklet of Truck Regulations In U. S. Again Issued by FWD

TRUCK AND TRAILER size and weight restrictions throughout the United States for 1947 have been compiled in booklet form by the research department of the Four Wheel Drive Auto Co. The eighteenth edition to be published by the company, it is the first to appear since the war, when publication was suspended because blanket regulations were enacted by the federal government in order to facilitate movement of war materials, superseding state regulations in most cases.

Since each state has its own method of regulating size and weight of trucks, it is necessary for truck and trailer manufacturers and operators to use caution in the sale and operation of their equipment. The new pamphlet offers an accurate and comprehensive knowledge of such laws, as well as the various state road laws subject to conditions of the courts and other rulings.

Largest Steel Frame

General Motors plant at Van Nuys, Calif. expected to produce 400 passenger cars and trucks a day when completed—Largest factory building of all-steel construction in Southern California under one roof is divided into four units and provides a second floor area in excess of 300,000 sq. ft.

By R. W. BINDER
Chief Engineer,
Bethlehem Pacific Coast Steel Corporation,
Los Angeles, Calif.

THE GENERAL MOTORS Chevrolet Division assembly plant at Van Nuys, California, is rapidly reaching completion; when finished it will be the largest factory building under one roof in Southern California. It is expected that production from this plant will be at the rate of 400 passenger cars and trucks a day.

The plan area of the building is 610 ft. by 810 ft., and it is divided into four units by double rows of columns, 1 ft., 6 in. on center, at the expansion joints. The two units on the south side, known as the "Chevrolet Section," are 360 ft. by 350 ft., and 360 ft. by 450 ft.; the two units on the north side, known as the "Fisher Body Section," are 250 ft. by 350 ft., and 250 ft. by 450 ft. Figure 1 shows the arrangement of the expansion joints dividing the building into 4 units.

Large second floor

An unusual feature for a large factory building in this area is a second floor which covers a plan area in excess of 300,000 sq. ft., and it will be noted that certain areas of the second floor are designed for future extension. It is contemplated that the Chevrolet Section will ultimately have complete second floor coverage; such addition will give a second floor in excess of 350,000 sq. ft. or 8 plus acres of supported floor area.

The floor is a 6-in. reinforced concrete slab on 24-in., 76-lb. wide flange beams 10 ft. on centers, supporting a live load of 175 lb. per sq. ft. A typical panel is shown in Figure 2. There are a total of 37 penthouses, varying in plan area from 17 ft. by 19 ft. to 43 ft. by 80 ft., used to house fan rooms, heater houses, transformer rooms, ovens and other installations. Heat and ventilation are furnished to the building by ducts leading from the fan rooms. The total supported area of second floor, penthouse floors and roof is 840,000 sq. ft., and required 7,850 tons of fabricated structural steel, or an average of 18.8 lb. per sq. ft. of supported area.

Figures 2 and 3 show typical second floor and roof plans respectively. Typical column spacing is 50 ft. by 50 ft. or 50 ft. by 60 ft. Because of the necessity of omitting interior vertical bracing to permit continuous assembly lines, and because of the arrangement of the second floor plan area, it was not possible to use the 6-in. concrete slabs as a diaphragm for lateral forces except for local panels and isolated areas. This required that, in general, the building had to be designed as a series of bents in both directions except where it was practical to use vertical bracing in the exterior walls or to use the exterior concrete walls as shear walls.

Seismic design

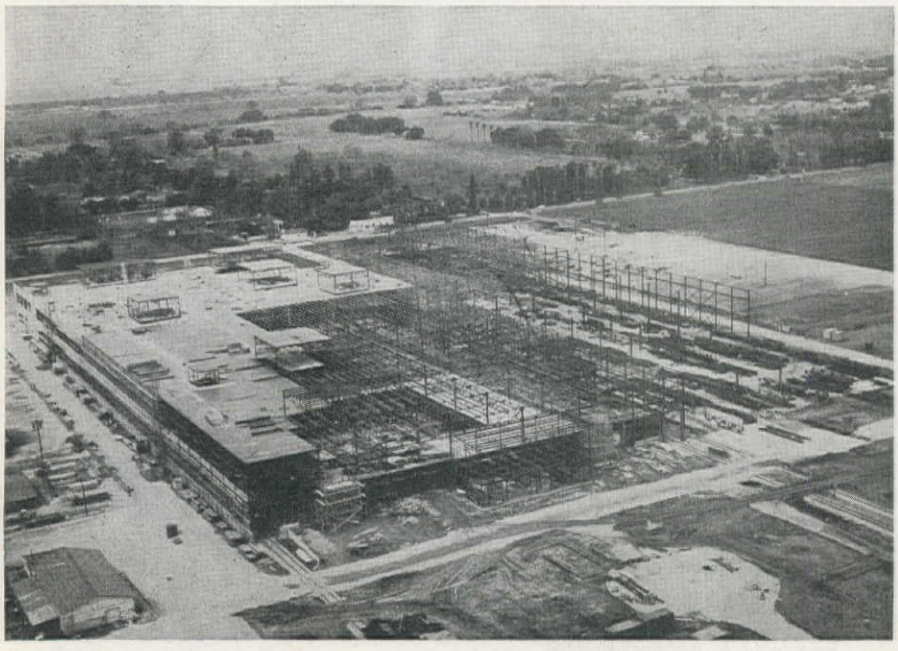
In order to get equal column resistance to bending about the two major axes it was decided to turn the columns alternately as can be seen in the several sketches. The lateral seismic force to be resisted by the bents was a percentage factor of the total dead load of the structure plus the weight of any fixed equipment: the percentage at the roof line was 13.3 per cent and at the second floor line 10.9 per cent. Since loads at the roof line are considerably less, in general, than those at the second floor line a special problem confronted the structural engineer in the selection of a design approach which would secure an economical design along with workable details.

A careful study by the structural engineer resulted in assuming the roof columns as pinned at the second floor line and the columns supporting the second floor as having a point of inflection at ⅓ their unsupported length, as shown in accompanying Figure 4. Allowable unit stresses were increased ⅓ for seismic forces and for the average condition the bending in the columns contributed approximately 80 per cent and 55 per cent of the total stress for the second and first tier columns respectively.

Obviously, there were many special conditions due to special floor and roof openings and the heavy loads supported on the penthouse floors. Had the building been designed for 15 or 20 lb. per sq. ft. of wind surface instead of for seismic forces the lower tier columns would have been affected very little by bending and as a consequence the column pattern and design details would have been entirely different. Various details either fixing the second tier columns at the second floor or running the first tier columns beyond the second floor and splicing were considered, but were finally discarded in favor of the final details because they were not practical or economical, or encroached on the clearance lines set up by the owners.

To handle the high top chord stresses at the second floor line and to obtain a workable base detail for the roof column, the details finally used are those shown in Figures 1 and 4. The details as adopted took into consideration (1) large and special stresses to be handled, (2) practicability of truss and second tier column erection, (3) entering and driving of long grip rivets. From Figure 2 it will be noted that top chords of FT5 trusses are one inch higher than the FT1 trusses. This arrangement of the elevations of the top chords permitted the passing of the one-inch continuity plates uninterruptedly at right angles and at the same time maintained a constant

OVERALL view of the Van Nuys assembly plant during construction, showing the erection of the steel framework. Certain areas on the second floor are designed for extension, and the Chevrolet section may have complete second floor coverage.



Plant Finished Soon

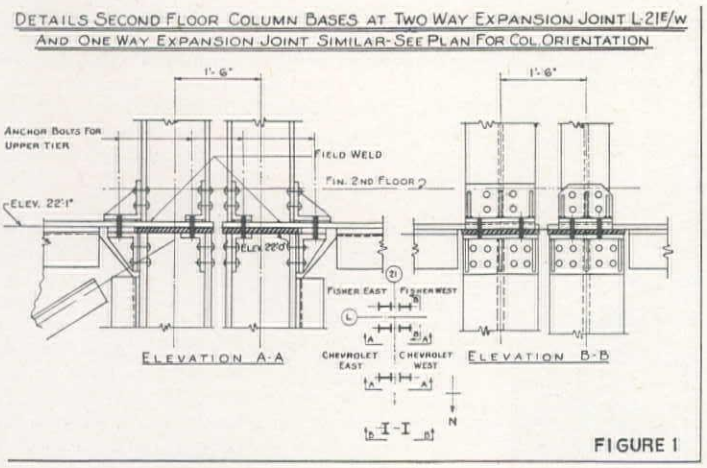
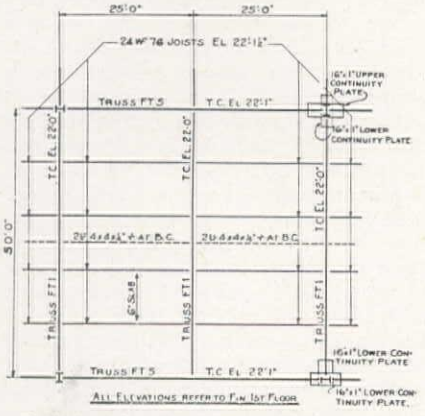
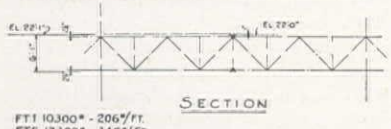


FIGURE 1

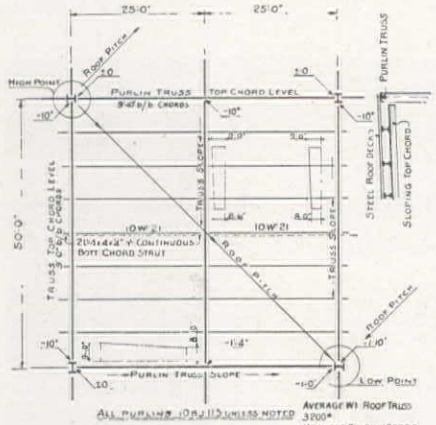


TYPICAL 2ND FLOOR FRAMING PANEL



FT.1 10300* - 206#/FT.
FT.5 13300* - 346#/FT.
HEAVIEST TRUSS 26000*

FIGURE 2



TYPICAL ROOF FRAMING PANEL

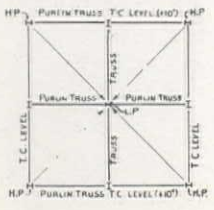


FIGURE 3

elevation of 22 ft., 2 in. for the base of the roof columns.

Columns and trusses

Column sizes were 14-in. H sections throughout and in this way the bearing area of the flanges of the upper sections was directly above the flanges of the lower tiers with the one-inch continuity plates acting as butt plates. The interior columns varied in size for the first tier from 14WF-103# to 14WF-426# and for the second tier from 14WF-43# to 14WF-287#. The exterior columns (25 ft. on centers) were mostly 14WF-61# and 14WF-87# without any splice at the second floor.

Careful consideration was given to truss depths; depths were established (1) to fix the tops of columns, (2) to permit passage of ducts, equipment, etc., (3) to carry either light roof loads or special equipment loads or moving cranes (see Figure 6), (4) to secure maximum economy of steel. Truss depths and weights are given in Figures 2 and 3; of interest are the roof truss slopes used to obtain roof pitch for drainage.

Structural plans were prepared by Joseph Sheffet, structural engineer for the architectural firm of Parkinson, Powelson, Briney, Bernard and Woodford, of Los Angeles. Albert Kahn Associated Architects and Engineers were the consultants for the entire project. The general field construction superintendent for the owners, the Chevrolet Division of the General Motors Corp., was W. J. Massey.

Organization

A total in excess of 8,500 tons of fabricated structural steel has been used for this entire project which in addition to the assembly plant, includes an office building, cafeteria and garage building, carloading building and a one-story parts building 240 ft. by 360 ft. All of the above steelwork was fabricated and erected by the Fabricated Steel Construction Division of the Bethlehem Pacific Coast Steel Corporation.

The general contractor for the project is the William Simpson Construction

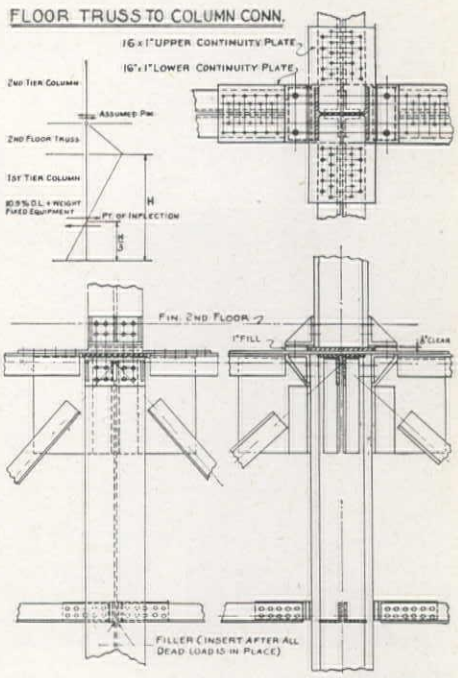


FIGURE 4

DETAILS FIRST FLOOR COLUMN BASE AT EXP. JOINTS

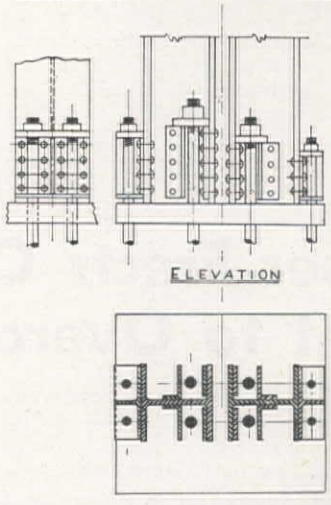


FIGURE 5

DETAIL CRANE RAIL HANGER CONNECTION

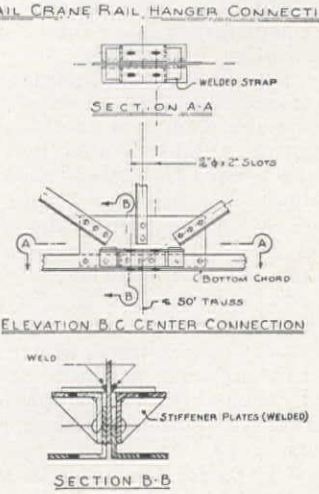
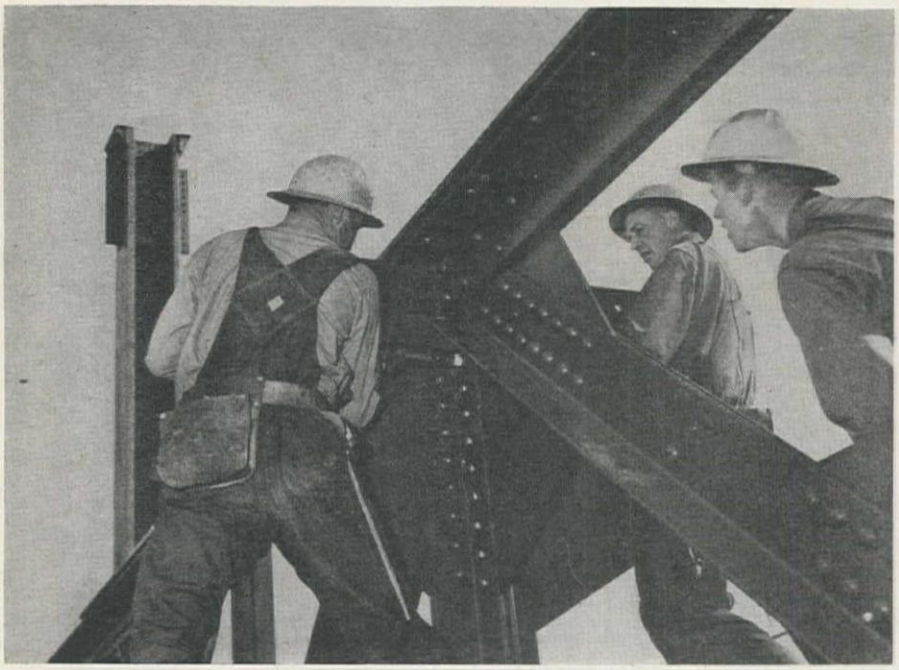


FIGURE 6

DIAGRAMS showing structural details of steel construction on the plant. Columns were turned alternately in order to get equal column resistance to bending around the major axes, for seismic forces.



MEMBERS OF the riveting crew on the Van Nuys construction are shown making a floor truss connection. Bethlehem Pacific steel erection crews were at one time erecting steel at the rate of over 100 tons per day for the mammoth job.

Co. of Los Angeles. One of the interesting aspects of the general contractor's work, in addition to the pile foundations, was the placing of the concrete first floor prior to the erection of the steelwork. The placing of the floors in advance materially assisted several subtrades in using rolling scaffolds. The erection crews of Bethlehem Pacific, working from the concrete first floor erected (exclusive of final riveting) the entire "Fisher Body Section," a total of 2,950 tons of structural steel in the excellent time of 21 working days.

Kaiser Erects Own Soda Ash Plant to Overcome Shortage

TO PARTIALLY overcome the current soda ash shortage Kaiser Aluminum Division has completed construction of its own plant on Owens Lake in California.

D. A. Rhoades, vice-president and general manager of Permanente Metals Corp., which last year expanded to include the manufacture of aluminum, said the new plant, operating at designed capacity, will produce approximately 100 tons of soda ash daily. Output of the Owens Lake plant will be absorbed by Permanente's Baton Rouge, La., works, where it is used to convert bauxite ore into alumina.

The new facilities were rushed to completion in 67 ten-hour working shifts because of the nation-wide shortage of soda ash.

At the present time there are only two locations in the United States where soda ash is being produced commercially by the natural soda process. These are Owens and Searles Lakes, both in California.

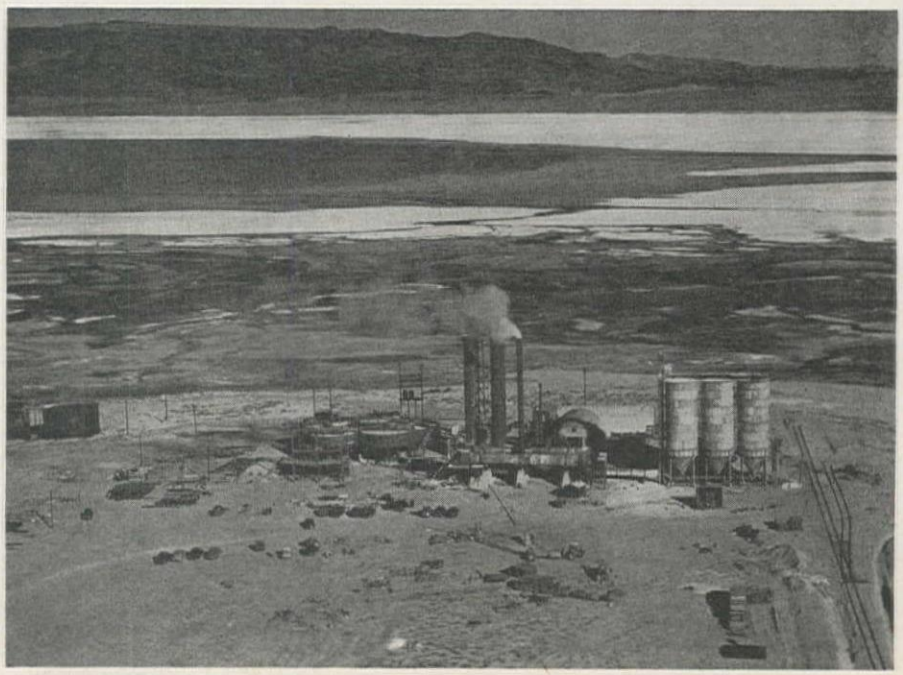
Brine is pumped from wells sunk in the crystal bed of the shallow lake to a depth of about eight feet. A 3½-mi., 8-in. pipeline, built of spiral weld, 10-gauge "invasion" pipe because standard pipe was not available, brings the brine into two storage tanks, each of which has a capacity of 500,000 gal. From these storage tanks the brine is pumped into three vertical shell and tube heat exchangers where it is heated to approximately 100 deg. F. The heated brine next enters the top of the 94-ft. carbonating towers. These four towers have a capacity of 20,000 gal. each.

While this process is under way, four 110-hp. boilers, fired by oil, are producing steam to drive three compressors. A note of economy is demonstrated by the fact that exhaust steam from the compressors is used to heat the brine before it enters the carbonating towers and the condensed steam is piped back to the boilers.

Carbon dioxide captured from the boiler and kiln gases, is cleaned and cooled in two gas scrubbers after which it is compressed and pumped into the bottom of the carbonating towers. The action of the gas moving upward through the brine results in carbonation, producing either sesquicarbonate or bicarbonate. Slurry containing these solids is fed by gravity flow to the first of a series of five thickener tanks, each of which is 40 ft. in diameter. The slurry is pumped from one tank to another during which it undergoes a counter-washing process, consisting of fresh water flowing by gravity in the opposite direction to which the raw material is pumped. After leaving the thickener tanks the concentrated slurry moves on to four 48-in. centrifuges or drum filters where it is dewatered.

The resulting cake-like material is moved by a short conveyor belt to the two rotary kilns—approximately 80 ft. long by 7 ft. in diameter. Here calcining takes place under temperatures up to 600 deg. F. The white, granular product that drops from the discharge end of the kilns is soda ash which is cooled and then stored in three large bins while awaiting shipment.

Paralleling the lake shore several hundred yards from Permanente's plant is a Southern Pacific rail line. A spur line has been built on plant property and as cars are loaded with soda ash they start the trip by rail to Baton Rouge, where soda ash is used to produce alumina powder from bauxite ore.



OWENS LAKE, Calif. is the site of the new Kaiser plant, which will produce nearly 100 tons of soda ash daily.

Pavement Pumping Prevented

Prevention of water seepage and softening of base considered better treatment than later repair—Installation of semi-circular drain pipe in porous backfill along both joints and shoulders found most effective means of eliminating objectionable seepage

By WILLIAM C. SLEE
Drainage Engineer,
The Robinson Clay Products Co.,
Formerly Division Manager,
American Road Builders' Association

THERE ARE MANY schools of thought regarding the proper methods of protecting concrete slabs from pumping. Odd as it may seem, most of this thought has been aimed at correcting pumping conditions after pavement failure has started. Until quite recently, the proper study of subgrade conditions was not considered as important as the study and design of the balance of a highway project.

The object of this discussion is not the correction of pumping on existing pavements but "Built-In" protection.

Some years ago, the State Highway Commission of Kansas investigated the possibility of eliminating pumping at joints by installing a transverse pipe drain under each joint. These drains were carried beyond the width of the shoulder and emptied into sumps or pockets of coarse underdrain aggregate. The pipe used in these installations was semi-circular cradle invert pipe commonly called Skip Pipe.

Inspection of these transverse drains from time to time reveals the fact that they are functioning satisfactorily. Satisfactory performance of these drains precludes any possibility of subgrade saturation or pumping at the joints.

It would seem from this observation that the State of Kansas has developed a method of controlling pumping that is far superior to any other method yet in use.

Cause of pumping

It is common knowledge that most of the water which collects under concrete slabs is surface water which finds its way to the subgrade through unsealed expansion or contraction joints. When the subgrade becomes saturated, it quite naturally becomes unstable and a heavy wheel load has a tendency to push the slab into the subgrade. The difference in the bearing value between the portion of the subgrade which has become saturated and that portion of the subgrade which remains stable is the controlling factor that starts the disintegration of concrete slabs. The beginning of this disintegration is usually a corner crack extending from the outside edge of the slab on an angle to the joint which has started to pump. This corner crack then acts as another entrance to the subgrade for the infiltration of surface water and this infiltration tends to extend the area of unstable subgrade under the pavement.

Crushed stone drains along the edge of pavements are not very effective in controlling or stopping pumping. It is the opinion of many engineers that the installation of crushed stone drains without pipe is a waste of money. An investigation of many of these installations reveals the fact that hardly any flow of silt can be expected in such drains. The silt or foundation soil that enters the voids in stone trenches will eventually fill these voids and the drains' effectiveness is completely nullified.

Many highway departments are now installing marginal drains along the edges of pavement that have started to break up due to joint pumping. This practice is becoming more and more popular, especially where broken concrete slabs are to be re-surfaced with some type of bituminous material.

Combination drains

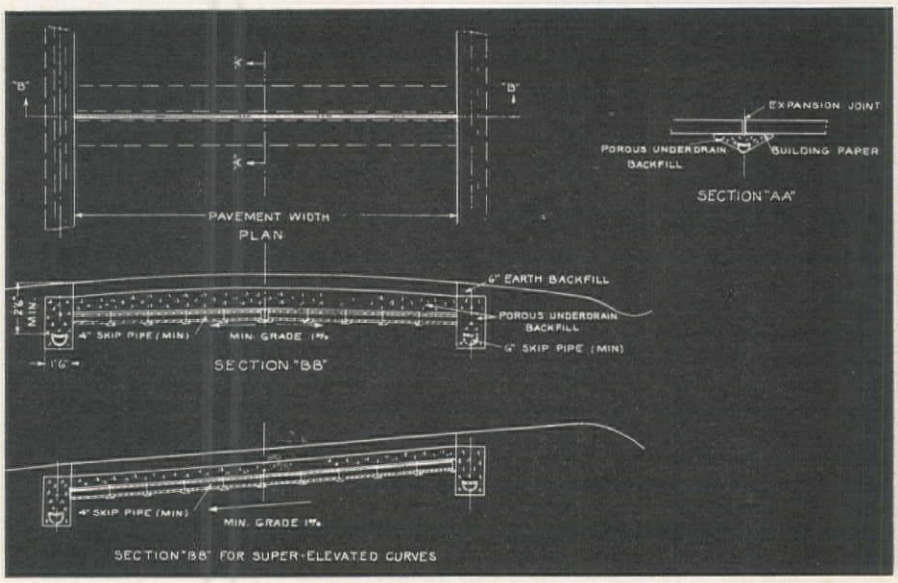
Combining the idea which was developed in Kansas with the conventional edge or marginal drain, produces a drainage installation which will go far in extending the useful life of concrete pavements. The combination of the two will provide a system of under-drainage that should keep the entire subgrade dry and stable.

The use of a blanket course of selected granular material underneath the slab is extremely necessary for most types of soils. A number of installations have been made incorporating the use of selected granular material directly under the slab and extended only to the outside edge of the slab. It has been found that in most of these cases, this blanket course acts only as a "reservoir" to collect and impound surface water which reaches the subgrade through open cracks or joints. In order to insure the effectiveness of such a blanket course, it is necessary that the granular material extend to the edge of the shoulders or that it be tapped and relieved by a definite system of drainage.

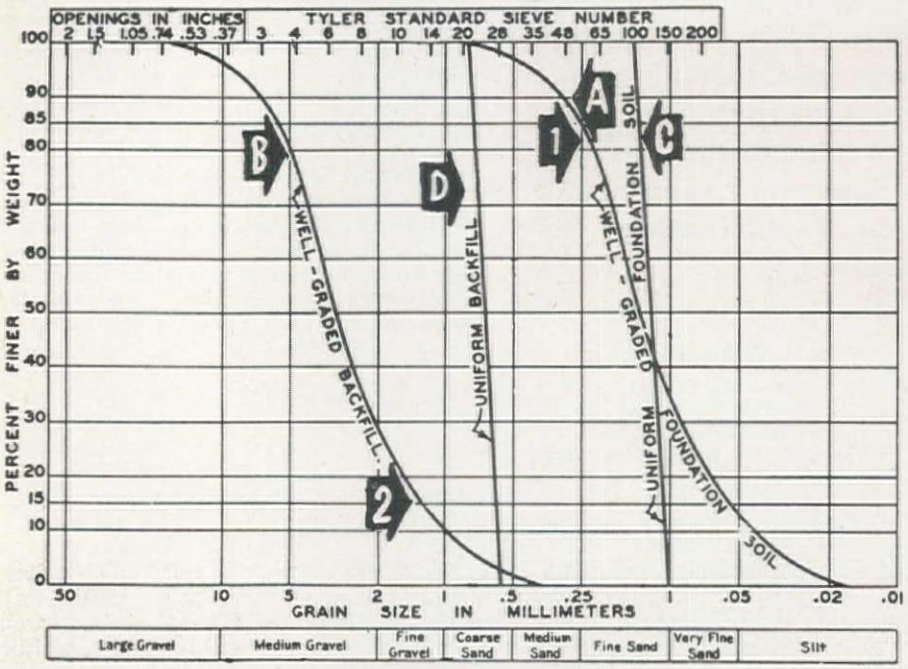
The design suggested above, when analyzed from a cost standpoint, will be found to be within the limits of economy when compared with the cost of extending a granular base course to the edge of the shoulders. It can readily be seen that such a base course under the shoulders will have a tendency in time to completely silt up and nullify the value of the base course under the pavement.

Proper design of any underdrain system is essential to the continuous successful operation of such an installation. Hundreds of cases have been reported and investigated where it has been found that the system is no longer functioning with any degree of efficiency. In almost every case it was found that the openings in the pipe were plugged up by the piping of the foundation soil. This condition indicated that little attention had been given to the design of the porous backfill material.

TYPICAL DRAIN installations, as used by Kansas State Highway Department along transverse pavement joints, supplemented by longitudinal drains at the shoulders. Lower illustration is this combination installation as used on curved sections.



LIMITING GRADATIONS FOR BACK FILL SURROUNDING DRAIN PIPE



U. S. BUREAU OF SOILS CLASSIFICATION

PIPING RATIO:

15% SIZE UNIFORM BACKFILL / 85% SIZE UNIFORM FOUNDATION — NOT GREATER THAN 4.0

15% SIZE WELL GRADED BACKFILL / 85% SIZE WELL GRADED FOUNDATION — NOT GREATER THAN 5.0

PERMEABILITY RATIO:

15% SIZE UNIFORM BACKFILL / 85% SIZE UNIFORM FOUNDATION — NOT GREATER THAN 5.0

15% SIZE WELL GRADED OR UNIFORM BACKFILL / 85% SIZE WELL GRADED FOUNDATION — NOT GREATER THAN 25.0

Grading back fill

Investigation by federal departments has established the fact that there is a direct relationship between the physical analysis of the foundation soil and the porous backfill media, which will permit the design of a porous backfill that will allow the water to reach the pipe but will prevent the foundation soil from flowing through the porous material.

In the accompanying chart the limiting size and gradation of the backfill to be placed adjacent to trench walls are shown for both uniform and well graded soil types. The limiting curves to be used are based on the ratio of the 15% size of the backfill to the 85% size of the foundation soil, which is termed the piping ratio. As the criteria have been expressed in ratios, the curves may be applied to any range of grain size distribution as long as the relationship between the curves is maintained as shown. For some drain pipes, where the openings are large, an additional layer of coarse material will be required adjacent to the pipe to prevent movement of the backfill or filter material into the pipe.

Curves A, B, C, D, in Figure No. 2 are merely inserted to explain the use of the chart. Take for example, curves A and B. Curve A has been plotted from the screen analysis of a typical well-graded foundation soil. Point No. 1 on curve A indicates the 85% size of the foundation soil. This size is shown as .25 millimeter. According to the proper piping ratio for a well graded foundation soil and a well-graded backfill, the 15% size of the backfill should be five times the 85% size of the foundation soil. This established the 15% size of the backfill as 1.25 mm and is indicated on curve B as Point No. 2. With this size established on the chart, Curve B is plotted parallel to Curve A. The gradation of the porous backfill can then be determined from the chart.

In the foregoing, an effort has been made, not only to suggest a practical and economical system of underdrain installation for the protection of pavement subgrade, but to stress the importance of permanently protecting a subgrade against saturation.

Incorporating the suggested underdrain protection in the design of a modern pavement will add but an infinitesimal percentage to the entire cost of the project. The benefits are manifold.

Standardization of Airport Runways For Different Types of Use Proposed

THE AVIATION industry is being circularized with a proposed technical order to obtain standardization of airport runways as to maximum lengths, widths and strengths for different types of use. The designers of transport or feeder type aircraft could then take such standards into account.

At present each newly designed transport airplane has trended toward longer and longer runways, thus making existing airports obsolete and creating a heavy financial burden upon municipalities. Aircraft designers, on the other hand, have been handicapped by the uncertainty regarding the size and strength of the runways which would be available at municipal airports, T. P. Wright, Administrator of Civil Aeronautics, pointed out.

In a letter to the principal aviation organizations accompanying the proposed order, Wright said: "Difficulties encountered in obtaining suitable airport sites which are relatively near to the population to be served and which will accommodate present and future aircraft, make it imperative that closer coordination between the design of airports and the design of transport type aircraft be established. These difficulties have been magnified by economic considerations of airport planning on the part of communities which desire to supply the commercial airline facilities. Many communities have expressed deep concern for the permanency of the installations that they are planning and for the soundness of the investments that they must make.

The suggested standards being circulated for comment and criticism apply to four types of airline service and are as follows:

Airline Service	Runway feet		Taxiway feet	Landing Strip feet	Maximum Pavement Loading lbs.	
	Length	Width	Width	Width	Single Wheel	Dual Wheel
Feeder	3500	75-100	40	300	15,000	20,000
Local	4500	100-150	50	400	30,000	40,000
Express	6000	150-200	75	500	60,000	80,000
International	7000	150-200	75	500	60,000	80,000

Additional Bay Crossing Proposals

Two New Bridges Suggested

By JOHN J. GOULD
Consulting Engineer,
San Francisco, Calif.

THE PROBLEM of bay crossing locations appears, at first glance, to be highly complex but, reduced to pertinent fundamentals, the choice at this time is reduced to two possible locations in the area south and one in the area north of the present Bay Bridge.

In 1930 the State Highway Department predicted that, by building the present Bay Bridge, no further crossing would become necessary until 1970. This analysis did not materialize because the new traffic facilities created many new conditions beyond the reach of estimate by the planners. One of these conditions is that in the building of approaches, city planning and city improvements did not, and could not, keep pace with the rapid growth of auto traffic. The mass transportation facilities on both sides of the Bay became less desirable as the auto traffic increased, more and more people were forced to substitute their own means of transportation, generating thereby an all-over traffic pattern of a very serious nature throughout the entire bay region and affecting all northern California.

State traffic count

The State Highway Department proposes to add another bridge close to the present one, which would ultimately dump 160,000 vehicles each day into congested approach areas, on both sides of the Bay. It justifies this plan on the basis of a traffic survey of one-day duration, during which 8,600 vehicles, out of a possible 65,000, were questioned as to origin and destination of their travels. The department predicts the most pessimistic traffic developments for the Bay Region should the State proposal not be accepted. For instance, it claims a diversion of only 8% from the present bridge if the future crossing is located at or south of Hunter's Point.

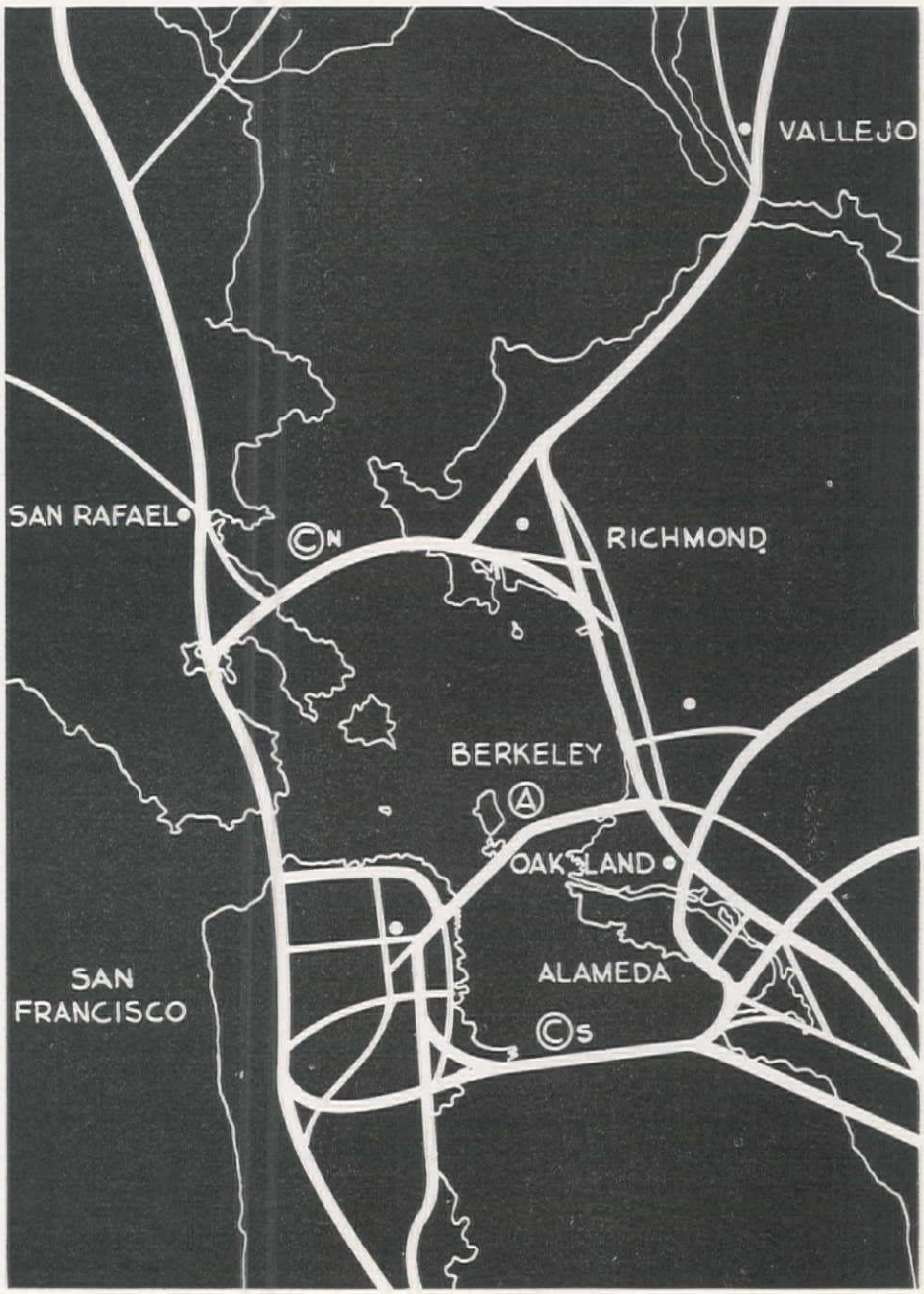
The 12-hour traffic count of March, 1946, makes accurate claims for future diversion of about 2 billion vehicles over a 40-year period. Such claims should be carefully studied in the light of previous predictions.

I know of no city in the world where the dumping of some 160,000 vehicles per day, concentrated in one single spot, could result in a sound overall traffic plan. I believe that San Francisco and Oakland present no exception. In general, a proven traffic pattern resembles that of a spider web in which great care is taken to lead thru-traffic around congested centers. In the overall Bay crossing plan, however, the Highway Department has largely ignored these principles since it contemplates building the spokes of the spider web all in one place.

Other fundamentals

In view of the expected long life of these bay crossings, which may be over hundreds of years, other fundamentals of the greatest importance to the communities of the Bay Region and the Nation must be considered. The last World War has demonstrated that the San Francisco Bay Region is one of the great strategic bases in the Pacific in case of war. Bridges in San Francisco Harbor are as important as fleets and armies in a battle.

The Army-Navy Board (See report in *Western Construction News* for March, 1947) considers that a twin bay bridge is not the proper solution for traffic in either peace or war. I concur fully with this opinion. Twin bridges would offer an easy target to bombs by an enemy and thus, with one blow, the entire communication system in this region would be destroyed. In case of a large fire in the area of the San Francisco approaches, both bridges would be seriously menaced. An earthquake that might develop a new fault near any of the piers could seriously damage both bridges and take them out of useful life



HUNTER'S POINT-Alameda and Richmond-Marin bridges, proposed by Gould, shown as supplements to existing structure.

for a period of years. I also feel that the twin bridges would have a detrimental effect upon the scenic beauty of the Bay and might act adversely upon the fast growing tourist industry.

I also agree with the Army-Navy Board in not accepting a plan which would place a large fill and tubes in the vicinity of the Oakland-Alameda Estuary. This type of bay crossing would seriously affect shipping facilities in times of peace or war and would have a large influence upon the tidal flow. All traffic would lead into already congested areas on both sides of the Bay. In addition, opinions based on Bikini bomb tests indicate that underwater structures, such as tubes, are subject to relatively greater damage than overhead structures. The tests also suggest a diversion of locations as another means for additional protection.

A south bridge

This analysis then would leave only two other possible locations in the south bay, namely, one from the Potrero District to Alameda and the other from the Hunter's Point area to Alameda and Bay Farm Island. The Army-Navy Board has recommended a tube and trestle crossing, at the first of these, at a cost of about $135,000,000. This tube would carry traffic into Alameda which, on the east, is confined by the Estuary and by congested areas in Oakland. Thru-traffic would have to be carried through these same areas at future large additional costs.

By locating a bridge 2 mi. south of this tube on the south side of Hunter's Point a saving of about $65,000,000 could be realized. A freeway would connect the bridge to the proposed Bay Shore freeway at Army and Vermont Sts. A number of spans about 500 ft. in length and 140 ft. above water would carry the bridge from Hunter's Point toward Alameda. Trestle and moles would constitute the balance of the structure, which explains its economy as compared to other locations or other types of construction.

About 2 mi. west of Bay Farm Island the crossing would fork, one arm going to San Lorenzo and Hayward, making the latter accessible to downtown San Francisco in 30 minutes at 45 mph. The northern arm of the bridge would connect to the Posey Tube and a new tube to be built in that vicinity. An easterly arm of the bridge would connect to Broadway and High Street in Alameda and then, by building some additional bascule bridges at least 25 ft. above the water of the Estuary, traffic would be brought to the southern part of Oakland.

Based on the traffic survey made by the State, which is most preliminary in character, I estimate that a minimum of about 28% of the present Bay Bridge traffic would be converted to this South Crossing. It should be noted that the distance between this bridge and the Bay Bridge in San Francisco is only 4½ mi., requiring about 6½ min. travel time on a freeway. Large portions of the Oakland traffic originating south of Lake Merritt and practically all of the Alameda traffic would be converted to the South Crossing because of the time element and comforts involved.

A north bridge

In the near future I also suggest that a Northern Crossing, between California Point in Marin County and Richmond be given serious study. While I estimate that the conversion from Bay Bridge traffic may amount to only 12% at this time, it would act as a standby and relief element. When other crossings and approach areas become congested, traffic from any one to another could be diverted readily either by regulation or by choice. Thus the investment in all crossings can be protected because the elimination of congestions would be assured. This bridge and approaches could be built for about $40,000,000 assuming two major spans of 1,500 ft. each, trestle and fill work. From the city of San Pablo to downtown San Francisco, a distance of 22 mi., a trip could be made in 30 min. at 45 mph. In mileage the trip would be equal, via the Golden Gate or Bay Bridge, to the San Francisco business district.

All combined, these three bay crossings could constitute, at a saving of $25,000,000 compared to the Army-Navy Tube proposal, a network (forming the spokes of a traffic spider web) which would guarantee a sound traffic flow for auto and for mass transportation throughout the Bay Area and Northern California.

Nishkian Proposes Causeway

ANOTHER PROPOSAL set forth as the solution to the San Francisco Trans-Bay crossing problem has been offered by L. H. Nishkian, prominent San Francisco consulting engineer, in a recent address before the Structural Engineers Association of Northern California. Nishkian's plan, which was submitted to the joint Army-Navy board last August, is essentially a condensation of the Reber plan, which was discussed fully in the March, 1942, issue of *Western Construction News*, and would constitute the first step in ultimate construction of the latter.

The only permanent solution to the traffic congestion problem which is necessitating another Bay crossing, Nishkian claims, is a solid, low-level causeway across the bay with space for all future transportation, plus industrial and waterfront expansion.

Traffic, industry, wharves

A giant causeway across the Bay from a point at China Basin in San Francisco, just south of the existing Bay Bridge to a point near the Oakland Estuary is the main project in the Nishkian plan. Constructed of earth and rock fill 2,000 ft. wide and three miles long, on its surface could run at least 24 traffic lanes and four main line railroad tracks, with room for more.

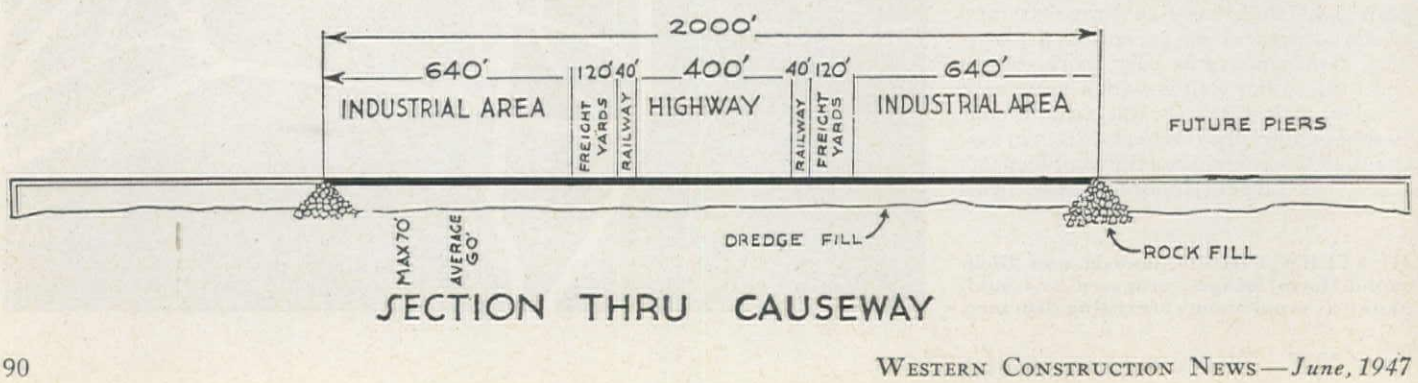
A ship channel 2,000 ft. wide through the eastern end of the causeway would connect the south Bay with the Bay proper. Vehicular and rail traffic would move under the channel through tubes, with a spur tube running directly to Alameda.

A strip 600 ft. wide for industrial developments and waterfront activities, plus a 160-ft. strip for freight yards would be located on each side of the transportation lanes. Both sides of the causeway could be used for docks, and would give San Francisco an added six miles of centralized waterfront.

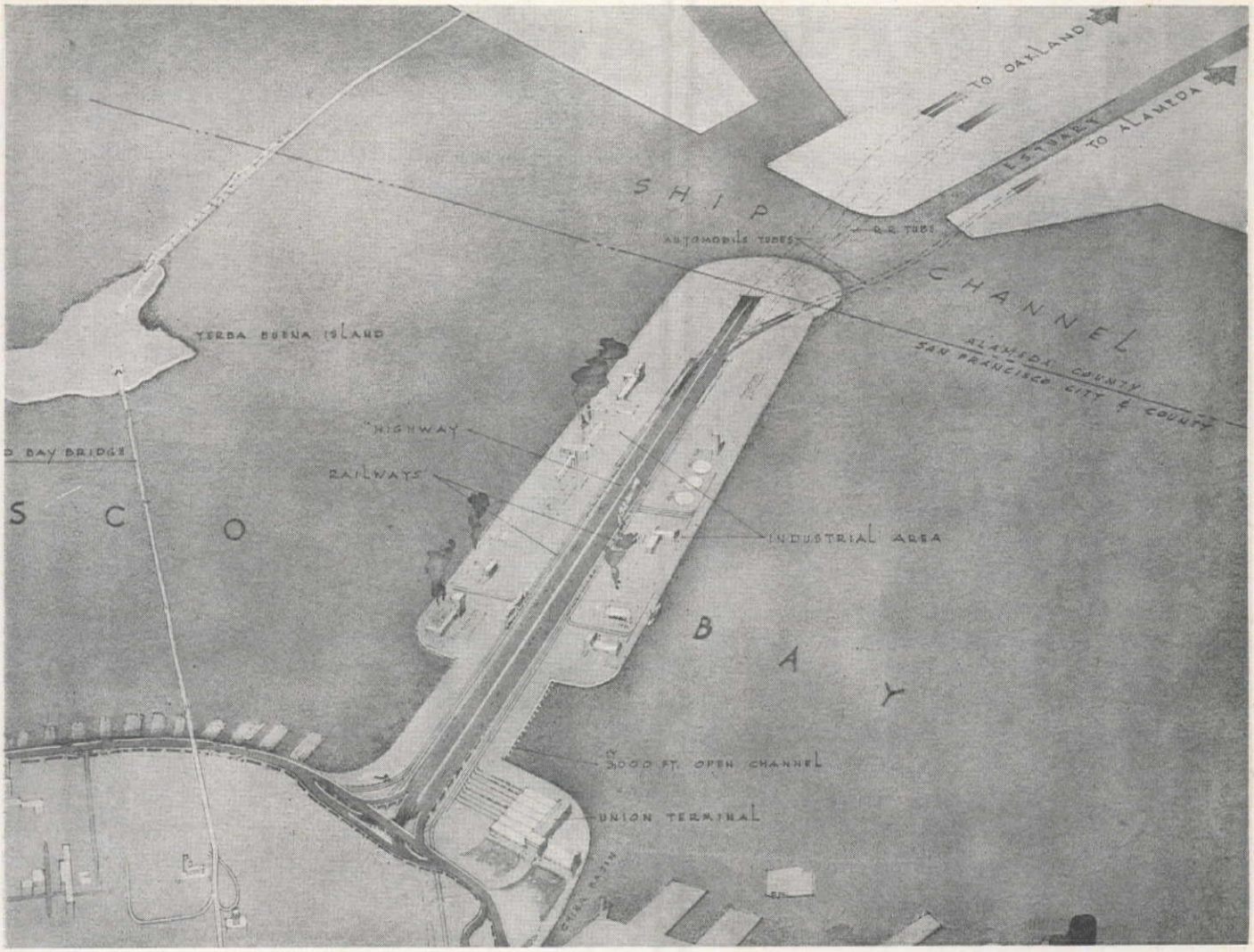
Without building either rail or industrial developments, estimated cost of the project would be apporximately $100,000,000, which would be less than building either a high level bridge parallel to the existing one, or the Army-Navy "roller-coaster" trestle-tube-fill plan.

Tidal flow accommodated

An extensive engineering study would be needed, Nishkian pointed out, before such a structure could be built. The tidal flow was the main consideration, and the State Board of Harbor Commissioners objected to the plan on the basis that the solid causeway would cut off this important flow, which keeps San Francisco docks from silting. Nishkian has since revised his plan to include



SECTION THRU CAUSEWAY



AT LEAST 24 lanes of auto traffic would run on the Nishkian-proposed causeway's 2,000-ft.-wide surface, with provision for railroads and industrial area on either side.

openings along the San Francisco end of the causeway to allow free tidal flow. These openings, however, would not constitute ship channels and no provision would be made for a draw or lift span bridge, since transportation would cross them over a solid level span.

Nishkian's choice of a causeway site was substantiated by his claims that the majority of the Bay Bridge traffic is bound for the centralized downtown areas of San Francisco and Oakland. Moving the crossing south would not change this flow, and would only add several miles to the distance to be traveled. He stated that whatever the type of crossing, it must serve these two areas directly.

Railroads to San Francisco

Rail traffic, also, would feed right into the downtown district with the causeway built in its proposed location. Although railroad companies have stated they would under no consideration enter San Francisco, this is generally considered smoke screen and free right-of-way on this land bridge would undoubtedly bring about a change in their attitude.

Traffic from the causeway and the Bay Bridge would have to be segregated as much as possible, but the fact remains, Nishkian claims, that the traffic would be destined for the downtown area and the crossing must serve that traffic. He concedes that southward growth on the San Francisco Peninsula and in Alameda County might in the future necessitate a low level crossing south of Hunter's Point, but the causeway would be built to serve the principal traffic needs.

Any movable bridge structure on the causeway would impede the flow of traffic tremendously; therefore Nishkian is opposed to any such suggestion. If such a structure were erected on the causeway, traffic would be constantly interrupted, since ships move continually to the south Bay. He also maintained that ship channels should be located on the eastern end of the causeway because foundations are better there for tubes. The few extra miles the ships have to travel are inconsequential, he said, inasmuch as a great deal of such movement is to anchorage only. There would be no added travel to reach Port of Oakland destinations.

Nishkian's calculations in regard to the causeway's effect on the tidal flow which keeps the Golden Gate bar from silting, indicate that the bar would move farther inshore, but would not appreciably heighten. The bar must be dredged anyway, and any extra dredging found to be necessary with this addition would be more than compensated for by the added advantages of the causeway.

Although Nishkian has made calculations concerning the effects, no one knows the exact effect on tidal flow and silting, and it would have to be studied with models. Speed of currents through the ship channel have been calculated at about four miles per hour, which is not excessive. Its 2,000-ft. width would leave ample room for ships to maneuver. The channel would be over three times the width of the Oakland Estuary.

The proposed project has been labeled by many as the permanent answer to the trans-Bay crossing problem. The 30-lane causeway, which could be constructed for the same amount of money required for a 10-lane bridge, would allow for the continuing increase in motor vehicles, whereas another high-level bridge is thought by many to be only a short-range solution. In 1932 there were 26,000,000 cars in the United States; in 1941 there were 32,500,000. California's increase was 50 per cent—from 2,145,000 in 1932 to 3,198,000 in 1941. While a new 10-lane span would more than double present transbay vehicle capacity, another bridge would again be needed when the amount of vehicles passed that amount.

The Colorado's Greatest Explorer

Pioneer hydrographic engineer made investigation of Colorado Basin a lifetime study — Made several expeditions through the canyons

By ALAN C. BERRY
Corps of Engineers,
Los Angeles, Calif.

THE LATE Eugene C. LaRue knew the stream system of the Colorado River Basin as he knew the lines in the palms of his hands. Hydrography was the prime interest of his life, and all streams fascinated him, but in none was he so absorbed as in the Colorado River and its tributaries. To bring up the subject of that mighty drainage system was to invite a masterly discourse on it . . . and one which was sure to be enlightening in some phase, no matter who the listener might be. Not that Eugene LaRue was garrulous, or that he was inclined to plunge headlong and at random into lengthy dissertations. His opinions carried great weight, and were invariably of value to his colleagues. Veteran hydraulic engineers all had profound respect for, and took into consideration, what he had to say on such subjects as were of prime importance in their work.

When flood control matters in their broader phases came up for discussion, particularly as they pertained to the Colorado River Basin, which was the dream of his life, it was almost inevitable that his name would be brought into the talk. The water resources of that region lured him for the greater part of his life.

His first job in his career as an engineer was an assignment to gauge some of the Southern California streams.

Authentic publications

His scientific study of the Colorado River and its feeder streams began in 1912 . . . and from that year he began to accumulate data, and for twenty years he continued to amass information. By 1916 it had grown into Water-Supply Paper No. 395, COLORADO RIVER AND ITS UTILIZATION, by Eugene C. LaRue. This was the first of what amounted to testaments to him, on that great stream. His second, U. S. Water Paper No. 556, appeared in 1925.

There are physical stream characteristics covered in these volumes which will never again, perhaps, be covered by the report of an hydraulic engineer; for many of the spots visited and studied by LaRue are now buried beneath 300 to 400 feet of water, due to the formation of Lake Mead, back from Hoover Dam. But LaRue knew them. He knew them so well, that his surveys are practically a bible on the hydrography of that stream and its branches.

He made exhaustive investigations of the entire basin. And these were largely personal investigations. These were made on a series of expeditions. By means of boat trips he made intimate studies of the main stream from end to end. He also explored all tributaries.

Through the canyons

The most memorable and spectacular of all LaRue's trips was made in 1923, and it extended from Lee's Ferry, a short distance below the Utah line, at the junction of the Colorado and the Paria Rivers, down through the Grand Canyon and on to Needles, California. A survey party of the United States Geological Survey went on this 456 mi. trip with him. He was hydraulic engineer for the group. It was on this trip that he made a comprehensive photographic record of all that was checked. The collection of those shots forms what is perhaps the most complete pictorial compendium of the Colorado extant. Beyond that, it will perhaps never be rivalled, since, as pointed out above, much of the subject matter is now buried below the waters of Lake Mead.

A few of the views from his collection are shown with this article. Their quality will satisfy even the exacting professional photographer. Yet these were shot a quarter of a century ago, under conditions which were often far from ideal. But Eugene LaRue was like that. He was as skillful and careful with his photography as he was about his exact engineering work.

On the 1923 expedition, there was an official geologist . . . Dr. R. C. Moore. But LaRue did some of this work as well. If an interested reader should thumb through U. S. Water Supply Paper No. 556, published in 1925, he will find the results of their findings indicated on various selected pictures.

During later years, Eugene LaRue made other trips through the Grand Canyon, and the results of studies conducted on these trips were correlated and went to supplement the great volume of data collected on the 1923 trip.

All of this work was so carefully done, and so precise, that from their exhaustive thoroughness the United States Geological Survey plotted and prepared official maps.

Maps of the Colorado

In 1915 LaRue prepared a "Map of the Colorado River and Drainage Basin, Showing Reservoirs and Water-Power Sites, Developed and Undeveloped to 1915, and Points of Diversion from Drainage Basin." Private engineers furnished him with the data from which he prepared this early map. The next year, he prepared another one, with data from the same sources, showing volume discharge of the tributaries as well as the main stream. In the same year he drew up a map covering diversion data, on which he showed "Constructed and Proposed Diversions from the Colorado River Basin to the Mississippi River Basin."

Whenever in the future, historic records are written of the water resources features of the Colorado River Basin, such records will not be complete unless they record many of his findings.

Eugene C. LaRue died March 22, of this year, 1947. He was 67 years old. At the time of his death, which came after a very brief illness, and which came as an unexpected and distinct shock to those who knew him and worked with him, he was with the Los Angeles District, Corps of Engineers, as Chief, Civil Works Branch. He'd had a slight heart attack about three weeks before his death, but no one had anticipated that it would prove fatal.

After news of his death spread, comments were heard frequently on his outstanding ability. Those who knew him best and who were familiar with his career, realized that this country had lost a man who had contributed a lifetime of valuable work to his government.

With the exception of ten years . . . just before the time he went to work for the Corps of Engineers, he had spent his whole career in government service. That career had started in 1904, shortly after his graduation from the University of California, when he went to work for the United States Geological Survey.

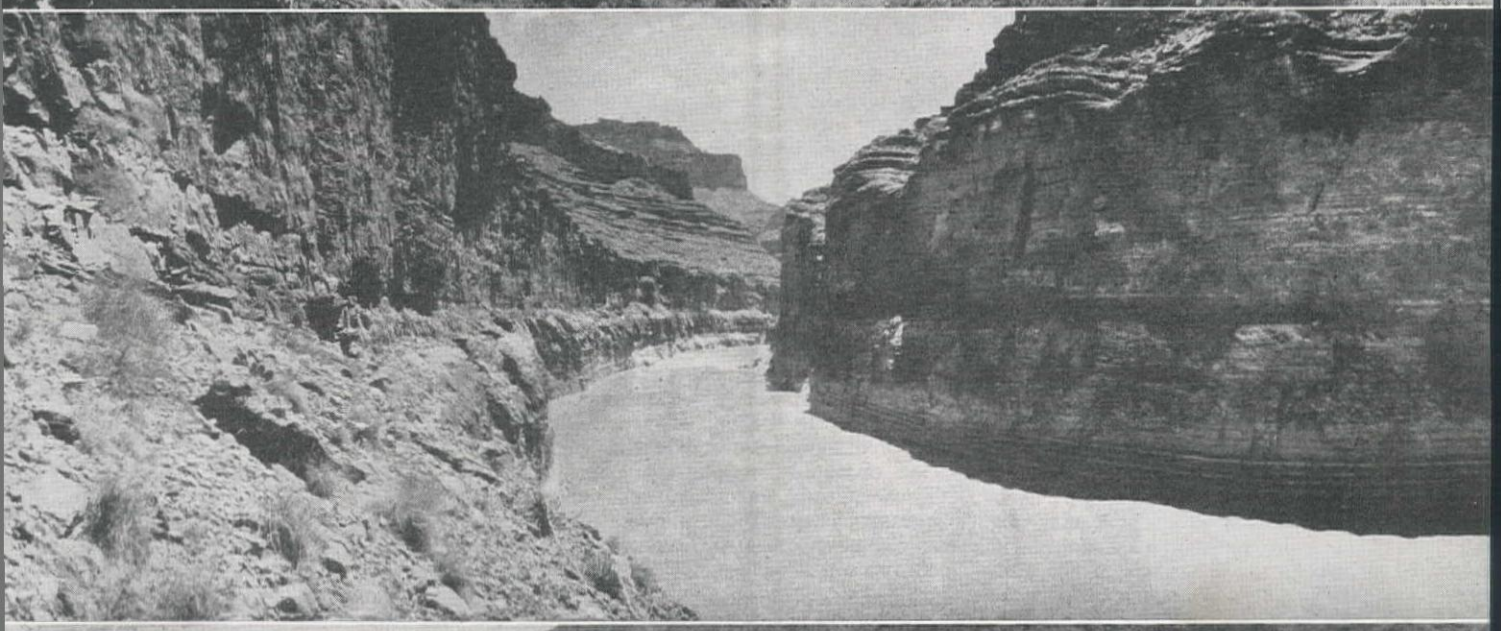
Eugene LaRue is missed by his associates and the engineering profession. He knew what he knew.

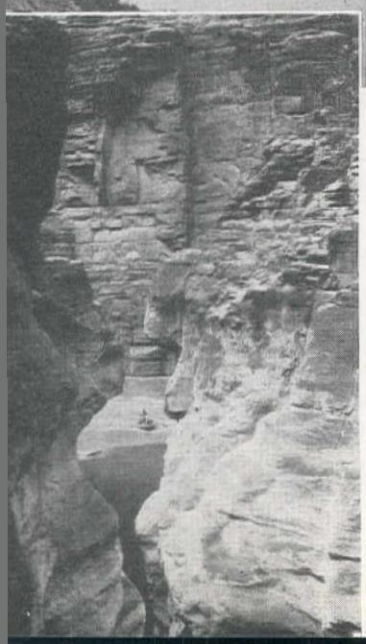
E. C. LARUE died unexpectedly in Los Angeles a few weeks ago. He was perhaps the most widely known and widely quoted authority on the flow of the Colorado River. This tribute was written by one of his co-workers.

B. C. Terminal to Combine Land, Sea Facilities

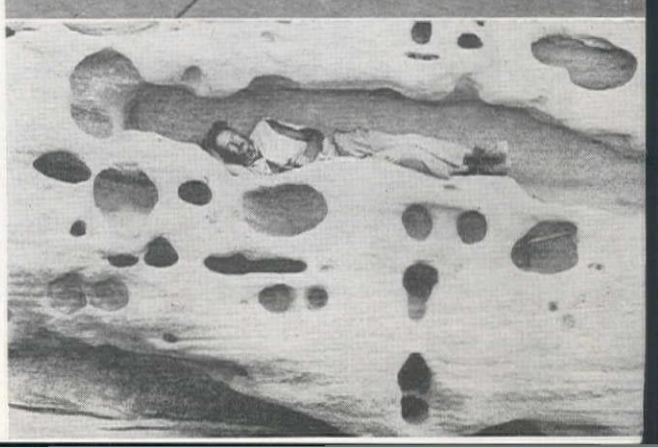
CONSTRUCTION of a new terminal is now under way at Nanaimo, B. C., which will combine land and sea facilities. The project is being undertaken by the Canadian Pacific Railway Co., and will involve expenditure of $2,000,000.

The existing wharf terminus at Nanaimo will be replaced by new piers which will provide wharf facilities for two ships. Buildings will include a passenger depot on the wharf which will connect directly with the auto-station. There will also be a depot for freight trucks and a garage for servicing trucks of the Canadian Pacific Express. Roads from the terminal will connect with principal Vancouver Island highways out of Nanaimo.





PHOTOS TAKEN by E. C. LaRue in 1923 while travelling through the canyon of the Colorado. Canyon walls rise 1,000 ft. above the river in Merle Canyon, top. Downstream view of Marble Canyon 28.6 mi. below Paria River, next, with a view of the old Lee's Ferry taken from the left bank, third from top. Lower left, downstream view of Havasu Creek, with the Colorado in the background, showing one of the 1923 expedition boats. Interesting figures are carved in the limestone forming the walls of a canyon, right. LaRue is resting in one.



Important Northwest Conventions

Sewage Works

By DUDLEY F. STEVENS
Associate Editor, Western Construction News
Seattle, Washington

EFFECT OF INDUSTRIAL wastes on the design, construction, and operation of sewage treatment works, factors involved in determining the degree of treatment, and the committee report on the ozone plant at West Kelso, Wash., were among the outstanding program items at the annual meeting of the Pacific Northwest Sewage Works Association held in Victoria, B. C., May 14. The one day meeting was presided over by C. M. Howard of Seattle, president of the association.

In a panel discussion of sewer system design and construction, Loren Thompson, member of the firm of Stevens & Koon, Portland, explained a system adopted for establishing standard trench widths for the $14,000,000 sewerage program being planned for the city of Portland. Determining that 8-in. clearances on both sides of the pipe would be the minimum necessary to permit proper construction of joints, the engineers prepared a chart from which maximum depths permissible for various ASTM pipe specifications could be readily selected.

Another subject included under the same discussion brought out a description of the machine placed cement mortar joints in concrete sewer pipe by W. P. McNamara of the Seattle city engineering department. This machine has been previously described in the January, 1947, issue of *Western Construction News*, p. 71.

Treatment of industrial wastes has been a problem under intensive study in the Northwest for the past several years following the adoption of legislation by both Oregon and Washington directed toward the correction of stream pollution, which has been increasing with growing industrialization in both states. Carl E. Green, member of the firm of John Cunningham and Associates, Portland, opened the discussion on the effect of industrial wastes on the design, construction, and operation of sewage treatment works.

Organic wastes, either large in volume or potent in character, are a principal problem in the design of public treatment plants, Green said. Plant costs may be increased by any of a number of factors including high volume, chemical quality, quantity of suspended and dissolved solids, and the biochemical oxygen demand of the industrial plant waste flowing into the sewage to be treated. In most cases industrial plants should be required to install fine screening of the waste before it enters the sewer system. In other cases pretreatment may have to be extended to sedimentation and settling, or chemical treatment.

Taking up the point of unexpected problems caused by the locating of an industrial plant, Loren Thompson recommended that city administrative officials and members of chambers of commerce should be better informed as to the problems involved in the introduction of an industry into a community. These should be considered before an industry is granted unlimited privileges as a means of attracting industry to a community.

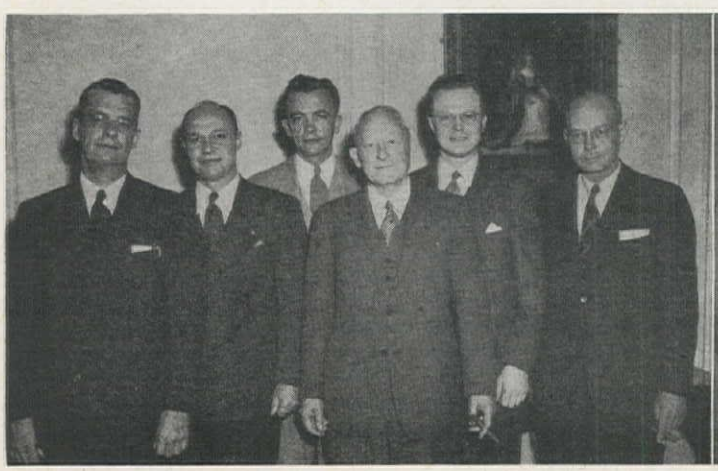
Lack of cooperation between industry, municipalities, and state authorities is often a stumbling block in the financing and construction of adequate combined treatment facilities, reported Leland Sphar, associate engineer with Parker & Hill, Seattle. Although combined treatment is often the only logical method, industry is too frequently ignorant of the facts required by the sanitary designer. When design has been completed and financing is to be arranged, municipal authorities are often unwilling to discuss financing with industry representatives.

Division of financing combined treatment plants between the community and industries of the community can be effected by a two-way preliminary estimate, according to Harrison W. Kramer, partner with James W. Carey and Associates, Seattle. Preliminary estimates should first be made for treatment of domestic wastes only. A second estimate based on enlarged facilities required for treatment of industrial wastes together with domestic wastes will permit arrival at a figure of additional costs required by inclusion of the former, which may then be spread between all industries.

The committee on sewage treatment by ozone reported that the plant at West Kelso, Wash., will probably be in operation again by the middle of June after a six-month period of inactivation. The plant was operated for a few days in September, 1946, during which time the effluent appeared to be comparable to that of an activated sludge plant. However, the short period of operation did not permit conclusive tests to be made, and economy could not be determined. New activity at the plant includes redesign of many of the units with correction of early mistakes. Definite results of plant operation may be available by the end of 1947. In the meantime the committee saw no reason for modifying its earlier report recommending against adoption of the ozone method of sewage treatment.

Election of officers at the banquet concluding the meeting resulted in H. C. Clare, director of public health engineering for Idaho, succeeding to the presidency. Other officers for the ensuing year include Kenneth Spies, associate state sanitary engineer for Oregon, first vice-president; and Emil C. Jensen,

NEW OFFICERS, PNW Sewage Works Association, left picture, left to right: H. C. CLARE, president; W. H. WISELY, national executive secretary; EMIL C. JENSEN, second vice-president; WM. P. HUGHES, secretary-treasurer; KENNETH H. SPIES, first vice-president; and C. M. HOWARD, retiring president. Newly-elected officers of the PNW Water Works Section, right picture, l. to r., are: CHAS. H. WILLIAMS, retiring chairman; HARRY E. JORDAN, national secretary; ELMO JAMES, trustee; FRED C. MERRYFIELD, re-elected secretary-treasurer; J. E. MORRISON, vice-chairman; SIDNEY J. BENEDICT, 1947 chairman; WALTER J. MOORE, national director from the Pacific Northwest Section. Meetings were held in Victoria, B. C.



chief public health engineer for Washington, second vice-president. William P. Hughes, city engineer of Lewiston, Idaho, was re-elected secretary-treasurer, and C. M. Howard, retiring president, became a member of the board of control.

Water Works

WATER SERVICE to consumers residing outside corporate limits was the principal topic of discussion, sometimes heated as well as lengthy, at the twentieth annual meeting of the Pacific Northwest Section of the American Water Works Association which was held in Victoria, B. C., May 15 to 17. A plan for development of a metropolitan water district in the Willamette Valley of Oregon was presented in a paper prepared by Ivan Oakes, engineer analyst for the Willamette River Basin Commission.

In opening the discussion on handling of water service to the urban fringe, Walter J. Moore, water superintendent of Eugene, Ore., indicated that the problem is handled by refusing to serve individual consumers, but serving groups which may be organized, either formally as water districts under state law, or informally. Growth of the fringe areas has doubled in the past 5 yr. and now represents about 25 per cent of the water department customers.

It seemed to be felt that eventually either the problem of securing adequate water service, or the necessity of providing sanitary facilities would result in many of the fringe areas applying for annexation to the adjoining city. One case where neither has proved to be of sufficient impelling power is McMinnville, Ore., where the existing capacity of the water supply system has reached its maximum and the city expects to have to undertake construction of a sewage treatment plant in the near future. Nevertheless, residents refused annexation.

One point of view, expressed in similar ways by William P. Hughes, city engineer of Lewiston, Idaho, and W. C. Morse, water superintendent of Seattle, was that cities have certain responsibility to adjacent unincorporated areas by reason of the fact the residents of both are closely linked both economically and in matters of sanitation. Ben S. Morrow, city engineer of Portland, suggested that sufficient attention has not been given to the advantages of the metropolitan water district type of operation.

A development of this type was suggested for the Willamette Valley Basin in western Oregon in connection with the Willamette Valley flood control project which is under construction by the Corps of Engineers. The proposed plan calls for laying out a plan for a metropolitan water district covering both the upper and lower valleys. Local water districts organizing within the valley would be required to have systems designed in conformity with the overall plan so that eventually all could be incorporated in a single large district.

Questioning the value of designs based on population estimates projected 35 to 40 yr. into the future, Holly A. Cornell, member of the firm of Cornell, Hayes & Merryfield, Corvallis, Ore., recommended the use of flow-per-unit-area determinations as a basis for simplifying design problems. In the Willamette Valley such flows have been found to average about 50,000 gal. per 1,000 sq. ft. per day.

Soil-cement can be used effectively in water supply reservoirs under certain circumstances, J. R. Heath, president of General Engineering Co., Seattle, told those in attendance at the engineering and construction division. Adoption of this type of construction requires a careful sieve analysis and chemical analysis of the soil prior to final determination of the design. Construction of two earthfill dams in northern Washington with central cores of soil cement resulted in impervious structures at costs not appreciably greater than compacted clay embankments at the same sites would have been.

Only one gadget was submitted at this year's convention for consideration in the annual gadget contest. The award went to J. A. Kuehl, engineer with the Tacoma water department, who submitted photographs and drawings showing a method of connecting a 39-in. steel transmission main with a 52-in. steel main under pressure. The method was described briefly in the February, 1947, issue of *Western Construction News*.

G. B. Schunke, assistant superintendent of the Seattle water department, was given the George W. Fuller memorial award for 1947 in the Pacific Northwest Section. Harry E. Jordan, national secretary for the American Water Works Association, made the presentation.

The third day of the convention was occupied by a trip to the Sooke Lake dam and other features of the Victoria water works system. G. B. Irwin, city engineer and water commissioner for Victoria conducted the tour, and had previously outlined the development of the system, and described a $4,250,000 improvement program to be undertaken during the next 15 yr. One of the principal units of the improvement program will be a 7-ft. tunnel to be driven from Sooke Lake dam to Humpback reservoir to replace the 42-in. concrete pipe line which meanders 27½ mi. to deliver water an air-line distance of about 7 mi., and last year lost 60 per cent of the reservoir outflow through leaks.

Sidney J. Benedict, assistant engineer with the Portland water bureau, was elected chairman of the section for the ensuing year, succeeding Charles H. Williams, superintendent of the Olympia, Wash., water department. Other officers include James E. Morrison, manager of utilities for Renton, Wash., vice-chairman; Elmo James, water superintendent of Spokane, trustee; and Walter J. Moore, water superintendent of Eugene, Ore., national director. Fred C. Merryfield, professor of sanitary engineering at Oregon State College, was re-elected secretary-treasurer.

Wood Preservers

MODIFICATION of timber treatment specifications and standards constituted the principal business of the forty-third annual meeting of the American Wood Preservers' Association held in Portland April 22-24. Numerous changes were made in the tentative standards for pressure treatment of intermountain Douglas fir and hemlock, most of them being minor in nature, although the penetration limits for poles was reduced to 0.75-in. minimum and the requirement for penetration of 85 per cent of the sapwood was eliminated.

The study on treatment standards for intermountain fir and Western hemlock led to the instigation of further study to identify refactory characteristics of

A. J. LOOM, left, new president of Wood Preservers Association, and R. H. RAWSON, retiring executive of the group.

Douglas fir. General agreement throughout the treating industry that Rocky Mountain types of Douglas fir are more difficult to treat than the Pacific Coast type has resulted in the establishment of special studies at Oregon State College to determine the factors causing refactoriness. Preliminary investigations indicate that rate of growth may be associated with treatability.

Growing interest was reported in the use of glued-laminated bridge stringers built of pressure treated wood. American Lumber & Treating Co. is engaged in a project in Oregon in conjunction with the Spokane, Portland & Seattle Railroad and the Wauna Lumber Co. Stringers will be fabricated from 3 x 10-in. Douglas fir to build up 9 x 18-in. by 28-ft. stringers. Four combinations of treatment and gluing will include building up stringers with untreated wood and treatment with Wolman salts and fire retardant, and treatment of individual laminations with Wolman salts and creosote prior to gluing.

Establishment and operation of the Northwest Chemonite Corp., plant at Linnton, Ore., was described by Chester W. Ott as the third of three papers on the development of Chemonite, a cop-

per, arsenic, and ammonium acetate treatment first developed at the University of California for treatment of live trees against fungus and insects. In operation since 1941, the plant has treated considerably more than 40,000 MFBM of unseasoned Douglas fir.

At the final session of the convention R. H. Colley presenting the report of the special committee on AWPA specifications and manual recommended that standards recommended by the committees be accepted as standard and inserted immediately in the manual rather than being held as tentative over a period of years. Standards adopted would be subject to revision by the convention the following year. The recommendation was accepted, and will be incorporated into the new manual which will be issued this fall.

New officers for the year were elected at the business meeting closing the session. A. J. Loom, Brainard, Minn., was elected president to succeed R. H. Rawson, consulting engineer of Portland. Other officers include G. B. McGough, first vice-president; J. S. Giddings, second vice-president; and H. L. Dawson, who was re-elected secretary-treasurer. New members elected to the board of directors included J. B. Akers, J. O. Blew, and L. J. Jacoby.

Snow Meeting

WATER SUPPLY for power and irrigation in the Pacific Northwest appears to be adequate in most sections according to forecasts announced at the tenth annual meeting of the Columbia Basin Water Forecast Committee held in Portland, Ore., in conjunction with the Western Snow Conference and the Hydrology section of the American Geophysical Union. The triple conference on April 21-23 was attended by representatives from all of the Western states.

The Columbia River Basin water forecast occupied the first morning. Summarization of the individual reports and forecasts by George H. Canfield, U. S. Geological Survey, Portland, compared the forecasts for peak flow in the Columbia. Bonneville Power Administration produced the highest of three estimates with 596,000 sec. ft. The Corps of Engineers estimated a median 560,000, while the Weather Bureau was low with 510,000. All figures are for the flow at The Dalles.

The Columbia forecast was closed at a luncheon meeting of the CDTFFPOBGOPDOCRNTD (committee donating to fund for promotion of better guessing of peak discharge of Columbia River near The Dalles). The annual pool on the peak discharge brought out estimates ranging from below 500,000 sec. ft. to above 600,000, as well as considerable comment on rubber rating curves attributed to the winner of the 1946 pool.

Under proper conditions clouds can be made to produce snow by seeding the cloud with selected types of foreign materials, Vincent J. Shaefer, research chemist for General Electric Research Laboratories, told those in attendance at the Western Snow Conference, Shaefer said that it was economically feasible to nucleate the atmosphere over the entire United States. Experiments to date have largely been in the production of precipitation from super-cooled clouds and nothing has been done to produce precipitation from clouds above 32 deg. F. For the immediate future interest lies principally in the dissipation of hail storms.

A joint dinner meeting of the three organizations was addressed by John W. Haw, director of the agricultural development department, Northern Pacific Railroad, St. Paul, Minn. In speaking on the future of western development, Haw said, "Above all things we must retain the confidence and the good will of the country, as represented by Congress, in these great water control and use projects. The strongest, most compelling argument favoring their authorization is that they are wholly or in large part self-liquidating as to capital cost, and that as to power features interest is returned to the Federal treasury to offset the interest which it in turn pays on the money borrowed from its citizens. To validate this claim it may become necessary to raise somewhat the yearly assessment for provision of an irrigation water right or the rate at which power is merchandized in order to establish these projects as a national investment rather than an expenditure."

The second feature of the evening meeting was an attempt to evaluate in concrete terms the usefulness of snow surveys to water users in 1946. Of fifteen speakers representing private industry and various levels of public agencies only two were able to place a dollars and cents value on the results of snow surveys, although all agreed that large benefits do accrue in ways difficult to evaluate. In the case of the Kootenai Valley in northern Idaho, where a flood was predicted for 1946, an estimated $3,500,000 was saved through strengthening of dikes which prevented any broaching and avoidance of planting in undiked areas which were flooded. The Merced Irrigation District in central California reported that its contribution to the cooperative snow survey in that state represented the profit from only four hours operation of its Exchequer hydroelectric plant.

Trends in runoff in the Pacific Northwest, discussed by C. C. MacDonald, U. S. Geological Survey, Tacoma, Wash., emphasized the decline in recorded water supplies over the past 90 years. The Columbia River, which in the 1858-67 decade had an average peak discharge of 733,000 sec. ft. at The Dalles, Ore., shows a decline to 428,000 for the average peak discharge over the 1938-46 period, representing an average decline of 3,400 sec. ft. per year for the 89 yr. of record. Tributaries of the Columbia show similar trends of decreasing flows although records generally are for shorter periods.

Several meteorological records show corresponding trends. Precipitation has had a decreasing trend through the same period, although not to as great an extent. Precipitation at Portland has been more or less constant since 1895, however. Mean annual temperatures, on the other hand, show an increase which might account for an increase in evaporation and transpiration losses. The trend toward drier and warmer weather is also indicated by the steady recession of glaciers in the Cascade Mountains which was the subject of another paper by Arthur Johnson, U. S. Geological Survey, Tacoma.

Delegates attending the meeting of the Western Snow Conference selected Reno, Nev., as the site of the 1948 conference with the date set tentatively as April 16. The Colorado Basin Water Forecast Committee and the Section of Hydrology of the American Geophysical Union will be invited to join in the 1948 meeting. It was proposed that the meeting be held in honor of Dr. J. E. Church, University of Nevada, founder of the Western Snow Conference.

DINNER MEETING of the joint snow conference; at the head table were, l. to r.: Miss RUTH SINGER, secretary; FRED PAGET, State of California; GEORGE D. CLYDE, Soil Conservation Service, Utah; JOHN W. HAW, Northern Pacific R.R.; PHIL E. CHURCH, Univ. of Washington; WAYNE D. CRIDDLE, Soil Conservation Service, Idaho; M. W. KYLER, chairman, Central Snow Conference; G. H. CANFIELD, Portland, Ore.

A. G. C.

LABOR AGREEMENTS, apprenticeship training, industrial insurance, and multiple chapter memberships were the principal topics of discussion at the annual spring meeting of the Pacific Northwest Branch of the Associated General Contractors held in Tacoma, Wash., April 18-19. Fourteen official chapter representatives and six chapter secretary-managers were in attendance from the eight chapters comprising the branch, and in addition a number of

visitors from nearby chapters.

One of the outstanding actions of the delegates was the approval of a recommendation that members of one chapter working in territory under the jurisdiction of another chapter be granted membership in the second chapter at 50 per cent of the fee charged resident members with waiver of the initiation fee. This subject has been under discussion for a number of years, and delegates attending the convention felt that the action taken represented a definite step forward. The recommendation now goes to the individual chapters for approval or rejection.

Following reports from each chapter on labor agreements, and an extended discussion of the subject including escalator, travel, and subsistence clauses, chapter managers were instructed to confer and bring to the fall meeting a recommendation for a uniform labor agreement to be used by all chapters included in the membership of the branch.

Sessions of the Pacific Northwest Branch were presided over by A. Stuart Macdonald, who was elected president to succeed M. P. Munter. Ray R. Kelly was elected vice-president, J. A. Harrison, treasurer, and J. P. Hart, secretary. All officers for the year are from the Tacoma chapter which is host to the branch this year. Arrangements for the convention were directed by W. A. Osborne, secretary-manager of the Tacoma chapter.

Cast Concrete Truck Barrier

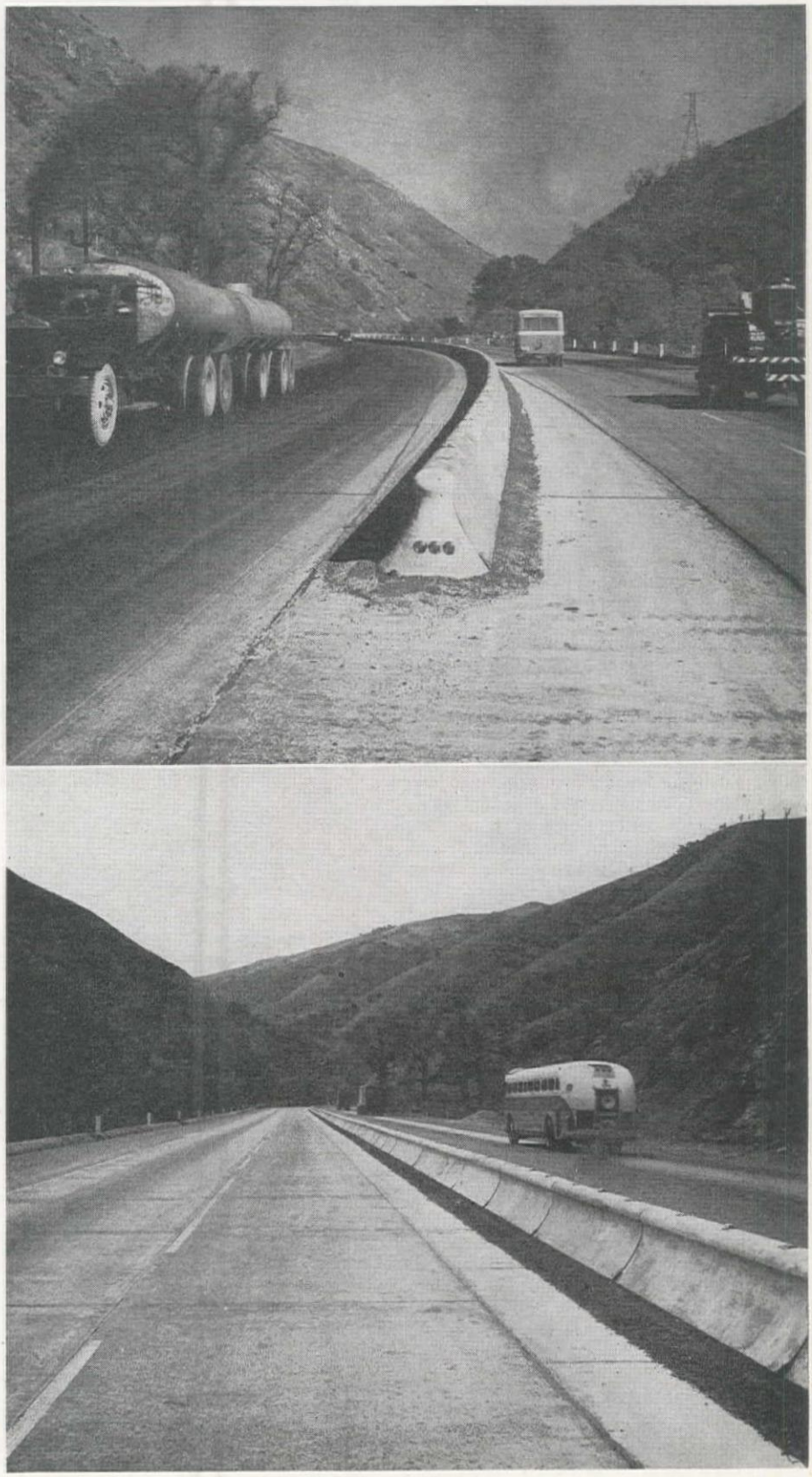
SOMETHING NEW in the way of highway barriers is being tried on the hazardous Grapevine grade on U. S. 99, the famous "Ridge Route" between Los Angeles and San Francisco, through replacement of a section of metal barrier wall with a new concrete deflector barrier. The concrete addition was erected in an attempt to reduce high maintenance costs of the former metal rail and to provide additional assurance against head-on collisions on the stretch of highway, located halfway between Fort Tejon and Grapevine Station.

The 4.9-mi. long, 6 per cent Grapevine grade, long the site of many accidents, averages a volume of 7,000 vehicles per day, 1,000 of which are trucks which approach the legal maximum. The guard rails of metal and wood and a division strip which divided the north and southbound lanes of traffic proved inadequate by failing to prevent heavy runaway trucks coming down the steep grade from crossing over into the opposing stream of traffic.

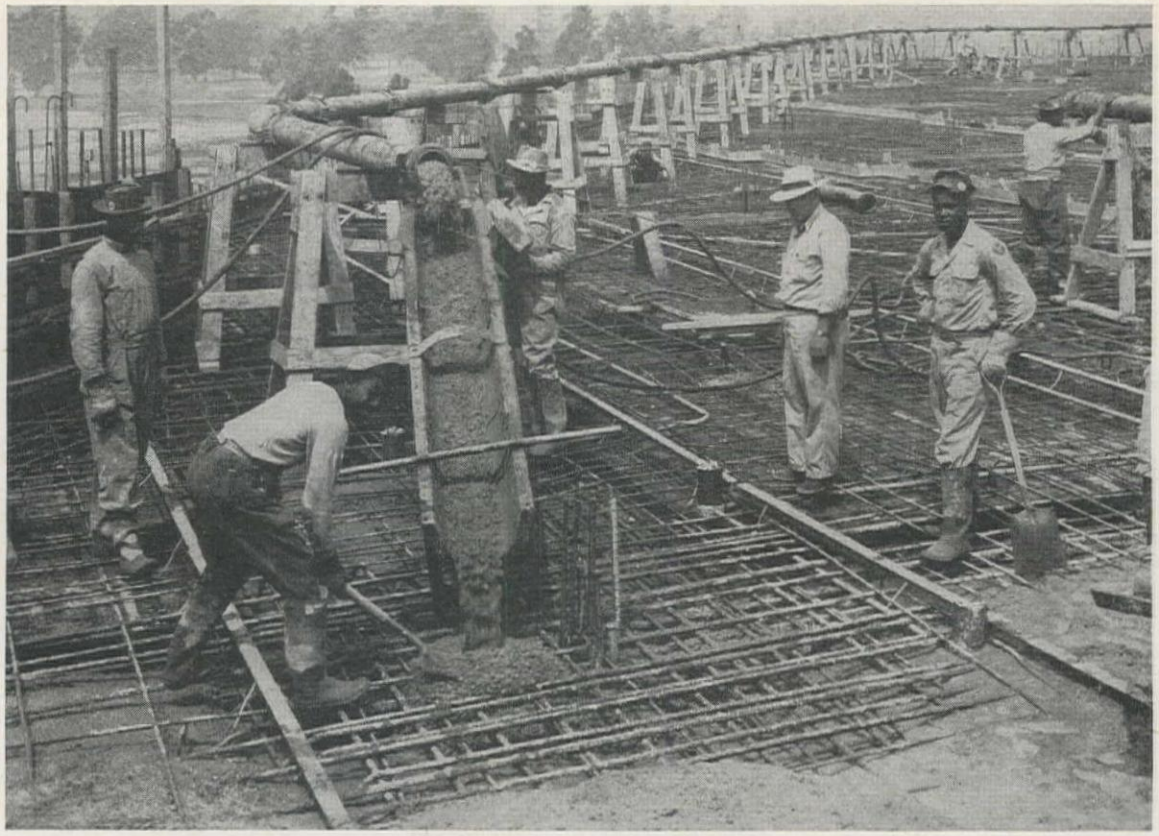
Maintenance costs for the old guard rail were excessive, as speeding trucks or those out of control used it as a rubbing strip to reduce speed. The new barrier is designed so trucks cannot rub against it. The parabolic base repels truck wheels from the barrier without permitting rubbing action. Constructed of precast units 10 ft. long and weighing approximately 3,000 lb. each, the new experimental barrier is only 2,000 ft. long.

The units were cast in the Bakersfield yard of The Griffith Co., contractor, according to Division of Highways plans and specifications, and were installed by the same firm. They are held in place by vertical ¾-in. expansion bolts into the pavement at 3-ft. centers. Total cost of the present 2,000-ft. section was $20,000.

No fatalities have been reported since its installation in October, 1946. After a sufficient period of testing, if the barrier seems to produce satisfactory safety results, it will be extended over the entire 4.9-mi. particularly dangerous stretch.



EXPERIMENTAL cast concrete traffic separator, installed on the Ridge Route when metal guard rail proved inadequate to withstand the thrust of heavy trucks rolling out of control down the heavy grade.



DELIVERING CONCRETE by pipeline during construction of floor slabs at the May Co. Crenshaw building in Los Angeles. A new method of building erection, William Simpson Construction Co. found it entirely satisfactory.

Building Poured by Pumpcrete

Conveyance of concrete through pipes, although widely used for mass placement, is demonstrated on Los Angeles store building, to be practicable for walls, slabs, columns, etc.

By S. PERLITER
Perliter & Soring, Engineers,
Los Angeles, Calif.

PUMPCRETING a reinforced concrete building is a somewhat unique application of equipment in the construction of a new department store owned by the May Company in Los Angeles. Although use of pumpcrete machines has been universally accepted in practically all other types of construction, many architects, contractors, and engineers engaged in general building work apparently have not recognized the adaptability and advantages of pumpcrete as applied to the building industry. With the employment of pumpcretes, a central plant and a pipeline to the delivery point is substituted for the slow, costly, bothersome use of elevators, towers, platforms, runways, and buggies. Pumpcretes place concrete almost anywhere, usually with substantial savings in expense and labor, and with the allowance of greater freedom for other construction activities.

Pumpcretes were introduced on the Pacific Coast in 1932, when it was proven to the builders of Hoover Dam that the pumping method would be the ideal solution to the placement of 250,000 cu. yd. of concrete which were required on that project from 1932 to 1934. In 1934, 75,000 cu. yd. of concrete were pumped off shore into the piers of the San Francisco-Oakland Bay bridge, and from 1935 to 1937 more than 600,000 cu. yd. of pumpcrete were placed in tunnels of the Colorado River aqueduct of the Metropolitan Water District of Southern California. It was in this latter project that many of the original operating difficulties were overcome, and the present-day operating technique was perfected. The first large building to be constructed with use of pumpcrete in Los Angeles was the 17-story Federal Post Office, where 50,000 cu. yd. of concrete were pumped into place. Thus through 16 years of pumpcrete equipment development, pumping through a pipeline became one of the most satisfactory proven methods of transporting concrete.

Building design

The May Co. store, when completed, will be a three-story, mezzanine and full basement structure, allowing approximately 261,500 sq. ft. of floor space, and containing 15,000 cu. yd. of concrete. It will have reinforced concrete floor slabs and roof, architectural concrete exterior trimmed with black Granux, and marquee on three sides, and will be supported by 1,500 monotube piles capped with reinforced concrete mats 6 to 8 ft. deep. Columns are spaced in a rectangular pattern 24 x 20 ft., and vary in diameter from 30 in. in the basement to 15 in. on the third floor. Floor construction of the building is unique in that 6-in. slabs are supported by beams 12 in. deep and 6 to 8 ft. wide. Reinforced concrete exterior walls vary in thickness from 14 in. in the basement to 10 in. on the third floor.

Ready-mixed concrete for the May Co. building is supplied from a permanently located plant some distance from the construction site. Loaded transit-mix trucks back up to a short ramp and dump into a remixer set directly over a pumpcrete machine which is centrally located in the construction area. From the pumpcrete machine, concrete is pumped through an 8-in. pipeline to all parts of the structure. The pipeline is made up of sections 10 ft. long, held together by special quick opening toggle couplings. Shorter lengths of pipe and a variety of elbows to facilitate pumping of concrete to any location and in any direction are also provided.

Concrete placing

The concrete placing crew on the May Co. job is made up of three vibrator men, one hose tender, four shovel men, two clean-up men, and three pipe tenders—thirteen men in all. When 75% complete, the largest pour on the building was 406 cu. yd. in a ten hour shift. The normal pour for a pumpcrete of the size used on this job is 200 to 250 cu. yd. in an eight hour shift. The longest length of pipe employed on this job was approximately 475 ft. of horizontal run and 40 ft. of vertical run. In this arrangement a horse 6 ft. high was placed under each 10-ft. section of pipe, and a distributing spout was used to direct the concrete to any exact point.

The mix used on the May Co. job is designed to have a slump of 3 in. For slabs and mass concrete and where placing concrete through reinforcing steel is not a problem, a 28-day strength of 3,000 lb. was secured by using a maximum aggregate size of 1½ in. and a maximum volume of aggregate of 5.5 cu. ft. per sack of cement. The cement factor was 6 sacks per cu. yd.

For heavy reinforced sections, thin walls, columns, and deep beams, to secure a 28-day strength of 3,000 lb., the maximum aggregate size was 1 in., and the maximum volume of aggregate 5.0 cu. ft. per sack of cement. The cement factor was 6.46 sacks per cu. yd.

Two admixtures are being used in the concrete. For slabs on earth and concrete walls around basement and pits, 4/5 quart of Red Label Suconem per sack of cement are added. For exterior walls and sign wings, ½ lb. per sack of Plastiment is used.

One of the greatest advantages found in placing concrete with pumpcrete on the job proved to be that the area around the placing operations remained clear and free of runways, buggies, and other congestion, thus eliminating the necessity of additional labor and time for straightening reinforcing steel and other general clean-up.

The May Company's Crenshaw store was designed by Albert C. Martin & Associates, Architects and Engineers of Los Angeles, and Samuel A. Marx of Chicago was Associate Architect. The Joshua H. Marks Co. is the general contractor, and the pumpcrete equipment on the job is under the supervision of Albert Nicholson and Raymond Hamby.

The Pumpcrete machine proper is manufactured by the Chain Belt Co. of Milwaukee, Wis., and sold in the Southern California territory by the Brown-Bevis Equipment Co. of Los Angeles.

Pumping details

The pump has inlet and outlet valves which are synchronized to open and close with the movement of the piston. On the suction stroke, concrete passes from the remixer through the inlet valve into the pump chamber. At the conclusion of the suction stroke the intake valve closes and the outlet valve opens, and on the forward stroke the piston forces the concrete through the discharge valve into the pipeline. On each stroke the concrete is moved a distance equal to the travel of the piston.

Proper planning of a construction job on which pumpcrete is to be used is of extreme importance. The plant should be so located as to facilitate delivery of concrete to it and to minimize length of discharge lines. Lines should be laid on the shortest possible route that will least interfere with other construction operations and that will require the least amount of moving as work progresses.

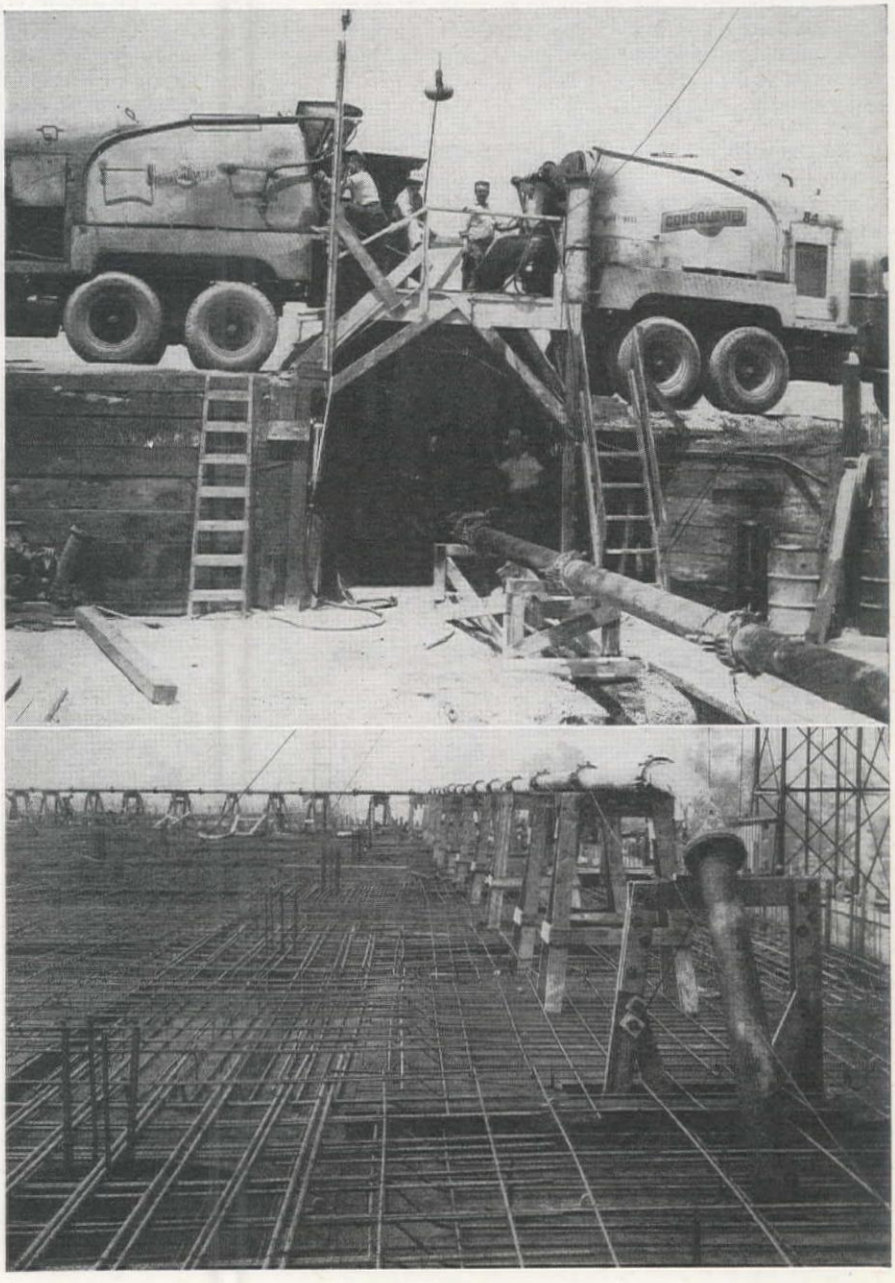
The alignment should be reasonably straight, and sharp bends should be avoided wherever possible, as the power required to pump through a 90-deg. bend is equivalent to the power required to pump 40 ft. in a straight line. Anchors must be provided at all bends to prevent the thrust at those points from displacing the line.

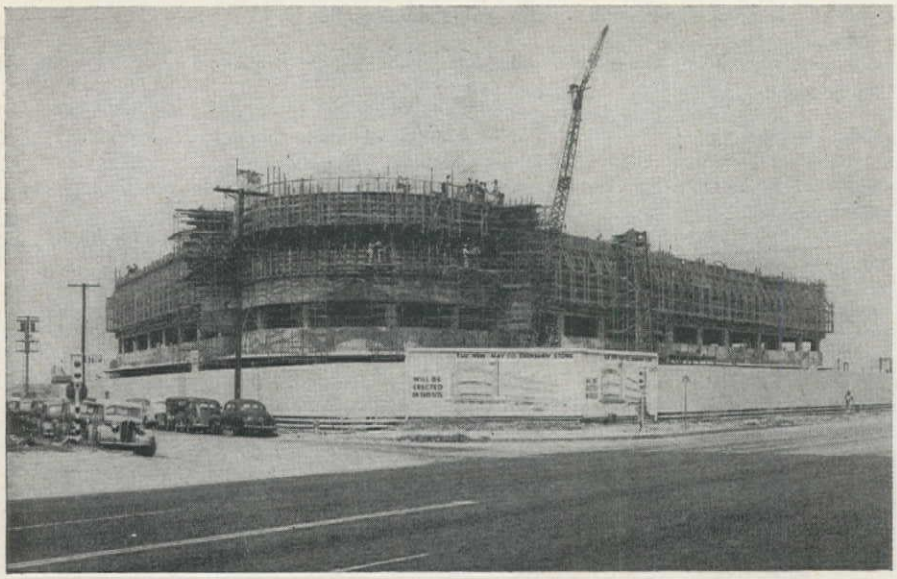
Concrete placing for any particular pour should start at the point farthest from the pumpcrete plant and progress towards the plant. This will allow pumping to go on continuously as sections of pipe may be removed from the end of the line without halting operations. Placing of pipe supports over fresh concrete is eliminated in this manner, and plant output is increased. At least a 50-ft. horizontal run of pipe should be provided between the pump and a vertical rise in the line, as during pumping the inertia of the concrete in this section will tend to balance the back pressure from the weight of concrete in the vertical section. Further, the outlet valve on the pump will operate more easily and with less wear and tear. In order to gain spouting height, the line is usually supported on saw horses or cross frames.

Concrete design for pumping

Probably the most important single consideration in the pumping of con-

TRUCK MIXERS on a ramp are shown in upper picture discharging into the hopper of the pumpcrete machine. Transit-mix trucks feed the concrete direct to machine with minimum effort and no loss of time. Below, pipeline as it emerges from the second floor, through the 3rd floor slab form of the store. Pipeline is supported on horses every ten feet.





VIEW of the May Company Crenshaw store building as it appears 75 per cent complete. Data shows the pumping method of concrete placement compares favorably with other methods.

crete is proper design of the mix, with emphasis on gradation of aggregates. It is a common misconception that concrete for pumping must be wet; that is, have a high slump. This is decidedly not a factor. In fact, free water in concrete to be pumped is a serious obstacle. On the other hand, it is possible to pump concrete of proper mix design with slumps as low as one inch. Practically any grade or quality of concrete can be pumped satisfactorily provided the mix is properly designed. Mixes that are poorly graded and those containing porous or highly absorptive aggregate or aggregates too large for the equipment to handle, have given trouble. Proper concrete mortar possesses good cohesive properties which in pumping support the coarse aggregates at the center of the pipe. Consistency, plasticity and density govern the distance concrete may be pumped.

Gravel is favored over crushed rock as a coarse aggregate in pumped concrete owing to its lesser surface area and its smaller percentage of voids. However, a well-graded cubical stone of normal specific gravity and low absorption is entirely satisfactory. Flat-breaking angular stone is not desirable as a coarse aggregate as it necessitates control of grading, proportioning and mixing.

Porous aggregates such as cinders and those produced from burned clay or from lava rock having a large percentage of voids will tend to dry up a mix because compressive action of the pump forces water into the pores of the aggregate. Consequently, if an initially dry mix is being used, such further loss of moisture under pressure may result in impossible pumping.

It may be generally stated that for conditions favorable to pumping, concrete mixes should follow a smooth grading curve having no excessively flat or steep sections and should contain sufficient fineness to prevent particle interference for the particular cement content. It should be noted that no amount of pressure will pump stone, gravel or sand unless the particles are contained in a properly graded mixture with just sufficient liquid to make it fluid or, as in the case of concrete, the aggregates become a part of a semi-fluid mass by the cohesiveness and lubricating properties of the cement mortar.

Wear and cleanup

An all-important factor in building construction is the steady flow of concrete, as it sets the pace for other construction. A good operator who understands the characteristics of the equipment is essential to the success of a pumpcrete job. Obviously, if the equipment is to function properly, its maintenance is extremely important. Generally, about 50,000 cu. yd. of concrete can be pumped between major overhauls of equipment and before pipeline wear becomes noticeable. Pipe wear is actually very small owing to the low velocity of flow through it.

Upon completion of a pour, a "go-devil," which is a barrel-shaped object with a rubber cup on each end, preceded by a wad of wet burlap or paper cement bags, is inserted into the pipeline just forward of the discharge valve. This plug is forced through the line either by compressed air or by pumping water through it. The remixer should also be emptied of concrete at completion of a pour and flushed clean with water.

Reliable cost data on pumpcreting have been compiled and show that the pumping method of concrete placement compares favorably with other methods on a wide range of projects. One classic example of a large saving concerns a mining company which reported a reduction in cost from $135.00 to $25.00 per cu. yd. in underground concrete placing.

California Construction Contracts Reach Record-Breaking Peak in 1946

A RECORD-BREAKING PEAK of nearly $1,500,000,000 was reached by California construction contracts for the year 1946, it was announced in a report compiled by the technical staff of the State Reconstruction and Reemployment Commission. Contracts awarded, as reported by four leading construction magazines alone, *Western Construction News* being one, totaled $867,640,000, with other construction work unreported through these sources adding another $600,000,000.

Despite reduced buying power of the construction dollar, it was reported, the volume of work contracted for in the state during the year far outdistanced any previous year. About 105,000 dwelling units were built in California last year according to the report, with a construction cost of about $650,000,000.

Contracts reported for public works during the year amounted to $255,000,000, of which $116,000,000 was for Federal construction projects. Awards by the state, counties, cities and other local agencies together amounted to only $139,000,000.

Industrial expansion

Industrial expansion in the West was shown by the fact that a total of 581 contracts were awarded for new factories or industrial plant expansions, 497 of which were in six California counties. Los Angeles County led with 404 and Alameda was second with 45.

Construction applications for 8,243 commercial and industrial projects at an estimated cost of $255,500,000 have been approved by the two regional offices of the Civilian Production Administration in California. The twelve southern California counties were again in the lead, with 5,100 of the total, at an estimated $156,000,000.

Los Angeles County together with the nine San Francisco Bay Area counties held 95 per cent of the total contract awards for private residential building, at a figure of $290,000,000. Most private non-residential construction was also concentrated in those two areas.

Employment in construction, which increased steadily throughout the year, reached a peacetime peak of almost 185,000 in October. This rise has not been as great as the dollar volume would indicate, because of higher postwar construction costs, it was stated.

A breakdown of the reported contract awards for the year into types of construction reveals the following figures:

Private Construction	Amount	Percent
Residential	$315,405,000	36.4
Industrial	116,244,000	13.4
Commercial and Other	181,226,000	20.9
	$612,875,000	70.7
Public Construction		
Housing	$ 25,438,000	2.9
Other Buildings	26,474,000	3.0
Other Construction	202,853,000	23.4
Total Public	$254,765,000	29.3
Total Public and Private	$867,640,000	100.0

Construction Design Chart

LXXXIV . . . Stiffness Factor for Concrete T-Beams

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

A RELATED series of charts for the determination of bending moments in fixed end beams have been presented in past issues. These were designed as an aid in making an analysis of a building frame by the method of distributed moments. On releasing a joint, in the analysis, it is necessary to know the relative stiffness of adjacent beams and columns in order to properly distribute the moment differential. The accompanying chart has been designed to provide a quick means of determining the stiffness factor of T-beams. A somewhat similar chart for concrete columns will be presented in the December, 1947, issue.

The determination of the stiffness of composite members of reinforced concrete is open to arguments. An exact solution is impossible for actually the stress-strain relation of concrete is not a straight line. Computing the moment of inertia of a concrete member with reinforcing steel by the method of transformed sections is still an approximation based on a constant relation of $\frac{E_s}{E_c} = n$.

The A. C. I. Code and the Joint Committee Report both recommend, for purposes of analysis by distributed moments, that the moment of inertia of reinforced concrete members be based on the gross section omitting the effect of the reinforcing steel. The effect of the T-beam flange is problematical since the flange is not fully effective for the entire span of a continuous beam due to the reversal of stress.

The Portland Cement Association[1] recommends, as a satisfactory approximation, the doubling of the moment of inertia of the gross web section of a T-beam in order to allow for the effect of the flange. Thus the moment of inertia, computed for the web only is

$$I = \frac{b' D^3}{12}$$

The stiffness factor for a reinforced concrete T-beam would then be

$$K = \frac{2I}{L} = \frac{2\, b' D^3}{12\, L} = \frac{b' D^3}{6\, L}$$

If the stiffness factor, for both beams and columns, is divided by a constant factor, the relative stiffness would remain the same. Thus reference 1 gives a table by which the stiffness factors for concrete T-beams may be obtained on the relation

$$K = \frac{2\, I}{10\, L} = \frac{b' D^3}{60\, L}$$

The accompanying chart has been designed to give the same information as Table III of reference 1, without the difficulties of two-way interpolation for intermediate values. Two straight lines, intersecting on the line marked "Support" are necessary for a solution of the chart. One such line must be drawn between values on the (A) scales, while the other solution line must pass through the intersection on the "Support" and values on the (B) scales. I have drawn solution lines on the chart for the following assumed conditions:

Breadth of stem, $b' = 15$ in.
Overall depth, $D = 24$ in.
Beam span, $L = 30$ ft.

The stiffness factor, as determined by the chart, is seen to be about

$$K = 120$$

whereas Table III of reference 1 gives a value of

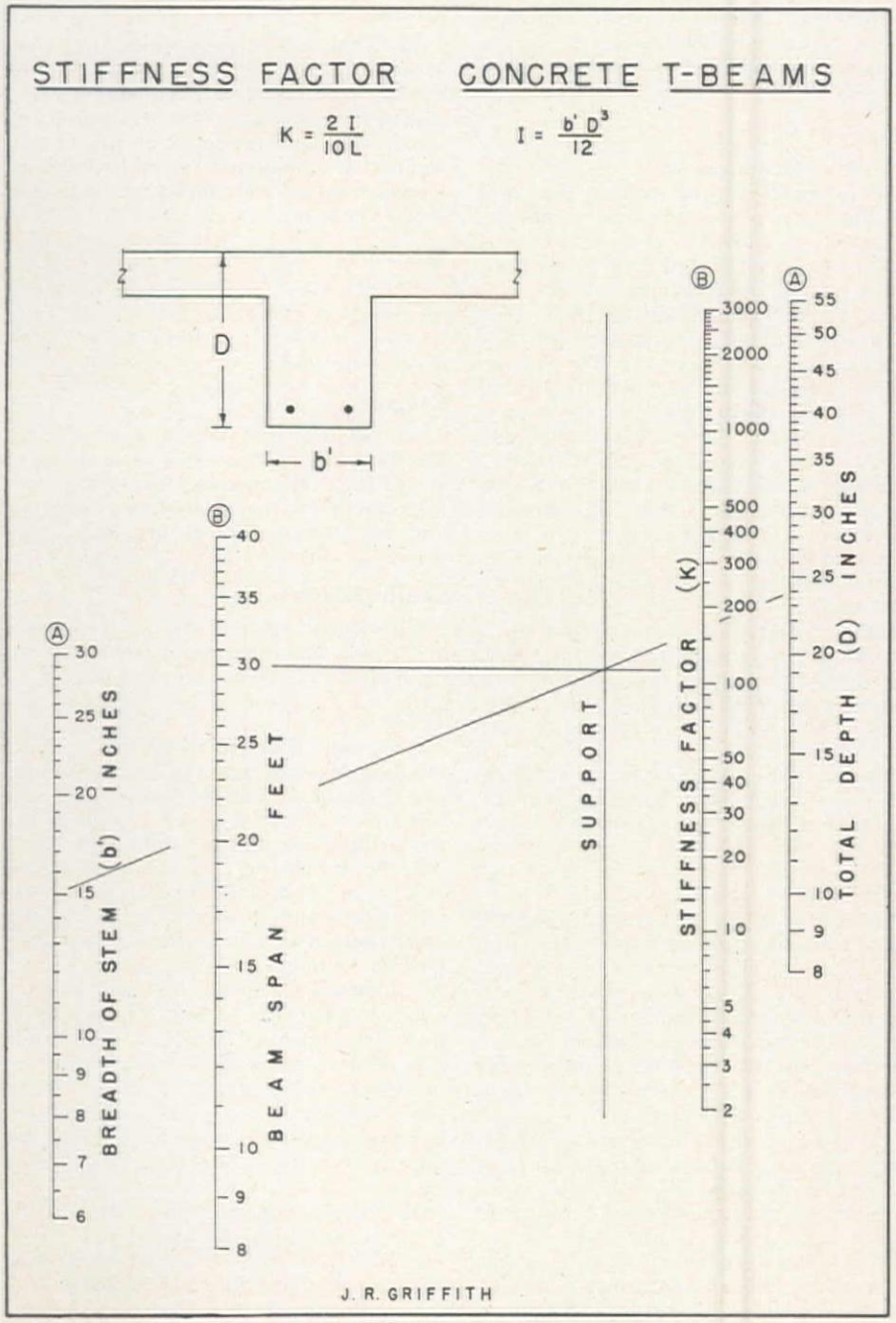
$$K = 115$$

By substitution in the equation, we obtain

$$K = \frac{b' D^3}{60\, L} = \frac{15 \times 24^3}{60 \times 30} = 115.5$$

In consideration of the assumptions made, an accuracy such as obtained by use of the chart would be entirely within reason. Furthermore, any slight difference would not be noticed when distributing the moment differential.

[1] "Continuity in Concrete Building Frames," Third Edition, Portland Cement Association.



State Approves Sewage Plans

OREGON CITY is the first municipality to submit final plans for construction of sewage treatment works as a part of the postwar Willamette River pollution abatement program. Plans for the $350,000 project were prepared by Stevens & Koon, Portland, and have been approved by the Oregon State Sanitary Authority.

Further Advances Granted to Western States by FWA, REA

MANY FURTHER advances have been announced during the past month by both the Federal Works Agency and the Rural Electrification Administration. Advances made by the FWA are for the financing of preparation of drawings and specifications for local public works, and are to be repaid, without interest, when construction is begun. REA loans are used to finance rural electric facilities or rural distribution lines, and are to be repaid from operations of the facilities.

FWA

Alaska

A Federal advance of $10,000 was made to Petersburg to finance plans and specifications for a high school, including an auditorium, estimated cost of which is $300,000.

Arizona

Willcox received two loans for preparation of drawings and specifications. One advance for $2,500 was for proposed additions to the sanitary sewage collection and treatment system, estimated at $59,100. The other was an advance of $4,200 for natural gas distribution system estimated cost of which was $98,000. Yavapai County received $4,600 for additions and alterations to the hospital near Prescott, estimated at $127,600.

California

Compton Junior College District received a Federal advance of $5,050 for proposed gymnasium additions and alterations at Compton, estimated cost of which is $121,500. Fallbrook Union Elementary School District of San Diego County was granted $6,700 for elementary school additions at Fallbrook, to provide classrooms and administration office at an estimated cost of $156,368. Advances to Norwalk School District of Los Angeles County totaled $10,200 for a primary school at Norwalk, including classrooms, toilets and administration unit, at a total estimated cost of $267,320.

Colorado

Louisville was advanced $2,850 for street paving, curb and gutter and appurtenant work, estimated at $140,000. An advance of $7,700 was also granted School District No. 4, Weld County, to finance preparations and specifications for a new gymnasium and addition to the auditorium at Windsor, at an estimated cost of $175,000.

Montana

Great Falls was advanced $2,000 to finance preparation of drawings and specifications for enlargement of the ice arena in the Civic Center Building at an estimated cost of $54,500. Great Falls was also given $2,800 for a sanitary sewer system in the southwest section, estimated to cost $90,300.

New Mexico

A Federal advance of $1,750 was granted to Hatch for preparation of drawings and specifications for sanitary sewer system extensions and improvements, estimated to cost $62,000.

Oregon

Junction City was granted $7,500 by the Federal agency for plans and specifications for a sanitary sewerage system and treatment plant, estimated at $203,700. Independence received an advance of $4,900 for an estimated $130,500 sanitary sewerage system extension and sewage treatment plant, and the Union High School District No. 3, Washington County, received $7,800 for a high school gymnasium at Hillsboro, estimated to cost $210,000.

Texas

Lufkin was awarded a Federal advance of $5,450 to finance drawings and specifications for a municipal building, estimated at $189,500. Rogers received $2,250 for an estimated $59,000 sanitary sewer system and treatment plant.

Big Spring Independent School District was granted a total of eight advances, all for projects at Big Spring. These included an advance of $13,350 for a senior high school with cafeteria and auditorium, estimated at $469,250; $4,800 for a proposed $178,500 elementary school; an advance of $3,400 for a senior high school gymnasium, estimated at $118,650; $1,450 for proposed additions to Kate Morrison Elementary School at a cost of $51,450; a loan of $1,750 for College Heights Elementary School addition, costing $61,950; another advance of $1,750 for South Ward Elementary School addition estimated at $61,950; and $1,450 for Lakeview School addition, estimated to cost $51,450.

Cleburn received an advance of $5,600 for plans for airport grading, runway paving and hangar, at a proposed cost of $194,400.

Wyoming

Gillette received an advance of $5,000 for a water treatment plant, estimated cost of which is $109,000, while School District No. 3, Carbon County, was given $8,400 for an elementary school at Rawlins, estimated at $263,100. School District No. 24, Fremont County, received $3,050 in Federal funds for a school addition at Shoshoni.

Trustees of the University of Wyoming were awarded a Federal advance of $22,500 for preparation of drawings and specifications for a stadium and field house at Laramie, estimated cost of which is $800,000. Another advance was given to the Board of County Commissioners of Albany County, $13,500 for a proposed $373,000 addition to Ivinson Memorial Hospital at Laramie.

REA

Arizona

The NYCO Electric Cooperative, Inc., Salome, a new borrower, was loaned $298,000 by the REA for acquisition and rehabilitation of three mi. of line serving 50 consumers from the Sheffler Brothers of Salome, for acquisition and rehabilitation of 15 miles of line serving 330 consumers from the Parker Electric Supply Company, of Parker, and for the construction of 135 mi. of new line to serve 247 additional rural consumers made possible by these acquisitions.

Colorado

The Poudre Valley Rural Electric Association, Inc., Fort Collins, received $195,000 for system improvements and for 64 mi. of line to serve 363 rural consumers.

Kansas

The C.M.S. Electric Cooperative, Inc., Meade, received $357,000 for 262 mi. of line to serve 306 rural consumers. Included in the loan are funds to purchase, rehabilitate and integrate 28 mi. of line serving 46 consumers near Protection, Kans., and to construct 32 mi. of line to serve 33 consumers.

Montana

The REA recently granted $165,000 to the Sun River Electric Cooperative, Inc., Fairfield, for 129 mi. of line to serve 168 rural consumers.

Oregon

An advance of $100,000 was made by the REA to the Wasco Electric Cooperative, Inc., The Dalles, for system improvements to completed construction and for completion of previously approved construction.

South Dakota

The Butte Electric Association, Inc., at Newell, was granted $50,000 for 30 mi. of line to serve 60 rural consumers.

Texas

Greenbelt Electric Cooperative, Inc., Wellington, was granted an REA loan of $150,000 for 63 mi. of line to serve 202 consumers. This loan includes funds for the acquisition and rehabilitation of 10 mi. of line serving 25 consumers in the village of Kellerville from the Kellerville Light and Power Co., and for the construction of 13 mi. of line to serve 15 rural consumers.

A loan of $175,000 to the Lamb County Electric Cooperative, Inc., of Littlefield, was also approved by REA. The funds will be used to finance system improvements and to construct 126 mi. of line to serve 290 rural consumers. McCulloch County Electric Cooperative, Inc., of Brady, received $260,000 for 240 mi. of line to serve 441 rural consumers.

Pedernales Electric Cooperative, Inc., of Johnson City was awarded $620,000 for 537 mi. of line to serve 828 rural consumers, while a loan of $330,000 was granted to the Taylor Electric Coopera-

tive, Inc., of Markel, for system improvements and for 298 mi. of line to serve 584 rural consumers. The Tri-County Electric Cooperative, Inc., of Azle, received $370,000 for 318 mi. of line to serve 829 rural consumers.

Utah

The Escalante Valley Electric Association, Inc., of Modena, was granted REA funds of $115,000 for 27 mi. of line to serve 30 rural consumers and 54 irrigation pumps.

Washington

A loan of $180,000 was made by the REA to the Benton County Rural Electrification Association, Prosser, for completed construction and for 76 mi. of line to serve 182 rural consumers.

Construction Costs Discussed At AGC Board Seattle Meet

CONSTRUCTION COSTS generally are reaching a point of stabilization, although conditions in the industry vary widely in different parts of the country. This was the conclusion reached by members of the board of directors and the advisory board of The Associated General Contractors of America after three days of deliberations at the 1947 spring meeting of the two boards at Seattle.

The formal statement authorized by the combined boards at the concluding session on May 21, was as follows:

"It is our considered judgment that:

"1. Although conditions in the industry vary widely in the different sections of the country, as a general trend construction costs are reaching their peak and becoming stabilized.

"2. The efficiency and economy with which the industry can operate will improve at the rate at which adjustments to new conditions are made by the entire economy.

"3. During a period which cannot be foreseen accurately, construction costs may decline gradually until they reach what can be considered the new normal levels.

"4. In an economy which has been subjected to the inflationary pressures of World War II, construction costs generally cannot return to levels which prevailed before the war unless the nation suffers an economic catastrophe. When prices reach new normal levels they generally will be substantially above prewar levels.

"5. The public should not be led to believe that there will be quick or drastic reductions in construction costs. There may be reductions in costs of materials, but they may not be great. Decreases in wage rates are not forseeable without a depression. Reductions in costs will come through elimination of uncertainties in business conditions, increased productivity of workmen, increased efficiency by management, development of more economical methods of construction, and other factors. These will come about, but the changes will be gradual.

"6. Buyers' resistance has developed throughout the country in construction. In part this has been the result of buyers' resistance to the prices of other services and commodities which has discouraged investment for expanded business facilities.

"7. The price of projects completed to specifications of the owner is established by the costs of construction operations for which general contractors have the central responsibility. General contractors fully recognize their responsibility to the buying public to do all within their power to hold costs to the minimum possible for the quality specified.

Recommendations

"8. Steps which the Governing and Advisory Boards recommend to general contractors throughout the country include the following:

"a. Where it is the normal custom of the contractor, and to the fullest extent possible, firm prices should be quoted to the owner. Contractors should require firm prices from subcontractors and sellers of materials and machinery.

"b. Fair and just wages should be paid to workmen, and all possible steps should be taken to encourage workmen to produce a day's work for a day's pay, to maintain wage rates for agreed upon periods of time, to settle disputes without stoppage of work, to eliminate wasteful practices, and to permit the training of adequate numbers of apprentices to supply additional skilled craftsmen for the industry.

"c. All possible steps should be taken to improve the efficiency of management.

"d. Where possible, owners should be discouraged from demanding completion of projects at speeds which require overtime work at premium rates of pay, or procedures requiring extra costs.

"9. The Associated General Contractors of America calls upon all organizations and individuals in the industry—architects, engineers, general contractors, subcontractors, producers and distributors of materials and equipment, and others—to cooperate to help eliminate uncertainties from the industry and to permit operations to be carried on as quickly, efficiently and economically as possible.

"10. It will take time for public recognition and understanding of the fact that construction and other costs must be higher than before the war if the national economy can operate at a level which will permit the repayment of the national debt. The public should be informed that construction costs have reached their peak, that as readjustments are made in the national economy gradual increases in efficiency and economy can be brought about in construction, and that responsible elements of the industry recognize their obligations and are doing all within their power to carry out operations so that the public receives the maximum for its investment in construction."

Highway Division

Most of the discussion by highway contractors centered around the letter of T. H. MacDonald, commissioner of the Public Roads Administration, addressed to all PRA division engineers and dated April 17, 1947, in which the commissioner said in part, "For determining action upon the award of contracts the state price level established during 1946 will be used as the base for comparison. . . . it is desired that division engineers . . . continue their serious endeavors in having the states select only essential projects on which there is free and real competition for the work in order to insure maintenance of prices at or below the levels of 1946. . . . Awards of contracts involving prices not in reasonable conformity with approved estimates will be seriously questioned."

Consensus of opinion among the highway contractors was that they are basically not in accord with the Commissioner's ruling, and cannot agree that no increases have occurred since Jan. 1, 1946. On the contrary, both labor and material prices have increased. However, they were all desirous of cooperating to the fullest extent with PRA through the various state highway departments in order to permit an adequate highway program to continue.

Construction equipment

Availability of construction equipment has generally improved, although the situation in regard to power shovels is considered to be unchanged, and it was reported that Caterpillar equipment appears to be less readily available than a year ago. Most items of paving equipment are available for immediate delivery with the exception of some electrical items, and ditchers are available. Of all items of equipment the LeTourneau line was reported to be the most plentiful.

Specifications

Rather disappointing progress in persuading the Bureau of Reclamation to make changes in its specifications and field procedures was reported by the committee on specifications. To date the Bureau has made some minor changes, but procedure in the field has not changed noticeably. Nine points were listed on which changes had been requested but no action had been taken, or the suggestions had been rejected. These included: larger allowance than 10 per cent for extra work, permitting contractor to supply materials, inclusion of an escalator clause covering freight rates, publication of complete information from sub-surface investigations prior to bid openings, reimbursement for handling of materials, and payment for overhaul as an additional item.

A proposed escalator clause to cover freight rate increases was submitted to the boards by the Corps of Engineers. After considerable discussion the boards agreed to inform the Corps of Engineers that no escalator clause was desired in Army contracts.

NEWS OF WESTERN CONSTRUCTION

JUNE, 1947

Davis Dam Rock Fault Causes Wholesale Corrective Action

CORRECTIVE ACTION involving an extra $6,500,000 was found necessary for the Davis Dam project in Arizona and Nevada to make the structure safe, it was declared by the Bureau of Reclamation after hearing the report of the special consulting board. The board's report was detailed in the May '47 issue of *Western Construction News*.

Through discovery of an extensive rock fault on the Arizona side of the Colorado River, the Bureau's chief engineer is preparing change orders for the contractor, the Utah Construction Co.

Cost of the dam and related works will be increased by about $6,500,000 or about 8½ per cent of the total project cost. Changes will involve thickening the spillway dam, shifting the intake structure and moving the power plant slightly upstream. The Davis dam proper, contrary to many rumors which have been circulating, is not affected in any way. It had been previously rumored that the dam might have to be moved or abandoned.

It was stated that there was no evidence that the preliminary surveys and appraisals were faulty or inadequate, but rather that core drilling did not and could not show that the fault would be as continuous as it was, or that it would run for considerable length.

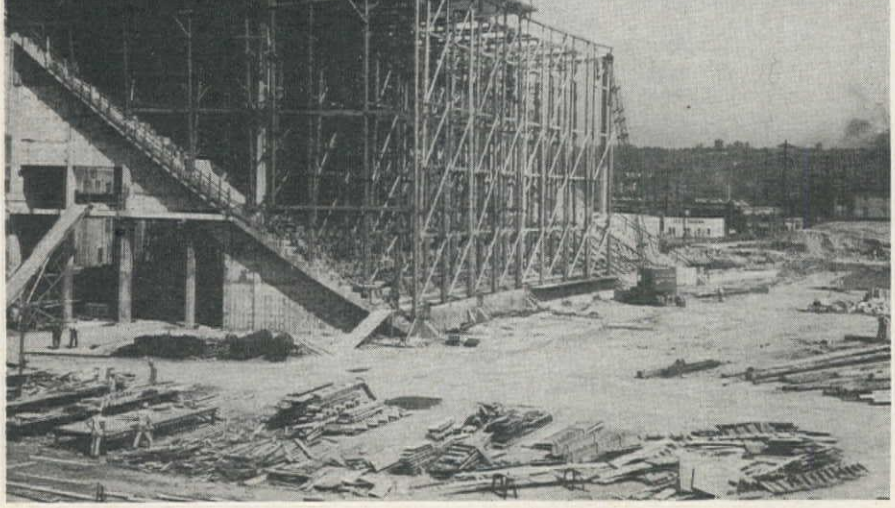
Under terms of a U. S.-Mexico treaty for the use of Colorado River waters, the dam, which lies 64 mi. below Hoover Dam, must be finished by 1950, but the new development may delay completion somewhat. Broken rock conditions on part of the construction site were disclosed by additional core drillings, after excavation for the power plant and diversion channel had proceeded "to a considerable depth."

Additional excavation will account for a large percentage of the increased cost, it was stated. Extensive grouting of rock formations to consolidate the foundation will also be necessitated. Spillway base will be thickened to about 30 ft. and the subgrade will be placed on a level instead of the originally planned slope.

The intake dam's north edge will be removed from a weak spot near the rock fault by shifting the dam to more nearly parallel the river bed. The power house site will be moved about 40 ft. farther from the rock fault, thus also necessitating changes in the penstocks.

REINFORCED CONCRETE MEMORIAL STADIUM UNDER CONSTRUCTION

PILINGS 70 ft. long for falsework to support the roof were used in construction of this reinforced concrete stadium, which is being erected in Seattle, Wash. To be called the Seattle Memorial Stadium, it is being constructed by the Puget Sound Bridge and Dredging Co. for Seattle School Board. G. C. BULLOCK is general superintendent.



Facts Told About Building Industry

INTERESTING FACTS pertaining to apprenticeship and why the building industry is dying appeared recently in the Salt Lake City, Utah AGC News, organ of the Intermountain Branch of the Associated General Contractors of America. The statistics, reprinted from a letter sent to H. E. Foreman, managing director of the AGC by a group of contractors, contained the following points:

1. The number of building mechanics at the present time is 1,110,000 whose average age is 55 years. An estimated 96,000 leave the building trades every year.

2. On January 1, there were less than 90,000 apprentices being trained. Figuring a four-year training period, this means that no more than 22,500 mechanics enter the trades each year.

3. At this rate it will take 50 years to produce 1,100,000 mechanics. And, at the end of 50 years a large number of these new mechanics will have died or gone into other businesses.

4. In 1929, 2,500,000 workmen handled a construction volume of $12,900,000,000. In 1946, 1,650,000 workmen were asked to handle a construction volume of $16,000,000,000. Even with the increase in unit costs it can be seen that this made necessary longer hours for each workman, adding overtime to already high costs of building.

5. This year's projected volume of construction of $22,000,000,000 cannot possibly be attained unless very quick action is taken toward training sufficient mechanics. The present method of training

apprentices has not and will not produce the required results.

6. It was suggested that GI's be put into a school for pre-training for a period of from three to four months of intensive training. After that training they could be indentured to the joint committee as improvers.

7. It was further suggested that each boy be classified according to the progress he had made in school. Some could make progress sufficient to classify them as third or fourth year apprentices.

Bids Open for Hawaii Belt Road Improvement

BIDS WERE OPENED June 9th on the Hawaii Belt Road, Federal Aid Project No. FAF 14B(1), according to B. F. Rush, Highway Engineer for the Territory of Hawaii at Honolulu.

Rush stated "The project is the first unit of the proposed improvement of approximately 45 mi. of highway between Hilo and Honokaa along the Hamakua Coast on the Island of Hawaii. Present session of the Territorial Legislature has authorized the sale of bonds in the amount of $5,850,000, to be matched with a like amount of Federal funds for the construction of the aforesaid highway along the Hamakua Coast.

"In addition to the above work, the Territory will construct an arterial highway through the industrial area of the City of Honolulu within the next two years, which is estimated to cost $5,500,000. The first unit of the arterial highway will cost approximately $1,227,000, and plans for this unit are complete.

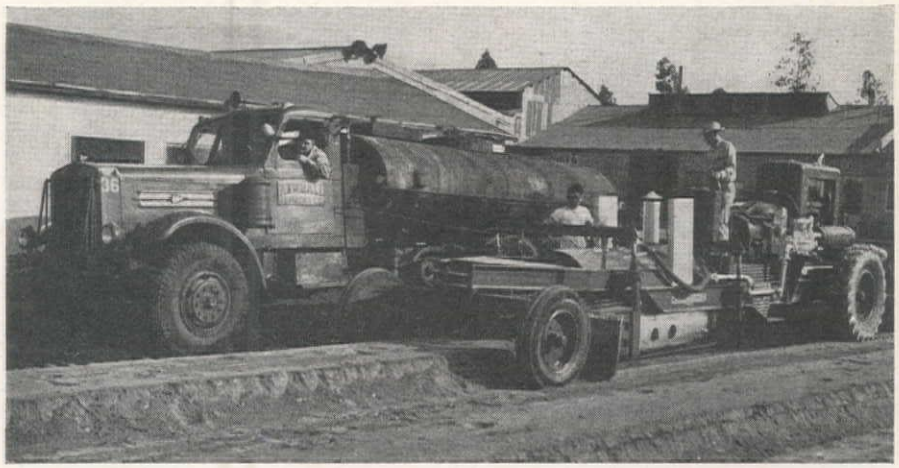
"Similarly, plans are now complete for $1,700,000 worth of highway work in the vicinity of Scofield Barracks on the Island of Oahu.

"Surveys are now under way and plans will be completed soon for $1,600,000 worth of highway and bridge work in connection with the improvement of the Pali Road on the Island of Oahu."

Demonstration Oil Shale Plant Opened in Colorado

GREAT EXPECTATIONS for a future supply of oil are held by officials who are in charge of the oil shale demonstration plant located about 9 mi. west of Rifle, Colo. This is a million-dollar project, under federal control, and was opened on May 17. According to Boyd Guthrie, engineer for the plant, it has been estimated that formations in Colorado, Wyoming and Utah hold about 92 million barrels of oil, and these figures represent about twice the amount of oil which has been produced from all oil pools in the country to date.

About eighty tons of shale a day will be processed when the plant is first opened. It is thought that later the amount may run as high as five hundred tons a day. In order to provide homes for workers, fifty housing units are being moved from Cunningham, Kans., where they were part of a wartime project.



WOOD ROADMIXER TESTS NEW MODEL BY RESURFACING OWN YARD

CONSTRUCTING a 2-in. asphalt mat surfacing at the company's own yard at North Hollywood, Calif., was one of the first tests put to the new model roadmixer manufactured by Wood Manufacturing Co. Using an SC-2 binder and native sandy material, which was first windrowed, then treated by the roadmixer and spread and rolled, only two and one-half hours were required to surface an area of 3,600 sq. yd.

Proposed Highway Relocation for Cascade Dam Brings Near Civil War

A BITTER BATTLE is being fought between the state of Idaho and a group of Cascade, Ida., businessmen over six and one-half miles of highway which is to replace the present road, about to be inundated by creation of a reservoir behind Cascade Dam, a Bureau of Reclamation project in Valley County.

Residents of Cascade claim the route selected by the State Highway Department after a survey would be impassable during the winter months. Instead of the state-planned re-routing over a series of ridges to be known as the "nook" or "cove" route, the Cascade Chamber of Commerce favors a highway to run around the lake which will be created by the dam.

They claim this route would not be as likely to be impassable in winter months, that it would be more scenic, and that it would obviate the danger of Cascade's "getting off the main line" through further straightening later on of the route between Cascade and the canyon leading to Horseshoe Bend, Idaho.

Bids have already been submitted for the state-planned highway relocation, with J. A. Terteling & Sons of Boise submitting the low bid of $912,671 for the construction work. The contract will not be awarded, however, until other proposals have been checked by highway department engineers, State Commissioner of Public Works E. W. Sinclair, said. The cost of the project, to be borne by the Reclamation Bureau, will ultimately be repaid by water users on the Black Canyon project land over a long contract period.

Meanwhile, George Nock, president of the Cascade Chamber of Commerce, together with other city businessmen, vigorously protested the state's plan, claiming that a 90-ft. cut necessitated by the "nook" route will fill with snow each winter, making the north-south artery impassable. They also assert that the planned relocation will cost $200,000 more than the shoreline road Cascade is seeking.

Nock also said that the new bids for the highway job tend to substantiate the preferability of the shoreline route. Chamber of Commerce engineers estimated the complete cost of the latter route at $968,000, including surfacing. The bids on the "nook" route project do not provide for surfacing.

After a conference with reclamation and state highway officials, Governor C. A. Robins announced the state's decision to stand by its original plan. He expressed his regret and attributed the choice to the fact that a thorough survey of the "nook" route already exists, and at the same time acknowledged the fact that the shoreline route is favored by "a majority of the Cascade and Long Valley people."

Kuckenberg Construction Co. Wins Oregon Road Contract

KUCKENBERG CONSTRUCTION Co., Portland, has been awarded a $2,322,000 contract for construction of 6.7 mi. of the North Santiam highway between Detroit and Niagara, Ore. One of the essential preliminaries before construction can begin on Detroit dam, unit of the Willamette Valley flood control project, this highway project is expected to be one of the most spectacular in many years. The road location is largely on steep mountainsides above the North Santiam River with most of the excavation to consist of rock. Construction of the highway will be supervised by the Public Roads Administration.

Another prerequisite to construction of Detroit dam was secured during May when the Interstate Commerce Commission granted the Southern Pacific Co. permission to abandon its 20-mi. branch line which runs up the North Santiam River through the proposed reservoir site. Abandonment of the railroad line will be effected when the highway relocation around the reservoir site has been completed.

Morrison-Knudsen Reports Huge Construction Backlog

BACKLOG of uncompleted construction of Morrison-Knudsen Co., Inc., and subsidiaries as of March 31, stood at $105,105,000 of which $58,494,000 represents projects to be completed in the United States or possessions. These figures were announced by Harry W. Morrison, president of what is one of the world's largest engineering and construction organizations, following a board of directors meeting at the home office in Boise, Idaho, May 9-10.

Contract operations completed during the first quarter of 1947 amounted to $16,522,000 of which about 50 per cent was in the U. S. and possessions. The company anticipates completing a domestic contract volume of $45 to $50 million this year. Foreign volume to be completed is estimated at a minimum of $25 million. Both figures will represent substantial increases for comparable figures of 1946.

L. A. Voters Approve Civic Center Plan

ONE OF THE MOST pretentious civic projects in the country—a $15,000,000 plan for a Los Angeles Civic Center, was approved by the southern California city's voters at a May 27 election.

The plans, which were a more elaborate revision of original plans adopted in 1941, were drafted by the Los Angeles Civic Center Authority under the direction of Burnette C. Turner, member of the American Institute of Architects. The Authority is composed of representatives of both city and county governments.

Main feature of the revised plan was a proposal that the Civic Center be extended from Main St. to Alameda St., along First St., with the new police facilities building, receiving hospital and health building all located in this area. Bond issues totaling nearly $15,000,000, which were presented at the recent election, were to cover the cost of these buildings.

Overall boundaries of the new Civic Center district, which had not been previously indicated, were defined as Alameda St., Grand Ave., First St., and Ord St. Two whole city blocks in the First St. line, however, were set out to accommodate new State buildings. These are the blocks bounded by Main, Spring, First and Second St., and Broadway, Hill St., First St., and Second St.

Preservation and beautification of Ft. Moore hill as a park and war memorial site was also incorporated, as well as provisions for retention with some improvements of the Plaza, Olvera St., Avila Adobe, Pico House and other historic landmarks.

Another feature of the proposal was that First St. be widened to Alameda St., Temple St. opened through to Alameda St., and a tunnel would put Hill St. under Ft. Moore hill to Castelar St.

An exhaustive study of traffic and parking problems in the area proposed for the new Civic Center was also made in the written report tendered to the Board of Supervisors and the Los Angeles City Council. It provides street level and underground parking for 20,000 automobiles.

Contract for Completion of Jackson Gulch Dam Awarded to Vinnell Co.

CONSTRUCTION to complete Jackson Gulch Dam and the inlet and outlet canals for the Jackson Gulch Reservoir on the Mancos project in southwestern Colorado, has been placed under contract by the Bureau of Reclamation. The contract amounting to $1,925,904 was awarded to the Vinnell Co., Inc., of Alhambra, Calif. This company submitted the lowest of four bids received for the work.

The dam will be built across Jackson Gulch, at a point about four miles north of Mancos. Approximately 35 per cent of the construction work on the Mancos project has been completed with CCC, WPA and CPS labor. The work began in January, 1942, and continued until January, 1946. The dam will be an earth structure about 1,900 ft. long, with a maximum height of 180 ft. The inlet and outlet canals will have a combined length of about 5 mi.

The inlet canal will divert water from the West Mancos River into the Jackson Gulch Reservoir where it will be stored to provide supplemental irrigation for about 6,900 ac. of land and furnish water for development of an additional 13,000 ac. in the Mancos Valley. The outlet canal will return the water, released from the reservoir, to the river. The diversion and distribution systems for irrigating part of the Mancos project area were constructed by local water users, and have been in use for about 60 years. Construction work on the project is designed to rehabilitate the established aggricultural area which has been inadequately irrigated. Present plans also contemplate the allocation of some reservoir storage space to the Park Service to supply Mesa Verde National Park.

Major items of construction under the contract include 1,640,000 cu. yd. of excavation from borrow pits and transportation to the dam, 1,400,000 cu. yd. of earth fill in the dam embankments, 525,000 cu. yd. of cobble-and-rock fill on the dam embankment slopes, nearly 5,000 cu. yd. of concrete in the structures requiring 240 tons of reinforcement bars, and the installation of 91,000 lb. of valves, gates, hoists, and miscellaneous metal work.

The construction must be completed in about 38 months after the contractor receives notice to proceed.

FOUNDATION and left abutment of the partially completed Jackson Gulch Dam cut-off wall is shown below. The structure, together with inlet and outlet canals and other appurtenant works are to be completed under the $1,925,904 contract awarded.

WASHINGTON NEWS

. . . for the Construction West

By ARNOLD KRUCKMAN

WASHINGTON, D. C.—Some time in June the conferees of the House and Senate Appropriations Committees are expected to come to an agreement about the 1947-1948 budget for the Bureau of Reclamation and the rest of the anxious parts of Julius Krug's Interior Department. If the bulky Julius were not so obviously inclined to follow the lead of the bulky Mike in regarding Interior and Reclamation as a sort of personal possession, the Members of Congress might be much more lenient about the appropriations. It is literally true that the lack of love in Congress for Julius and Mike is a serious liability to the Western States whose Governors came here in an imposing phalanx to overawe the Congress.

Only God and the Governors know the facts, of course; it is interesting, however, to hear that this Western invasion is supposed to have stemmed from a cry for help which Washington's Walgren projected across the continent to the White House, and which is said to have caused the White House to wonder what might be the result if Washington's First Citizen and the First Citizens of the other Western States were to come to the Nation's Capital and give the Members of the Congress pieces of their minds. The politically funny part of the story is the snapper which asserts that while Governors Walgren of Washington, Snell of Oregon, Knous of Colorado, and Ford of Montana, were packing their bags to come East, Governor Warren of California packed himself and Mrs. Warren into a plane and quietly but swiftly whizzed to the Capital in time to be one of the real features of the Spring dinner of the Gridiron Club, and to steal the show at the Congressional Committee hearings from the other governors by having a hearing all to himself before the others arrived. The others appeared en masse in public, even though they may have done a little horse-trading alone and behind the scenes.

The governors' junket

There was, for instance, Governor Ford, of Montana, who quietly had an off-the-record dinner, in an off-the-record hotel, in the middle of the restaurant, with Mike Straus and some champions of the Hungry Horse deal, including Radio Impresario Traylor of Montana. Mike, who is of monumental dimensions, was massively winsome in his arch approach to these moulders of public opinion in the Far West.

At this writing, late in May, the general assumption in the best reclamation circles is that the Senate will be inclined to further boost the present overall Bureau appropriation of $141,000,000 by $33,000,000. The same exclusive set believes that the ultimate increase will be not more than $25,000,000 after the conference between the House and Senate Committees. It is anticipated that Rep. Jones of Ohio, and Rep. Jensen of Iowa, will stubbornly insist upon approximate adherence to the original deep cut, while Sen. Wherry, chairman of the Senate appropriations committee, and Sen. Cordon, of Oregon, will lead the way in effecting the usual horse trades. It is generally supposed that the Central Valley project will receive another $3,000,000 or $4,000,000, and that there will be comparable increases in the allotments to the Colorado-Big Thompson project, the Hungry Horse project, the Columbia Basin project, Anderson Ranch, Boise project, and others. What may happen, literally, is pure guesswork, at this time, except that there are bound to be moderate increases. Boston Babson thinks that Gov. Warren's visit, together with State Engineer Ed Hyatt's pre-Warren-visit work, means California, especially, will get more money.

No harm meant to West

It was sharply clear throughout the discussion of Reclamation affairs on the floor of the House and the Senate that there is no desire to harm the Western irrigation and hydro-power States, but that the lack of confidence springs obviously from a dislike of the administration of Interior and Reclamation business. Sen. Taft and other Republican leaders went out of their way to emphasize that eventual adjustments would be arranged to the satisfaction of the Western States. Rep. Jones of Ohio produced documentary evidence to show that there is still $139,000,000 unused for reclamation in the fund frozen by the President late last year. Others demonstrated that the total fund available for expenditure during the year between June 30, 1947 and July 1, 1948, was an aggregate greater than the Bureau actually ever has had before.

In the Senate hearings, the Interior Secretary clearly was less belligerent than he had been in his disrespectful speech before the National Rivers and Harbors Congress, and at his earlier press conferences. Releases from the Department's Information Division, designed to stir up Western pressure, were "killed" by orders from Krug's office. Particular emphasis is now placed by Reclamation officials on the needs of the Columbia Basin, Colorado-Big Thompson, and the Davis Dam.

Bonneville criticized

It is still doubtful whether or not Arthur Goldschmidt's Power Division of the Interior Department will survive this fight. The temper of the House Appropriations Committee is reflected in the report which discussed the Bonneville Power Administration. "The unobligated balance as of Feb. 1, 1947, was $7,453,870, and there was an unexpended balance in addition thereto of approximately $11,000,000, making a total unexpended and unobligated of nearly $19,000,000. Funds in the sum of $324,981 for market surveys have been eliminated from the estimate because present demand for power, according to testimony, is in excess of the amount available and it would appear to be unnecessary to investigate demands for additional power in the area. . . . **The Committee is of the opinion that the number of employees engaged in public relations and publicity activities are far in excess of essential requirements and directs the Bonneville Power Administration to effect a reduction in these activities during the next fiscal year. The Committee is definitely opposed to the use of funds for encouraging the development of public-utility districts.**"

Further criticism was voiced at the Senate Committee hearing in May, when both private and municipal power representatives from the Pacific Northwest frankly expressed dissatisfaction with Bonneville Power Administrator Paul J. Raver. Both Sen. Dworshak and Sen. Cordon joined in questioning Raver's judgment for making long-term contracts with industrial firms at lower rates than BPA could get from power companies which would serve more people. Raver admitted he would not make similar contracts today with the present power shortage, thus conceding he, too, had underestimated the Northwest's power needs. The public and private pool representatives did not endorse the complete restoration of Bonneville's funds. They restricted their recommendations to construction of new generators, back-bone transmission lines, and specific substations and feeder lines.

Army Engineers

Lieut. Gen. Wheeler, Chief of the Corps of Engineers, in addressing the National Rivers and Harbors Congress here early in May, interestingly indicated the nation has spent over $2,000,000,000 on improvement to harbors and waterways, and $1,000,000,000 on flood control. He said the Corps of Engineers has started 153 flood control projects since the end of the war, and that the flood control backlog totals $2,001,017,634, while the Rivers and Harbors backlog amounts to $1,659,000,000. The program recommended for the fiscal year ending June 30, 1948, includes 75 flood control projects and 46 Rivers and Harbors projects, to cost a total of $190,350,000.

He especially pointed out that the Big Dry Creek Dam programmed for California is one of the most important projects in this schedule. He urged that there is pressing necessity that the early work be done as quickly as possible on the great McNary Dam on the Columbia. Since most of the Engineers civil functions work is non-reimbursable, it is considered doubtful if Congress will provide any but the most necessary funds.

In June, hearings will be held to transfer some of the public power authority from Interior to the Corps of Engineers. H. R. 3036 provides that all power generated at dams built by the Engineers

(except Bonneville) should be marketed by the Engineers. Federal Power Commission supports the bill. The Commission would regulate rates and service; duplicate transmission lines would be banned. It is not anticipated the bill will be enacted this session. Success is expected in 1948.

One reason for the hegira to Alaska by the President and the Congress and the Interior brass hats this Summer and Fall, is the consciousness that Krug's hope to put over the plan to establish public power development in the northern area has dimmed considerably. The trend is towards private development. Krug apparently hopes the Alaska trip may change the swing.

Advancement for Warne

Bill Warne's last public appearance as Assistant Commissioner of Reclamation occurred when he went before a Congressional Committee to plead for the retention of the anti-speculation clause in the Reclamation Law. His performance was admirable. The presentation was logical, persuasive, good-tempered, and smoothly deft. Bill uses a real silken glove, not nylon. His method contrasts with the bludgeoning technique of Commissioner Straus, who appeared before the same Committee to demand that Congress retain the 160-ac. limitation in the law. No report has yet been made.

Shortly after his Committee performance, Warne was nominated as Assistant Secretary of Interior by the President. It is assumed there will not be much difficulty about his confirmation by the Senate. Many Members of the Congress have rather leaned on Bill while he was in the Reclamation Bureau. This is probably the reason why there was gossip around the Capital that all was not as smooth between Bill and Mike as it had been.

Warne is by birth a Hoosier, and by adoption a Californian. He came here from the Coast in the wake of Straus, and originally was employed in the press department of the Bureau. In California he had been an active newspaper reporter in the Imperial Valley, in San Diego, and in Los Angeles. He is 42. He has been in the Department of Interior over 12 years. He succeeds Warner W. Gardner, who resigned to go into private practice of law.

Associations

Floyd Hagie, once the head of the National Reclamation Association, now the mainspring of the Seattle Chamber of Commerce, was the only Westerner chosen as a director of the National Rivers and Harbors Congress. The Congress endorsed a national power policy; favored construction of multi-purpose dams with full development of hydroelectric projects, for flood control, navigation, and irrigation; and endorsed the principles of irrigation as the most beneficial use of water in the 17 Western States. It opposed the establishment of the Missouri Valley Authority; urged Congress to continue the reclamation program; and requested appropriation of funds for advanced planning of rivers, harbors and flood control projects that have already been authorized by Congress. Sen. McClellan of Arkansas is the new president.

Secretary-Manager Don McBride recently announced the National Reclamation Association will hold its annual convention this year at Phoenix, October 28 to 31.

Charles Upham, engineer-director of the American Road Builders' Association told us, here, recently, that 6,000 to 10,000 engineers are urgently required for the construction of the 1947 road construction schedule. He pointed out there is a special shortage in California, Illinois, and New York. It is reported that private industry and States pay less in salaries than the Federal Government. Only 59% of the 20,000 men who left to go to war have returned to the various Highway Departments. Montana is the single state which shows a 100% restaffing. The average state salary for a Chief Engineer is reported to be $7,945 to $9,030, while the Federal Government pays from $9,975 to $10,000 for a comparable post. The American Society of Civil Engineers recommends $9,600 as the standard, with the same ratio in other grades.

How is the business?

The conflict in information about construction activities, as well as other business in this country, is strikingly illustrated by reports from Government and private sources concerning building and construction. It gives point to the bold statement by Boston Babson that the "panic" in the United States is being engineered by foreign Communistic propaganda as a part of a world-wide campaign to inspire insecurity.

Private reports assert that unemployment in the construction industry is growing everywhere. Reno and Arizona are specifically mentioned in the West. Over-all it is claimed there has been a 31% drop in engineered construction.

The Bureau of Labor Statistics, on the other hand, reports an 8% rise by work value for the first four months of this year, compared with each year since 1939. It is reported to be the highest seasonal level since 1942. Gains in public utility work is reported as 70%; streets, 19%; highways, 26%; privately financed work, 48%; home building is reported as 50% higher than 1941, the prewar peak. Highway and street work is reported to have jumped 45% from March to April of this year. The only item reported as lower is public housing, which dropped 50% from the January level.

Housing units are currently reported to be going along at the rate of 700,000 per year, or about 250,000 less than was predicted. However, if the ratio is maintained it is expected July, August and September will be busy months. The present doubt concerns the last three months of the year.

It also is suggested it will be wise to bear in mind that American contractors will be expected to build many airfields in Greece, Turkey, and elsewhere, suitable for the heaviest American bombers; likewise heavy roads, and other heavy construction of almost every type with which the industry is familiar. Babson, a very sound barometer, attributes any present lag to three bottlenecks: shortage of things such as nails, gypsum board, lath, millwork, plumbing; shortage of building labor; and lack of investors willing to risk money at present high prices for materials and labor. Babson also predicts there will be an extraordinary building boom both next year and in 1949.

Burton N. Behling, the choice of Chairman Smith, was appointed to the vacancy in the Federal Power Commission. Behling is an economist who came from the faculty of the Illinois University to join the staff of the FPC. He is the first career man to be appointed to the FPC. His appointment disappointed the politicians who expected Commissioner Sachse's unexpired term to be completed by another political choice from California.

As expected, the President signed the bill which double-copper-rivets Herbert Hoover's name on the dam at Boulder City, and at Black Canyon, which heretofore has illegally been miscalled Boulder Dam.

LATE WIRE

ARTHUR E. GOLDSCHMIDT, Goodrich Lineweaver, and Wesley R. Nelson are the most frequently mentioned as possible successors to William E. Warne as Assistant Commissioner of Reclamation, the position left vacant when he was named Assistant Secretary of the Interior. Nelson, present head of the Bureau's Region V at Amarillo, Tex., is the only engineer of the three. Goldschmidt is presumed to have best chance if he wants the job; he is a protege of Sam Rayburn, minority leader of the House, and an intimate of the President. Mike Straus, Commissioner, is reported opposed to Goldschmidt, who is slated to be out of a job soon, if appropriations committees carry through plans to cut funds of Interior's Power Division, of which he is now head. Straus is expected to suggest that economy could be served by leaving Warne's former job vacant.

No appropriations have yet been made for airports and none is expected until well into July. The requested $65,000,000 to build Class 4 and 5 airports has been cut by committees to $32,500,000, which CAA regards as just sufficient to make essential improvements and maintain 400 existing airports; no new work would be possible.

In the course of the 160-ac. limitation hearings, a Bureau of Reclamation witness testified that the potential irrigation program in California's Central Valley would supply supplemental water for 1,300,000 ac., but will not supply any for new acreage. This drew explosive admonition from Sen. Downey of California, who appeared to think the Bureau officials present at the hearings had not been frank with the other witnesses who assumed there is water for new land.

Prospective Reclamation Work Announced for Bid

MAJOR CONSTRUCTION bids soon to be called by the Bureau of Reclamation include Boysen Dam, in Wyoming, including an earthll dam, power plant, and railroad relocation, about June 16; about 55,000 ft. of laterals and sub-laterals on the north unit of the Deschutes project in Oregon, about June 16; laterals and pipeline 37,500 ft. long on the Roza Division of the Yakima project in Washington, about June 16; a transmission line 123 mi. long from Parker Dam to Blythe, Calif., and thence to Pilot Knob, on the Colorado River, about June 23; the Jordan Narrows pumping plant and siphons on the Provo River project in Utah, about June 25; about 72,000 ft. of canal extension on the Riverton project in Wyoming, about June 27; laterals on the Boise project, near Caldwell, Ida., about June 30.

Probable July bid invitations include 6 mi. of high pressure steel pipe and two storage tanks near Boulder City, Nev. about July 1; pumping plant, canals and laterals near Savage, Mont. on the Yellowstone River, about July 15; laterals and structures on the Altus project in Oklahoma, about July 15; about 81,000 ft. of the West Canal of the Columbia Basin project in Washington, about July 15; some 44,000 ft. of the Potholes East Canal of the Columbia Basin project, about July 15.

Alaska Contracts Value Increased by New Award

DOLLAR VALUE of contracts held by the joint venture firm of Birch-Johnson-Lytle for army construction in Alaska has been increased to $51,000,000 it was announced last month by D. L. Cheney, general manager for the organization with headquarters in Seattle. Latest addition to the work is an $8,125,000 heavy bomber base to be constructed at Mile 26, southeast of Fairbanks on the Alaska highway. Other work is situated at Fort Richardson near Anchorage, and Ladd Field near Fairbanks.

A mass movement by air of 2,000 construction workers from Seattle was scheduled to take place late in May to augment the 2,500 workmen already on the jobs. Wage rates being paid on the projects generally correspond to the Puget Sound rates, but meals and lodging will cost workers only $1.50 per day at the company camps. Workers are being engaged on 1-yr. contracts.

Montana Registration Law Signed by Governor

SIGNING of a bill requiring registration of civil engineers and land surveyors in Montana, which was sponsored by the Montana Civil Engineers, made Montana the 48th state to adopt such legislation. The signing of the bill by Governor Sam C. Ford was witnessed by many representatives of the association, a group composed of nearly 100 of the state's practicing engineers and land surveyors.

After 30 years of effort by Montana engineers to obtain such legislation, the new bill completes the list of states, all of which now are in support of the campaign by engineers to raise their professional standards by setting up qualifications and requiring the registration of practicing engineers. The first registration act of this kind was passed in Wyoming 40 years ago.

The bill adopted coincides with the Model Law sponsored by national engineering groups except for modifications which make it applicable to civil engineers and land surveyors only.

Senate Bill No. 66 was introduced jointly by Sen. Manning of Treasure County and Sen. McQuitty of Wheatland County, both of whom have wide knowledge of engineering work through past experience as engineers and contractors.

Governor Ford will appoint a five-man board of engineers to administer the act, which becomes effective July 1, 1947.

Error Noted in Reporting of ASCE Convention in Phoenix

IN REPORTING the Spring Meeting of the American Society of Civil Engineers at Phoenix in the May issue, it was stated that the Board of Direction had passed a resolution urging the states of Arizona and California to arbitrate their differences on the Colorado River water. Allen Wagner, assistant to the secretary states that no such resolution was passed, although several speakers in their addresses indicated this as a wise move. *Western Construction News* regrets the error which occurred in the report.

OBITUARIES . . .

James A. Paterson, retired Reno, Nev., building contractor, died Sunday, April 27, after a brief illness. Paterson, who had been retired for the past 20 years, for many years had engaged in building and construction work in Reno with his brother, the late Andrew Peterson. A native of Scotland, he came to the United States when he was 13 years old.

* * *

Eugene Clyde LaRue, 67, veteran hydraulic engineer with the Los Angeles District, Corps of Engineers, died on March 22 after a brief and unexpected illness. LaRue, who had been with the Corps since 1935, was Chief, Civil Works Branch for the Los Angeles District at the time of his untimely death.

* * *

John S. Beakey, 47, former traffic engineer for the Oregon State Highway Commission at Salem, died in Denver April 30. A graduate of Oregon State College and employed by the Oregon State Highway Commission from 1929 until the outbreak of World War II, Beakey was recognized as an authority on highway traffic problems. During the war he served in the European theater with the Transportation Corps.

* * *

Lyle M. Rowell, 58, draftsman for the Idaho Power Co., and one time commander of the second battalion of the 116th Engineer regiment, died in Boise on April 9. Starting as a commercial artist, Rowell joined the staff of the Idaho Bureau of Highways, and later joined the staff of the power company with which he had been associated for 28 years prior to his death.

* * *

Ray L. Brewster, 57, regional chief of land utilization for the Soil Conservation Service, died in Portland on April 9. A graduate of the University of Chicago, Brewster moved to Prineville, Ore., in 1909 and became assistant county surveyor of Crooks County. He served in the armed forces during World War I.

* * *

Arthur E. Power, 81, retired building contractor, died in Los Angeles recently. He had been a resident of the southern city for 59 years.

* * *

Joseph H. Tillotson, 39, well-known Denver, Colo., contractor, died recently as the result of an automobile accident.

* * *

John Bergstrom, native of Sweden and a resident of Colorado since 1886, died recently at his Denver home. Bergstrom, who constructed many homes in the East Denver area, would have been ninety years old had he lived a few more hours.

* * *

Albert E. Finley, 79, well-known Los Angeles building contractor, died Tuesday, April 22.

* * *

Christian A. Tolboe, contractor of Provo, Utah, died in that city on April 3, at the age of 76. Many important Utah buildings are monuments to his years in the building business.

* * *

U. Ernest Nelson, consulting civil engineer of Portland, died in Portland during April. One of the major projects with which he had recently been associated was the Cedar Hills housing project for which his organization designed the water supply, sewerage facilities and streets.

* * *

W. A. Payne, 29, of Tucumcari, N. Mex., died May 20 in a hospital at Estes Park, Colo., from injuries received when he touched a power line. He had been employed on construction of Mary's Lake power plant.

* * *

Grover F. Conroy, transportation engineer for the California State Railroad Commission for the past five years, died May 19 at his home in San Francisco. He was formerly county engineer of Placer County and State Highway engineer of New Mex.

Sewage and Water Engineers To Convene in San Francisco

AN IMPOSING ARRAY of events is in store for the delegates of the Federation of Sewage Works Associations, in conjunction with the California Sewage Works Association and those of the American Water Works Association when they meet in San Francisco on July 21 for a joint convention.

Committees chosen

Under the co-chairmanship of R. C. Kennedy and Blair I. Burnson, a joint committee is proceeding with local arrangements for the San Francisco event. Other joint subcommittees include: Hotel arrangements, Nelson Eckart, chairman, with George Pracy, J. H. Peterson and Keeno Fraschina; Entertainment, John B. Gill, chairman, with W. J. Orchard, G. T. Bowman and others not yet selected; Meeting room arrangements, J. W. Pratt, chairman, with J. T. Norgaard and J. H. Kimball. Special FSWA subcommittees on registration and finance are also being instigated, with Harold L. May as registration chairman and George White as finance chairman.

Committee meetings will occupy the AWWA at nine o'clock Monday, July 21, according to the tentative program slated. At 10 A. M. Samuel B. Morris will discuss "The Colorado River, the Southwest's Greatest Water and Power Resource," and at 11:15 A. M. the Water Works delegates will hear Frederick Ohrt speak on "Water Supply Developments in the Pacific Islands, with special reference to Control of Salt Water Intrusion." Oscar G. Goldman will make "Hydro-Pneumatic Pumping Stations" the subject of his talk at 11:45 A. M.

Sewage Associations business meeting

Registration and inspection of exhibits is scheduled as the first event of Monday, July 21, for the Federation of Sewage Works Associations, and begins at 10 A. M. Following a business luncheon for the California Sewage Works Association, the Board of Control business session begins at 2:00 P. M.

At a general morning session of the American Water Works Association on Tuesday, July 22, G. E. Arnold will speak at 9:30 A. M. on "Applying Business Principles to Water Works Operation." He will be followed at 10:10 by a speech by A. P. Kuranz on the "Value of Public Service Commission Control to Municipal Water Works Management." H. R. Hall and H. B. Shaw will speak at 10:50 A. M. on the "Washington Suburban Sanitary District—Twenty-eight Years of Operations."

At the same time Tuesday morning, the AWWA Water Purification Division will hold meetings, beginning with a speech at 9:15 A. M. by W. W. Aultman on "Disposal of Wastes from Water Purification and Softening Plants." "Separation of Water from Solid and Liquid Mixtures" will be the context of a talk at 10:00 A. M. by A. A. Kalinske, while Ray L. Derby will discuss "Control of Slime Growth in Transmission Lines" at 10:45 A. M. The Division will close its morning session with a discussion of "Superchlorination and Dechlorination Experiences" at 11:15 A. M. by N. J. Howard and C. J. Lauter.

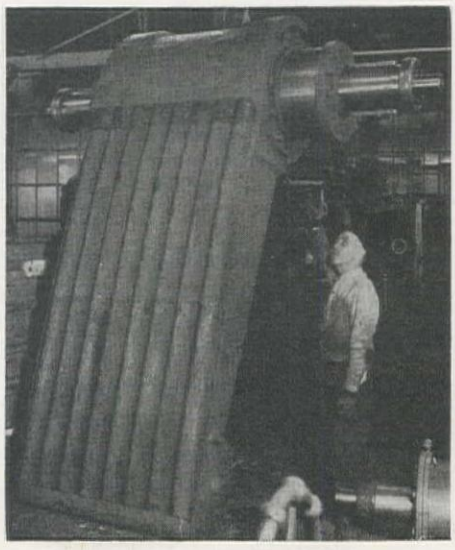
The Federation of Sewage Works Associations will convene the Twentieth Annual Meeting at 9:30 A. M. Tuesday, July 22, with a technical session. Sewage improvements in development at San Francisco will be reported on by Clyde C. Kennedy, while A. M. Rawn will discuss a paper compiled by J. E. Stevens and H. L. Thompson on Portland improvements. A joint session will highlight the afternoon session, when delegates meet to discuss Ground Water Pollution Problems, with the Water Works Association as host. Schedule for the afternoon meetings include a talk at 2:00 P. M. by A. P. Black on "Basic Concepts in Ground Water Law," a discussion of "Ground Water Production Works" at 2:45 P. M. by Malcolm Pirnie and R. W. Sawyer, and a meeting on "Formulating Legislation to Protect Ground Water from Pollution" led by B. E. Doll at 3:20 P. M.

Wednesday sessions

A general session of the AWWA will be held Wednesday morning, July 23, with W. T. Ingram and F. B. Elder starting the program at 9:30 A. M. with a discussion of the Program of the A.P.H.A. for Engineering Personnel. At 10 o'clock J. H. Murdoch will speak on "Upgrading the Water Works Industry," and Sterling Green will follow at 10:40 A. M. with a talk on "Engineers' Organizations for Labor Bargaining Purposes."

A technial session of the FSWA on Wednesday morning featuring stream pollution and industrial wastes papers by F. W. Kittrell, G. E. Symons, W. J. O'Connell, Jr., and W. T. Knowlton, will be followed by a joint afternoon session with the AWWA, when the Federation as host, will follow the theme of Reclamation of Sewage Effluents. "Industrial Uses for Reclaimed Sewage Effluents" is to be the subject for a 2:00 P. M. talk by N. T. Veatch, while Abel Wolman will speak on "Use of Reclaimed Sewage Effluents of Baltimore" at 2:45 P. M. "Agricultural Uses for Reclaimed Sewage Effluents" is to be L. V. Wilcox's topic at 3:30, and S. T. Powell will draw the meeting to a close with his talk on "Limits of Pollution of Water for Industrial Use" at 4:15 P. M.

WORLD'S LARGEST overhead eccentric jaw crusher has just been completed at Lipmann Engineering Works, Milwaukee for Charles Hoyt, Silverton, Ore., construction contractor. Standing 11 ft., ½ in. high and weighing 84,000 lb., the huge crusher has a hard rock capacity of 210 tons per hour at 3-in. discharge opening. Movable jaw is 10 ft., 10 in. high, weights 35,000 lb.



Thursday events

At a joint morning session of the plant management finance and accounting divisions, the AWWA delegates will hear W. W. DeBerard and H. P. Hagedorn discuss "Testing Material and Equipment for Water Works Construction and Operation" at 9:30 A. M., Thursday, July 24. J. B. Eddy is to speak on "Fifteen Years Progress in Leak Prevention" at 10:00 A. M. "Long Line Hydraulic Studies" is the topic chosen by F. C. Scobey who speaks at 10:30.

The Thursday afternoon general session of the AWWA will be opened by H. S. Swanson and S. A. Evans, who will discuss "Lessons in Water System Design Derived from World War II" at 2:00 P. M. C. J. Kraebel will talk on "Erosion Control in Mountain Areas of California" at 3:00 P. M., and "Erosion Control in Watersheds of the East Bay Municipal Utility District" will be L. S. Hall's topic at 3:30. "Erosion Control in Watersheds of the Los Angeles Department of Water and Power" by Burton S. Grant will close this session.

At the same time, the Water Purification Division will hold sessions beginning with a 2:00 P. M. talk on "Operating Characteristics of Synthetic Siliceous Zeolites" by L. Streicher, E. A. Bowers, and H. E. Pearson. "Use and Interpretation of Langelier Stability Diagram" is the topic of a talk by W. B. Lawrence at 2:30 P. M., while J. Green and J. W. Ryznar will discuss "Calculation of the pH of Saturation of Tricalcium Phosphate" at 3:15 P. M.

An elaborate manufacturers' exhibit will also be in evidence, with such a multitude of booths already reserved that it is probable that some exhibits will have to be set up outside of the huge arena in the Civic Auditorium.

The general session Friday morning which winds up the Water Works convention, will be started at 9:30 A. M., when a paper on "The Use of Radio in Water System Operation and Maintenance" by A. Damiano will be discussed by B. A. Currie and W. C. Morse. Abel Wolman will speak at 10 on "Should Public Water Supplies be Used as Means of Mass Medication?" and a paper by F. R. Dolson on "Inter-Industry Problems Derived from Cathodic Protection" will be discussed at 10:45 A. M. by L. J. Alexander and F. D. Pyle.

PERSONALLY SPEAKING

Three administrative assistants have been appointed to the staff of **Lt. Col. William J. Ellison, Jr.,** who is in charge of the construction of McNary Dam on the Columbia River near Umatilla, Ore. **Robert G. Hooson,** chief of the service branch of the North Pacific Division, Corps of Engineers, will be chief administrative assistant. **Edgar J. Scheufele,** head of the civil projects sub-section of the fiscal branch, Portland district, will be chief of the cost section. **George Lautman,** in charge of the Bonneville dam warehouse, will be chief of the warehouse and property section.

* * *

Robert A. Allen, Nevada state highway engineer for the past 12 years, was replaced recently by **William T. Holcomb,** following a meeting of the State Highway Board. Holcomb, who has served in the state highway department for 27 years, has been successively, a draftsman, testing engineer, chief draftsman and office engineer. In 1937 he was placed in charge of planning and since 1944 has been assistant engineer in charge of planning and designing.

* * *

B. D. Stewart, commissioner of mines for the Territory of Alaska, was elected president of the Territorial Board of Engineers and Architects Examiners to serve for the next two years. He succeeds **Victor C. Rivers. William Manley,** architect of Anchorage, was elected vice-president, and **Linn Forrest** was re-elected secretary. Other members of the board include **Harold B. Foss** and **Homer Nordling,** both of Juneau.

* * *

Dr. Stephen P. Timoshenko, professor emeritus of theoretical and applied mechanics at Stanford University, is the recipient of the James Watt International Medal, one of the highest international honors a mechanical engineer can receive. Only other American ever to receive this honor was the late Henry Ford, who was given the medal in 1939. The medal was presented to Dr. Timoshenko in London, England, by the Council of the Institution of Mechanical Engineers of Great Britain. Bestowed every two years, it was founded by the Council to commemorate the bicentenary of the birth of James Watt, who made many contributions to the development of the steam engine. Timoshenko has been on the Stanford faculty since 1936.

* * *

Keith F. Jones has been appointed Jefferson County, Wash., engineer, succeeding **Jack Lay,** who resigned last January. Jones had been with the Washington state highway department for 15 yr. previous to his new appointment, having been stationed in Tacoma most recently. **Harvey S. Christian** has been appointed office engineer. Headquarters for Jefferson County are in Port Townsend.

* * *

Appointment of **W. Wendell Palmer** as unit supervisor of the Bureau of Reclamation's Missouri-Souris Unit in North Dakota was announced recently by **W. E. Rawlings,** acting regional director. Palmer, who was engaged as a relocation specialist and senior agricultural administrator for the War Relocation Authority from April, 1943, to September, 1945, will maintain headquarters at Minot, N. D.

GEORGE ATKINSON, president of Guy F. Atkinson Co., is the 1947 president of Northern California Chapter of Associated General Contractors of America.

Hal Colling, of the Pacific Coast Building Officials Conference, Los Angeles, Calif., and **Col. William B. Greeley,** Chairman, American Forest Products Industry, Seattle, Wash., are the two western members named to the continuing committee which will carry on the work recommended in the action report adopted by the President's Conference on Fire Prevention. The thirty-two members on the committee are from all sections of the country and include the secretaries of the seven committees which drew the reports of the President's Conference in Washington May 6-8.

* * *

R. H. Workinger has been transferred from Washington, D. C., to Billings, Mont., where he will be executive officer of Region VI of the Bureau of Reclamation. Workinger was assistant director of WPA from 1934 to 1940, following which he was in the office of the Secretary of the Interior. Most recently he has been a management analyst in the Washington Office of the Bureau of Reclamation.

* * *

Augustus V. Saph, Jr., past president of the Structural Engineers Association of Northern California, was recently appointed by Governor Warren as a member of the California State Board of Registration for Civil Engineers, replacing **Mark Falk,** who resigned.

* * *

Curtiss M. Everts, Jr., Oregon state sanitary engineer and secretary of the Oregon state sanitary authority, has been awarded the Chevalier grade in the French Order of Public Health in recognition of his services to France following the invasion of Europe. Serving as a major on the staff of the chief surgeon for the European theater of operations, Everts was in charge of the distribution of medical and sanitation supplies for the civilian population in liberated countries.

Kenneth Winebrenner, Kalispell, was elected chairman of the Montana Sewage Works Association at its third annual meeting held in Havre late in April. Other officers of the association include **F. F. Palmer,** Forsyth, vice-chairman; **Kenneth Chrysler,** Billings, national director; and **F. E. Brandis,** Chinnook, and **Joe Wright,** Lewistown, trustees. **H. B. Foote,** Helena, was re-elected secretary-treasurer. **W. M. Cobleigh,** dean emeritus of the school of engineering, Montana State College, was presented with the Kenneth Allen Award for leadership, membership activity, and for technical contributions bringing prestige to the association.

* * *

James W. Carey & Associates, consulting engineers of Seattle, have been retained by the city of Ellensburg, Wash., to prepare plans for an additional water supply source and complete rehabilitation of the water distribution system. Total cost of the entire project is estimated to be in excess of $1,000,000.

* * *

Carl Davis, Butte, has been elected president of the Montana Society of Engineers, succeeding **C. H. Steele** of Butte. Other officers to serve this year include **Dr. A. J. Johnson,** Bozeman, first vice-president; **C. A. Champ,** Butte, second vice-president; **R. D. Piper,** Butte, secretary-treasurer; **F. C. Gilbert** of Helena, **August Grunert** and **M. W. Plummer** of Butte, trustees.

* * *

Alvord, Burdick, and Howson, consulting engineers of Chicago, Ill., have been retained by the city of Boise, Idaho, to make a preliminary survey and prepare plans for a sewage disposal plant. Estimated cost of the plant is set at about $800,000 and plans are expected to be complete about April, 1948.

* * *

Ernest L. Gould, superintendent of streets at Great Falls, Mont., for the past two years, has resigned to accept a position with the Northwest Engineering Co. on a highway project near Glasgow, Mont. **Henry Brand,** assistant street superintendent, will serve as acting street superintendent.

* * *

George Hall, formerly assistant superintendent of the streets and water department of Toppenish, Wash., has been appointed acting superintendent following the resignation of **P. D. Wilson,** who had been superintendent since 1932. Wilson has been appointed acting postmaster for Toppenish.

* * *

H. M Patton is the newly elected president of the Engineers Club of Fresno. Other new officers are headed by **V. Calvon McKim** as vice-president and **E. J. Griffith** as secretary-treasurer. Members of the board of directors include: **Dr. C. N. Beard, Frank Baxter, R. E. Dunkle, Donald Piston, J. P. McElroy,** and **V. Calvon McKim.**

* * *

Edward Hubbard, veteran of 25 years' service with the Los Angeles Department of Water and Power, was recently advanced to the position of Water System

valuation engineer, reporting to **L. E. Goit**, chief engineer of the water works. **H. Arthur Price** succeeds to Hubbard's former position of head of the Specification department, and reports to **E. B. Mayer**, executive engineer. Hubbard joined the Los Angeles department in 1922 as a draftsman. In 1930 the Specifications section was created and Hubbard was appointed to head that department, a position which he held until his recent advancement.

* * *

F. O. McGrew, Jr., has resigned from the engineering staff of the Portland district, Corps of Engineers, to become city engineer of Coos Bay, Ore. In a reorganization of the city administrative staff, **Evan Peterson**, recently appointed city manager, has reappointed **C. A. Langworthy** as building inspector and superintendent of streets.

* * *

F. M. Limbaugh is the acting district engineer at Albuquerque, N. Mex., replacing **E. L. Stockton** who returned to the army with the rank of major. Limbaugh, who has been in the private contracting business since 1943, was formerly state highway engineer before that time. He has over twenty years' experience with the highway department besides his contracting experience.

* * *

Henry G. Porak, assistant city engineer for Tacoma, Wash., during the past year, has been appointed city engineer of Olympia, Wash. **Charles H. Williams**, who has been city engineer and water superintendent for Olympia, will retain the position of water superintendent.

* * *

S. J. Norris, City Engineer of Oroville, Calif., for the past 36 years, resigned recently. He will start construction of a large irrigation dam at Palermo for the Oroville-Wyandotte Irrigation District.

* * *

Raymond M. Leonard has been appointed locality expediter for the National Housing Agency in Portland, succeeding **Richard Rice**. Leonard has been serving as analyst for the Oregon district construction review committee of the Civilian Production Administration.

* * *

Former **Col. George D. Burr**, who located and engineered the site of San Francisco's municipal airport, is back in civilian life again. He returns to his former position as San Francisco city engineer assistant and airport design engineer, under **B. M. Doolin**, airport manager.

* * *

Jerry Moore, who had been in charge of five federal public housing projects in eastern Oregon with headquarters in Pendleton, has established a private civil engineering practice in Pendleton, where he will specialize in structural design.

* * *

Edward C. Dohm, consulting engineer of Olympia, Wash., has resigned as city project engineer of Olympia in order to devote his time to private practice.

* * *

A. E. Johnson and **N. S. Kendall**, who have been associated with the well-known heavy construction firm of Platt Rogers, Inc., Pueblo, Colo., have set up their own general construction company in Tucson, Ariz.

Eugene H. Riggs, prominent Pasadena engineer, was recently selected as El Monte, Calif.'s first city manager. During the war, Riggs served in the army as post engineer at the San Bernardino Air Depot and Maywood Air Depot and also took part in the military government in Japan.

* * *

McDonald Engineering Co. of Tacoma, Wash., has been retained by the North Points Mutual Water Co. of Tacoma to design a water supply system to be constructed by the company.

* * *

John F. Goodwin, instrument man from Seattle, and **Allan Fladboe**, formerly draftsman for the Public Roads Administration on the Alcan highway, have joined the staff of William P. Hughes, city engineer of Lewiston, Idaho.

* * *

John Sletten, Hervig M. Sletten, Owen J. Murphy, and **Fred O. Koch**, Great Falls, Mont., have filed incorporation papers for the Sletten Construction Co. The company is engaged in general construction of all types.

* * *

James Dunstan, city engineer of Wenatchee, Wash., has been reappointed as a member of the committee on sewer specifications of the American Public Works Association.

* * *

Phil Storm, street and park superintendent of Redding, Calif., was recently named by the City Council to succeed **James Neal** as City Manager. In his new capacity, Storm will also continue to direct the street department.

* * *

John H. Stevenson and **Boris R. Rubens**, structural engineers of Seattle, have opened new and larger offices on the seventh floor of the Empire Building in Seattle. Open house was held in the new quarters on April 4 in celebration of the expansion.

ON OKINAWA with the big Guy F. Atkinson Co. and Jones Construction Co. Joint contract are, l. to r.: K. C. DANSTROM, chief engineering inspector; W. C. SHEPHERD, project manager; COL. LEE B. WASHBOURNE, Okinawa District Engineer; and LT. COL. T. F. AIRIS, chief of the operations section, District Engineer office.

William J. Wenzel, formerly chief engineer for Corwin & Co., Great Falls, has established his own offices in Great Falls, Mont., where he will specialize in the design of waterworks, sewers, street paving, and other municipal improvements. During the war he served as an engineer on the Alaska highway and Canol projects in Canada.

* * *

Martin Anderson has been made a member of the Seattle building contracting firm of Nettleton & Baldwin, Inc., and the name of the firm has been changed to Nettleton-Baldwin-Anderson, Inc.

* * *

L. J. Booher, formerly assistant agricultural engineer at the University of Arizona, was transferred to Davis, Calif., where he is a specialist in irrigation at the University of California Agricultural School.

* * *

Lt. Cmdr. Roger Lasley is supervising for the Naval Bureau of Yards and Docks the construction of a naval reserve armory at Butte, Mont. General contract for the building is held by the Cahill-Mooney Co., Butte, which bid $134,448 for the work.

* * *

C. J. "Jack" Smith is now estimating and design engineer for the Guy F. Atkinson Company in their Portland, Ore., district office. He was recently transferred from the San Francisco district.

* * *

Frank C. Thompson is now doing field and survey work for the Bureau of Reclamation as an engineering aide at Pasco, Wash.

* * *

Merlin R. Stover, who now resides in San Rafael, Calif., is connected with the State Bridge department and is assistant resident engineer on the Linden Lane Undercrossing.

* * *

Frank M. O'Brien has been appointed assistant manager of the Seattle chapter of Associated General Contractors. He succeeds **C. Lloyd Gilbert**, who resigned recently.

* * *

R. A. Frandsen, engineer in the state highway department for seven years, is the new city engineer for Montrose, Colo., following the resignation of **D. W. Rowe.**

* * *

P. E. Jones, water superintendent for Kelso, Wash., has been appointed head of the city sanitary department, succeeding **Cal Smith**, who resigned last March.

* * *

Charles E. McLaughlin, who recently resigned from the California State Bridge department, is now associated with the Sacramento Municipal Utility District.

* * *

Malcolm McEachin, former Nevada secretary of state, was recently appointed that state's highway safety engineer, succeeding **Raby Newton**, whose resignation became effective April 15.

* * *

Arthur Reitter's first job as City Engineer of Colusa, Calif., is to make corrections in streets, gutters, grades and storm sewer drainage in the southwestern section of the city.

SUPERVISING THE JOBS

Everett J. Peters is superintendent for Howard S. Wright on their construction of a 2-story newspaper plant with basement and tower. Resident engineer for the $1,500,000 job is **Joseph W. Geddes,** with **Thomas Nyall** as project manager. Other key men include: **Geo. C. Hammer,** general carpenter foreman; **Glenn J. Adams** and **Martin D. Ford,** carpenter foremen; **Ed Koster,** labor and concrete foremen; **H. E. Merritt,** office engineer; **E. W. Jayne,** field engineer; and **E. C. Hightower,** office manager. **R. C. "Bob" Arnin** is superintendent for the Sparling Steel Co., the subcontractors, with **E. R. "Bert" Falconer** as foreman. Martin D. Ford was formerly with the Sound Construction Co.

* * *

Ralph Wigle is supervising the remodeling of a rock plant at Clements, Calif., for the Claude C. Wood Co. of Lodi. The plant will make all kinds of crushed products now in addition to concrete aggregate. A portable crushing plant is busy making road rock for nearby highway construction as well as supplying local needs. **Harold Baker** is Wighe's assistant on the job, with **George Adder** as Plant No. 1 foreman and **Roy Monk** as foreman at the second plant. **Ralph Miller** is master mechanic, **Fred Cooper** welder foreman, and **Henry Morris** Model 6 NW operator.

* * *

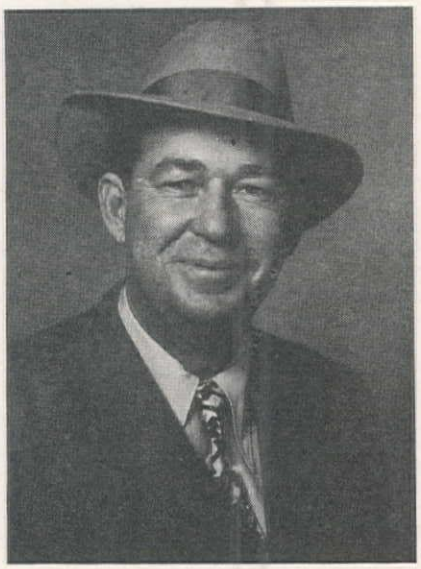
Chas. H. Rogers is on the job as general superintendent for the Austin Co., who are constructing a hangar and office building at 176th and Pacific Highway in Seattle, Wash. **Frank Tetter** is Rogers' assistant, with **M. E. Barr** as job engineer and **James N. Reed** as general steel foreman. **Edward F. Hansen** is reinforced steel foreman, with **John H. Manson, Jr.,** as labor foreman; **Ernest E. Brown** as office manager, and **Chas. W. Cameron** as purchasing agent. **Francis E. Smith** is carpenter foreman on the project, expected to be completed by August.

* * *

J. A. Sheldon is Harms Bros.' superintendent on a highway job at Concord, with **J. W. Henry** as job superintendent on the same contract. **Roy Ziegler** is general foreman, **C. L. Lukehart,** shovel foreman; **Howard Jones,** driller foreman, and **George McFarland** master mechanic on the project. **Jack Wilson** is the contractor's engineer, with **Robert Jones** and **Caesar Regusci** as assistants and **C. L. Travis** as welding foreman. **W. C. (Slim) Wentworth** is superintendent of paving.

* * *

C. G. Larson is supervising the Sound Engineering and Construction Co.'s construction of an electrical engineering building on the University of Washington campus in Seattle. Others on the job, expected to be completed by April of 1948, include: **Bill Richstein,** carpenter foreman; **C. J. Hutchinson,** steel foreman; **Glenn Olson,** labor foreman; **Clarence Larson,** carpenter foreman; and **Lester Ekman,** office manager. **F. C. Locker** is foreman for the subcontractors, the Rautman Plumbing and Heating Co., of Seattle.



JESS M. RITCHIE

Jess M. Ritchie, formerly general superintendent for the Drake-Utah-Grove operations at Florida Blanca Army Air Base in the Philippine Islands, has formed a general partnership with **Donald E. Keifer** of Oakland, known as Pioneers, engaged in the manufacture and distribution of Protecto-Charge, a battery preservative.

* * *

Jack McLeod is general superintendent for Howard S. Wright in his construction of a warehouse in Seattle, Wash. **Garvin Brackel** is carpenter foreman for the one-story structure, to be built of steel and reinforced concrete. Subcontractor for the job is the Sparling Steel Co., with **R. C. "Bob" Arnin** as superintendent and **Frank Goehanour** as foreman.

* * *

Al Bergquist is in charge of construction of a classroom building on the University of Washington campus for Strand and Sons of Seattle. Carpenter foreman on the job is **Joe Ness,** with **Cliff Mathews** as labor foreman and **Ed Swartz** as office manager. Subcontractors on the job include: Matt Schelle, Seattle, reinforced steel; Isaacson Steel Co., Seattle, structural steel; University Plumbing Co., Seattle, plumbing, with **Art Drake** as foreman; and Northwest Electric Co., Seattle, electricity, with **Wm. "Bill" Sroufe** as foreman.

* * *

Ernest W. Farris is superintendent for the Calif. Rock and Gravel Co., at their Auburn plant, located 6 mi. from Auburn, Calif. **William V. Cantrall** is plant foreman and welder, with **Warren A. Miles** as master mechanic. Other important men include **Charley J. Galloway,** who is chief shovel operator, **Douglas H. Walker,** foreman of powder and mining, and **Leonard P. Hibbard,** office manager. C. H. Van Metre & Son have the contract for all hauling.

Martin V. Carlson is supervising the Austin Co.'s job of constructing a roundhouse, turn table, machine shops, car repair shop, and coal and sand bunkers at Shelton, Wash. **"Babe" Carlson** is resident engineer for the project, with **William Shinrock** as general carpenter foreman, **Karl Sells** as carpenter foreman, **Wesley F. Morgan** as steel foreman, and **A. L. Barnes** as general labor foreman. **Frank Burns** is office manager on the job, completion of which is expected the first of September, and **A. A. Bekke** is purchasing agent.

* * *

L. H. Gordon is supervising work for the Kuckenberg Construction Co. on a job of highway construction at the west end of the Ross Island Bridge, Portland, Ore. **J. Barbee** is resident engineer for the job, with **Henry** and **L. W. Kuckenberg** as project managers. **Clyde Roe** is labor foreman, **Ellis Anderson,** carpenter foreman; and **B. E. Soucie,** office manager. **C. I. Calkins** is operator for the project, completion of which is expected by fall of 1948.

* * *

C. G. Nixon is field superintendent on the Atherton Construction Co.'s job of constructing a food processing plant in Seattle, Wash. Carpenter foreman for the reinforced concrete construction is **Chas Miller,** with **"Bill" Vogel** as steel foreman. The building, which consists of a one-story factory and 2-story office, is expected to be completed in late August.

* * *

O. T. Moore is project manager for the Allison Honer Co., Santa Ana, Calif., on their $816,318 construction of a reinforced brick administration building, classroom quadrangle, cafeteria and transformer buildings at 17th and Bristol Sts., Santa Ana. **Erwin Kind** is superintendent for the job, with **F. N. McCandless** as his assistant.

* * *

Jim Jones is superintendent for Henry George & Sons, Spokane, Wash., in charge of building the Institute of Technology structure and metals annex at Washington State College, Pullman. The main building will be a 3-story structure 350 x 57 ft., and the annex will be a 2-story structure 165 x 64 ft. Cost of the two buildings is $1,700,000.

* * *

Slim Tomlinson is construction superintendent for Union Construction Co., Great Falls, Mont., in charge of 5.8 mi. of highway construction on U.S. 2 along the west side of Glacier National Park. The job, which extends from Belton southeast up Middle Fork Canyon, was begun last September but shut down for the winter until early April. Tractor foreman under Tomlinson is **Ray Hollern.**

* * *

General superintendent for Riggle and Creighton on a $49,000 construction of an auto agency in Yakima, Wash., is **R. F. Creighton. Kenneth Riggle** is project manager for the job, to be reinforced concrete with pumice curtain walls. **W. Sonnabend** is general foreman on the construction, to be completed near the middle of July.

* * *

J. R. MacDonald is supervising construction of a highway bridge at Marysville, Calif., for J. H. Pomeroy & Co., Inc. **C. S. Winters** is resident engineer on the contract, with **J. N. Pomeroy** as project manager. Foremen on the job include: **Harold**

Little and **Jim McCreary,** erection; **Fred Turner,** riveting; **Cliff Harvey,** yard; **Bud Curtis,** general carpenter foreman; and **Murrey Albers,** carpenter foreman. **Mark Foster** is master mechanic on the job, which is expected to end September 15. **Thomas Wilson** is welding foreman, with **Frank Shott** as office manager and **Fred Peery** as company engineer.

* * *

Carl and **Joe Erickson** are in charge of construction for the Erickson Paving Co. on a highway construction calling for 1.5 mi. of grading near Longview, Wash. **E. G. Nettleton** is resident engineer on the project. Foremen include: **Monroe Piercy,** grade foreman; **Fred Hanson,** shop foreman; and **Jess Scott,** truck foreman.

* * *

General superintendent for the Louis C. Dunn Co. of their construction of a warehouse and office building in Emeryville, Calif., is **R. H. (Bob) Laws,** with **Arnold Thomas** as general foreman. **Jack Herrero** is serving as engineer and clerk, with **Ira Cook** as labor foreman, and **Erwin Stressman, Vance Wise,** and **Harvey Hannigan** as carpenter foremen.

* * *

John S. Anderson has the job of supervising construction of 2.4 mi. of highway for P. J. Anderson & Sons. **P. J. Anderson** is project manager for the $30,000 job, which calls for widening, leveling and grading the Cedar Home Road at Stanwood, Wash. **Hugh Anderson** is grade foreman.

* * *

G. C. Bullock is general superintendent and project manager for the Puget Sound Bridge and Dredging Co.'s big job of constructing a stadium at 3rd and Republican Sts., Seattle, Wash. Bullock's assistant is **Fred Stevia,** with **Frank Weerdenhoff** as resident engineer on the construction. **A. E. Busse** is paymaster, with **A. W. Stolzman** as purchasing agent, **Claude Bradley** as senior draftsman, and **W. E. Lehman** as accountant. **William J. LaVerne** is expediter on the job, with **Hugh Hallett** as clerk of the works for the School Board. Important foremen on the construction include: **J. Murphy, C. E. Symmes, Cameron Terry,** and **H. R. Dewey,** carpenter foremen; **A. Kirkland, D. O. Trimble,** and **Lee Hopkins,** labor foremen; **Helge Erickson** and **F. R. Steele,** pilebutt foremen; **G. Erickson,** cement finishing foreman.

G. C. BULLOCK

Ralph Gibbs is superintending the Class A construction of a 12-story building and 3 penthouses at S.W. 6th and Stark Sts. in Portland, Oregon, for Ross B. Hammond. Other important men on the job, which is expected to be completed in December, include: **Ray Gibson,** general carpenter foreman; **Arthur B. Fields, T. Z. Tupanainen,** and **Dirk Winters,** carpenter foremen; **C. M. Sims,** office clerk; and **Roy Payne** and **Edward J. Curtin,** timekeepers. **W. J. Fehrenbucher** is concrete foreman; **Frank A. Newman,** labor foreman; **Chas. Chaney,** cement finishing foreman; **Clarence Schaad,** steel superintendent; and **Wallace Usitalla,** steel foreman.

* * *

T. H. Rutherford is general superintendent for the Phoenix Construction Co. on their job of constructing 4.6 mi. of highway at Piercy, Calif. Resident engineer is **Percy Main,** with **Britt Pugh** as project manager. **Jack Dundee** and **W. H. Snook** are foremen, with **J. E. Keithley** as purchasing agent and **J. W. Clark** as timekeeper.

* * *

Don Micklethwaite is acting as general superintendent for the Atherton Construction Co. on their job of building an addition to the Great Northern Freight office in Seattle, Wash. **George Timpe** is general foreman, with **Verne Jones** as brick foreman on the job, expected to be completed by July.

* * *

Ed Westhefer is supervising the job for Ross B. Hammond on his construction of an auditorium and gymnasium for St. Mary's Academy in Portland, Ore. Labor foreman on the job is **Don Brenaman,** with **H. C. Abeling** as office manager. The two-story concrete and steel structure will cost $271,601.

* * *

E. I. Martinson is job superintendent for Don L. Cooney, Inc., Seattle, Wash., on a $54,000 bridge construction between Cle Elum and Ellensburg, Wash., on Highway 10. **G. M. (Bud) Raines** is steel foreman on the job, expected to be completed in July, and **Bill Cartwright** is general superintendent.

* * *

Ben R. Dow is on the job as superintendent for the Piombo Construction Co., who are excavating for the P. G. & E. power house at Electra, 7 mi. out of Jackson, Calif. **Jack Cooney** is resident manager, and **W. A. "Bill" Pierce** is foreman. **H. P. D. Thomas** is timekeeper and **Charlie George** chief operator, with **George Parr** inspecting for the P. G. & E.

* * *

R. A. Jenkins is Warren Northwest, Inc.'s job superintendent on their job on improving 21.9 mi. of highway on the Milwaukie-Estacada section of highway in Oregon. **Marion Stoddard** is crusher foreman on the $421,548 job, with **Bill Johnnie** as paving plant foreman, **Dick Bartholomey** as street foreman, and **Carl DeNucci** as grade foreman.

* * *

W. Howard Pudden is the Austin Co.'s general superintendent on their contract calling for construction of an office and warehouse in Seattle, Wash. **Harold Jorgensen** is assistant superintendent on the job, with **Jim Grove** as labor foreman and **James O. Helend** as office manager. Project is expected to be completed by the middle of July.

Oscar Benson is Morrison-Knudsen Co.'s tunnel superintendent on their job of tunnel drilling for the Electra tunnel near Jackson, Calif. **B. A. (Pete) Peters** is project manager for the construction, with **C. S. Flinn, Dee Butterworth, Anthony Martin, Robert Long, Harlan Pearce,** and **C. H. Overstreet** as walkers. **Art Moren** is master mechanic, **Harry Hirschfeld** chief electrician, and **Jack Doland** office manager on the job, expected to be completed by June 1. **L. L. (Lou) Wheeler** is company engineer, while **L. W. (Andy) Andrews** is expeditor and **M. A. Ryan** warehouseman.

* * *

Andy Johnson is job superintendent and **M. B. Kehrer** is labor foreman and timekeeper on construction of the Carter-Rice Paper Co. building in Seattle. W. G. Clark Co., Seattle, holds the contract for the $125,000 structure which will be a 2-story concrete mill building.

* * *

G. H. Sather is carpenter foreman for Burns Builders and Painters, Inc., on their construction of a drive-in theater in Midway, Wash., 15 mi. south of Seattle. The dirt moving subcontract is held by Chas. Pede, with **V. Foster** as his general foreman.

* * *

W. T. Fairey is job superintendent for Fairey-Hammond, Inc., and R. A. Farish, San Francisco, on their $199,856 job calling for 5.8 mi. of highway construction on Highway 14-C from McMillville east, Shasta Co., Calif. **W. D. Hammond, Jr.,** is assistant superintendent, with **Boyd Cable** as grading superintendent.

* * *

Robert Mottner is supervising construction of a pumping station and reservoir at McAllister Springs, Olympia, Wash., for Scheuman & Johnson, contractors. **Harry Stilwell** is superintendent of the pumping station, and **August Miller** superintendent of the reservoir. Other key men include: **Dwight Southmayd,** carpenter foreman; **Ben Verle,** steel foreman; and **C. C. Hill,** pile driver foreman. Stilwell, who is second in command on the project, was with the Seabees during the war as a diver on ship salvage.

AMONG THE piledrivermen on the McAllister Springs job of Scheuman & Johnson (mentioned above) are, l. to r.: PERCY WATKINS, FRED NICHELSON, MAC McKEOWN, ROY FRUITENSTIEN, JOE GOTCHLEY, GENE BARRIKLOW, and C. C. HILL, foreman. The project is for a new water supply for the city of Olympia, Wash.

General superintendent for Nettleton & Baldwin, Inc., on their apartment housing project in Ambaum Way, Seattle, Wash., is **Axel Hallberg,** with **Harry Anderson** as his assistant. **"Tommy" Thompson** is job engineer, with **E. S. Johnson** as office manager. Key foremen on the $4,500,000 job, expected to be completed by April, '48, include: **Ray Hedberg, Erik A. Olson,** and **F. A. Doble,** carpenter foremen; and **W. L. Layner,** equipment foreman.

* * *

E. H. Hatch is acting as the Walsh Construction Co.'s general superintendent on their tunnel construction near Jackson, Calif. **L. E. (Haywire) Huntington** is his assistant, with **Bill Lyons** as master mechanic, **R. C. Schultz** chief electrician, and **Wild Bill Harris, Earl Cliff,** and **Gene Tufts** as the walkers.

* * *

Robert Kenning and **Henry Glackin** are superintendents on the Guy F. Atkinson Co.'s job on 2.2 mi. between San Mateo and Burlingame, Calif., on the Bayshore Freeway. **Pat Chadwell** is in charge of the concrete and office, with **Shelby Dorris** and **Harvey S. Tilton** as grading foremen.

* * *

Bert Norris is job superintendent for Peter Kiewit Sons' Co., Seattle, Wash., on their $678,771 contract for 4.3 mi. of highway construction and a bridge south of Highway 1, between Ostrander and Castle Rock, Wash. **Ken Waggoner** is job office manager.

* * *

Daley Bros. Corporation have **W. L. McConnell** as their superintendent on the construction of a market in San Leandro, Calif. **W. A. Sorenson** is general foreman on the project, with **A. W. Kopf** as carpenter foreman and **G. U. Johnson** as office manager.

* * *

Mike Borgford is general superintendent for Harrison Bros., who are grading, draining and surfacing a stretch of Highway 10 near Ellensburg, Wash. **L. H. Mackey** is resident engineer on the job, with **E. C. Rogers** as grade foreman and **C. A. Wetzel** as crusher foreman. The job is expected to be finished by the first of July.

* * *

Dale Loftin is plant superintendent, and **E. W. Yoder** is job superintendent on a job by E. C. Hall, Portland, Ore., calling for 6.3 mi. of highway construction in the Crow Flat section of the John Day-Burns Highway, Harney Co., Ore. **C. W. Ireton** is timekeeper on the $296,913 job.

* * *

C. W. Ragsdale is construction supervisor for Robert Kellogg on an annex to the courthouse at Kelso, Wash. Architectural engineer for the steel and concrete, brick-faced building which was started in December, is **Lawrence B. Rice.**

* * *

S. M. Wicks is supervising a job for Daley Bros. on their job of camp construction and a culvert for penstock at the Electra tunnel and power house sites near Jackson, Calif. **Fred Snow** is foreman of the job, with **J. Cooney** as resident manager.

* * *

J. S. Dowell is supervising 1 mi. of grading and surfacing of secondary Highway 7B near Ellensburg, Wash., for L. J. Dowell. **L. H. Mackey** is resident engineer on the project, to be completed the middle of June.

LEADING PERSONNEL for McLean Construction Co. and Morrison-Knudsen Co., Inc. on a $1,917,000 building contract at the Central College of Washington, Ellensburg, are, standing, l. to r.: RUEBEN BROOM, labor supt.; WM. E. SISSOM, steel foreman; LAWRENCE BARROME, steel supt.; CHAS. EVANS, sawyer foreman; DAVID SCHWITTERS, building supt.; F. L. PITMAN, JR., office manager; L. P. WILLIAMS, purchasing agent. Seated, l. to r.: A. J. SCHWITTERS, job supt.; KATHLEEN BROWN, stenographer; CLYDE GARLOWE, carpenter supt.; LOUISE TORSETH, bookkeeper; and FLOYD SCHUMACHER, timekeeper.

J. W. Hardison is the J. W. Hardison Co.'s general superintendent on a job calling for 7 mi. of ballast and gravel surfacing northwest of Yakima, Wash. **Fred Brashears** is resident engineer on the $57,000 job, with **Gene Sullins** as grade foreman.

* * *

H. W. Eliason is project manager for H. Earl Parker on construction of the Big Dry Creek reservoir in Fresno Co., Calif. **Snyder Alt** is general superintendent on the $762,896 contract, with **Chas. Rowe, Irving Poston,** and **Slim Storey** as foremen. **Robert Bendorf** is office manager.

* * *

H. R. Terpening is general superintendent on construction of a bridge on Lake Whatcom Blvd., Bellingham, Wash., by Terpening & Sons. County engineer for the job, expected to be completed by July, is **T. P. Scholz.**

* * *

George T. Hanford is supervisor for Northwestern Engineering Co., Rapid City, S. Dakota, on their $246,828 job of grading 21.8 mi. of the Glasgow-Opheim Highway, Valley Co., Montana. Other key men on the contract are **Leland W. Wells,** foreman, and **Harry W. Elliott,** field clerk.

* * *

Ralph Yount is serving the Hall-Atwater Construction Co., Yakima, Wash., as general foreman on their job of building an addition to a Yakima hospital. **C. W. Parker** is steel foreman for the construction.

* * *

Henry Harbordt is job superintendent for Robert E. McKee, Los Angeles, who have a $735,400 contract to construct an addition to the library building at U.C.L.A. **Frank Anding** is field engineer and **George Fordham** field office manager for the project.

* * *

Jack DuBruille is job superintendent for W. G. Clark Co., Seattle, supervising the construction of an $80,000 concrete automobile repair shop.

Frank Bryant is supervising construction of a $6,618,262 Narrows Dam and Power Plant on the Little Missouri River, near Murfreesboro, Ark., for the L. E. Dixon Co. and Arundel Corp. of Glendale, Calif. **Henry Murphy** is office manager on the job, with **John Willcox** as purchasing agent and **Claude L. Coray** as project manager.

* * *

D. R. Peterson is Ross B. Hammond's general superintendent on the job calling for an addition to St. Joseph's Hospital at Vancouver, Wash. **C. O. Wallace** is carpenter foreman for the project.

* * *

A. J. Wyberg is in charge of construction of a poultry killing plant at Mount Vernon, Wash., by John H. Sellen. **Adolph Nelson** is his assistant on the job.

* * *

Ray Helm is supervising construction for Spencer Webb, Inglewood, Calif., on their $253,089 contract for 2 box girder undercrossings at the Santa Ana parkway, Euclid and Marietta Sts., Los Angeles. **Ellis Beeson** is his assistant.

* * *

Thomas Mansfield, former Western area construction worker, is now owner of his own service station in Canutillo, Texas, 14 mi. north of El Paso and 6 mi. south of New Mexico.

* * *

Fred Michel is supervising for the Anderson Bridge Construction Co. on their project of bridge construction at Tacoma, Wash. **Bert Duer** is pile driver foreman for the job.

* * *

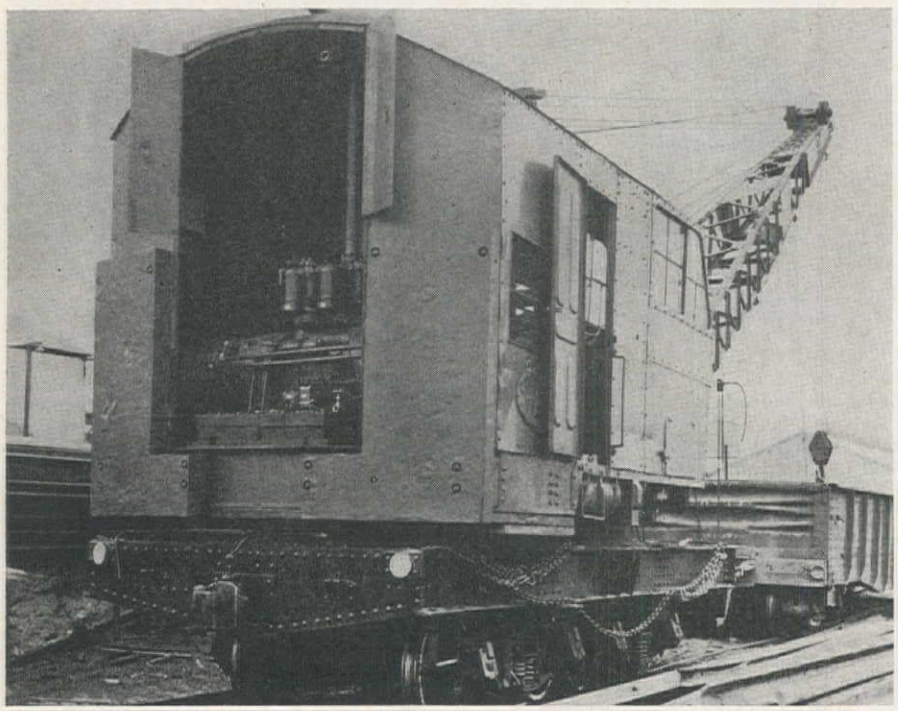
K. T. Milligan is operator for the Anderson Construction Co., Seattle, Wash., on their job of bulldozing and excavating at 151st and Pacific Highway in Seattle.

* * *

J. Lester Brown is now associated with Peter Kiewit Sons' Co. as assistant superintendent on their canal construction at the Friant-Kern Canal, Fresno, Calif.

HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD



Repowered Diesel Locomotive Crane Gives Doubled Service

FACED WITH A NEED for more effective crane service, the Texas Steel Co., Fort Worth, Tex., solved their problem by repowering an obsolete 35-ton electric crane with a Cummins Diesel engine and placing it in service alongside two oil-fired steam locomotive cranes in the plant.

The resulting multiplication of both track and hook speeds has made the crane highly effective for unloading raw materials, loading finished products, and switching cars in and out of the plant. Traveling, hoisting and swinging speeds of the repowered crane are reported to be nearly double that of the steam cranes.

The crane was equipped originally with a 75-hp. wound induction motor for traction and hoisting power, and a 35-hp. motor to provide independent swinging power. A gasoline unit was installed to move the machine from job to job.

Estimates made by Superintendent Thruman Killman's engineering department as to the feasibility of dieselizing the old crane showed that this could be accomplished with a smaller investment than would be required to purchase a second hand diesel-powered group. The repowering job was carried out by the plant maintenance group under the direction of the company's chief engineer, Phil H. Edwards.

A Model HB-600 Cummins Diesel Engine, which develops a maximum of 150 hp. at 1800 rpm., was chosen for installation in order to provide maximum operating flexibility with the ratios originally in the rig.

A variable speed hydraulic governor accomplishes throttle control, and thus leaves the operator free of throttle adjustment for the delicate jobs of spotting and hooking.

The jack shaft was installed in place of the 75-hp. electric motor and control. A reversing countershaft assembly with friction clutches operates the swinging gear. This is driven by a roller chain from an idler gear in the main driving gear train. Greater range of vision was provided the operator by revamping of the cab and relocation of the operator's seat.

An increase in speed of from 1.2 mph. before rebuilding to a present speed of 9 mph. was proved in many actual yard tests. Draw bar effort also was increased from nearly 6,000 lb. to more than 15,000 lb.

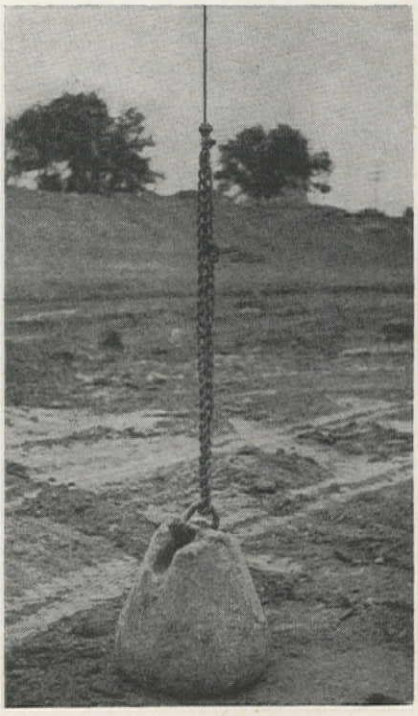
Other advantages gained by dieselization included an increase in hook speed from a maximum of 36 ft. per min. with a two-part line to 268 ft. per min. under the same conditions, as well as a considerable decrease in fuel consumption.

Welded Chain Used To Eliminate Twist

ONE CONSTRUCTION man has found a bright solution to the problem of eliminating twist in a drop hammer rope, through the use of an ordinary welded chain as the rope terminal. Operators who use "skull-crackers" or "nigger-heads" to break paving, rock, scrap, slag or other material have discovered that the common trouble with the drop hammer hoist rope is not so much the shock and torque attendant to lifting and dropping the hammer, as it is the tendency of wire rope to twist and kink when suddenly released of tension by the hammer hitting the material. The momentum of the hoist line will carry the skull-cracker six or eight feet after the impact, which causes the rope to twist or kink.

By using preformed wire rope instead of the ordinary variety, a great deal of this difficulty is overcome. The preforming process frees the component wires from locked-up, torsional stresses, and thereby greatly reduces the tendency of non-preformed wire rope to twist, rotate, or kink.

The accompanying photograph illustrates the use of ordinary welded chain as the rope terminal, a method which has been found to be most satisfactory. The chain takes the sudden slack without twisting, and continues to hold the line steady.



The Durability of "HERCULES" (Red-Strand) Wire Rope is a big factor in speeding up production, and consequently reduces operating costs.

Here is a Wire Rope that provides the Strength, Toughness, Adaptability and Endurance that "Heavy Duty" jobs call for. Its outstanding performance through the years has placed it high on the list of approved equipment in *all* industrial fields.

Made in Round Strand and Flattened Strand Constructions—Preformed and Non-Preformed—there's a type exactly fitted to meet *your* particular requirements.

Your inquiries are invited!

"HERCULES"

REG. U.S. PAT. OFF.

RED-STRAND

WIRE ROPE

MADE ONLY BY

A. LESCHEN & SONS ROPE CO.

ESTABLISHED 1857

5909 KENNERLY AVENUE • ST. LOUIS 12, MISSOURI

NEW YORK • CHICAGO • DENVER • SAN FRANCISCO • PORTLAND • SEATTLE

UNIT BID SUMMARY

Power . . .

Colorado—Larimer County—Bur. of Reclam.—Power Plants, etc.

Morrison-Knudsen Co., Inc., and Peter Kiewit Sons' Co., Denver submitted the low bid of $2,176,708 to the Bureau of Reclamation and was awarded the contract for the construction of the Estes and Marys Lake power plants, switchyards, penstock gate structures and penstocks. The work must be completed in about 30 months. Unit bids submitted follow:

(1) Morrison-Knudsen Co., Inc., & Peter Kiewit Sons' Co. $2,176,708

(2) Winston Bros., Co. & Al Johnson Construction Co. $2,420,906

SCHEDULE NO. 1	(1)	(2)
26,975 cu. yd. excavation, common	2.40	1.00
9,435 cu. yd. excavation, rock	2.40	2.00
27,590 cu. yd. fill	.30	.80
27,590 cu. yd. compacting fill	.50	1.20
6,000 cu. yd. furn. and place topsoil fill	2.00	3.30
3,000 sta. cu. yd. overhaul	.06	.03
3,500 sq. yd. dry-rock paving	5.00	3.50
1,200 cu. yd. dumped riprap	3.00	5.50
900 cu. yd. furn. and placing gravel surf. on switchyard	6.00	4.50
1,800 cu. yd. furn. and place gravel or crushed rock for base of road and parking-area surf.	6.00	3.20
108 M. gal. watering base course	4.00	2.50
7,300 gallon furn. and apply asph. material for prime coat	.30	.15
800 cu. yd. furn. and place gravel or crushed rock for surface course	6.00	3.50
15,000 gal. furn. and apply asph. material for surface course	.30	.15
10,100 sq. yd. mix, finish, and roll surface course	.30	.15
2,600 gal. furn. and apply asph. material for seal coat	.30	.15
27 cu. yd. furn. and apply coarse sand for seal coat	14.00	6.00
350 lin. ft. construct. 6-in. diam. sewerpipe drains	2.00	2.40
980 lin. ft. construct 8-in. diam. sewerpipe drains	3.00	3.50
475 lin. ft. construct 12-in. diam. sewerpipe drains	4.00	5.00
120 lin. ft. construct 12-in. diam. corr. metal pipe culv.	2.00	2.80
510 lin. ft. drill holes for anchor bars and grouting bars in place	2.00	2.20
3,800 cu. yd. concrete in power-plant substruct.	42.00	40.00
1,575 cu. yd. concrete in power-plan superstruct.	73.00	120.00
2,500 cu. yd. second-stage concrete in power plant	30.00	18.00
20 cu. yd. concrete in blockouts	90.00	150.00
2,300 sq. yd. place bonded concrete floor finish	4.50	5.50
775 cu. yd. concrete in switchyard foundations	45.00	70.00
278 cu. yd. concrete in switchyard tunnel	40.00	60.00
300 cu. yd. concrete in switchyard ducts	30.00	45.00
650 cu. yd. concrete in retaining walls	35.00	60.00
5,455 sq. ft. concrete in sidewalks	.40	.40
1,180 lin. ft. concrete in combined curbs and gutters	1.50	3.20
15,200 bbl. furn. and handling cement	4.40	4.50
1,010,000 lb. furn. and place reinf. bars ¾-in. diam. and larger	.12	.13
1,400 lin. ft. placing metal sealing strips	1.10	1.70
350 sq. ft. placing joint filler	2.50	.26
440 lin. ft. constr. control joints	2.50	3.50
160 intersection insulating reinf. bars and elect. metal conduits	3.00	.65
12,000 sq. ft. place coal-tar-saturated felt roofing, complete with flashing	.20	.10
1,200 sq. ft. placing 5-ply membrane waterproofing	.20	.10
560 sq. ft. placing 2-ply membrane waterproofing	.20	.10
1,550 sq. yd. dampproofing outside walls	.90	1.00
1,680 sq. ft. installing glass-block panels	1.50	2.60
6,000 lb. installing bulkhead gates	.09	.07
4,500 lb. installing gate guides and latches for bulkhead gates	.21	.10
216,000 lb. installing butterfly valves	.14	.07
210,000 lb. erecting structural metal framework	.13	.07
190 track ft. installing rails, ties, and ballast	8.00	8.00
29,200 lb. installing rails in concrete	.06	.08
132,500 lb. installing cranes	.06	.07
45,100 lb. install. stand. metal pipe, fittings, and valves less than 6 in. in size	.40	.40
70,000 lb. install. stand. metal pipe, fittings, and valves 6 in. or more in size	.22	.24
4,000 lb. installing steel pipe railings	.35	.24
9,900 lb. install embedded metal frames for openings in floors and walls	.13	.24
26,900 lb. install metal gratings, floor plates, and cover plates	.07	.10
8,600 lb. install oil storage tanks	.07	.07
4,200 lb. install pumps	.24	.16
504 sq. ft. install metal accordion doors	1.50	3.00
750 sq. ft. install metal swinging doors	1.50	3.00
64 sq. ft. install metal fire doors	1.50	3.00
160 sq. ft. install metal-sash windows	1.50	3.00
1,500 lb. install metal louvers	.60	.40
3,500 lb. install metal inserts	.37	.40
21,400 lb. install misc. metalwork	.34	.40
1,500 lb. install plumbing fixtures and appurtenant hardware	.26	1.20
7,000 lin. ft. install embedded elect. metal conduit 1¼ in. or less diam.	.80	1.20
8,200 lin. ft. install embedded elect. metal conduit more than 1¼ in. and not larger than 3 in. diam.	1.30	1.50
500 lin. ft. install elect. embedded metal conduit larger than 3 in. diam.	2.30	1.80
25,000 lin. ft. install embedded elect. nonmetallic conduit	.53	1.30
1,600 lb. install ground wires and rods	2.00	.40
1,660 ton transport freight of all kinds for the govt. or its agents, other than the contractor, betw. the railroad sta. and the power-plant site	10.50	8.00

SCHEDULE NO. 2	(1)	(2)
Lump sum, unwatering foundation for power plant	$20,000	$28,000
2,075 cu. yd. excav., common	4.00	1.00
4,160 cu. yd. excav., rock	4.00	2.00
40 cu. yd. excav., rock, for keys for switchyard foundation	40.00	45.00
1,130 cu. yd. fill	.50	.80
1,130 cu. yd. compacting fill	1.00	1.20
160 cu. yd. dumped riprap	3.00	5.50
70 cu. yd. furn. and place gravel surf. on switchyard	6.00	4.50
80 lin. ft. constr. 6-in. diam. sewerpipe drains	2.00	2.40
420 lin. ft. drilling holes for anchor bars and grouting bars in place	2.00	2.20
1,400 cu. yd. conc. in power-plant substruct.	50.00	40.00
500 cu. yd. conc. in power-plant superstruct.	80.00	120.00
500 cu. yd. second-stage conc. in power plant	35.00	18.00
5 cu. yd. conc. in blockouts	90.00	150.00
35 cu. yd. placing lightweight concrete fill on floor	20.00	28.00
900 sq. yd. placing bonded concrete floor finish	4.50	5.50

(Continued on next page)

"New Lorain-41 Is Best Yet"...

REPORTS E. C. POWELL, GREAT FALLS, MONTANA

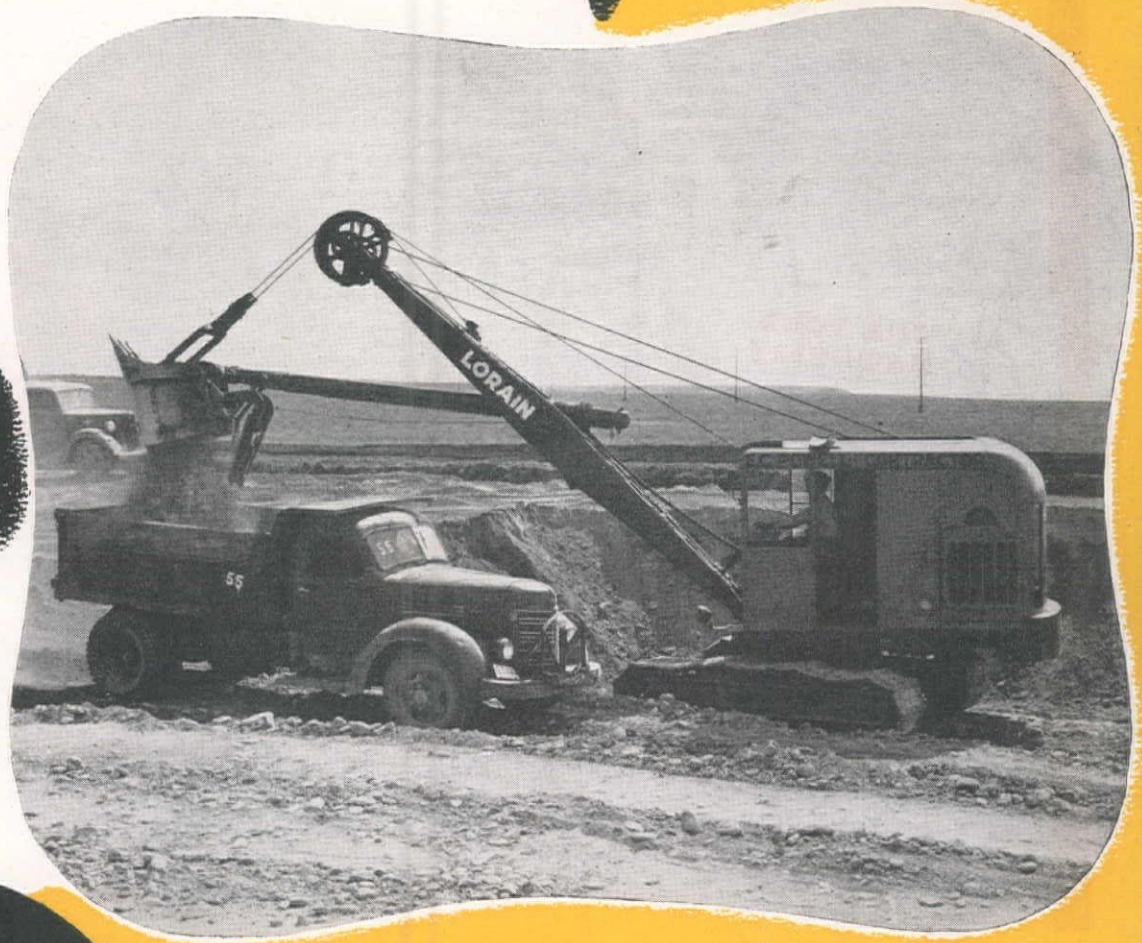
... Lorain-41 Shovel Averaged 135 Yds. Per Hour On First 100,000 Yds.

E. C. Powell of Great Falls, Montana knows his Lorains. Five times he has repeated—and now his latest ¾-yard Diesel Lorain-41 shovel brings this comment—"The L-41 has given remarkably fast, economical performance. This new shovel is the best yet!"

Contractor Powell backs up that statement with a performance report of 135 yards per hour in the first 100,000 yards of digging on a gravel loading job for the Montana Highway Relocation Project between Gore Hill and Ulm in Cascade County.

Lorain-41's are the "best yet" for your jobs demanding high output, powerful digging, and proven, rugged construction. They are available for every class of work — on crawler mounting, 2-engine Moto-Crane and single-engine Self-Propelled rubber-tire carriers. All popular front ends can be interchanged on any mounting. Get the latest Lorain story from your Thew-Lorain Distributor listed below!

THE THEW SHOVEL COMPANY, LORAIN, OHIO



"... remarkably fast, economical performance"... states owner E. C. Powell, Great Falls, of his new ¾-yd. Lorain-41 shovel shown here loading selected gravel at the rate of 135 yds. per hour for Montana highway project.

See Your THEW Lorain REG. U. S. TRADE MARK Dealer

LE ROI-RIX MACHINERY CO., Los Angeles 11
CATE EQUIPMENT CO., Salt Lake City 4
LIBERTY TRUCKS & PARTS CO., Denver 1
COAST EQUIPMENT COMPANY, San Francisco 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
CENTRAL MACHINERY CO., Great Falls, Montana
MOUNTAIN TRACTOR CO., Missoula, Montana
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; Billings, Montana
Branches: Sheridan, Greybull, Casper, and Rock Springs, Wyoming

70	cu. yd. concrete in switchyard foundations	50.00	70.00
15	cu. yd. concrete in switchyard ducts	38.00	45.00
500	cu. yd. concrete in retaining walls	32.00	60.00
4,600	bbl. furn. and handling cement	4.40	4.50
357,000	lb. furn. and placing reinf. bars ¾-in. diam. and larger	.12	.13
100	lin. ft. placing metal sealing strips	1.10	1.70
120	lin. ft. constructing control joints	2.50	3.50
60	intersection insulating reinf. bars and elect. metal conduit	3.00	.65
3,000	sq. ft. pl. coal-tar-saturated felt roofing, complete with flashing	.20	.10
400	sq. ft. pl. 2-ply membrane waterproofing	.20	.10
500	sq. yd. dampproofing outside walls	.90	1.00
300	sq. ft. install glass-block panels	1.50	2.60
11,000	lb. install bulkhead gates	.09	.07
2,200	lb. install gate guides and latches for bulkhead gates	.21	.10
24,000	lb. erect struct. metal framework	.13	.07
75	track ft. install rails, ties, and ballast	8.00	8.00
17,150	lb. install rails in concrete	.06	.08
89,200	lb. install crane and hoist	.06	.07
14,600	lb. install stand. metal pipe, fittings, and valves less than 6 in. diam.	.40	.40
24,000	lb. install stand. metal pipe, fittings, and valves 6 in. or more diam.	.22	.24
3,400	lb. install steel pipe railings	.35	.24
3,150	lb. install embedded metal frames for opening in floors and walls	.14	.24
10,800	lb. install metal gratings, floor plates, and coverplates	.07	.10
7,500	lb. install oil storage tanks	.07	.07
2,100	lb. install pumps	.24	.16
300	sq. ft. install metal accordion doors	1.50	3.00
212	sq. ft. install metal swinging doors	1.50	3.00
40	sq. ft. install metal fire doors	1.50	3.00
600	lbs. install metal louvers	1.50	.40
1,600	lb. install metal inserts	.37	.40
4,500	lb. install misc. metalwork	.34	.40
380	lb. install plumbing fixtures and appurtenant hardware	.30	1.20
1,500	lin. ft. install embedded elect. metal conduit 1¼ in. or less diam.	.80	1.20
2,700	lin. ft. install embedded elect. metal conduit more than 1¼ in. and not larger than 3 in. diam.	2.30	1.50
3,900	lin. ft. install embedded elect. nonmetallic conduit	.53	1.30
1,600	lb. install ground wires and ground rods	2.00	.40
400	ton transport freight of all kinds for govt. or its agents, other than the contractor, betw. railroad station and power-plant site	10.50	8.00
	SCHEDULE NO. 3	(1)	(2)
18,200	cu. yd. excav., common	3.50	.50
51,700	cu. yd. excav., rock	3.50	2.00
50,000	cu. yd. haul excess rock excav. material from the Estes Power Plant penstock excav.	.40	.55
28,050	cu. yd. backfill	1.00	1.10
16,000	cu. yd. compacting backfill	4.00	3.50
3,000	cu. yd. backfill earth and gravel	2.50	2.40
60	cu. yd. riprap	7.00	10.00
3,922	cu. yd. conc. in penstock gate struct., substruct., spillway, and penstock, anchors and walls	50.00	42.00
245	cu. yd. conc. in penstock gate struct., superstruct.	80.00	120.00
6,200	bbl. furn. and handling cement	4.40	4.50
579,600	lb. furn. and placing reinf. bars ¾ in. diam. and larger	.12	.13
100	lin. ft. construct control joints	2.50	3.50
1,900	sq. ft. pl. coal-tar-saturated felt roofing complete with flashing	.25	.10
35	sq. yd. dampproofing outside walls	1.00	1.00
55	sq. ft. install glass-block panels	2.00	2.60
4,000	lb. install fixed wheel gate	.13	.10
4,800	lb. install fixed-wheel gate frame and guides	.20	.10
3,000	lb. install fixed-wheel gate hydraulic hoist	.20	.10
216,000	lb. install high-pressure gate	.14	.07
4,000	lb. install high-pressure and fixed-wheel gate hydraulic control apparatus	.13	.40
100	lb. erect. struct. metal framework	.50	.07
3,200	lb. install rails in concrete	.06	.08
12,000	lb. install overhead traveling crane	.06	.07
1,300	lb. install stand. metal pipe, fittings, and valves less than 6 in. diam.	.40	.40
81,150	lb. install stand. metal pipe, fittings, and valves 6 in. or more diam.	.22	.24
41,900	lb. install trashrack metalwork	.09	.08
7,100,000	lb. install penstocks	.06	.06
195	sq. ft. install metal swinging door	2.00	3.00
255	sq. ft. install metal-sash windows	2.00	3.00
20	lb. install metal louvers	2.00	.40
80	lin. ft. install downspouts and leader boxes	2.00	1.60
30,775	lb. install misc. metalwork	.40	.40

Irrigation . . .

New Mexico—Quay County—Bur. of Recl.—Earthwork & Structs.

The Al Johnson Construction Co., Minneapolis, Minn., was low before the Bureau of Reclamation at Tucumcari, with a bid of $1,102,832 for the construction and completion of the Conchas Canal from station 3539 plus 38.1 to station 4452 plus 46.3, lateral unit No. 6, and a timber bridge across the Hudson Canal at station 306 plus 20, on New Mexico State Highway No. 88, Tucumcari Project, New Mexico. The work is situated 5 to 11 miles southwest of Tucumcari. The term "canal" includes laterals, sublaterals and wasteways. Unit bids are as follows:

	Sched. 1	Sched. 2	Sched. 3	Total
(1) Al Johnson Construction Co.	$213,325	$329,817	$559,690	$1,102,832
(2) J. A. Terteling & Sons, Inc.	200,299	309,536	596,970	1,106,805
(3) H. B. Zachry Co.	192,281	499,231	843,299	1,534,811

	SCHEDULE NO. 1	(1)	(2)	(3)
1,800	cu. yd. excav., common, for canal	.30	.40	.75
430	cu. yd. excav., rock, for canal	.75	.40	2.50
200	cu. yd. excav. for core banks	.35	.40	.40
500	sta. cu. yd. overhaul	.04	.05	.015
100	cu. yd. compacting embankments	.05	.45	.45
15,900	cu. yd. excav., common, for structs.	1.38	1.00	2.00
2,260	cu. yd. excav., rock, for structs	4.55	2.50	2.50
14,900	cu. yd. backfill	.75	.40	.50
600	cu. yd. compacting backfill	2.80	2.50	5.00
200	cu. yd. riprap	11.00	6.00	10.00
180	cu. yd. conc. in structs., except siphon barrels	80.00	70.00	80.00
1,670	cu. yd. conc. in siphon barrels	53.20	60.00	47.85
2,590	bbl. furn. and handling cement	6.50	5.80	4.60
311,000	lb. furn. and placing reinf. bars ¾-in. diam. and larger	.127	.12	.10
90	sq. ft. placing elastic filler matl. in joints	1.20	1.00	.50
190	lin. ft. placing rubber water stops in joints	.80	1.00	.50
9,070	lb. placing metal water stops in joints	.30	.15	.15
1.4	M.B.M. furn. and erect timber in structs.	415.00	225.00	250.00
6,500	lb. install gates and miscl. metalworks	.30	.30	.10

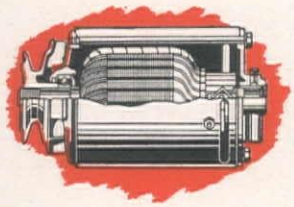
(Continued on next page)

"Certainly FORD TRUCKS LAST LONGER!"

"That's why we operate 207 of them!"—says C. R. Littlepage, Supt. of Transportation, Houston Oil Field Material Co., Houston, Texas.

Two 1939 Ford Trucks owned by HOMCO that prove the point: (Above) Driver Joe Zachary and Pickup, mileage 207,316; (Below) Driver H. O. Carpenter and Pickup, mileage 228,398. Supt. Littlepage adds: "Our Ford Trucks deliver trouble-free miles at minimum cost!"

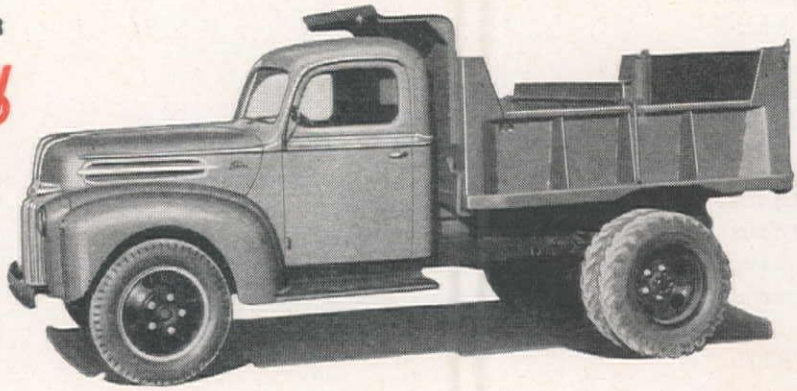
One BIG Reason—
FORD ELECTRICAL UNITS STAND UP!



The fame of Ford Trucks for swift, sure starting and all-weather reliability rests solidly on Ford design and Ford quality . . . in particular, the Ford Electrical System. More than 12 million Ford-designed starter motors and generators have been built in Ford shops. Repeated tests for electrical efficiency consistently prove these fine, Ford-built units to be outstanding. Long, trouble-free generator service is assured by such long-life features as pre-lubricated, sealed ball bearings on armature shafts, and by bushings wick-lubricated from a reservoir with an overflow drain, which prevents surplus oil from reaching commutator. Ford starter motors are pre-lubricated, requiring no oiling whatever. Ford wiring and generous battery and generator capacity adhere strictly to the highest standards of the industry. The simplicity and high efficiency of the Ford starting system circuit, too, have much to do with Ford's faithful starting performance.

Ford

THE 6 YOUR PICK OF POWER THE V-8



Hauling bulk building and street construction materials, the Ford Dump Truck chassis provides capacity, maneuverability and long life that have made it a prime favorite everywhere. This shows an 8-foot-long center-gate Dump body for "batch-work," by Anthony Company, Streator, Illinois.

Only Ford Brings You All These Long-Life Features: Your choice of engines, V-8 or SIX —each with new Flightlight oil-saving 4-ring pistons and precision bearings · true truck frames in all models, with siderails *doubled* in heavy duty units · rear axle shafts free of weight-load, ¾-floating in half-ton units, full-floating in all others · big, easy-action brakes with non-warping, score-resistant cast drum surfaces—in all, *more than fifty* such endurance engineering features! And more than 100 body-chassis combinations to choose from. See your Ford Dealer now!

MORE FORD TRUCKS IN USE TODAY THAN ANY OTHER MAKE!

SCHEDULE NO. 2	(1)	(2)	(3)
180,000 cu. yd. excav., common, for canal	.30	.40	.80
38,000 cu. yd. excav., rock, for canal	.75	.40	3.00
30,000 cu. yd. excav. for core banks	.35	.40	.40
100,000 sta. cu. yd. overhaul	.04	.05	.015
56,000 cu. yd. compacting embankment	.05	.45	.35
7,900 cu. yd. excav., common, for struct.	1.10	1.00	2.60
1,900 cu. yd. excav., rock, for structs.	4.55	1.00	8.00
5,700 cu. yd. backfill	.75	.40	.50
3,500 cu. yd. compacting backfill	2.80	2.50	4.00
1,700 sq. yd. dry-rock paving, 10-in. over-all thickness	6.40	5.00	4.00
250 sq. yd. dry-rock paving, 15-in. over-all thickness	6.40	6.00	4.50
1,340 cu. yd. conc. in structs.	88.00	70.00	75.00
1,870 bbl. furn. and handling cement	6.50	5.80	4.60
106,000 lb. furn. and place reinf. bars ¾-in. diam. and larger	.127	.12	.10
10 sq. ft. placing elastic filler matl. in joints	1.20	1.00	.50
76 M.B.M. furn. and erect timber in structs.	354.00	225.00	250.00
3,300 lin. ft. laying 18-in. diam. conc. pipe	1.55	1.50	1.25
240 lin. ft. laying 24-in. diam. conc. pipe	2.00	1.75	1.60
260 lin. ft. laying 30-in. diam. conc. pipe	2.20	2.00	2.00
540 lin. ft. laying 36-in. diam. conc. pipe	3.55	2.50	2.50
25,300 lb. installing gates and miscl. metalwork	.30	.30	.10

SCHEDULE No. 3	(1)	(2)	(3)
280,000 cu. yd. excav., common, for canal	.30	.61	.85
35,000 cu. yd. excav., rock, for canal	.75	.61	3.00
10,000 cu. yd. excav. for core banks	.35	.40	.40
125,000 sta. cu. yd. overhaul	.04	.05	.015
273,000 cu. yd. compacting embankment	.05	.20	.40
11,400 cu. yd. excav., common, for structs.	1.10	1.00	2.60
2,900 cu. yd. excav., rock, for structs.	4.55	1.00	8.00
10,700 cu. yd. backfill	.75	.40	.50
7,700 cu. yd. compacting backfill	2.80	2.50	4.00
2,770 sq. yd. dry-rock pacing, 10-in. over-all thickness	6.40	5.00	4.00
410 sq. yd. dry-rock paving, 15-in. over-all thickness	6.40	6.00	4.50
2,830 cu. yd. conc. in structs.	88.00	70.00	75.00
3,970 bbl. furn. and handling cement	6.50	5.80	4.60
222,000 lb. furn. and placing reinf. bars ¾-in. diam. and larger	.127	.12	.10
270 sq. ft. placing elastic filler matl. in joints	1.20	1.00	.50
350 lin. ft. placing rubber water stops in joints	.80	1.00	.30
46.5 M.B.M. furn. and erecting timber in structs.	354.00	225.00	250.00
3,720 lin. ft. lay 18-in. diam. conc. pipe	1.55	1.50	1.25
1,050 lin. ft. lay 24-in. diam. conc. pipe	2.00	1.75	1.60
290 lin. ft. lay 30-in. diam. conc. pipe	2.20	2.00	2.00
1,380 lin. ft. lay 36-in. diam. conc. pipe	3.55	2.50	2.50
1,580 lin. ft. lay 42-in. diam. conc. pipe	4.55	3.00	2.90
32 lin. ft. jacking 42-in. diam. conc. pipe under railroad	46.00	42.00	20.00
31,500 lb. install gates and miscl. metalwork	.30	.30	.10

Oklahoma—Jackson County—Bureau of Reclam.—Earthwork, Structs., Surface

Stebbins Construction Co. of Tulsa, Okla., submitted the low bid of $137,173 to the U. S. Bureau of Reclamation at Altus, for earthwork, structures, and surfacing for the reconstruction of Oklahoma State Highway No. 9, to align it outside of Altus Reservoir. Unit bids are as follows:

(1) Stebbins Construction Co. $137,173
(2) Oklahoma Paving Co. 146,645
(3) James & Phelps Construction Co. $176,410

	(1)	(2)	(3)
27,500 cu. yd. excavation, unclassified	.65	.65	.80
24,000 cu. yd. compacting embankment	.22	.05	.15
100 roller hr. rolling embankment	3.20	3.00	4.50
150 M. gal. watering	2.50	3.00	2.50
110 cu. yd. excavation, unclassified, for structs.	6.60	5.00	4.00
3,300 cu. yd. hauling and placing riprap	4.40	2.50	2.00
3,700 sq. yd. furn. and place gravel base course	.94	1.25	1.20
1,125 gal. furn. and apply prime coat (RC-2)	.28	.50	.20
3,700 sq. yd. furn. and place blended rock-asph. surf. crse.	.67	1.25	1.15
0.4 mi. const. highway shoulders	800.00	$1,000	400.00
Lump sum, reconst. temp. highway bridge	$13,800	$17,000	$19,884
Lump sum, maintaining temp. highway crossing	$9,450	$5,000	$24,656
Lump sum, raising truss spans on existing bridge	$31,800	$55,000	$43,016
150 cu. yd. furn. and place conc. in bridge piers and abutments	48.50	70.00	52.00
30 cu. yd. furn. and place conc. in bridge deck slab	52.00	70.00	56.00
15,000 lb. furn. and place reinf. bars	.09	.10	.11
250 cu. yd. remove concrete	12.00	5.00	20.00
Lump sum, remove struct. steel from existing bridge	$2,400	$1,000	$8,713
Lump sum, remove and hauling materials from tempy. highway bridge	$7,700	$3,150	$9,153
315 lin. ft. manufacturing and driving reinf. conc. piles	11.00	10.00	10.00
4,284 lin. ft. furn. and install metal plate guardrail	2.05	2.00	2.00
260 ea. furn. and install standard guideposts	3.30	4.00	2.00
15 ea. furn. and install right-of-way markers	3.00	5.00	5.00

Idaho—Canyon County—Bureau of Reclam.—Earthwk. & Structs.

Humphrey-Ketchen of Boise, was low before the Bureau of Reclamation at Boise for the construction of earthwork and structures, Conway Gulch Lateral from station 60 plus 50 to the end of "C" line east canal, laterals 9.2 and 9.4, and sublaterals, Boise project. The bid price was $251,381. The work is located approximately 5 miles north of Caldwell and involves the following:

(1) Humphrey-Ketchen $251,381
(2) Henry Horn 296,579
(3) Vernon Bros. 289,068
(4) J. A. Terteling & Sons $329,096
(5) Marshall & Haas 343,884
(6) Morrison-Knudsen Co., Inc. 346,747

	(1)	(2)	(3)	(4)	(5)	(6)
205,000 cu. yd. excav., common, for laterals	.23	.22	.21	.34	.22	.25
100 cu. yd. excav., rock, for laterals	.23	2.00	3.00	.36	.22	4.00
1,500 cu. yd. excav., for core banks	.30	.50	.60	.42	.50	.80
15,000 sta. cu. yd. overhaul	.02	.04	.05	.04	.05	.04
2,700 cu. yd. compacting embankment	1.00	.75	.70	.54	1.00	.30
32,000 cu. yd. excav., common, for struct.	.65	1.20	.47	.85	1.00	1.25
50 cu. yd. excav., rock, for struct.	.65	8.00	3.00	1.20	3.00	6.00
28,500 cu. yd. backfill about struct.	.25	.40	.70	.24	.60	.50
7,900 cu. yd. compacting backfill about struct.	1.00	1.00	2.00	2.50	2.50	1.25
16,000 cu. yd. placing earth lining of lateral	.50	.25	.80	.36	.40	1.00
500 cu. yd. gravel blanket on slope of lateral	1.50	5.00	3.00	3.00	6.00	3.50
4,050 sq. yd. dry-rock paving	3.75	4.00	4.00	5.40	6.00	4.00
2,175 cu. yd. conc. in struct.	37.50	49.00	46.00	52.50	55.00	55.00
3,300 bbls. furn. and handling cement	5.50	5.00	6.00	6.00	6.00	4.00
140,000 lbs. place reinf. bars	.06	.06	.05	.05	.08	.12
29 M.B.M. erecting timber in struct.	70.00	80.00	100.00	78.00	75.00	80.00
6,800 lin. ft. lay 15-in. diam. conc. pipe	1.00	1.10	1.50	1.00	1.40	1.50

(Continued on next page)

This New Formula Golden Shell Motor Oil

BRINGS TOGETHER THE BEST OF NEW-FOUND COMPONENTS

A development of Shell Research, it provides engine protection beyond the demands of average operation

New-Formula Golden Shell Motor Oil achieves a goal long sought by lubrication engineers.

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.*

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 sells for less than most premium oils. Order enough now for your gasoline-powered equipment.

NEW-FORMULA **Golden Shell** MOTOR OIL

SHELL

520 lin. ft. lay 18-in. diam. conc. pipe	1.50	1.25	1.50	1.15	1.60	1.75
332 lin. ft. lay 24-in. diam. conc. pipe	1.75	1.90	2.50	1.44	2.50	2.00
200 lin. ft. lay 30-in. diam. conc. pipe	2.50	2.75	2.75	1.80	3.00	3.00
150 lin. ft. lay 36-in. diam. conc. pipe	3.00	3.50	3.30	2.20	3.50	4.50
1,110 lin. ft. lay 48-in. diam. conc. pipe	4.50	4.25	4.75	4.00	5.00	5.25
3,000 lin. ft. lay 54-in. diam. conc. pipe	4.50	5.00	6.00	4.60	6.00	6.00
36 lin. ft. lay 15-in. diam. corr. metal pipe	.75	1.00	1.00	.60	.50	1.00
2,100 lbs. install gates	.25	.25	.30	.20	.25	.22
10,650 lbs. install misc. metalwork	.25	.30	.30	.30	.25	.45

Sewerage . . .

California—Tulare County—City—Sewage Treatment Plant

Trewhitt, Shields & Fisher, Fresno, submitted the low bid of $232,322 to the Public Utilities Commission of Tulare for the construction of additions and alterations to the present sewage treatment plant, located about one mile southwest of Tulare. The work includes construction of filter and digester and appurtenant equipment, reconstruction of primary sedimentation tank and certain pump pits. The following unit bids were submitted:

(A) Trewhitt, Shields & Fisher $232,322
(B) Hoagland-Findlay Co. 244,300
(C) Fred J. Early, Jr. 248,746
(D) Stanley H. Koller 257,000
(E) Central California Construction Co. $297,839
(F) Johnson Western Co. 298,073
(G) James W. Huntley 298,932
(H) De Luca & Son 299,361

(1) lump sum, reconst. sewage treatment plant
(2) per ft., drill water well below depth of 75 ft.
(3) per cu. yd., add Class A conc.
(4) per cu. yd., add Class B conc.
(5) per cu. yd. add gunite
(6) per cu. yd., add machine excav.
(7) per cu. yd. add hand excav.
(8) per cu. yd. add compacted fill

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	$232,322	$244,300	$248,746	$257,000	$297,839	$298,073	$298,932	$299,361
(2)	3.00	6.00	7.50	6.00	10.00	12.75	10.00	5.00
(3)	60.00	75.00	42.00	85.00	50.00	78.00	50.00	75.00
(4)	60.00	70.00	35.00	35.00	40.00	30.00	40.00	70.00
(5)	.....	.....	.....	.....	.....	75.00	60.00	.....
(6)	1.00	2.00	1.25	3.50	1.50	.60	1.00	2.00
(7)	2.00	4.00	6.00	7.00	4.00	3.50	3.00	10.00
(8)	1.20	3.00	3.00	3.50	2.00	1.25	1.00	3.00

Dam . . .

New Mexico—Sierra County—Bur. of Recl.—Spillway Alter.

J. H. Ryan submitted the only bid to the Bureau of Reclamation at El Paso, Tex., for the construction of spillway alterations at Elephant Butte Dam, Rio Grand Project, New Mexico-Texas. Ryan's bid amounted to $143,505 on the two schedules. 240 days are allowed for completion of work. Unit bid follows:

	Schedule No. 1	Schedule No. 2	Total
(1) J. H. Ryan	$78,390	$65,115	$143,505

SCHEDULE 1

3,220 cu. yd. excav., all classes, for inlet channels	5.00
840 cu. yd. excav., rock and conc., for gate structs.	20.00
200 lin. ft. drill holes for anchor bars and grout bars in place	1.00
700 bbl. furnishing and handling cement	5.00
80 cu. yd. conc. in inlet channels	60.00
420 cu. yd. conc. in gate structs.	65.00
29,000 lb. furn. and place reinf. bars	.15
Lump sum constructing vortex eliminators	
3,500 lb. installing anchor bolts	.20
Lump sum, dismantling and removal of existing cylinder gates, frames and hoists	$2,000
140 lin. ft. installing electrical metal conduit	1.00

SCHEDULE 2

210 cu. yd. excav., rock and conc., for training wall footing	40.00
240 cu. yd. excav., common, back of channel walls	4.00
10 cu. yd. excav., conc., for baffles	100.00
650 lin. ft. drill holes for anchor bars and grout bars in place	1.00
80 sq. yd. chip and roughen concrete surfaces	5.00
975 bbl. furn. and handling cement	5.00
210 cu. yd. conc. in training wall footing	40.00
200 cu. yd. conc. in training wall except footing	50.00
150 cu. yd. conc. in channel cover	60.00
120 cu. yd. conc. in baffles	80.00
91,000 lb. furn. and placing reinf. bars	.12
100 cu. yd. rock fill on channel cover	4.00
170 sq. yd. grouted paving	3.00

Highway and Street . . .

California—Imperial County—State—Grade and Surf.

Basich Bros. Construction Co. & Basich Bros. of Alhambra submitted the low bid of $1,431,227 to the Division of Highways, Sacramento, for highway construction between El Centro and Brawley, about 13.1 miles in length to be graded and surfaced with plant-mixed surfacing on cement treated base. The State will furnish the standard brass plates required for center line monuments. Unit bids follow:

(1) Basich Bros. Construction Co. & Basich Bros. $1,431,227
(2) R. E. Hazard Construction Co. 1,468,816
(3) Winston Bros. Co. 1,482,930
(4) Morrison-Knudsen Co., Inc. 1,487,061
(5) United Concrete Pipe Corp. & Ralph A. Bell $1,494,584
(6) Fredricksen & Kasler and E. B. Bishop 1,553,599
(7) Peter Kiewit Sons Co. 1,603,847

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
550 cu. yd. remove conc.	3.75	9.00	6.00	4.00	6.00	5.80	7.35
Lump sum, clearing and grubbing	$10,000	$10,000	$5,000	$12,700	$20,000	$10,700	$22,800
182,000 cu. yd. rdwy. excav.	.35	.32	.36	.40	.40	.43	.45
17,200 cu. yd. struct. excav.	2.50	1.80	2.00	2.50	2.00	2.50	2.25
38,000 cu. yd. canal excav.	.25	.55	.50	.50	.40	.37	.30
40 cu. yd. ditch and channel excav.	2.00	4.00	2.00	3.00	2.00	5.20	1.25
600 ton gravel backfill	2.50	3.82	2.80	3.00	3.00	2.60	3.85
172,000 cu. yd. imported borrow, Type A	1.10	1.05	.92	1.05	1.36	1.20	1.30
91,000 cu. yd. imported borrow, Type B	1.10	.86	.92	.95	1.27	1.05	.80

(Continued on next page)

WHEN YOU BUY CONSTRUCTION MACHINERY AND EQUIPMENT...

USE A C.I.T. CHECK TO COMPLETE YOUR PURCHASE

MR. CONTRACTOR: If you need money to buy machinery and equipment, let C. I. T. FURNISH THE FUNDS. You can borrow large or small amounts, at reasonable cost, and spread repayment over many months.

The right equipment, on hand when you need it, can be the means of earning larger profits for you. Don't let the lack of ready cash deprive you of owning any equipment needed to handle your construction jobs economically and with greater efficiency.

When buying equipment, you need make only a moderate initial investment. Use a C.I.T. check to take care of the unpaid balance . . . our funds are available promptly, anywhere, anytime. Amortize the cost by monthly payments arranged to suit your needs.

Any of these C.I.T. offices will furnish rates, terms and full information. They will help you arrange every detail, and their friendly services are available upon request.

Send for NEW booklet on Equipment Financing

CIT "The mark of leadership"

C. I. T. CORPORATION

Industrial and Equipment Financing

One Park Avenue	One N. La Salle St.	66 Luckie Street, N. W.	660 Market St.	416 W. 8th Street
NEW YORK	CHICAGO	ATLANTA	SAN FRANCISCO	LOS ANGELES

AFFILIATED WITH COMMERCIAL INVESTMENT TRUST INCORPORATED

2,400 ton imported subgrade material	2.50	3.80	3.00	2.50	2.00	2.30	2.85
175,000 sq. yd. comp. orig. ground	**.05**	**.04**	**.05**	**.06**	**.05**	**.05**	**.03**
1,880,000 sta. yd. overhaul	.003	.007	.008	.004	.005	.005	.008
Lump sum, dev. wat. sup. and furn. wat. equip.	$10,000	$12,000	$6,000	$2,500	$20,000	$7,500	$3,000
38,000 M. gal. apply water	1.85	1.35	1.60	1.50	1.80	1.40	1.80
695 sta. finishing roadway	15.00	20.00	10.00	10.00	20.00	21.00	7.00
68,000 ton min. aggre. (cem. tr. base)	3.00	4.12	4.00	3.40	3.50	3.80	4.50
22,000 bbl. Portland cem. (cem. tr. base)	4.00	3.72	4.10	5.00	3.50	4.25	3.50
670 ton asph. em. (pt. bdr. cur. sl. & sl. ct.	40.00	35.45	27.00	35.00	30.00	32.00	30.00
2,900 ton screenings (sl. ct.)	7.00	6.00	6.50	5.00	6.00	6.00	5.25
105 ton liq. asph. SC-2 (pr. ct. & pen. tr.)	20.00	27.25	32.00	24.00	25.00	22.00	28.00
70,000 ton min. agg. (P.M.S.)	4.00	4.25	4.00	3.85	3.25	3.88	4.10
3,800 ton paving asph. (P.M.S.)	19.00	17.65	22.00	21.00	17.00	22.00	21.50
540 lin. ft. raised bars and rolls (P.M.S.)	.75	1.00	1.00	1.00	2.00	1.70	1.00
800 sq. ft. placing down drains (P.M.S.)	.25	.40	.50	.25	.50	.23	1.00
880 cu. yd. Cl ."A" P.C.C. (structures)	55.00	53.70	70.00	55.00	70.00	80.00	70.00
35 cu. yd. Cl. "B" P.C.C. (pipe encase.)	25.00	20.00	20.00	40.00	40.00	25.00	20.00
52,000 lb. furn. struc. steel	.11	.105	.12	.12	.10	.125	.13
52,000 lb. erecting struc. steel	.05	.045	.06	.04	.05	.055	.07
1,035 lin. ft. furn. conc. piling	3.00	2.85	3.50	3.00	3.00	3.20	3.50
23 ea. driving piles	175.00	165.00	180.00	150.00	160.00	135.00	135.00
262 lin. ft. tee-rail br. railing (new br.)	6.00	5.45	6.00	6.00	5.00	4.90	4.50
177 lin. ft. tee-rail br. railing (exist. br.)	6.00	6.50	7.50	7.00	10.00	5.80	5.50
70 cu. yd. sacked conc. riprap	25.00	41.00	30.00	35.00	16.00	35.00	30.00
180 cu. yd. broken conc. riprap	20.00	8.20	10.00	25.00	10.00	18.00	15.00
570 cu. yd. P.C.C. (curbs, gut'rs & sdwk.)	25.00	31.50	40.00	55.00	30.00	40.00	40.00
930 ea. curb dowels	.50	.60	.50	.50	1.00	.35	.80
80 ea. reflectors	.75	1.50	2.00	1.00	2.00	3.30	2.15
100 ea. right-of-way monuments	6.00	5.00	5.50	7.00	5.00	6.00	5.65
90 ea. center line monuments	15.00	10.00	10.00	7.00	5.00	9.00	10.75
260 lin. ft. metal plate guard railing	2.50	3.00	3.20	5.00	2.50	2.30	2.50
155 ea. guide posts	6.00	5.00	6.00	7.00	3.00	6.00	6.70
115 ea. culvert markers	5.00	5.00	6.00	7.00	3.00	6.00	6.00
10,200 lin. ft. wire mesh fence	1.70	1.50	1.60	2.00	1.40	1.80	1.75
5.5 mi. new prop. fence	$1,250	$1,400	$1,200	$1,200	$1,900	$1,800	$1,500
0.5 mi. rem. & reconst. exist. prop. fences	500.00	$1,400	550.00	600.00	600.00	730.00	650.00
22 ea. drive gates	60.00	85.00	60.00	50.00	50.00	95.00	100.00
1,136 lin. ft. 12-in. R.C.P. (std. str.)	2.50	2.90	3.60	3.00	2.50	3.60	3.60
3,464 lin. ft. 18-in. R.C.P. (std. str.)	3.75	3.75	4.70	4.25	4.00	4.20	4.70
4,996 lin. ft. 24-in. R.C.P. (std. str.)	5.00	5.00	6.00	6.00	6.00	5.70	6.50
60 lin. ft. 30-in. R.C.P. (std. str.)	6.00	6.80	7.70	8.00	7.00	7.80	8.75
64 lin. ft. 24-in. R.C.P. (3000 D)	6.70	6.50	7.70	7.75	8.00	7.40	8.00
84 lin. ft. 18-in. R.C.P. siphon (std. str.)	4.60	4.80	5.50	5.00	6.00	4.80	5.25
600 lin. ft. 24 in. R.C.P. siphon (std. str.)	6.30	6.25	7.30	7.00	7.00	6.70	7.40
712 lin. ft. 30-in. R.C.P. siphon (std. str.)	8.50	8.20	9.00	9.25	9.00	8.80	9.75
484 lin. ft. 36-in. R.C.P. siphon (std. str.)	12.00	10.00	11.50	12.00	10.00	11.50	12.50
312 lin. ft. 48-in. R.C.P. siphon (std. str.)	17.00	15.20	17.00	18.00	15.00	18.10	18.75
426 lin. ft. 8-in. plain conc. pipe	.95	.95	1.00	1.00	.70	1.20	1.90
72 lin. ft. 12-in. plain conc. pipe	1.45	1.90	1.80	2.00	1.00	1.75	2.50
1,376 lin. ft. 18-in. plain conc. pipe	2.50	2.35	3.00	3.00	1.50	2.80	3.50
8 lin. ft. 30-in. plain conc. pipe	7.50	8.20	8.00	8.25	3.00	7.80	8.75
220 lin. ft. 36-in. plain conc. pipe	8.50	7.45	10.00	10.00	4.00	9.35	10.60
20 lin. ft. jacking 24-in. R.C.P. (3000-D) through R.R. embankment	20.00	22.00	12.00	50.00	40.00	32.20	32.50
1 ea. 16-in. slide headgate	60.00	36.00	30.00	50.00	30.00	37.20	42.00
3 ea. 30-in. slide headgate	125.00	120.00	100.00	1.25	90.00	93.00	110.00
1 ea. 36-in. slide headgate	150.00	130.00	110.00	1.70	100.00	110.00	130.00
2 ea. salv. exist. frames & grates for drop inlets	20.00	10.00	15.00	25.00	10.00	12.60	10.00
5 ea. manhole frames & covers (curb inlets)	50.00	32.50	40.00	50.00	50.00	47.00	75.00
4 ea. sewer manholes	250.00	150.00	140.00	500.00	200.00	175.00	180.00
2 ea. manhole frames & covers (sewers)	60.00	35.00	50.00	60.00	50.00	56.00	80.00
1 ea. adj. manholes to grade	30.00	50.00	30.00	25.00	50.00	30.00	70.00
680 lin. ft. 8-in. vit. clay pipe	2.50	1.40	3.00	1.25	3.00	3.20	2.00
1,700 lin. ft. 4-in. galv. steel pipe	2.00	1.50	1.70	2.00	2.00	2.45	2.50
110 lin. ft. 8-in. cast iron pipe	5.00	3.25	4.00	3.00	5.00	5.30	6.00
520 lb. misc. iron and steel	.40	.44	.40	.70	.50	.49	.45
110,000 lb. furn. bar reinf. steel	.06	.065	.07	.08	.06	.065	.07
110,000 lbs. placing bar reinf. steel	.04	.047	.04	.05	.04	.04	.04
Lump sum, Engineer's office	$1,500	$2,000	$2,500	$5,000	$2,000	$2,100	$2,000

Oregon—Multnomah County—State—Hydraulic Embank.

Hydraulic Dredging Co., Ltd., of Oakland, Calif., was low before the State Highway Commission, Salem, with a bid of $937,337 for 0.9 mi. of rock toe, 2.5 mi. of rock slope protection, 8.4 mi. of roadbed topping and topsoiling and seeding of Troutdale-Wahkeena Creek Section of the Columbia River Highway. The unit bids were as follows:

(1) Hydraulic Dredging Co., Ltd. $937,337
(2) Johnson Western Co. 962,235
(3) Franks Dredging Co. $1,038,595
(4) General Construction Co. 1,041,515

	(1)	(2)	(3)	(4)
Lump sum, clearing	$25,000	$29,000	$24,000	$30,000
1,900 cu. yd. struct. excav., unclass.	2.50	2.25	1.90	3.00
3,200,000 cu. yd. hydraulic embankment in place	.266	.274	.297	.2975
5,000 cu. yd. extra for filling cellular wall	1.50	.30	1.10	1.50
850 lin. ft. 18-in. corr. metal pipe, protected invert	3.96	4.00	4.80	4.25
1,100 lin. ft. 18-in. ex. str. corr. metal pipe, prot. inv.	4.17	4.60	5.00	4.50
1,300 lin. ft. 24-in. corr. metal pipe, prot. inv.	5.80	6.50	6.50	5.75
2,800 lin. ft. 24-in. ex. str. corr. metal pipe, prot. inv.	6.90	7.00	7.50	6.35
450 lin. ft. 30-in. ex. str. corr. metal pipe, prot. inv.	8.55	9.00	9.50	7.75
230 lin. ft. 36-in. corr. metal pipe, prot. inv.	10.55	10.00	12.50	9.50
650 lin. ft. 36-in. ex. str. corr. metal pipe, prot. inv.	12.00	12.00	13.70	10.50

Utah—Cache County—State—Grade and Drain

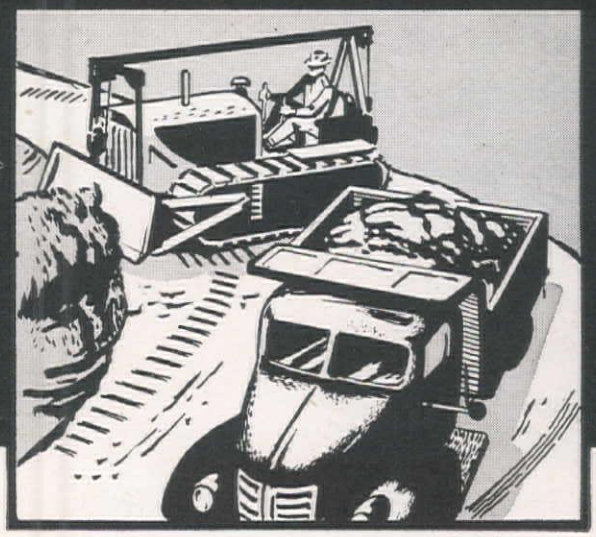
Olof Nelson Construction Co., Logan, Utah, submitted the low bid to the State Road Commission at Salt Lake City for the construction of a graded and drained roadway on U. S. Hwy. 91, between Box Elder Co. line and Wellsville. The length of the road to be constructed or improved is 1 mile. The amount of the low bid was $225,329. Unit bids follow:

(A) Olof Nelson Construction Co. $225,329
(B) V. C. Mendenhall Company 238,684
(C) Palfreyman Construction Co. 258,546
(D) Parson & Fife Construction Co. 258,587
(E) Reynolds Construction Co. $307,543
(F) Grant Construction Co. 313,262
(G) LeGrand Johnson 314,617
(H) W. W. Clyde & Company 338,663

(1) 260,000 cu. yd. unclass. excav.
(2) 1,500,000 sta. yd. overhaul, Class "A"
(3) 21,000 yd. mi. overhaul, Class "B"
(4) 800 hr. rolling
(5) 900 1,000-gal. watering
(6) 40 cu. yd. channel excav.
(7) 3.0 acre clear and grub
(8) 270 lin. ft. 18-in. concrete pipe
(9) 30 cu. yd. excav. for structs.
(10) 1,100 cu. yd. pit run gravel base crse.
(11) 0.322 mi. obliteration of old roads
(12) 900 lin. ft. guard rail
(13) 8,150 lin. ft. right-of-way fence, Type "B"
(14) 4 ea. 16-ft. gates
(15) 23 ea. right-of-way markers

(Continued on next page)

for rugged summer work



Veedol Trac-Lube
Veedol Trans-Gear Oil
Veedol Multi-Gear Lubricant

For your toughest hot-weather work, check these hard-hitting, money-saving lubricants against *your* specific needs.

VEEDOL TRAC-LUBE. A water-resistant lubricant for rollers on all track-laying tractors. Combats pounding—stays *in the rolls!* High viscosity base stock compounded with special soap gives maximum tackiness, stubborn staying power. Grades 80, 90, 140.

VEEDOL TRANS-GEAR OIL. Highly recommended for all transmissions (except Overdrive) requiring an uncompounded oil—and for all rear axles (except Hypoid and Worm Gears). A straight mineral oil, from 100% Pennsylvania base steam cylinder stock. Again and again users praise Veedol Trans-Gear's stability under severest conditions. Grades 80, 90, 140, 250.

VEEDOL MULTI-GEAR LUBRICANT. A real *multi-purpose* lubricant. Tops for transmissions, spiral bevel and Hypoid rear axles—for all gear boxes except worm drives. A special extreme pressure additive plus a base stock of Pennsylvania Gear Oil results in a long-lasting, *tough* gear lubricant with a variety of heavy equipment uses. Grades 80, 90, 140, 250.

Tell Your Associated Dealer You Want a National Credit Card

Call your Associated Representative for expert help on any lubrication problem.

TIDE WATER ASSOCIATED OIL COMPANY

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	.72	.78	.84	.83	1.00	1.05	.98	1.15
(2)	.015	.015	.015	.0175	.02	.015	.025	.015
(3)	.15	.15	.15	.15	.20	.20	.30	.15
(4)	4.00	3.50	4.50	4.00	5.00	5.00	5.00	5.00
(5)	2.00	1.50	3.00	1.50	2.00	2.00	2.00	2.50
(6)	2.00	.50	1.00	2.50	2.00	1.00	2.00	2.00
(7)	100.00	40.00	100.00	100.00	100.00	100.00	150.00	100.00
(8)	3.50	2.50	3.50	4.00	3.70	3.00	3.25	3.35
(9)	2.00	1.50	2.00	2.50	2.00	2.00	8.00	1.50
(10)	1.00	.90	1.00	1.00	1.00	2.00	1.50	.90
(11)	200.00	150.00	100.00	100.00	300.00	$1,000	600.00	200.00
(12)	2.50	2.20	3.70	4.00	2.00	1.50	4.50	3.00
(13)	.30	.25	.27	.27	.35	.30	.30	.30
(14)	30.00	25.00	30.00	30.00	35.00	30.00	35.00	30.00
(15)	5.00	3.00	3.00	10.00	5.00	5.00	4.00	5.00

Oregon—Clatsop County—State—Grade and Rock Prod.

Leonard & Slate of Portland, Ore., was low to the State Highway Commisison at Salem, Ore., for .9 mile of grading bituminous macadam surfacing of the Circle Bridge-Summit Section of the Oregon Coast Highway and furnishing 11,000 cu. yd. of crushed rock in stockpiles. Approximately 270,000 cu. yd. of excavation; 210 cu. yd. of concrete; 37,000 lb. of metal reinforcement; 18,300 cu. yd. of crushed rock; and 162 tons of asphaltic materials are required. The bid price was $291,473. The following unit bids were submitted:

(1) Leonard & Slate.....$291,473
(2) Guy F. Atkinson Co..... 368,478
(3) Kuckenberg Construction Co..... 409,896
(4) McNutt Bros. $428,503
(5) Grimstad & Vandervelt 443,822
(6) Natt McDougall Co..... 464,319

	(1)	(2)	(3)	(4)	(5)	(6)
Lump Sum, grub and clean	$12,000	$18,000	$24,000	$49,000	$25,000	$45,000
1 acre extra clear and grub	$1,000	$2,000	$2,000	$2,400	$1,500	$3,000
1,300 cu. yd. structural excav., unclassified	3.00	7.00	7.00	5.00	3.00	3.00
400 cu. yd. trench excav., unclassified	2.00	5.50	7.00	5.00	3.00	3.00
73,000 cu. yd. general excav., stas. 97+47.15 to 150+00, unclassified	.55	.52	.90	.68	.95	1.00
195,000 cu. yd. general excav., stas. 150+00 to 165+00, unclassified	.55	.80	.90	.89	1.00	1.00
860,000 cu. yd. sta. short overhaul	.02	.01	.02	.02	.03	.015
25,000 yd. sta. long overhaul	.50	.70	.50	.50	.50	.55
1,500 lin. ft. rounding cutbanks	.25	.20	.25	.20	.20	.15
0.99 mile finishing roadbed and slopes	$1,000	700.00	$3,000	$1,000	500.00	$1,000
290 lin. ft. 18-in. conc. pipe	3.50	3.50	3.50	3.50	4.00	4.55
260 lin. ft. 24-in. conc. pipe	4.50	4.80	4.50	5.00	5.50	6.30
600 lin. ft. 18-in. conc. pipe, extra strength	4.00	4.10	3.75	3.75	5.00	6.00
1,200 lin. ft. 6-in. perforated corr. metal dr. pipe, coated	1.50	1.30	1.50	1.50	1.50	1.75
500 lin. ft. 8-in. perforated corr. metal dr. pipe, coated	2.00	1.60	2.00	2.00	1.75	2.40
210 cu. yds. rock or gravel backfill in drains	5.00	6.50	10.00	8.00	5.00	5.90
210 cu. yd. Class "A" conc.	60.00	95.00	60.00	50.00	75.00	80.00
37,000 lb. metal reinforcement	.12	.12	.08	.09	.12	.13
3,300 cu. yd. 2-in. - 0-in. rock in base	3.50	5.00	3.50	3.70	3.00	4.70
2,250 cu. yd. ¾-in. - 0-in. rock in base and shldrs	3.60	5.00	3.50	3.70	3.50	4.80
160 M. gal. sprinkling	4.00	3.50	3.00	2.50	3.00	3.45
0.99 mile preparation of base	200.00	250.00	500.00	100.00	300.00	235.00
120 cu. yd. ¾-in. - 0-in. rock in binder course	5.00	6.50	6.00	3.70	6.00	6.25
1,700 cu. yd. furn. and place aggregates	5.25	6.50	5.00	4.70	6.00	6.35
20 tons furn. and place RC-3 asph. in binder crse	50.00	45.00	30.00	40.00	40.00	44.00
120 ton furn. and place 121-150 asph.	50.00	48.00	35.00	40.00	45.00	46.00
22 tons furn. and place RC-3 or emul. asph. in seal ct.	50.00	45.00	33.00	40.00	40.00	44.00
4,200 cu. yd. ¾-in. - ½-in. crushed rock in stockpile	2.00	2.10	2.25	3.95	3.00	2.30
4,700 cu. yd. ½-in. - ¼-in. crushed rock in stockpile	2.00	2.10	2.25	3.95	3.00	2.30
2,100 cu. yd. ¼-in. - 0-in. crushed rock in stockpile	2.00	2.10	2.25	3.95	3.00	2.30
81,000 yd. mi. hauling crushed rock, pile measure	.12	.15	.16	.15	.12	.14

Bridge and Grade Separation . . .

California—San Mateo County—State—Bridges and Substruct.

Sorensen & Oser of Redwood City were awarded the $412,331 contract by the Division of Highways, Sacramento, for the construction of three bridges and the substructures for two railroad overheads on the Bayshore Freeway in the City of South San Francisco. Materials in connection with items 24 to 34 inclusive and item 36 are to be furnished by the State. The following unit bids were submitted:

(A) Sorensen & Oser.....$412,331
(B) Carrico & Gautier..... 421,905
(C) Caputo & Keeble 439,938
(D) C. N. Swenson Co..... 457,544
(E) Guy F. Atkinson Co..... 465,861
(F) Barrett & Hilp $473,398
(G) Chas. L. Harney, Inc..... 492,925
(H) M. & K. Corp. 498,159
(I) Eaton & Smith..... 573,878

(1) 350 cu. yd. rem. conc.
(2) 3,250 cu. yd. rdwy. excav.
(3) 4,010 cu. yd. struc. excav.
(4) 2,000 cu. yd. struc. backfill
(5) 9,100 cu. yd. imported borrow
(6) 1,400 cu. yd. imported subgrade matl.
(7) 2,800 tons crusher run base
(8) 10 ton liquid asphalt SC-1 (pr. ct.)
(9) 1,800 ton P.M.S.
(10) 3,752 cu. yd. Cl. "A" P.C.C. (structs.)
(11) 74 cu. yd. Cl. "B" P.C.C. (curbs & gutters)
(12) 769 lin. ft. conc. railing
(13) 5,710 lin. ft. furn. conc. piling
(14) 126 ea. driving conc. piles
(15) 17,150 lin. ft. furn. steel piling
(16) 519 ea. driving steel piles
(17) 52 ea. steel pile splices
(18) 450 lin. ft. 8-in. C.M.P. (14 ga.)
(19) 719,500 lb. furn. bar reinf. steel
(20) 719,500 lb. placing bar reinf. steel
(21) 555 lin. ft. steel railing
(22) 72 lin. ft. rubber waterstops
(23) 9,800 lbs. misc. iron and steel
(24) 13 M.F.B.M. placing timber headers
(25) 2,412 lin. ft. rem. exist. track
(26) 5 ea. rem. exist. turnouts
(27) 2,300 lin. ft. new track
(28) 2 ea. turnouts (new track)
(29) 4 ea. turnouts (exist. track)
(30) 3,000 lin. ft. raising exist. track
(31) 4,177 lin. ft. relocating exist. track
(32) 2,600 lin. ft. shifting & restoring exist. track
(33) 2,954 lin. ft. guard rail
(34) Lump sum, Buda type bumper
(35) Lump sum, plank & steel plate switch protec.
(36) 1,050 lin. ft. installing conduit
(37) 400 lin. ft. furn. and install 2½-in. conduit
(38) 500 lin. ft. furn. and install 1¼-in. conduit
(39) Lump sum, moving exist. freight house
(40) Lump sum, Engineer's Office

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
(1)	10.00	5.60	6.00	6.00	6.00	8.00	6.40	20.00	4.50
(2)	.60	1.65	1.00	1.50	1.00	.80	.85	.80	.95
(3)	3.00	2.00	6.00	3.60	8.50	6.50	10.00	4.00	4.00
(4)	1.50	2.10	2.00	2.75	2.50	.80	2.00	2.00	3.00
(5)	1.47	1.50	2.00	1.70	.75	1.80	1.00	2.00	1.10
(6)	1.25	2.65	3.00	5.45	5.00	2.00	2.80	2.20	1.25
(7)	2.15	2.92	3.00	2.80	2.40	3.00	2.45	3.30	3.00
(8)	18.00	27.30	40.00	25.00	25.00	30.00	20.00	34.00	20.00
(9)	6.00	7.00	6.50	6.40	6.00	8.50	5.50	9.00	6.60

(Continued on next page)

H-Section Welded Truss Has Wide Adaptability

By J. K. GANNETT, Vice President and Director of Engineering and Research
The Austin Company
Cleveland, Ohio

THE standard H-section welded truss designed by The Austin Company greatly simplifies the designing of one-story industrial buildings and effects many economies in their construction.

The truss, using H-Sections with all webs in a vertical plane and with all connections made by direct fillet welds without the use of gusset plates, is shop-fabricated in standard 50, 60, 70 and 80-foot lengths. It is readily adaptable to different loadings by simply changing the weights of the beams used for the various members. The depths need not be changed, thus standard jigs are used for economical fabrication. Fig. 1 shows one of the trusses being finish-welded.

The top chord is a wide flange beam that can carry purlins at a variety of spacings without regard to panel points, and is also adaptable to continuous uniform loading. The bottom chord can carry loads at any point and can be used as a monorail. See Fig. 2. Thus the truss is adaptable to a wide variety of loading demands and factory arrangements which ordinarily require specially-designed trusses.

Economical Fabrication

Fabrication is quite economical because it has been reduced to three simple operations: cutting the members to length, assembly and welding.

Since the truss members are abutting instead of lapping, it is important that they be cut to exact length and angle. A large friction saw is satisfactory for cutting the chord members, while an abrasive saw is used to cut web members to the exact angle required.

For assembly, the members are simply "laid in place" in the horizontal jig. Jigs greatly reduce production costs and insure that the webs of all members are placed in precisely the same plane. Monorail hoists are used to place the chords, but the short web members are usually so light that two men can quickly place them by hand.

After the truss is tack welded, it is removed from the jig and stood on its bottom chord, being held at the top by monorail hoists. The bottom chord joints are then finish welded as shown in Fig. 1. Then the truss is turned upside down and all top chord joints welded. This procedure permits 100% down-welding.

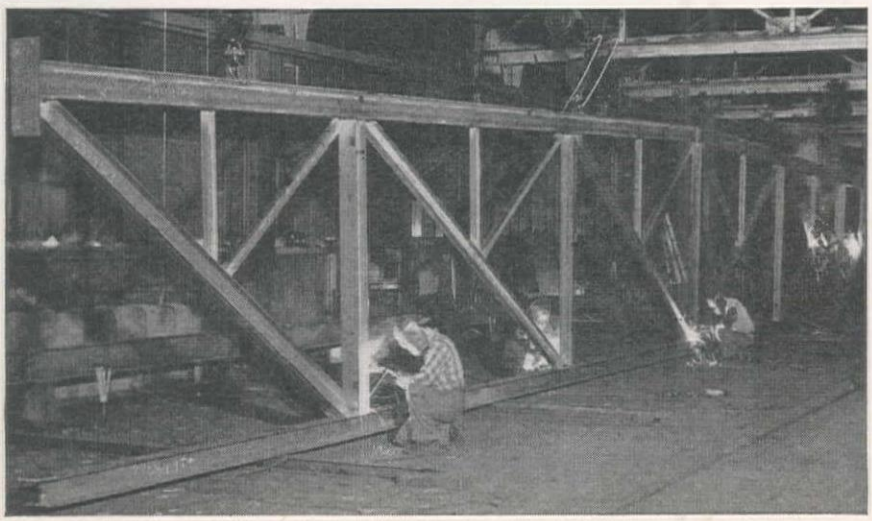


Fig. 1. Finish-welding diagonal and vertical web members to bottom chord of an H-truss.

All of the welds are fillets, ranging from ¼″ to ⅜″, depending on the size of the truss and the location. A 50-foot truss requires a total of 41 lineal feet of fillet welds.

No Cut Edges Exposed

The fillets are run completely around the members at their end connections. Thus all cut edges are covered and only the original rolled surfaces are exposed, which increases resistance to corrosion and simplifies painting and maintenance.

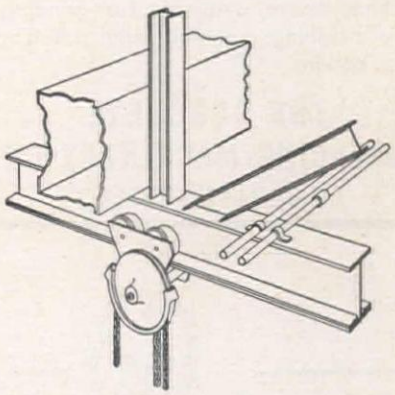


Fig. 2. How bottom chord can be used to support various loads and serve as monorail.

This fabrication procedure exemplifies the economy and simplicity obtainable in structures of good welded design. There is no punching, coping or chipping; no templates are needed; all welding is the simplest possible—horizontal fillet welding; and, except for the end connection, every pound of steel is in a truss member—there is no detail material such as gusset plates, fillers or stiffeners.

This truss has been thoroughly tested and has been—or is being—incorporated in Austin buildings, from coast-to-coast with an aggregate floor space of over three million square feet.

New developments in welded design are thoroughly described in "Studies in Structural Arc Welding," available free to engineers. Write The Lincoln Electric Company, Dept. 283, Cleveland 1, Ohio.

(10)	40.00	37.00	38.00	42.00	48.00	41.00	42.00	42.00	70.00
(11)	40.00	54.50	30.00	60.00	50.00	60.00	33.00	52.00	31.00
(12)	7.00	3.00	7.00	6.75	7.00	10.00	6.70	11.00	6.00
(13)	3.00	4.90	4.00	4.40	3.50	4.00	3.70	5.00	4.25
(14)	85.00	90.00	90.00	94.00	100.00	100.00	94.00	110.00	98.00
(15)	2.52	2.30	2.50	2.65	2.30	2.60	2.80	3.10	2.55
(16)	32.00	41.50	45.00	42.25	47.00	50.00	45.00	50.00	45.00
(17)	40.00	21.00	25.00	28.00	25.00	30.00	30.00	33.00	30.00
(18)	1.35	3.30	2.00	1.80	1.80	4.00	1.50	3.00	1.45
(19)	.06	.05	.05	.05	.055	.055	.055	.0585	.045
(20)	.02	.0225	.02	.02	.018	.018	.015	.02	.02
(21)	6.50	13.50	8.00	7.75	7.00	13.00	7.00	7.00	6.00
(22)	2.00	3.50	4.00	3.00	4.50	7.00	1.85	4.00	5.00
(23)	.35	.25	.30	.25	.25	.30	.45	.30	.21
(24)	60.00	71.50	100.00	75.00	35.00	300.00	120.00	130.00	30.00
(25)	.70	.70	.70	.80	.70	.70	1.20	.50	1.86
(26)	115.00	121.00	100.00	156.00	125.00	125.00	250.00	240.00	300.00
(27)	2.30	2.50	2.20	2.50	2.40	2.50	3.50	2.75	3.60
(28)	290.00	303.00	250.00	333.50	300.00	300.00	590.00	290.00	480.00
(29)	320.00	303.00	250.00	388.75	300.00	300.00	770.00	$1,000	480.00
(30)	.90	.90	.85	1.00	.90	1.00	2.40	1.70	2.10
(31)	1.15	1.20	1.15	1.30	1.20	1.30	4.70	2.10	3.14
(32)	3.45	3.70	3.30	3.80	3.10	3.50	5.90	3.00	7.00
(33)	1.15	1.20	1.10	1.25	1.20	1.30	3.00	.85	3.60
(34)	205.00	212.00	200.00	200.00	100.00	200.00	60.00	45.00	120.00
(35)	170.00	182.00	175.00	312.75	175.00	180.00	250.00	145.00	240.00
(36)	.75	2.00	1.00	1.90	.63	.50	.85	2.80	1.40
(37)	2.00	2.95	1.50	2.75	1.80	1.60	1.60	3.30	2.60
(38)	1.00	2.08	1.10	2.00	1.75	.80	1.40	2.50	1.80
(39)	$11,680	$14,473	$18,000	$17,000	$9,000	$20,000	$9,800	$17,000	$15,000
(40)	$2,000	$2,697	$3,000	$1,500	$2,000	$1,500	$1,900	$1,500	$2,400

California—Inyo County—State—Timber Trestles

Macco Corporation of Clearwater submitted the lone bid in the amount of $159,839 to the California Division of Highways, Sacramento, for the construction of two timber trestle bridges and about 4.4 mi. of grading and penetration treatment to be applied on the Warm Springs Road, near Bishop and the Poleta Road. The unit bid follows:

(1) Macco Corporation.....$159,839

		(1)
45	cu. yd. rem. conc.	4.50
Lump sum,	clearing and grubbing	$3,600
14,400	cu. yd. rdwy. excav.	.55
50,500	sta. yd. overhaul	.02
710	cu. yd. struc. excav.	3.00
200	cu. yd. ditch and channel excav.	2.50
15,400	cu. yd. imported borrow, Type "B"	1.70
14,800	cu. yd. imported borrow, Type "A"	2.50
Lump sum,	dev. water supply and furn. water equip.	500.00
1,700	M. gal. applying water	3.80
232	sta. finishing roadway	15.00
190	tons liquid asphalt SC-2 (pen. tr.)	26.00
240	cu. yd. Cl. "A" P.C.C. (structs.)	76.00
24,240	lb. furn. bar reinf. steel	.06
24,240	lb. placing bar reinf. steel	.03
69.8	M.F.B.M. Douglas fir timber	280.00
6.5	M.F.B.M. treated Douglas fir timber	310.00
18.5	M.F.B.M. Douglas fir timber (br. railing)	365.00
2,815	lin. ft. furn. treated Douglas fir piling	1.40
81	ea. driving timber piles	80.00
98	lin. ft. 12-in. 16-ga. C.M.P. culverts	2.60
124	lin. ft. 18-in. 16-ga. C.M.P. culverts	3.50
118	lin. ft. 24-in. 14-ga. C.M.P. culverts	5.40
140	lin. ft. 36-in. 12-ga. C.M.P. culverts	9.25
72	lin. ft. 48-in. 12-ga. C.M.P. culverts	12.00
72	ea. culvert markers and guide posts	8.00
290	lb. misc. steel	.35
Lump sum,	removing bridges	$2,600

Miscellaneous . . .

Nevada—Clark County—City—Miscellaneous

H. W. Polk, Las Vegas, with a bid of $111,538 was low before the Boulder City Council for the construction of streets, sidewalks, curbs and gutters, and extension of sewerage and water distribution systems for Boulder City. Unit bids were submitted as follows:

(1) H. W. Polk.....$111,538 (2) Hensler Construction Corp.....$191,741

		(1)	(2)
12,600	cu. yd. excav. for streets	.60	.75
3,200	lin. ft. combined conc. curb and gutter removed	.50	.60
13,200	sq. yd. asph. paving removed	.12	.18
1,000	lin. ft. excav. and backfill of sewer pipe trenches	1.60	4.50
1,800	lin. ft. excav. and backfill of water pipe trenches	.50	3.00
7,500	cu. yd. compacting fills for streets	.30	.18
10,000	sta. cu. yd. overhaul	.015	.03
20,900	sq. yd. prepare existing subgrade and base crse.	.15	.18
3,000	cu. yd. furn. and place gravel or cr. rock for base crse.	1.40	1.83
145	M. gal. watering base course	1.50	3.30
3,200	cu. yd. furn. and place gravel or cr. rock for surf. crse.	1.50	1.83
55,000	gal. furn. and apply asph. material for surf. crse.	.12	.1125
47,800	sq. yd. mix, finish and roll surf. crse.	.10	.165
9,600	gal. furn. and apply asph. material for seal coat	.12	.1575
125	cu. yd. furn. and apply crse. sand and seal coat	5.00	7.80
150	lin. ft. furn. and lay 4-in. diam. pipe and fittings for sewer lines	1.90	2.625
25	lin. ft. furn. and lay 6-in. diam. pipe and fittings for sewer lines	2.40	2.625
820	lin. ft. furn. and lay 10-in. diam. pipe and fittings for sewer lines	3.10	3.00
2	ea. construct sewer manholes	175.00	450.00
1,130	lin. ft. furn. and install 6-in. diam. C.I. water pipe and fittings	3.15	3.375
600	lin. ft. furn. and lay ¾-in. diam. copper service pipe	1.60	2.25
30	lin. ft. furn. and lay 2-in. diam. copper service pipe	2.20	4.50
24	ea. furn. and install ¾-in. copper water service connect	30.00	30.00
1	ea. furn. and install 2-in. copper water service connect	35.00	37.50
24	ea. furn. and install ¾-in. curb-stop and service-box assemblies	25.00	30.00
1	ea. furn. and install 2-in. curb-stop and service-box assemblies	30.00	37.50
2	ea. furn. and install 6-in. gate valve and valve-box assemblies	60.00	105.00
14,000	lin. ft. conc. in combined gutters and curbs	1.50	2.40
111,250	sq. ft. conc. in sidewalks	.32	.75
630	lin. ft. conc. in gutters	1.40	.90
65	cu. yd. conc. in retaining wall	55.00	90.00


PACIFIC
SUPER STEEL
PREFORMED
WIRE ROPE
PACIFIC WIRE ROPE COMPANY
LOS ANGELES 21, CALIF., U.S.A. BRANCHES:
SAN FRANCISCO HOUSTON PORTLAND

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 . . .

Ozark Dam Constructors, Little Rock, Ark., a nine company combine including **Morrison-Knudsen,** Box 450, Boise, Idaho, received a $22,146,440 contract for partial constr. of Bull Shoals Dam, Arkansas. Total cost of the dam will be approx. $47,000,000. Corps of Engineers, Little Rock, made the award.

Birch-Johnson-Lytle, Seattle, Wash., received an $8,125,000 contract from the Corps of Engineers, Seattle, for the construction of a bomber base near Fairbanks, Alaska. These contractors now hold contracts amounting to $51,000,000 for army construction in Alaska.

Kuckenberg Construction Co., Portland, Ore., will constr. 6.7 mi. of hwy., betw. Detroit and Niagara, Ore. The Public Roads Administration, Salem, awarded the $2,322,000 contract.

Del E. Webb Construction Co., Phoenix, Ariz., received $1,000,000 from the Arizona Republic & Phoenix Gazette for the constr. of a newspaper publishing plant in Phoenix, Ariz.

Basich Bros. & Basich Construction Co., Alhambra, Calif., was awarded a $1,431,227 contract for 13.1 mi. hwy. construction in Imperial County, by the Division of Highways at Sacramento, Calif.

N. M. Ball Sons, Berkeley, Calif., will build a bridge and construct 2.2 mi. of hwy. in Santa Barbara Co., Calif., for $877,917. The Division of Highways, Sacramento, made the award.

Haddock Engineers, Ltd., Montebello, Calif., for $1,485,000 will construct 12 bldgs. and facilities at Inyokern, Calif. The Bureau of Yards & Docks, Washington, D. C., awarded the contract.

Robert E. McKee, Los Angeles, will build a $735,400 addition to the library bldg. at the University of California, Los Angeles, Calif., for the Board of Regents of the University.

Robert E. McKee, El Paso, Tex., received the $2,000,000 award from the U. S. Atomic Energy Commission, Santa Fe, for the erection of a community center development at Los Alamos, New Mexico.

Warren Northwest, Inc., Portland, Ore., will widen and pave a portion of the Clackamas S. Hwy., Clackamas Co., Ore., for the State Highway Commission, Salem. Amount of the award is $421,458.

Silver State Construction Co., Fallon, Nev., will constr. 16 mi. of Hwy. in Elko County for the Department of Highways, Carson City, Nev., on a $662,872 contract.

Shea Co., Los Angeles, Calif.; **General Construction Co.,** Seattle, Wash.; and **Pacific Bridge Co.,** San Francisco, Calif., will receive $2,000,000 from the Kaiser Engineers, Inc., Oakland, Calif., to construct 51 mi. of railroad in Riverside County, Calif.

Puget Sound Bridge & Dredging Co., Seattle, Wash., will dredge the Wrangell Narrows, Alaska. The Corps of Engineers, Seattle, awarded the $500,000 contract.

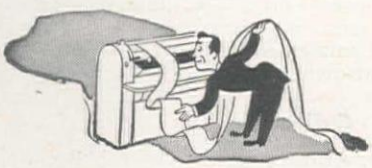
R. H. Fulton, Lubbock, Tex., will construct a $661,113 water supply main in Lubbock, for the City Council.

NEW! THE OZALID STREAMLINER

• Reproduces your engineering and architectural drawings in seconds—also your typed, printed, photographic material.

• Moderately priced . . . designed for the thousands of drafting rooms that want these 5 EXTRA VALUES in Printmaking at no extra cost—

1. EFFICIENCY! You always get positive (not negative) prints direct from your tracings . . . prints that are sharper, brighter, much easier for you to read, check, and make notations on.



You produce these without waste of material or waste of motion. Your tracings can be up to 42 inches wide, any length . . . and can be printed either on rolls of Ozalid sensitized paper or on cut sheets of matching size.

Your prints are always delivered dry, ready for immediate use . . . after just two simple operations—Exposure and Dry Development.

2. SPEED! ONLY 25 seconds to reproduce your standard-size tracings, specification and data sheets, etc.

3. ECONOMY! An 8½ x 11-inch reproduction costs you *one cent;* 11 x 17 inches, two cents . . . and so on. The Ozalid Streamliner soon pays for itself . . . in time, labor, and dollars saved.

With it, you can also effect amazing short cuts in design. For example—eliminate redrafting when changing obsolete drawings . . . combine the details of separate tracings on *one* print . . . re-

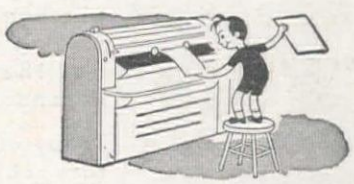
claim old or worn tracings . . . make transparent overlays in different colors.

4. VERSATILITY! You can reproduce the lines and images of any original in black, blue, red, sepia, or yellow . . . on paper, cloth, foil, film, or plastic.

Simply use the Ozalid sensitized material you think best for job at hand; e.g., use identifying colors for prints of separate departments or operations . . . DRYPHOTO to produce beautiful con-

tinuous-tone prints from film positives (which can be made from any negative) . . . OZAPLASTIC to produce oilproof, waterproof prints for shop or field use. *All* prints are made in same fast, economical manner.

5. SIMPLICITY! NOW—printmaking is an easy desk job, automatic in practically every detail.



Anyone can feed originals and sensitized material into the Ozalid Streamliner. Prints are delivered on top, stacked in order—within easy reach of the operator, who does not have to leave her chair.

You can install your Streamliner anywhere; it requires only 11 square feet of floor space.

Write today for free, illustrated booklet . . . showing all the ways you can use the new OZALID STREAMLINER . . . and containing actual reproductions — like those you can make.

Gentlemen: DEPT. 282

Please send New Ozalid Streamliner booklet . . . containing reproductions of drawn, typed, printed, and photographic material. No obligation.

Name_____

Position_____

Company_____

Address_____

OZALID

DIVISION OF
GENERAL ANILINE AND FILM CORPORATION
Johnson City, New York

Ozalid in Canada
Hughes Owens Co., Ltd., Montreal

C. L. Browning, Jr., San Antonio, Tex., will erect housing facilities at Fort Sam Houston, Tex. The Corps of Engineers, Galveston, awarded the $861,970 contract.

J. A. Terteling & Sons, Inc., Boise, Idaho, received $912,671 from the Bureau of Reclamation at Boise for the relocation of Hwy. No. 15 in Valley County, Idaho.

Hydraulic Dredging Co., Oakland, Calif., received $937,337 for 6 mi. of hydraulic dredged embankment in Multnomah Co., Ore., from the State Highway Commission, Salem, Ore.

L. H. Hoffman, Portland, Ore., will constr. for $1,508,485 a psychiatric hospital near Salem, Ore. Contract let by State Board of Control, Salem, Ore.

DeLuca & Sons, San Francisco, Calif., will build a $652,692 sewage treatment plant near Fresno, Calif. The Fresno City Council made the award.

Highway and Street . . .

Arizona

MARICOPA CO.—**Larsen Construction Co.,** Box 1572, Phoenix—$373,016 for grade, drain, base and bitum. surf. Phoenix-Rock Springs Hwy.—by State Highway Department, Phoenix. 5-12

MARICOPA CO.—**Tiffany Construction Co.,** P. O. Box 846, Phoenix—$19,556 for constr. of improvements in Amelia-Fairmount Improvement District from 7th St. to 10th St.; on 9th St. from Indian Rd. to Fairmount Ave.—by Board of Directors of Amelia St.-Fairmount Ave. Improvement District, Phoenix. 5-8

PIMA CO.—**Southwestern Quarry & Rigging Co.,** Box 1669, Phoenix—$94,663 for 5 mi. grade, drain, base and bitum. surf. of Tucson-Mt. Lemmon Hwy.—by State Highway Department, Phoenix. 5-6

YUMA CO.—**Bartol & Shearer Contracting Co.,** 1350 S. 7th St., Phoenix—$35,226 for 6.6 mi. hwy. improvement from Tacna to Mohawk Valley School — by State Highway Department, Phoenix. 5-12

YUMA CO.—**Bartol & Shearer Contracting Co.,** 1350 S. 7th St., Phoenix—$30,918 for approx. 5 mi. grade, drain, base and road-mix bitum. surf. of Araby-Laguna Dam Hwy., from State Hwy. 95, approx. 8 mi. E. of Yuma extending toward Laguna Dam—by State Highway Department, Phoenix. 5-6

California

ALAMEDA CO.—**J. R. Armstrong,** 400 Central, Box 216, El Cerrito—$24,640 to resurf. U. S. Naval Hospital roads, Oakland—by Navy Public Works Department, San Francisco. 5-29

ALAMEDA CO.—**Heafey Moore Co.,** 244 High St., Oakland—$22,971 to improve Keller Ave., from Mountain Blvd. east, Oakland—by City Council, Oakland. 5-2

FRESNO CO.—**A. Teichert & Son, Inc.,** Box 1133, Sacramento—$206,530 for 8 mi. grade and surf. on Reed Ave., betw. Manning Ave. and Rt. 41—by Division of Highways, Sacramento. 5-2(

IMPERIAL CO.—**Basich Bros. & Basich Construction Co.** Box 151, Alhambra—$1,431,227 for approx. 13.1 mi. grade and surf., betw. El Centro and Brawley—by Division of Highways Sacramento. 5-2(

INYO CO.—**Brown & Krull,** 644 Schofield St., Palo Alto—$16,463 for 3.2 mi. surf. Route 23 in Bishop and Keeler—by Division of Highways, Sacramento. 5-2(

KERN CO.—**Basich Bros. Construction Co., and Basich Bros** P. O. Box 151, 600 So. Fremont Ave., Alhambra—$30,265 for highway improve. betw. Muroc Junction and 65 mi. east, about 6.5 mi.—by Division of Highways, Sacramento. 5-

KERN CO.—**Rexroth & Rexroth,** Box 1138, Bakersfield—$36,734 for 3.4 mi. grade and surf. on Comanche Drive, from State Hwy. 58, south—by Division of Highways, Sacramento. 5-(

LOS ANGELES CO.—**Griffith Co.,** 1060 S. Broadway, Los Angeles—$40,856 for improving Willing Ave. from Valleyheart Dr to Ventura Blvd., Los Angeles—by City Council, Los Angeles 5-

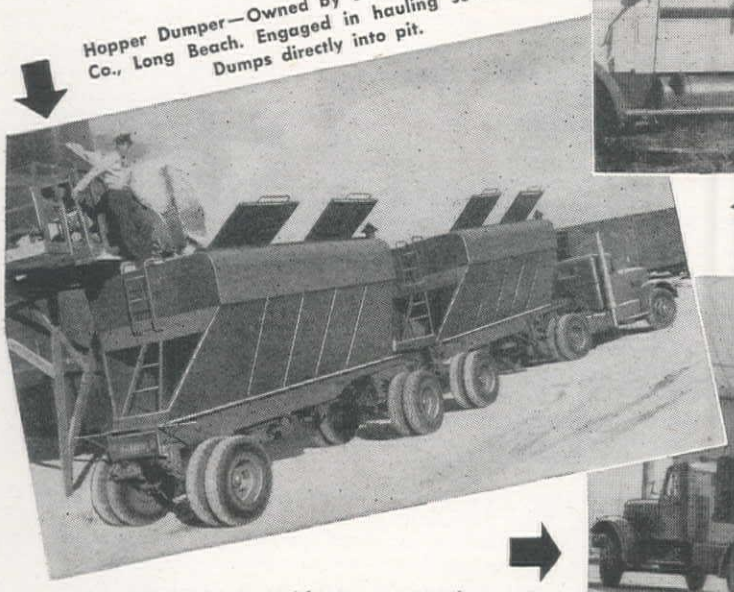
LOS ANGELES CO.—**Vido Kovacevich Co.,** 5300 Imperia **Hwy., South Gate—$192,220 grade and pave interchange hwy:** betw. Aliso St. viaduct, Ramona and Santa Ana Parkways—by Division of Highways, Sacramento. 5-2(

LOS ANGELES CO.—**Jesse S. Smith,** 444 E. Ross St., Glendale—$30,354 for .7 mi. surf. of Lakewood Blvd., betw Spring St. and Conant St.—by Division of Highways, Sacramento. 5-2

FRUEHAUF "Dumpers"

handle BIGGER QUANTITIES, QUICKER

End Dumper—Owned by Clark Julian & Strong, Idaho Falls, Ida. Hauls 40 yds. of volcanic cinders or 20 yds. of gravel.



Hopper Dumper—Owned by Lamb Transportation Co., Long Beach. Engaged in hauling soda ash. Dumps directly into pit.

Screw Dumper—Owned by Cement Distributors, Inc., serving Seattle and vicinity. Discharged 110 bbls. of bulk cement in 12 minutes.

Fruehauf Dump Trailers will haul bigger quantities, quicker, put them exactly where wanted and do it for less money than any other haulage method.

The men who design Fruehauf Trailers know what constructors must have and they put all of it in Fruehaufs. Result: Fruehauf is prepared to furnish any type of Dump Trailer you may need. Screw Dumps for dense materials, such as cement; Hopper Dumps for gravity discharge; Side or End Dumps with hoists for rock, sand, gravel, earth.

By proper engineering and selection of weight-saving metals, Fruehauf puts more payload into Dump Trailers. The rugged Fruehauf understructure is assurance of longer life, greater durability and lower maintenance costs.

Fruehauf is the only Trailer manufacturer with a nation-wide chain of Factory Branches to service your Trailers wherever they may be.

World's Largest Builders of Truck-Trailers

FRUEHAUF TRAILER COMPANY

Western Manufacturing Plant—Los Angeles

SALES AND SERVICE BRANCHES—LOS ANGELES • SAN FRANCISCO • FRESNO • SPOKANE • BILLINGS
PORTLAND • SEATTLE • EL PASO • PHOENIX • SAN DIEGO • SALT LAKE CITY • DENVER

FRUEHAUF TRAILERS *"Engineered Transportation"*

MERCED AND STANISLAUS COS.—**M. J. Ruddy,** 922 J St., Modesto—$60,968 for approx. 8.9 mi. resurf., N. of Livingston and Stanislaus Co. line, and Modesto and Empire—by Division of Highways, Sacramento. 5-20

MODOC CO.—**Harms Bros.,** Rt. 4, Box 2220, Sacramento—$148,631 for 20.8 mi. base and seal coat betw. Lassen Co. line and Canby and NE. from Canby—by Division of Highways, Sacramento. 5-20

MONO CO.—**George E. France,** 1509 College Ave., Visalia—$37,872 for 2.8 mi. base and surf., betw. Point Ranch and Bridgeport—by Division of Highways, Sacramento. 5-6

MONTEREY CO.—**Granite Construction Co.,** Box 900, Watsonville—**$38,224 to widen Bridge St., betw. Marchant St. and** City Limits, Watsonville—by City Council, Watsonville. 5-13

MONTEREY CO.—**Granite Construction Co.,** Box 900, Watsonville—$22,478 for 3.7 mi. surf. in portions of Monterey Co.—by Division of Highways, Sacramento. 5-6

SACRAMENTO CO.—**Harms Bros.,** Rt. 4, Box 2220, Sacramento—$56,023 for 5.4 mi. surf. over exist. pave., betw. 12 mi. E. of Sacramento and Riley St., Folsom—by Division of Highways, Sacramento. 5-19

SAN BERNARDINO AND RIVERSIDE COS. — **Matich Bros.,** Box 390, Colton—$114,562 for 10.7 mi. plant-mix surf. and seal coat over exist. pave., Upland and Haven Ave., and west of Riverside and betw. Panorama Pt. and Squirrel Inn—by Division of Highways, Sacramento. 5-12

SAN MATEO CO.—**Chas. L. Harney, Inc.,** 575 Berry St., San Francisco—$74,117 to widen pavement at Geneva Ave., near San Francisco Co. line and in Brisbane near Visitacion Ave.—by Division of Highways, Sacramento. 5-20

SAN MATEO CO.—**L. C. Smith,** First and Railroad Ave., San Mateo—$99,786 to improve various sts. in Menlo Park—City Council, Menlo Park. 5-20

SANTA BARBARA AND SAN LUIS OBISPO COS. — **Brown & Doko,** Box 6, Pismo Beach—$114,120 for 3.9 mi. base and surf. over exist. pave. betw. Zaca and Wigmore and from 1.5 mi. S. of Nipomo and Delessigues Creek—by Division of Highways, Sacramento. 5-13

SANTA BARBARA CO.—**Frank T. Hickey, Inc.,** 12001 Benmore Terr., Los Angeles—$119,183 for 2.3 mi. grade and surf approx. 2.5 mi. E. of Buellton and Grand Aves., Santa Barbara—by Division of Highways, Sacramento. 5-2

SANTA CLARA CO. — **Granite Construction Co.,** Box 900 Watsonville—$10,718 for .1 mi. grade and surf. approx. 1¼ mi W. of Merced Co. line—by Division of Highways, Sacramento 5-2

SANTA CLARA CO.—**A. S. Jones,** Box 3067, Brown's Valley Rd., Napa—$42,593 approx. one mi. base and surf., betw. Alameda Co. line and Milpitas—by Division of Highways, Sacramento. 5-2(

SHASTA CO.—**Fairey-Hammond, Inc., & R. A. Farish,** 564 Market St., San Francisco—$199,856 for 5.8 mi. grade, drain and surf. County Hwy. 14-C, from Millville easterly—by County Commission, Shasta. 5-1

SOLANO CO.—**Fredrickson Bros.,** 1259 65th St., Emeryville—$28,277 for 4.8 mi. surf., Fairfield and Vacaville—by Division o Highways, Sacramento. 5-2(

STANISLAUS CO.—**Munn & Perkins,** Rt. 4, Box 1930, Modesto—$17,043 to widen and resurf. Claribel Rd. from Oakdale Waterford Hwy. to Langworth Rd.—by County Commissior Modesto. 5-2

VENTURA CO.—**Baker & Pollock,** 141 S. Coronado, Ventur —$87,925 for 5.7 mi. resurf. betw. Oxnard and Big Sycamor Creek—by Division of Highways, Sacramento. 5-2

VENTURA CO.—**O'Brien & Bell Construction Co.,** 1123 Free man, Santa Ana—$22,066 for 4 mi. resurf., betw. Ellsworth Barranoa and Santa Paula—by Division of Highways, Sacramento. 5-2

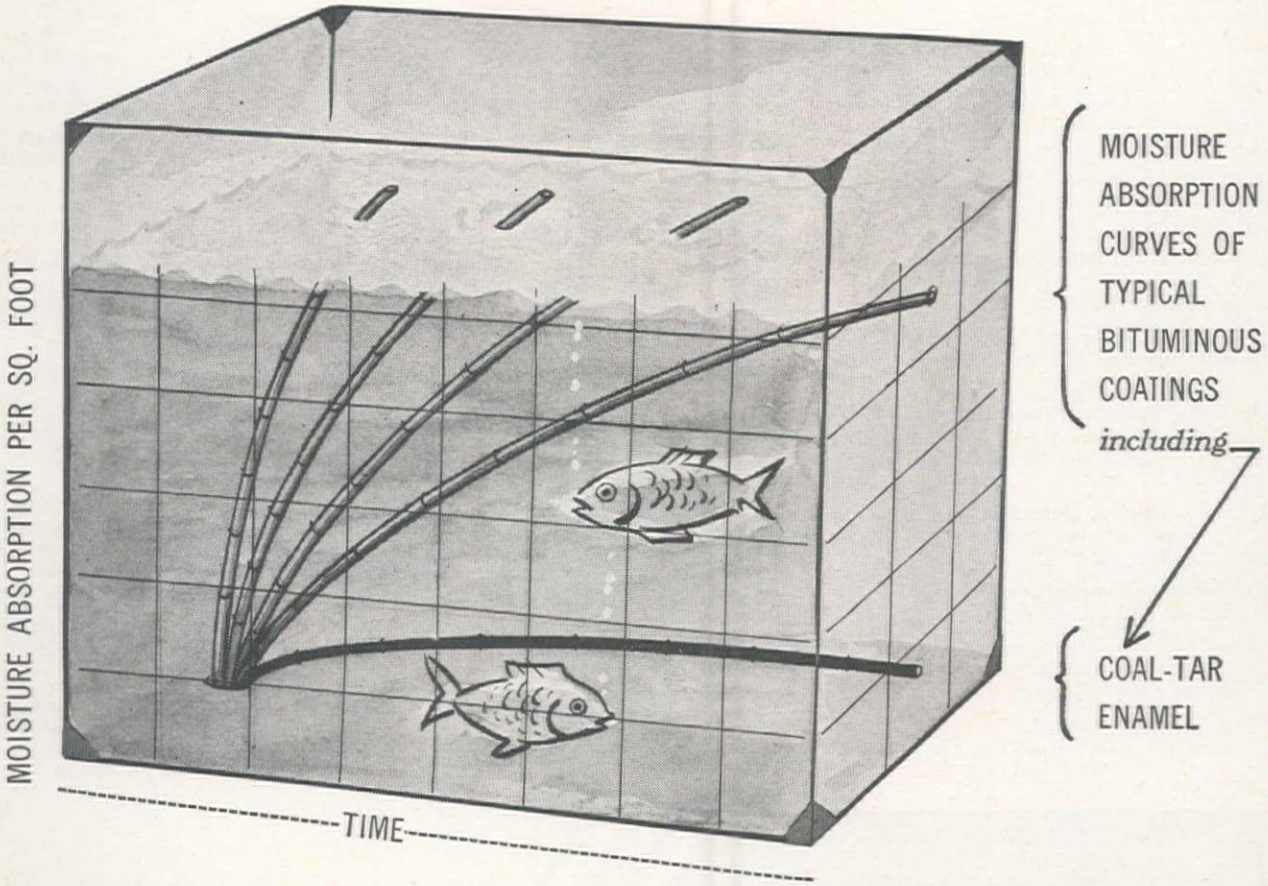
YOLO CO.—**McGillivray Construction Co.,** Box 873, Sacramento—$23,732 for 8.9 mi. hwy. constr. betw. Solano Co. line an 2 mi. S. of the irrigation canal—by Division of Highways, Sacramento. 5-2

Idaho

ADA CO.—**Stanley & Ehlen,** Boise—$116,329 for approx. 6 m surf. of U. S. Hwy. No. 30, betw. Boise and Blacks Creek—b Bureau of Highways, Boise. 5-2

GOODING, LINCOLN & JEROME COS.—**Jack C. Olso** Rigby—will furnish crushed gravel and cover material in stock

Stable Electrical Insulation



Barrett Coal-tar Enamels, because of their resistance to moisture absorption, provide an efficient electrical insulation over long periods of time.

Their high dielectric strength makes cathodic protection economical. Aware of this, engineers are today designing corrosion-proof pipelines, using protective coatings which have high electrical insulation values and require less current and equipment per mile of pipeline to make cathodic protection economical.

Over a period of many years Barrett Coal-tar Enamels have demonstrated their ability to resist electro-chemical corrosion, because of their inherent insulation value.

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.

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

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

piles, U. S. Hwy. 93 and State Hwy. 46—by Department of Public Works, Boise. 5-2

LATAH CO.—**F. R. Hewett,** Parkwater, Wash.—$96,470 for 5.8 mi. surf. of Moscow-Bovill Hwy. from Deary west and 3.2 mi. surf. of Arrow-Deary Hwy. betw. Kendrick and Deary — by Bureau of Highways, Boise. 5-23

VALLEY CO.—**J. A. Terteling & Son, Inc.,** Box 142, Boise — $912,671 for relocation of State Hwy. No. 15, N. of Cascade to replace present route to be inundated by constr. of Cascade Dam—by Bureau of Reclamation, Boise. 5-19

Kansas

HODGEMAN CO.—**Broce & Smith Construction Co.,** Dodge City—$109,813 for 7 mi. grade, base and dense graded surf. course—by State Highway Commission, Topeka. 5-7

HODGEMAN CO.—**Broce & Smith Construction Co.,** Dodge City—$84,340 for 11.5 mi. base and grade—by State Highway Commission, Topeka. 5-7

NESS CO.—**Broce & Smith Construction Co.,** Dodge City—$135,851 for 12.3 mi. subgrade modification and dense graded surf. course—by State Highway Commission, Topeka. 5-7

PHILLIPS CO.—**D. G. Hansen,** Logan—$10,527 for 15.9 mi. light type surfacing—by State Highway Commission, Topeka. 5-9

PHILLIPS CO.—**Inland Construction Co.,** 3867 Leavenworth St., Omaha, Neb.—$109,804 for 17.9 mi. bitum. reconstr. and single asph. surf. treatment—by State Highway Commission, Topeka. 5-9

SEWARD CO.—**San-Ore Construction Co.,** McPherson—$62,750 for 8.2 mi. dense graded surf. course—by State Highway Commission, Topeka. 5-7

SMITH CO.—**Harry Henery,** Ottawa—$75,120 for 11.6 mi. subgrade modification and single asph. surf.—by State Highway Commission, Topeka. 5-9

SMITH CO.—**Harry Henery,** Ottawa—$23,576 for 11.3 mi. light type surfacing—by State Highway Commission, Topeka. 5-9

SMITH CO.—**Harry Henery,** Ottawa—$16,750 for 20 mi. light type surf., detour—by State Highway Commission, Topeka. 5-9

SMITH CO.—**Adrian L. Schweitzer,** Osborne—$163,864 for 11.3 mi. grading—by State Highway Commission, Topeka. 5-9

STAFFORD CO.—**Tobias & Wright Sand & Gravel Co.,** Lyons—$12,971 for 11.1 mi. selected embankment material—by State Highway Commission, Topeka. 5-1

STEVENS CO.—**San-Ore Construction Co.,** McPherson—$83,177 for 8.3 mi. subgrade and dense graded surf.—by State Highway Commission, Topeka. 5-7

Montana

BLAINE, GLACIER AND TOOLE COS.—**Barry O'Leary,** Billings—$89,930 for stockpiling crushed rock—by State Highway Commission, Helena. 5-20

VALLEY, PHILLIPS AND SHERIDAN COS.—**Naranche & Konda,** Butte—$64,270 for stockpiling gravel—by State Highway Commission, Helena. 5-20

Nevada

ELKO CO.—**Silver State Construction Co.,** S. Main St., Fallon—$662,872 for 16 mi. hwy. constr. from ¼ mi. E. of North Fork Bridge to Deeth—by Department of Highways, Carson City. 5-10

New Mexico

CHAVES CO.—**D. D. Skousen,** Springer Bldg., Albuquerque—$229,188 for 4.4 mi. grade, base, and surf. of State Hwy. 83, betw. Mayhill and Artesia—by State Highway Department, Santa Fe. 5-16

DONA ANA CO.—**R. P. Skousen,** Springer Bldg., Albuquerque—$112,452 for 6.4 mi. grade, drain structs. and conc. box culvert, Rt. No. 140, betw. Hatch and Rincon—by State Highway Department, Santa Fe. 5-9

LEA CO.—**Wheeler & Trotz,** Albuquerque—$40,978 for 1.8 mi. grade, base and bitum. top course surf. in city of Hobbs—by State Highway Department, Santa Fe. 5-9

SAN JUAN CO.—**Skousen Construction Co.,** Springer Bldg., Albuquerque—$19,713 for 21 mi. sealing with asph. and stone chip, Rt. No. 44, betw. Bloomfield and Cuba—by State Highway Department, Santa Fe. 5-9

SIERRA CO.—**Floyd Haake,** 1201 Sierra Vista, Santa Fe—$16,060 for 2.1 mi. bitum. top course surf. and scaling on Rt. No. 52, betw. Hot Springs and Engle—by State Highway Department, Santa Fe. 5-9

North Dakota

McLEAN CO.—**Northern Improvement Co.,** Fargo—$76,696 for 6.1 mi. base, asph. conc. surf., and incidental work on State Hwy. 37, Garrison east—by State Highway Department, Bismarck. 5-16

McLEAN CO.—**Northern Improvement Co.,** Fargo—$14,508 for 3 mi. grade, gravel surf. and incidental work on Co. rd., Garrison Corners east—by State Highway Department, Bismarck. 5-16

MOUNTRAIL, WARD AND McLEAN COS.—**V. H. Butler Construction Co.,** 1401 NW. 5th, Oklahoma City, Okla.—$57,048 for 64 mi. resealing on U. S. Hwys. No. 2 and No. 83—by State Highway Department, Bismarck. 5-16

Oregon

CLACKAMAS CO.—**Warren Northwest, Inc.,** Box 5072, Portland—$421,548 for 21.9 mi. grade widening and 22.8 mi. pave., Milwaukie-Estacada Section of Clackamas S. Hwy.—by State Highway Commission, Salem. 5-1

CLACKAMAS AND WASCO COS. — **Pendleton Sand & Gravel Co.,** Pendleton—$43,983 for 44.13 mi. reoiling of Sandy-Wapinitia Junction-Clear Creek roads on Mt. Hood and Wapanitia Hwys.—by State Highway Commission, Salem. 5-15

DESCHUTES CO.—**Babler Bros.,** 4617 S.E. Milwaukie, Portland—$168,775 for 24.1 mi. re-oiling and furn. crushed rock in stockpiles, Millican-Brothers Section of Central Oregon Hwy. —by State Highway Commission, Salem. 5-1

HARNEY CO.—**E. C. Hall Co.,** Rt. 6, Box 630, Portland—$296,913 for 6.3 mi. grade, surf., oiling and furn. crushed rock in stockpiles, North section of Grant Co. line-Crow Flat section of John Day-Burns Hwy.—by State Highway Commission, Salem. 5-2

JEFFERSON CO.—**Albert W. Denton,** Portland—$59,974 for .3 mi. grade and surf., Madras Section of The Dalles-California Hwy.—by State Highway Commission, Salem. 5-1

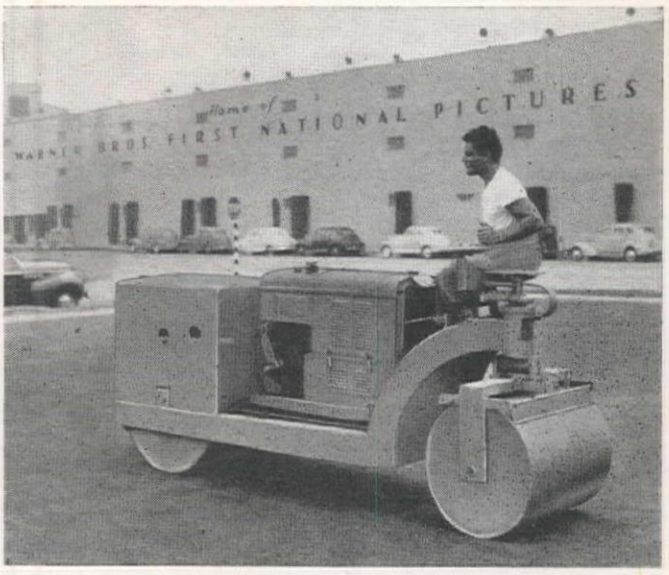
LANE CO.—**L. M. Hill Co.,** Springfield—$400,000 to $500,000 estimated cost of constr. of 20 mi. of pumite logging rd. and 15 acre log pond, east of Springfield—by Weyerhaeuser Timber Co. & Booth-Kelly Lumber Co., Springfield. 5-7

LINCOLN CO.—**J. N. & M. J. Conley,** Portland—$199,245 for 4.2 mi. bitum. surf., 1.1 mi. regrade and furn. crushed rock in stockpiles, Miner Creek-Agate Beach section of Oregon Coast Hwy.—by State Highway Commission, Salem. 5-2

MARION CO.—**Kuckenberg Construction Co.,** Box 949, Rt. 7, Portland—$2,322,000 for constr. of 6.7 mi. of North Santiam Hwy., betw. Detroit and Niagara—by State Highway Department, Salem, and Corps of Engineers, Portland. 5-20

MULTNOMAH CO.—**J. N. & M. J. Conley,** Portland—$389,770 for .9 mi. rock toe, 2.5 mi. rock slope protection, 8.4 mi. roadbed topping, topsoil and seeding, Troutdale-Wahkeena Creek section, Columbia River Hwy.—by State Highway Commission, Salem. 5-2

UMATILLA CO.—**Babler Bros.,** 4617 S.E. Milwaukie Ave.,



A Wheeler Tandem Roller smoothly compacting a new parking lot near the Warner Bros. Studios in Hollywood.

Portland—$271,602 for 4.7 mi. grade and bitum. surf., .7 mi. resurf. and furn. cr. rock in stockpiles, Milton-Washington state line section of Oregon-Washington Hwy.—by State Highway Commission, Salem. 5-2

UMATILLA CO.—**E. C. Hall Co.,** Route 6, Box 630, Portland—$391,131 to resurf. .7 mi. and grade and surf. 4.7 mi. of Milton-Washington state line hwy.—by State Highway Commission, Salem. 5-1

WALLOWA CO.—**J. C. Compton Co.,** Box 86, McMinnville—$25,964 for 31.1 mi. reoiling Minam-Wallowa Lake Section of Wallowa Lake and Joseph-Wallowa Lake Hwys.—by State Highway Commission, Salem. 5-1

WALLOWA CO.—**Natt McDougall Co.,** Portland—$142,606 for .8 mi. grade, slide removal and roadbed finishing on adjoining sect., N. Unit, Washington state line-Buford Creek sect. of Enterprise-Lewiston Hwy.—by State Highway Commission, Salem. 5-15

Texas

BEXAR CO.—**M. B. Killian Co.,** Sunset Rd., San Antonio—$12,787 to furn. and place asph. surf. on Blanco Rd. from end of existing pave. to Borefeldt Dr., San Antonio—by County Commission, San Antonio. 5-1

BEXAR CO.—**A. M. McNeel,** 315 Rivas St., San Antonio—$67,640 for pave and surf. in San Antonio—by City Council, San Antonio. 5-2

BEXAR CO.—**Southern Construction Co.,** 210 N. Center St., San Antonio—$20,375 for cold mix asph. and seal coat pave on Culebra Rd. btw. Leon Creek and Kallison Lane, San Antonio—by County Commission, San Antonio. 5-1

COMANCHE CO.—**Thomas & Ratliff,** Roger—$234,888 for 8.5 mi. grade, structs., base and surf.—by State Highway Department, Austin. 5-8

FORT BEND CO.—**M. J. Construction Co.,** Beeville—$203,976 for 14.960 mi. of grade., structs., base and base preservative from Fulshear to U. S. Hwy. No. 59, 1 mi. E. of Richmond—by State Highway Department, Austin. 5-15

HIDALGO CO.—**E. B. Darby & Co.,** Pharr—$111,636 for 1.489 mi. of grade., structs., and limestone rock asph. pave., Fed. project No. F 301(2)—by State Highway Department, Austin. 5-14

HUDSPETH CO.—**H. B. Zachry Co.,** San Antonio—$264,734 for 15.789 mi. grad. hot mix asph. concrete pave., Fed. Project No. F 245(11) and F 439(23)—by State Highway Department, Austin. 5-14

MARTIN CO.—**L. L. Cooper,** Kirby Bldg., Dallas—$175,069 for 20.8 mi. grade, struct., base and base preservative—by State Highway Department, Austin. 5-8

NUECES CO.—**M. J. Construction Co.,** 318 Camellia, Corpus Christi—$31,053 for 37 mi. roadway improvement in various sections of the county—by County Commission, Corpus Christi. 5-2

Utah

WASATCH CO.—**Deal Mendenhall Construction Co.,** Springville—$36,761 for 3.6 mi. road mix bitum. surf. of State Hwy. 222, betw. Wallsburg Junction and Wallsburg—by State Road Commission, Salt Lake City. 5-2

WAYNE CO.—**Taylor & Richards,** Price—$16,703 for 1.6 mi road-mix bitum. surf. on State Hwy. 117, btw. Teasdale Junct. and Teasdale—by State Road Commission, Salt Lake City. 5-2

Washington

BENTON CO.—**Standard Asphalt Co.,** Chronicle Bldg., Spokane—$87,776 for 60.4 mi. of oiling of county roads—by County Commission, Prosser. 5-29

CHELAN CO.—**Diesel Oil Sales Co.,** 2155 Northlake St., Seattle—$105,851 to improve 16.8 mi. of Navarre-Coulee rd.—by County Commission, Wenatchee. 5-7

CLALLAM CO.—**Hugh Govan,** Box 308, Port Angeles—$228,874 for 1.5 mi. grade, drain, base and surf., P. State Hwy. No. 9, Lake Crescent vicinity, Section 1—by Department of Highways, Olympia. 5-13

KING CO.—**Northwest Construction Co.,** 3950 6th Ave., N.W., Seattle—$52,594 for grade., pave, and draining 0.445 mi. of P. State Hwy. No. 5, Auburn to Enumclaw—by Department of Highways, Olympia. 5-6

KING CO.—**Washington Asphalt Paving Co.,** 309 W. 39th, Seattle—$35,000 to pave 13,000 ft. of roads in Bellevue area—by City Council, Seattle. 5-9

PIERCE CO.—**Asphalt Paving & Engineering Co.**, Box 106, Tacoma—$112,500 to resurf. 9th, 11th and 12th Sts., Tacoma—by City Council, Tacoma. 5-29

SPOKANE CO.—**D. A. Sullivan**, Parkwater—$30,872 to resurf. 8.3 mi. of Valley Chapel-Mount Hope-Rockford rd. — by County Commission, Spokane. 5-7

SPOKANE CO.—**D. A. Sullivan**, Parkwater—$19,238 for 8.8 mi. resurf. and stockpile, Palouse Hwy., Waverly to North Pine—by County Commission, Spokane. 5-7

YAKIMA CO. — **Strong & MacDonald, Inc.**, 4045 Rustin Way, Tacoma—$56,525 for 2.7 mi. hwy. constr. on P. State Hwy. No. 5, Dog Lake to Sand Ridge—by Department of Highways, Olympia. 5-13

Wyoming

CROOK CO. — **Teton Construction Co.**, Box 197, Cheyenne—$165,662 for 11 mi. surf. and oil of Moorcroft-Upton Rd.—by State Highway Department, Cheyenne. 5-1

Bridge & Grade . . .

Arizona

PINAL CO. — **Carney Construction Co.**, 125 N. 7th St., Phoenix — $155,227 for constr. of steel girder bridge and 1.4 mi. grade, base and bitum. surf., Florence-Superior Hwy., betw. Florence Junction and Superior—by State Highway Department, Phoenix. 5-12

California

ALAMEDA CO.—**Stolte, Inc.**, 8451 San Leandro St., Oakland—$14,173 for bridge deck repair Fruitvale Ave. bridge, Oakland —by Corps of Engineers, San Francisco. 5-19

FRESNO AND KING COS.—**Kay Bennett Construction Co.**, 514 Bryant St., Palo Alto—$141,867 for constr. of reinf. conc. girder bridge across Kings River near Hardwick — by Division of Highways, Sacramento. 5-6

FRESNO AND MADERA COS.—**Chas. H. MacClosky**, 112 Market St., San Francisco—$253,917 for constr. of two steel beam bridges, across San Joaquin River and overflow at Firebaugh—by Division of Highways, Sacramento. 5-23

HUMBOLDT CO — **Clifford A. Dunn**, Box 431, Klamath Falls, Ore.—$260,602 to constr. bridge substruct. and .5 mi. grade and surf. approaches, across Klamath River at Weitchpec — by Division of Highways, Sacramento. 5-20

INYO CO.—**Basich Bros. & Basich Bros. Construction Co.**, Box 151, Alhambra — $17,702 for 4.2 mi. grade and constr. of 2 timber bridges on Warm Springs Rd. and Keeler Rd.—by Division of Highways, Sacramento. 5-20

LOS ANGELES CO. — **Spencer Webb**, Box 921, Inglewood—$253,089 for constr. of 2 reinf. conc. box girder undercrossings and embankments on Santa Ana Parkway, Euclid Ave. and Marietta St., Los Angeles —by Division of Highways, Sacramento. 5-2

NAPA CO.—**George E. Murray**, 1702 E. Mariposa Rd., Stockton — $118,496 for constr. of reinf. conc. bridge and 4.7 mi. grade and surf. on Silverado Trail, near Calistoga—by Division of Highways, Sacramento. 5-6

SACRAMENTO CO.—**A. A. Edmondson & L. A. Miller,** 1715 7th St., Sacramento—$11,982 for constr. of culvert and headwalls and for bridge replacement, Marysville Blvd., 700 ft. N. of Del Paso Blvd., Sacramento—by County Commission, Sacramento. 5-7

SAN BERNARDINO CO. — **Geo. W. Peterson,** 6035 Burton Ave., Los Angeles—$72,884 for constr. of 2 reinf. conc. slab bridges and approaches across Day Canyon flood channel, approx. 5 and 7 mi. E of Upland—by Division of Highways, Sacramento. 5-19

SAN JOAQUIN CO. — **M. E. Shuper,** Elks' Bldg., Stockton—$31,960 to constr. steel and conc. bridge, Cherokee Lane at diverting canal—by County Commission, Stockton. 5-19

SANTA BARBARA CO. — **N. M. Ball Sons,** Box 430, Berkeley—$877,917 for 2.2 mi. hwy. constr. and reinf. conc. bridge, betw. Park Place and Rancheria, Santa Barbara—by Division of Highways, Sacramento. 5-20

SISKIYOU CO —**T. F. Baun,** 324 Princeton Ave., Fresno—$319,307 for constr. of bridge and underpass across Cottonwood Creek and under So. Pacific Co. tracks, approx. 2 and 5.5 mi. N. of Hornbrook—by Division of Highways, Sacramento. 5-19

STANISLAUS CO.—**Erickson, Phillips & Weisberg,** 3341 Telegraph Ave., Oakland—$128,141 for constr. of reinf. conc. girder bridge across Tuolumne River, 6 mi. E. of Modesto—by Division of Highways, Sacramento. 5-27

TRINITY CO.—**S. C. Giles & Co.,** Elks Bldg., Stockton—$22,197 for constr. of Big Creek Bridge on Big Bar-Hayfork Rd., Trinity National Forest—by Public Roads Administration, San Francisco. 5-27

TULARE CO. — **Northrup Construction Co.,** 927 E. Carson St., Long Beach—$147,415 for 2 reinf. conc. bridges across St. Johns River 5.5 mi. E. and 1.5 mi. N. of Visalia—by Division of Highways, Sacramento. 5-19

TULARE CO.—**E. H. Peterson & Son,** 5691 Dam Road, Richmond—$15,940 for reinf. conc. bridge across White river, approx. 7 mi. SE. of Earlimart—by Division of Highways, Sacramento. 5-23

Kansas

SMITH CO.—**Taylor & Brown,** Salina—$56,033 for constr. of 75 x 95 x 75 ft. steel beam spans—by State Highway Commission, Topeka. 5-9

SMITH CO.—**Taylor & Brown,** Salina—$20,701 for constr. of 35 x 45 x 35 ft. conc. slab spans — by State Highway Commission, Topeka. 5-9

New Mexico

UNION CO. — **D. D. Skousen,** Springer Bldg , Albuquerque—$267,090 for 18 mi. grade, drain and constr. of continuous slab conc. bridge, Rt. No. 58, betw. Springer and Clayton—by State Highway Department, Santa Fe. 5-9

Oregon

JACKSON CO.—**R. H. Jones,** Hillsboro—$87,230 to widen Reese Creek, Little Butte Creek and Antelope Creek bridges on Crater Lake Hwy. — by State Highway Commission, Salem. 5-2

LINCOLN CO.—**Tom Lillebo,** Reedsport — $19,279 for constr. of timber trestle bridge over Depot Slough on Corvallis-Newport Hwy.—by State Highway Commission, Salem. 5-1

LINN CO.—**Geo. E. Berry,** Beaverton—$37,655 for constr. of 120-ft. truss bridge with trestle approach spans over Crabtree Creek on Richardson Gap rd.—by County Commission, Albany. 5-2

MULTNOMAH CO.—**Guy F. Atkinson Co.,** Porter Bldg., Portland—$317,400 to constr. reinf. conc. bridge over O. W. R. R. & N. Co. tracks at Bridal Veil, Columbia River Hwy.—by State Highway Commission, Salem. 5-2

TILLAMOOK CO.—**DaVare Construction Co.,** Portland — $101,120 to constr. conc. slab deck span over Trask River on Netarts Sec. Hwy., near Tillamook — by State Highway Commission, Salem. 5-15

UMATILLA CO.—**E. C. Hall Co.,** Rt. 6 Box 630, Portland—$117,072 for constr. of 4 bridges at Milton, Oregon-Washington Hwy. — by State Highway Commission Salem. 5-2

Texas

TOM GREEN CO.—**Hunter Strain,** San Angelo — $73,172 for 0.719 mi. of Boi D'Arc draw bridge and approaches from 7 mi. N. of Schleicher Co. line to 1.3 mi. N of Schleicher Co. line—State Highway Department, Austin. 5-19

Washington

KING CO.—**Manson Construction & Engineering Co.,** Seattle—$185,200 for constr of steel girder bridge over the Sammamish

River, and grade., surf., and constr. asph. conc. approaches to bridge, .1 mi.—by Department of Highways, Olympia. 5-6

SNOHOMISH CO.—**Antonsen Painting Co.,** Tacoma—$22,000 for cleaning and painting Everett to Marysville Bridges Nos. 1-208 and 1-211—by Department of Highways, Olympia. 5-6

SNOHOMISH AND SKAGIT COS.—**Alton V. Phillips,** Seattle — $19,733 for constr. and reconstr. work on Everett to Marysville and Swinomish Slough bridges —by Department of Highways, Olympia.

WALLA WALLA CO.—**J. H. Collins & Co.,** Box 678, Walla Walla—$173,811 for 2.2 mi. hwy. work and constr. of reinf. conc. bridge, Stone Creek to Ore. State line—by Department of Highways, Olympia. 5-13

Wyoming

ALBANY CO.—**J. H. & N. M. Monaghan,** Derby, Colo.—$379,986 to constr. 2 bridges and 8 mi. grade and surf. of Rock River-Laramie Rd.—by State Highway Commission, Cheyenne. 5-1

CARBON CO.—**Inland Construction Co.,** 3867 Leavenworth, Omaha, Neb.—$132,990 for 4.5 mi. grade and surf. and constr. 4 culverts, Baggs-Savery Rd.—by State Highway Commission, Cheyenne. 5-1

SUBLETTE CO.—**Taylor & Allard,** Pinedale—$43,530 to constr. steel girder bridge and culvert, east of Big Piney—by State Highway Commission, Cheyenne. 5-1

Canada

BRITISH COLUMBIA—**Western Bridge & Steel Fabricators, Ltd.,** Vancouver — $57,088 for constr. of Vedder River bridge on Cultus Lake Rd., near Chilliwack—by Provincial Department of Public Works, Vancouver. 5-20

Airport . . .

California

KERN CO.—**R. E. Ziebarth,** 1750 California St., Long Beach—$133,761 to install underground electric distribution system at Muroc Army Air Field, Muroc — by Corps of Engineers, Los Angeles. 5-26

Idaho

TWIN FALLS CO.—**Triangle Construction Co.,** Box 2617, Boise — $588,201 for constr. of airport facilities approx. 5 mi. S. of Twin Falls—by Airport Commission, Boise. 5-1

Texas

DALLAS CO.—**Texas Bitulithic Co.,** Box 343, Dallas — $325,137 to pave at Redbird Airport, Dallas—by City Council, Dallas. 5-1

Wyoming

PARK CO.—**General Airport Co.,** Cody—$100,000 to improve runways, constr. bldgs. and for lighting service at airport, Cody—by City Council, Cody. 5-27

Territories

ALASKA — **Birch-Johnson-Lytle,** Textile Tower, Seattle, Wash. — $8,125,000 for constr. of heavy bomber base, Mile 26, SE. of Fairbanks on Alaska Hwy.—by Corps of Engineers, Seattle, Wash. 5-20

Water Supply . . .

Arizona

MARICOPA CO. — **N. P. Van Valkenburgh,** 8609 San Vincente, South Gate, Calif.—$186,810 for river pumps, pipelines and appurtenances, Phoenix — by City Council, Phoenix. 5-22

MARICOPA CO.—**Vinson Construction Co.,** 2020 W. Grant St., Phoenix—$145,945 to constr. 20,000,000-gal. reservoir and appurtenances, Phoenix — by City Council, Phoenix. 5-9

California

KERN CO. — **E. R. Siple Co.,** 2545 San Fernando Rd., Los Angeles—$104,361 for reconstr. of water supply facilities at Air Base, Muroc—by Corps of Engineers, Los Angeles. 5-22

KERN CO.—**Whitten Bros.,** High St., Delano — $18,065 to drill water well near Quincy & 20th Sts., Delano—by City Council, Delano. 5-21

LOS ANGELES CO.—**Rex V. Igo,** 2716 Ross Ave., Alhambra—$12,400 for installation of water lines and paving of Via Verde Rd., Covina Knolls—by Roy S. Hitchcock, Covina. 5-8

LOS ANGELES CO.—**Garn L. Moody,** 11036 Sherman Way, No. Hollywood — $118,020 for debris basin, 700 ft. downstream from Nordhoff St. on Wilbur Creek, Los Angeles—by Department of Agriculture, Los Angeles. 5-22

MARIN CO.—**R. J. Brant,** 118 New Montgomery St., San Francisco—$15,432 to install water mains in Kent Woodlands, Kentfield — by Marin County Municipal Water District, San Rafael. 5-15

NAPA CO.—**Stanley H. Koller,** 1694 Pomona, Crockett—$10,422 for water system extensions and replacements in Calistoga and near dam—by City Council, Calistoga. 5-19

SAN FRANCISCO CO.—**Edwin J. Tobin,** 1000 Carleton St., Berkeley—$36,136 to install 16-in. C.I. water main, Third St., from Evans to Arthur Ave., and main easement to Pier 92, San Francisco—by City and County Commission, San Francisco. 5-19

SAN MATEO CO.—**A. J. Peters & Son,** 410 N. 10th St., San Jose — $89,632 for constr. of water mains, valves and fittings, Sharp Park — by North Coast County Water District, Sharp Park. 5-12

SANTA CRUZ CO.—**Ed Jarvis,** 3688 Madrone Ave., Oakland — $16,616 to install water lines in Bay St. and W. Cliff Drive, betw. Mission and Beach, Santa Cruz—by City Council, Santa Cruz. 5-29

Texas

DALLAS CO. — **Diamond Engineering Co.,** Rt. 9, Box 489-A, Dallas—$20,693 for drainage improvements on Hopkins St., Lovers Lane and Taos Rd., Dallas — by City Council, Dallas. 5-8

DALLAS CO. — **Diamond Engineering Co.,** Rt. 9, Box 489-A, Dallas—$18,800 to constr. water mains in South Marsal, Dallas—by City Council, Dallas. 5-8

JONES CO.—**Fort Worth Structural Steel Co.,** 2400 W. 7th St., Fort Worth—$39,920 for constr. of water works improvements, Stamford—by City Council, Stamford. 5-8

LUBBOCK CO.—**R. H. Fulton,** 2711 Ave. H, Lubbock—$661,113 to constr. low pressure water supply main, Lubbock—by City Council, Lubbock. 5-8

LUBBOCK CO.—**W. G. McMillan,** Lubbock—$239,990 for constr. of 10 mil. gal. concrete storage reservoir and pump bldg., Lubbock—by City Council, Lubbock. 5-13

LUBBOCK CO. — **Panhandle Construction Co.,** Lubbock—$220,000 for constr. of 10 mil. gal. concrete storage reservoir and pump bldg., Lubbock—by City Council, Lubbock. 5-13

POTTER CO. — **Reinhart & Donovan,** Hightower Bldg., Oklahoma City, Okla.—$193,700 to constr. 5,000,000 gal. reinf. conc. water storage reservoir, Amarillo—by City Council, Amarillo. 5-8

Utah

CARBON CO. — **Burke & Co.,** Denver, Colo.—$20,000 to clear reservoir site, Scofield project, NW. of Price—by Bureau of Reclamation, Salt Lake City. 5-22

Washington

KING CO.—**State Construction Co.,** Seattle — $165,745 to constr. 5,000,000 gal. reservoir to be built at 24th Ave. S., and S. 160th St., Seattle—by Municipal Board of Public Works, Seattle. 5-1

Sewerage . . .

California

ALAMEDA CO. — **Erickson, Phillips & Weisberg,** 3341 Telegraph Ave., Oakland—$88,629 for reinf. conc. culvert extensions to N. and S. ends of Lake Merritt Channel culvert, Oakland—by City Council, Oakland. 5-19

ALAMEDA CO.—**Stanley H. Koller,** 1694 Pomona, Crockett—$209,713 for constr. of reinf. conc. box culverts and drainage and sewage facilities, Carey, Edes Aves., Stone, Denny and San Leandro Sts., Oakland—by City Council, Oakland. 5-12

ALAMEDA CO.—**McGuire & Hester,** 796 66th Ave., Oakland — $22,061 to constr. storm drain in Castro Valley—by Division of Public Works, Sacramento. 5-23

FRESNO CO.—**DeLuca & Sons,** 1745 Filbert St., San Francisco—$652,692 for pri-

mary sedimentation type sewage treat. plant with effluent used for irrigation, approx. 7 mi. W. of Fresno—by City Council, Fresno. 5-19

LOS ANGELES CO.—**B. Pecel,** 2927 6th Ave., Los Angeles—$62,199 to lay sewers and resurf. sts. in Hatteras St. and Camelia Ave. sewer district, Los Angeles—by City Council, Los Angeles. 5-23

SAN DIEGO CO.—**KeSton Construction Co.,** 643 N. Kilkea Dr., Los Angeles—$48,650 for constr. of sewage plant addition, El Cajon—by City Council, El Cajon. 5-21

SAN FRANCISCO CO.—**Healy-Tibbitts Construction Co.,** 411 Brannan St., San Francisco—$242,702 for constr. of Alemany sewer extension, Lower Islais Creek District outlets, San Francisco—by City and County Department of Public Works, San Francisco. 5-12

SAN MATEO CO.—**Edwin J. Tobin,** 1000 Carleton St., Berkeley—$39,924 for constr. of sewage treatment plant, sanitary sewers and appurtenances in Emerald Lake District — by County Board of Supervisors, San Mateo. 5-7

SANTA CLARA CO.—**Fred J. Early, Jr.,** 369 Pine St., San Francisco—$193,297 for constr. of sewage treatment plant, Palo Alto—by City Council, Palo Alto. 5-20

SANTA CLARA CO. — **Healy-Tibbitts Construction Co.,** 411 Brannan St., San Francisco—$11,900 to install outfall sewage line, Palo Alto — by City Council, Palo Alto. 5-20

SONOMA CO.—**E. E. Lowell,** 1331 Virginia St., Vallejo—$125,295 for constr. of additions and replacements to sewer system, Santa Rosa—by City Council, Santa Rosa. 5-6

STANISLAUS CO.—**McGuire & Hester,** 796 66th Ave., Oakland—$30,867 to install industrial waste sewer line, Modesto—by City Council, Modesto. 5-19

STANISLAUS CO.—**Manuel Smith,** 1440 Broadway, Oakland—$28,631 to install sanitary sewer lines, Ceres—by City Council, Ceres. 5-20

TULARE CO.—**W. M. Lyles Co.,** Box 83, Avenal — $13,770 to install sewer line in Kern St., betw. F St. and west city limits, Tulare—by City Council, Tulare. 5-23

Texas

DALLAS CO.—**E. E. Farrow & Co.,** Dallas—$17,441 for constr. of sanitary sewers and water mains for Cherrywood Addn. No. 3, Dallas—by City Council, Dallas. 5-19

Washington

SPOKANE CO.—**Victor Ehtee,** Spokane — $53,890 to constr. subtrunk and lateral sewer, Glenwood Park, Spokane—by City Council, Spokane. 5-29

WHITMAN CO.—**Geo. K. Meacham & Sons,** Lewiston, Ida., $19,415 to install sewer mains in portion of Colfax—by City Council, Colfax. 5-1

Waterway . . .

California

CONTRA COSTA CO. — **San Francisco Bridge Co.,** 503 Market St., San Francisco — $19,760 to dredge turning basin, Richmond — by Corps of Engineers, San Francisco. 5-20

SAN DIEGO CO.—**Franks Dredging Co.,** 845 Ventura Pl., Mission Beach—$110,467

to fill Tierra del Fuego Island and dredge adjacent channels in Mission Bay, San Diego—by City Council, San Diego. 5-19

SAN FRANCISCO CO.—**Healy-Tibbits Construction Co.,** 411 Brannan St., San Francisco—$13,700 to repair fender line and cor. Pier 15, San Francisco—by State Harbor Commission, San Francisco. 5-22

SAN JOAQUIN AND SOLANO COS.—**Johnson Western Co.,** Box 416, Alameda—$79,173 to dredge Stockton deep water channel and Suisun Bay—by Corps of Engineers, Sacramento. 5-20

SONOMA CO.—**Associated Dredging Co.,** 465 California St., San Francisco—$42,028 to dredge Petaluma Creek, Petaluma—by Corps of Engineers, San Francisco. 5-27

VARIOUS COS.—H. Earl Parker, 12th & F Sts., Marysville—$33,750 to clear 225 ac. of overflow areas of Feather River—by Corps of Engineers, Sacramento. 5-2

Idaho

CANYON CO.—**Vernon Bros. Co.,** Box 1787, Boise — $34,670 to repair existing levees on right and left banks of Boise river at Silver Bridge, 2 mi. S. of Parma—by Corps of Engineers, Portland, Ore. 5-1

Oregon

LANE CO.—**C. T. Malcolm & Co.,** Portland—$51,230 for bank protection work along left bank of Willamette River at Harpers Bend—by Corps of Engineers, Portland. 5-29

MULTNOMAH CO.—**Hydraulic Dredging Co., Ltd.,** Central Bank Bldg., Oakland, Calif.—$937,337 for 6 mi. hydraulic dredged embankment, Troutdale-Wahkeena Creek section, Columbia River Hwy.—by State Highway Commission, Salem. 5-2

Texas

DALLAS CO.—**J. W. Roberson,** Springtown—$53,820 for constr. of levee repairs along Elm Ford Diversion Channel, Dallas—by Corps of Engineers, Dallas. 5-6

Territories

ALASKA—**Puget Sound Bridge & Dredging Co.,** 2929 16th St., SW., Seattle, Wash. — $500,000 for approx. 261,000 cu. yd. dredging, Wrangell Narrows—by Corps of Engineers, Seattle, Wash. 5-23

Canada

BRITISH COLUMBIA — **B. C. Bridge & Dredging Co., Ltd.,** 544 Howe St., Vancouver—$195,750 for dredging inner harbor of Victoria—by Provincial Department of Public Works, Vancouver. 5-20

Dam . . .

Arkansas

BAXTER CO. — **Ozark Dam Constructors,** Box 3, Houston, Tex.—$22,146,440 for the constr. of the principal part of the big Bull Shoals Dam on the White River—by Corps of Engineers, Little Rock. 5-9

New Mexico

SIERRA CO.—**J. H. Ryan,** Albuquerque—$65,115 for alterations to spillway, Elephant Butte Dam, approx. 3 mi. E. of Hot Springs—by Bureau of Reclamation, El Paso, Tex. 5-20

Texas

HILL CO.—**Standard Paving Co.,** Tulsa, Okla.—$311,414 to constr. portion of embankment of Whitney Dam and Reservoir, Whitney—by Corps of Engineers, Dallas. 5-6

TARRANT CO.—**J. W. Mosley,** Jewett—$78,258 for earth embankment and partial excavation of spillway, on Clear Fork, 15 mi. above confluence with W. fork of Trinity River—by Corps of Engineers, Galveston. 5-20

Irrigation . . .

California

MODOC CO.—**George R. Stacy,** Tulelake—$120,341 for earthwork and structs., laterals and drains, conc. lining for "M" canal and Coppeck Bay area first extension, Modoc Unit, Klamath project, near Tule Lake—by Bureau of Reclamation, Klamath Falls, Ore. 5-2

Idaho

CANYON CO.—**Humphrey-Ketchen Co.,** Boise—$251,381 for earthwork and structs. for Conway Gulch lateral and "C" line East Canal laterals and sublaterals, approx. 5 mi. N. of Caldwell—by Bureau of Reclamation, Boise. 5-21

VALLEY CO.—**Wixson & Crowe,** Box 799, Redding, Calif.—$288,720 to clear part of Cascade Reservoir site, one to ten mi. NW. of Cascade—by Bureau of Reclamation, Boise. 5-29

Oregon

JEFFERSON CO. — **Morrison-Knudsen Co., Inc.,** Box 450, Boise, Ida.—$195,161 for constr. of earthwork, structs., and steel pipeline, Willow Creek siphon and wasteway, Deschutes Project, approx. one mi. NW. of Madras—by Bureau of Reclamation, Bend. 5-12

Tunnel . . .

Montana

BIG HORN CO.—**Jayhawk Construction Co.,** Billings—$119,546 for exploration tunnels, Yellowtail Damsite, Hardin Unit, on Big Horn River, approx. 45 mi. SW. of Hardin—by Bureau of Reclamation, Billings. 5-19

Oregon

MARION CO.—**Viesko & Post,** Salem—$166,539 to constr. 1800 ft. reinf. conc. tunnel to connect main bldg. with proposed treatment hospital, Oregon State Hospital, Salem—by Oregon State Board of Control, Salem. 5-26

Building . . .

Arizona

MARICOPA CO.—**J. R. Porter Construction Co.,** 3407 North 7th St., Phoenix—$75,000 for constr. of science bldg. at Glendale Union High School, Glendale—by City Union High School District, Glendale. 5-1

MARICOPA CO.—**Del E. Webb Construction Co.,** Box 4066, Phoenix—$1,000,000 for constr. of 2-story and basement newspaper publishing plant Van Buren and

2nd Sts., Phoenix—by Arizona Republic and Phoenix Gazette, Phoenix. 5-20

California

ALAMEDA CO. — **Collins Construction Co.,** 15 W. 10th St., Kansas City, Mo.—$235,000 for constr. of reinf. conc. and steel manufacturing plant on 27-acre site at San Leandro St. and 92nd Ave., Oakland—by Fruehauf Trailer Co., Detroit, Mich. 5-1

ALAMEDA CO.—**George Peterson,** Box 104, San Leandro—$168,709 for constr. of 15-room frame and stucco school bldg., Willow and Western Aves., Hayward—by City Elementary School District, Hayward. 5-13

ALAMEDA CO. — **Swanstrom & Stahl,** 2034 Hoover Ave., Oakland—$283,354 for constr. of warehouse and office bldg. addition at 45th and Adeline Sts., Oakland—by Aluminum Cooking Utensil Co., New Kensington, Pa. 5-15

ALAMEDA CO.—**Stolte, Inc.,** 8451 San Leandro St., Oakland—$82,000 for constr. of struct. steel frame plumbing store, 24th and Wood, Oakland—by Moran Plumbing Supply Co., Oakland. 5-27

FRESNO CO. — **Johnson Western Co.,** 2100 Wilmington San Pedro Rd., San Pedro —$200,000 for constr. of reinf. conc. power house and appurtenances, Big Creek Power House No. 3, E. of Fresno—by Southern California Edison Co., Los Angeles. 5-2

KERN CO. — **Haddock Engineers, Ltd.,** 1616 S. Greenwood Ave., Montebello — $1,485,000 to constr. 12 bldgs., sewage, water facilities, streets, etc., Inyokern—by Bureau of Yards & Docks, Washington, D. C. 5-20

LOS ANGELES CO. — **Bershon Realty Co.,** 6633 W. Manchester Ave., Los Angeles—$273,000 for constr. of 39, frame and stucco dwellings on W. 85th St., Venice District, Los Angeles—by Nate Bershon, Los Angeles. 5-5

LOS ANGELES CO.—**Robert E. McKee,** 4700 San Fernando Rd., Los Angeles—$735,400 for constr. of 2-story and basement, reinf. conc. wing addition to library bldg. at University of California, Los Angeles—by Board of Regents, University of California, Los Angeles. 5-2

LOS ANGELES CO.—**Sapp Construction Co.,** 460 N. Rexford Dr., Beverly Hills—$148,600 general constr. of stadium, 16th St., betw. Pearl & Pico Blvds., Santa Monica—by City High School District, Santa Monica. 5-20

LOS ANGELES CO.—**P. J. Walker Co.,** 3900 Whiteside Ave., Los Angeles—$130,000 for telephone bldg., 8000 Foothill Blvd., Sunland—by Sunland-Tujunga Telephone Co., Sunland. 5-21

MERCED CO.—**James I. Barnes Construction Co.,** Russ Bldg., San Francisco—$725,739 to convert barracks to officers quarters and constr. added officers quarters, Castle Army Air Field, near Merced —by Corps of Engineers, Sacramento. 5-1

RIVERSIDE AND SHASTA COS.—**R. J. Daum,** 6803 West Blvd., Inglewood—$300,000 employee housing and shop facilities, Blythe, Indio, Beaumont and Olinda —by Southern Counties Gas Co., Los Angeles. 5-20

RIVERSIDE CO.—**Frank Pinkerton,** 622 W. Grand Blvd., Corona — $552,730 for constr. of 2-story, reinf. conc. 22-room high school bldg., Main and Olive Sts., Corona —by City Union High School District, Corona. 5-5

SACRAMENTO CO.—**M. & K. Corp.,** Financial Center Bldg., San Francisco — $156,600 for conversion of bldgs. to officers quarters, Mather Field, Sacramento—by Corps of Engineers, Sacramento. 5-23

SAN DIEGO CO. — **W. D. Haxton,** Spreckels Theater Bldg., San Diego — $141,790 for constr. of 1-story, frame and stucco elementary school bldg., Johnson and Grant Ave., El Cajon—by Cajon Valley Union School District, El Cajon. 5-20

SAN FRANCISCO CO.—**Haas & Rothschild,** Merchants' Exchange Bldg., San Francisco—$95,000 for constr. of conc. and frame one-story packing plant and fruit storage bldg., 3rd & 16th Sts., San Francisco—by Levy & Zentner Co., San Francisco. 5-13

SAN JOAQUIN CO.—**Henry Arian Construction Co.,** 4142 Geary Blvd., San Francisco—$161,444 for constr. of emergency housing facilities, Pacific Reserve Fleet Personnel, Rough & Ready Island, Stockton—by Bureau of Yards & Docks, Washington, D. C. 5-13

SAN JOAQUIN CO.—**Dan Nomellini,** 304 W. Jackson St., Stockton — $363,723 for partial construction of reinf. conc., one-story school bldg., Main and Cardinal Ave., Stockton—by City Unified School District, Stockton. 5-7

SAN MATEO CO.—**Carrico & Gautier,** 365 Ocean Ave., San Francisco—$129,836 for general constr. of reinf. conc. swine and sheep barn at Cow Palace, Geneva Ave., Rio Verde—by State Division of Architecture, Sacramento. 5-27

SAN MATEO CO.—**William Horstmeyer Co.,** 23 Mars St., San Francisco—$52,653 for constr. of addition to school bldg., White Oaks Elementary School, San Carlos—by City Elementary School District, San Carlos. 5-5

SAN MATEO CO.—**Wagner & Martinez,** 181 So. Park, San Francisco—$65,000 for constr. of structl. steel factory bldg., Dumbarton Acres, Redwood City—by Chemical Process Co., San Francisco. 5-9

SANTA CLARA CO.—**Cahill Bros., Inc.,** 206 Sansome St., San Francisco—$98,000 for constr. of conc. warehouse foundations, Sunnyvale — by Libby, McNeill & Libby, San Francisco. 5-5

SANTA CRUZ CO. — **Stolte, Inc.,** 8451 San Leandro St., Oakland — $74,096 for constr. of one-story frame and stucco school bldg. addition, Porter School, Soquel—by City Union Elementary School, Soquel. 5-13

SHASTA CO.—**H. H. Larsen Co.,** 64 S. Park Ave., San Francisco — $105,000 for constr. of addition to existing telephone bldg. at 1304 Market St., Redding—by Pacific Telephone & Telegraph Co., San Francisco. 5-1

SOLANO CO. — **Biltwell Construction Co.,** 4745 Geary St., San Francisco—$426,198 for constr. of officers quarters and facilities at Suisun Army Air Field, Fairfield—by Corps of Engineers,Sacramento. 5-29

SOLANO CO.—**Recknagel & Yeomans,** 726 Kentucky St., Vallejo — $111,333 for reinf. conc. stadium seating, Corbus Field, Vallejo—by Board of Education, Vallejo. 5-19

YOLO CO.—**Campbell Construction Co.,** 900 R St., Sacramento—$194,695 for constr. of rice storage bins, West Sacramento—by Rice Growers' Association, West Sacramento. 5-8

Colorado

LARIMER AND GRAND COS.—**Green Lumber Co.,** Laurel, Miss.—$115,932 to provide 8 demountable houses, Fort Collins; and 20 ea. for camp near Estes Park and Shadow Mt. Reservoir—by Bureau of Reclamation, Washington, D. C. 5-15

Nevada

ORMSBY CO.—**The Walker J. Boudwin Construction Co.,** Gazette Bldg., Reno — $337,350 to constr. new cell block and remodel old cell block at State Prison, Carson City—by State of Nevada, Carson City. 5-26

WASHOE CO.—**Hillcrest Plumbing Co.,** 389 Sage St., Reno—$49,153 for constr. of furnace room and heating plant at McKinley Park School, Reno—by Board of Trustees, Reno School District No. 10, Reno. 5-1

New Mexico

SANTA FE CO.—**Robert E. McKee,** 1918 Texas Ave., El Paso—$2,000,000 for constr. of community center development; four bldgs., sewers, water and gas distribution systems, etc., Los Alamos — by U. S. Atomic Energy Commission, Santa Fe. 5-8

Oklahoma

COMANCHE CO.—**J. W. Bateson Co.,** Irwin-Keasler Bldg., Dallas, Tex.—$242,519 to convert barracks to housing units, convert hospital bldgs. to housing units and to constr. utility systems at Fort Sill—by Corps of Engineers, Tulsa. 6-1

Oregon

MARION CO.—**L. H. Hoffman,** 715 SW. Columbia, Portland—$1,508,485 for constr. of psychiatric hospital, State Hospital Cottage Farm, near Salem—by State Board of Control, Salem. 5-21

MARION CO. — **Dan J. Malarkey,** 923 SW. 17th St., Portland—$650,993 for reinf. conc., 3-story custodial ward bldg., State Hospital Cottage Farm, Salem—by State Board of Control, Salem. 5-21

MULTNOMAH CO. — **Waale-Camplan Co.,** 2100 SW. Jefferson St., Portland — $280,000 for constr. of steel frame roofing products plant at NW. Front Ave., betw. Kittredge and Doane Sts., Portland—by Pioneer Division, Flintkote Co., Portland. 5-1

Texas

BEXAR CO.—**C. L. Browning, Jr.,** Insurance Bldg., San Antonio — $861,970 for constr. of housing facilities at Fort Sam Houston—by Corps of Engineers, Galveston. 5-7

CAMERON CO.—**W. D. Ferguson & Son,** Brownsville—$68,000 for constr. of concr. stands at high school football field, Harlingen — by Independent School District, Harlingen. 5-21

DALLAS CO.—**Buel Crouch,** 831 10th St., Dallas—$125,000 for constr. of one- and two-story church bldg., Dallas—by Grace Temple Baptist Church, Dallas. 5-8

DALLAS CO.—**Inge-Hayman Construction Co.,** 2326 Beckley Ave., Dallas—$50,000 for constr. of one-story addition to manufacturing plant at 6700 Denton Drive, Dallas—by Kroehler Manufacturing Co., Dallas. 5-1

DALLAS CO.—**J. L. Jones,** 406 S. Clarendon St., Dallas—$90,000 for constr. of dept. store bldg., 427 W. Jefferson Ave., Dallas—by J. C. Penney Co., Dallas. 5-20

DALLAS CO. — **O'Rourke Construction Co.,** Box 5384, Dallas—$188,500 for constr. of one-story, masonry warehouse bldg., 6125 Peeler St., Dallas—by Industrial Investment Co., Dallas. 5-1

DALLAS CO.—**Simons-Langford,** Dallas —$200,000 for constr. of 2-story furniture bldg., 1919 Ross Ave., Dallas—by self. 5-6

EL PASO CO. — **McCann Construction Co.,** 1813 E. Lancaster St., Fort Worth—$136,918 to convert barracks bldgs. to family housing units, Biggs Field, El Paso —by Corps of Engineers, Albuquerque, N. M. 5-1

JOHNSON CO. — **J. W. Bateson Co.,** Irwin-Keasler Bldg., Dallas—$184,370 to constr. memorial hospital at Cleburne—by County Commission, Cleburne. 5-1

POTTER CO. — **Little-Hill Construction Co.,** Amarillo — $125,000 for constr. of sports and exhibit bldg., Amarillo — by County Commission, Amarillo. 5-1

RANDALL CO. — **Ramey & Mathis,** Amarillo—$75,000 for classroom and office bldg., Canyon — by West Texas State Teachers College, Canyon. 5-21

TARRANT CO.—**Cain & Cain,** Majestic Bldg., Fort Worth—$149,990 for constr. of 3-story bldg., 3rd and Lamar Sts., Fort Worth — by Ladd Furniture Co., Fort Worth. 5-15

TRAVIS CO.—**R. P. Farnsworth & Co., Inc.,** Austin—$134,934 for constr. of additions to Austin school—by Austin Independent School District. 5-13

Utah

SALT LAKE CO. — **Olson Construction Co.,** Box 366, Salt Lake City—$60,000 for constr. of stores bldg., Sandy—by Jordan School District, Sandy. 5-2

WEBER CO. — **Larsen Construction & Engineering Co.,** 2667 Lincoln Ave., Ogden—to constr. 3 conc. hay-storage and feed bldgs., Ogden—by Union Stock Yards, Ogden. 5-2

Washington

CHELAN AND KING COS.—**Alan Boen Construction Co.,** Seattle — $185,000 to constr. maintenance bldgs. at Stevens Pass —by Department of Highways, Olympia. 5-20

PIERCE CO.—**Central Construction Co.,** Spokane—$82,949 to constr. student union bldg., conc. and brick veneer, two-stories at Pacific Lutheran College, Parkland — by Board of Directors, Pacific Lutheran College, Parkland. 5-1

PIERCE CO.—**C. F. Davidson Co.,** Provident Bldg., Tacoma—$283,337 for constr. of juvenile detention home, Tacoma — by County Commission, Tacoma. 5-22

SNOHOMISH CO.—**John H. Sellen Construction Co.,** 228 9th Ave., N., Seattle—$156,300 for constr. of Naval Reserve Armory, Everett Waterfront—by Bureau of Yards & Docks, Washington, D. C. 5-19

SPOKANE CO. — **Central Construction Co.,** Spokane—$84,921 for constr. of bldg. additions at Deer Park grade school, Spokane—by Board of Education, Spokane. 5-1

SPOKANE CO. — **Halvorson Construction Co.,** First National Bank Bldg., Salem,

Ore.—$119,535 for constr. of additions to Dishman School, Spokane—by Board of Education, Spokane. 5-1

YAKIMA CO.—**W. M. Yeaman,** Seattle—$250,000 to complete installation of facing and sash on exterior and finish 2nd floor of hotel bldg., Yakima—by Fredrick Mercy, Yakima. 5-29

Wyoming

CARBON CO. — **Loren Hancock Construction Co.,** Cheyenne—$61,512 to constr. maintenance shop and storage bldg. at Saratoga—by State Highway Department, Cheyenne. 5-1

Canada

BRITISH COLUMBIA — **Allan & Viner Construction Co., Ltd.,** 602 W. Hastings St., Vancouver — $120,000 for constr. of dairy plant, Vancouver—by Turners Dairy, Ltd., Vancouver. 5-1

BRITISH COLUMBIA—**Commonwealth Construction Co., Ltd.,** 670 Taylor St., Vancouver — $125,000 for constr. of theater bldg. on Yates and Johnson Sts., Victoria—by Odeon Theatres of Canada, Ltd., Vancouver. 5-1

BRITISH COLUMBIA—**J. J. Doyle & Sons,** 196 W. 20th Ave., Vancouver—$75,000 for constr. of 6-room school bldg., Hope, B. C. — by Board of Education, Hope. 5-1

BRITISH COLUMBIA — **Marwell Construction Co.,** Vancouver — $70,000 for constr. of brick clothing factory, 1000 block W. Pender St., Vancouver—by Fit-Well Garments, Ltd., Vancouver. 5-1

BRITISH COLUMBIA—**Turnbull Bros., Ltd.,** 510 W. Hastings St., Vancouver — $50,000 for constr. of one-story, wood frame, conc. foundation gymnasium bldg. at 3200 W. 41st Ave., Vancouver — by Board of Management, Crofton House School for Girls, Vancouver. 5-16

Miscellaneous . . .

Arizona

VARIOUS COS.—**J. H. Baxter & Co.,** 333 Montgomery St., San Francisco, Calif.—$246,798 to furn. wood poles for second Parker-Gila 161,000-volt transmission line in Davis Dam project, from Parker Dam approx. 138 mi. south—by Bureau of Reclamation, Washington, D. C. 5-14

California

RIVERSIDE CO.—**Shea Co.,** 617 S. Olive St., Los Angeles; **General Construction Co.,** 3840 Iowa St., Seattle, Wash.; and **Pacific Bridge Co.,** 333 Kearny St., San Francisco—$2,000,000 for constr. of 51 mi. railroad from Eagle Mt. iron mines to S. Pacific main line near Mecca — by Kaiser Engineers, Inc., Oakland. 5-15

Nebraska

TURNAS CO.—**Capitol Steel & Iron Co.,** Oklahoma City, Okla.—$97,428 for 855 tons reinf. bars for Enders dam—by Bureau of Reclamation, Washington, D. C. 5-15

Nevada

CLARK CO.—**H. W. Polk,** Box 1368, Las Vegas—$111,538 for constr. of curbs, gutters, streets, sidewalks and water and sewer facilities in Boulder City—by Bureau of Reclamation, Denver, Colo. 4-4

TRADE WINDS

News of Men Who Sell to the Construction West

CALIFORNIA

Promotion of **Richard L. Erlin** from general sales service manager to the position of manager of rolled steel products sales was announced recently by KAISER COMPANY, INC., Iron and Steel Division, at Oakland, Calif. Erlin is being succeeded as general sales service manager by **O. D. Hole, Jr.,** who joined the firm last October. Erlin was associated with United States Steel Corp. for 16 years before joining Kaiser Steel in September, 1944.

☆ ☆ ☆

Edgar J. Davies and **Wm. F. Hartwig** are new appointees to the sales staff of SOULE EQUIPMENT COMPANY, according to announcement by **H. L. Stilley,** vice-president and general manager. Davies, who is a well-known contractor and equipment salesman, will be attached to Oakland headquarters, while Hartwig will handle the Minneapolis-Moline agricultural line in the Sacramento area.

☆ ☆ ☆

M. E. "Cap" Miller, well-known California equipment distributor, recently joined the staff of the SOULE' EQUIPMENT CO. in Oakland. Miller, who before his change was associated with the Rozier-Ryan Co., was also formerly Central sales manager for R. G. LeTourneau, Inc.

Opening of new offices and a warehouse located at 1315 Howard St., San Francisco, Calif., was recently announced by the SHOVEL AND CRANE DIVISION, LIMA LOCOMOTIVE WORKS, INCORPORATED, Lima, Ohio, with **Paul Fenwick** in charge as district manager for the area, **Ralph Rodgers** and **M. E. Army** as assistant district managers. Rodgers is located in the San Francisco office, and Army is with the Los Angeles sales agent, the SMITH BOOTH USHER CO.

☆ ☆ ☆

Eight new appointments for the $25,000,000 Sheet and Tin Mill at Pittsburg, Calif., plant of COLUMBIA STEEL COMPANY, a U. S. Steel subsidiary, were announced recently by **Joseph A. White,** general superintendent of the plant. The operational appointments included: **D. E. Rice,** division superintendent; **D. W. Lasell,** assistant division superintendent; **C. C. Morgan,** superintendent, Cold Reduction department; **J. P. Newman,** superintendent, Sheet Finishing department; **J. H. Clark,** superintendent, Tin Finishing department; **W. L. Clark,** general foreman, Cold Reduction department; **Melvin Rush,** general foreman, Hot Dip Tinning department; and **George Jedenoff,** general foreman, Electrolytic Tinning department.

☆ ☆ ☆

E. E. RICHTER & SON, one of the largest distributors of air-cooled engines on the Pacific Coast, are now located in Emeryville, Calif., with offices and plant at 5725 Hollis St. The company, which represents locally the Wisconsin Motor Corp., the Lipe Rollway automotive type spring loaded clutches, and the Yates American Machine Co., radiator division, has enlarged its service department with the increased space available. Stocks and supplies are also available in larger quantities to facilitate customer demand.

☆ ☆ ☆

New manager of the San Francisco branch of the GARDNER-DENVER COMPANY is **L. W. Rudolf,** formerly manager of the company branch office in El Paso for 28 years. Succeeding Rudolf at the El Paso office is **F. R. McNamara,** formerly a company representative in the Philippine Islands.

☆ ☆ ☆

An important Western merger was effected recently with the purchase of the WARMAN STEEL CASTING plant by the LOS ANGELES STEEL CASTING CO. Operation of the two firms will be under one management, and will be headed by **C. B. Tibbetts** as president and general manager. Other top personnel include: **E. S. Atkins,** secretary and treasurer; **Ralph A. Lewis,** sales manager; **G. B. Emmett,** works manager; **W. B. Emmett,** superin-

tendent of both plants; and **Carl Wissmann,** chief metallurgist.

☆ ☆ ☆

The ASBESTOS COMPANY OF CALIFORNIA, 941 Sixteenth St., San Francisco, is a new representative of the Manhattan Rubber Division of RAYBESTOS-MANHATTAN, INC., Passaic, N. J., in the San Francisco area. The company will carry a complete stock of belting, V-belts, hose of all types and other industrial rubber products. It will also take advantage of the new Raybestos-Manhattan warehouse, recently opened at 131 Mission St., San Francisco. The new warehouse quarters will provide adequate space for the company's industrial rubber products, and will enable them to more efficiently serve West Coast customers.

☆ ☆ ☆

Opening of a new store and district office in Emeryville, Calif., was announced by the AIR REDUCTION SALES CO. The new Airco headquarters is housed in a modernized 2-story building, and was opened to meet the increased demand for welding and cutting gases and equipment stimulated by the considerable industrial growth of the Emeryville, Oakland, East Bay area. Space has been provided for a demonstration room, in addition to retail sales and storage departments. The new store and office will be under the direction of **H. W. Saunders,** district manager.

☆ ☆ ☆

THE PETERSON TRACTOR & EQUIPMENT CO., a California Limited Partnership, was taken over and is now being conducted by Peterson Tractor & Equipment Co., a Nevada Corporation as of the first of March. No interruption has been made in the continuity of business.

☆ ☆ ☆

K. T. Winslow is the recently appointed San Francisco manager for SCHRAMM, INC., West Chester, Pa. Formerly Salt Lake City, Utah, district manager, he will now be located at 1101-15 David Hewes Building, 995 Market St., and will be ready to handle all inquiries concerning Schramm compressors throughout Northern California and Nevada.

☆ ☆ ☆

The SOULE' EQUIPMENT COMPANY, with offices in Oakland, Sacramento and Stockton, Calif., was recently appointed Northern California distributor for the complete line of BUDA industrial, automotive and marine engines, according to **H. L. Stilley,** vice-president and general manager of the firm. The Soulé Co. will carry large parts stock and have expert repair service and Buda engines available for immediate delivery.

☆ ☆ ☆

William A. Ross, president of COLUMBIA STEEL COMPANY, West Coast subsidiary of United States Steel Corporation since 1939, died recently in San Francisco following a heart attack. Ross, a native San Franciscan, started his long career in 1895 as an office boy for the Washburn-Moen Manufacturing Co., which was acquired shortly after by the American Steel and Wire Company. Upon consolidation of the West Coast holdings of American Steel and Wire with the United States Steel Corporation, he was appointed assistant treasurer. In 1930 when the old Columbia Steel Corporation was acquired by U. S. Steel, Ross was selected to serve the new company as vice-president and treasurer. He was appointed vice-president and general manager of sales, and served in that capacity until his election to the presidency in 1939.

J. Lester Perry, assistant to **Benjamin F. Fairless,** president of U. S. Steel, was elected to succeed Ross. Perry arrived in San Francisco May 12 to assume his new duties.

☆ ☆ ☆

PACIFIC UNION METAL COMPANY is the new name of the Pacific Union Marbelite Company, a wholly owned subsidiary of the Union Metal Manufacturing Company of Canton, Ohio. The change in names was made to facilitate closer identification with its parent company. Pacific Union, located at 3248 Long Beach Blvd., Los Angeles, Calif., manufactures "Marbelite" centrifugally spun concrete street and highway lighting standards. **R. G. VandenBoom** is president and treasurer of the company, while **E. J. Masline** is general manager.

☆ ☆ ☆

INTERMOUNTAIN

Fred Vickers, Great Falls, Mont., has been appointed sales representative for the INTERNATIONAL HARVESTER CO. and is on his way to Paris, France, which will be his new post.

☆ ☆ ☆

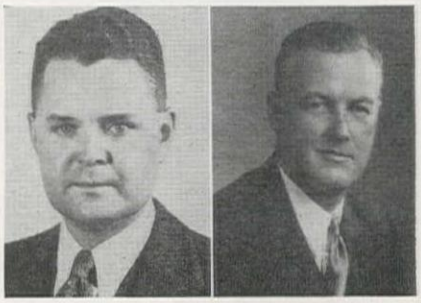
TOWNSCO EQUIPMENT CO., Oklahoma City, Okla., was recently appointed exclusive distributor for the BARBER-GREENE CO., Aurora, Ill., in the state of Oklahoma. Products being handled by the firm include bituminous mixing and paving machines, portable bulk material loaders, ditchers, portable and permanent belt conveyors, crushers, and coal handling

equipment for retail and industrial application.

☆ ☆ ☆

J. H. Deaderick, vice-president in charge of Parts, Service and Traffic departments of the CATERPILLAR TRACTOR CO., Peoria, Ill., and **E. L. Murray,** credit manager of the Treasury department, have resigned their positions to join Fred Elder of Phoenix as "Caterpillar" distributor for the greater part of Arizona.

Other changes announced by the company include the appointment of **E. W. Jackson,** general parts manager since 1944, to the position of director of parts and



MURRAY DEADERICK

service, and promotion of **M. T. Deams** from assistant general parts manager to the general parts managership. **W. Blackie,** vice-president and chief administrative head of the Accounting and Merchandise departments, has assumed administrative guidance of the Traffic department.

☆ ☆ ☆

August Chiary, previously serving R. G. LETOURNEAU, INC., as district sales representative in the New York, Pennsylvania, and New Jersey area, is now working in the same capacity in Arizona and Southern California. He replaces **Bill Worden** who recently became Central sales manager. At the same time, announcement was made of the appointment of **Ken Miller,** former special Western representative and assistant to the Western sales manager, to the position of district sales representative in Nevada, Northern California and Utah.

☆ ☆ ☆

Opening of a MINNEAPOLIS-HONEYWELL REGULATOR COMPANY office in Butte, Mont., was announced recently by **John B. Banks,** northwest regional manager of the company. **James A. Reynolds** has been transferred from the company's Seattle office to serve as branch manager for the new territory. Rapid expansion of home construction and industry in the Montana area was the reason for the opening of the new office, which is located in the Phoenix Building.

☆ ☆ ☆

F. L. Suddith has been named as manager of the Butte, Montana, office of the GENERAL ELECTRIC SUPPLY CORPORATION, succeeding **James L. Fahey,** who died recently. Prior to his appointment, Suddith was manager of the Billings, Mont., warehouse. He will be succeeded there by **H. R. Ellerby,** who formerly covered the Great Falls territory.

☆ ☆ ☆

Appointment of **C. E. Bourne** as sales representative for Texas and Oklahoma for the AMERICAN TRACTOR EQUIPMENT CORP., Oakland, Calif., was announced recently by **Mack Wooldridge,** president of the firm. Bourne, who served

during the war as a U. S. Navy procurement officer, will make his headquarters for ATECO at San Antonio, Tex.

☆ ☆ ☆

PACIFIC NORTHWEST

William C. Champion, Seattle, Wash., district manager of the Pacific Northwest Territory of the SHOVEL AND CRANE DIVISION, LIMA LOCOMOTIVE WORKS, died recently at the age of 65. He had been with the firm since 1930.

☆ ☆ ☆

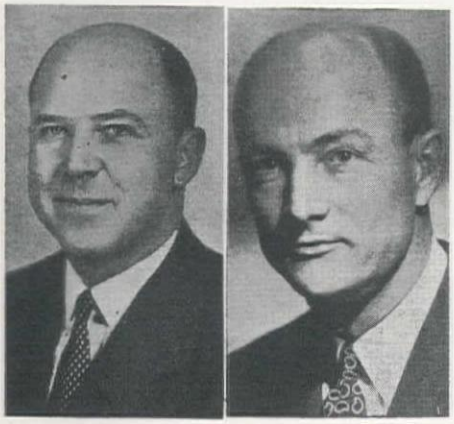
Three new men have been added to the Seattle staff of the MINNEAPOLIS-HONEYWELL REGULATOR COMPANY in order to better meet the growing demand for control instruments, it was announced recently by **W. G. Warrington,** Seattle branch manager. The three new appointments are **Frederick N. Fitting,** instrumentation engineer who will handle sales, engineering and installation of instruments for the company's Brown Instrument Company division; **Preston B. Tack,** electrical engineer who will work on specialty applications of control instruments and also the air conditioning division; and **Franklin L. Flower,** who will supervise sales and installation of Moduflow, a new method of home heating control. All three men served as army officers during the last war.

☆ ☆ ☆

INTERSTATE METALS, INC., distributor for GREAT LAKES STEEL CO. in 16 counties of eastern Washington, Oregon, and western Idaho, has opened offices in Walla Walla, Wash. **Kenneth M. Howser** is president of the newly incorporated firm, and will act as general manager and have charge of sales. **Al T. Warsinske** is vice-president in charge of construction.

☆ ☆ ☆

L. A. Hamilton, formerly assistant manager of AIR REDUCTION COMPANY's Seattle, Wash., district was recently appointed to the position of manager there. Hamilton, who started his association with Airco in 1930, was appointed assistant manager of the Seattle district in 1946 after his discharge from the service.



HAMILTON **MacCORKLE**

Emmett W. MacCorkle, Jr., has been appointed Portland district manager for AIR REDUCTION SALES CO., succeeding **E. R. Hodson,** who is retiring to enter his own business. MacCorkle has been assistant manager of the gas sales department of Air Reduction in New York. Hodson will head a new concern in Seattle to be known as WESTERN OXYGEN, INC.

New manager of the Seattle, Wash., branch of JOHN A. ROEBLING'S SONS CO., Trenton, N. J., is **A. R. Robinson,** according to recent announcement by **E. C. Low,** vice-president in charge of sales. Robinson, a native of Seattle, joined the Roebling Company in 1936 as a salesman in the Portland branch representing the company in the logging, marine and contracting industries.

☆ ☆ ☆

Appointment has been announced of the INLAND DIESEL & MACHINERY CO., Spokane, Wash., as a direct factory distributor for DAVEY COMPRESSORS. The entire Davey line, including Air Chief trailers; Auto-Air compressors; Da-V-Lite portable lighting equipment, and other equipment will be handled by the new distributor. Inland's sales territory is eastern Washington, northern Idaho, and northwestern Montana. Company headquarters are at East 7th and Third Ave., Spokane.

☆ ☆ ☆

Norman Field has been appointed manager of the Seattle office for TRUSCON STEEL CO., succeeding **Gordon Murray,** who recently resigned to accept a position in California. Field returned to civilian life last year after 5 yr. of service with the Navy.

☆ ☆ ☆

INTERNATIONAL HARVESTER CO. opened a modernized and redecorated motor truck branch at 1251 First Avenue South in Seattle on April 15. **J. H. Baker** is Seattle branch manager. Attending the

formal opening from the Chicago headquarters of International Harvester were **L. W. Pierson,** assistant manager of sales; **E. H. Watkins,** western district manager of the motor truck division; **E. B. Waltzek, Jr.,** manager, and **I. H. Birkhold,** of the industrial relations department.

☆ ☆ ☆

William J. Pyne has been appointed to the sales engineering staff of GRAYSTONE CONCRETE PRODUCTS CO. of Seattle. His duties will include principally estimating and sale of concrete masonry materials.

☆ ☆ ☆

COLUMBIA EQUIPMENT CO., Seattle distributors for Austin-Western, Barber-Greene, Novo, LeRoi, Cleveland, LaPlant-Choate, Standard Steel, and Heltzel, moved to new and larger quarters last month. Formerly located at 87 Holgate, Columbia Equipment Co. is now located at 5030 First Avenue South.

☆ ☆ ☆

AMONG THE MANUFACTURERS

Appointment of **Samuel Cottrell** of the AMERICAN POTASH & CHEMICAL CORPORATION's administrative staff to the post of vice-president in charge of technical operations was announced by **Peter Colefax,** company president. Cottrell joined the company last year after 25 years of service in the chemical industry.

☆ ☆ ☆

Purchase of the PETERBILT MOTORS COMPANY, Oakland, Calif., from the estate of the late **T. A. Peterman** was recently announced by **L. A. Lundstrom,** president and general manager of the concern since its founding in 1932. Other officers of the company include **F. E. Matthews,** vice-president and production manager; and **W. M. Fanning,** secretary and treasurer. Other key operating personnel prominent in the new ownership are **L. R. Scholl,** sales manager; **Al Ramos,** parts and service manager; **E. S. Ross,** chief engineer; and **O. D. McKinney,** director of purchases. The company anticipates doubling their production during the current year.

L. A. LUNDSTROM

M. F. Cotes was appointed executive vice-president of MOTOR WHEEL CORPORATION, according to recent announcement by **John E. Garlent,** president of the company. Elected to the directorate in 1937, Cotes has been with the company since 1932 when he came to Lansing to become sales manager of the Duo-Therm Division, which manufactures a complete line of fuel oil burning appliances.

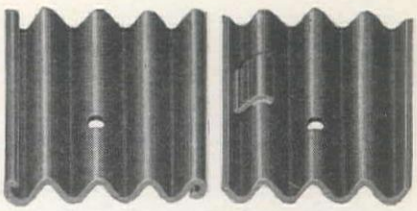
☆ ☆ ☆

A policy of local distribution has been instituted by the EUTECTIC WELDING ALLOYS CORPORATION, New York City, to meet increasing demand for Weldrods and Electrodes. Authorized distributors are being appointed to handle this line of welding rods and fluxes, with territories open to established supply dealers. To further stimulate dealer sales, the company is devoting much of its promotion work to acquainting new users with Eutectic unique qualities.

☆ ☆ ☆

Net earnings of $1,198,948 for 1946, after all charges and estimated taxes were made public by the RHEEM MANUFACTURING CO. in its 17th annual report. This compares with 1945 net earnings of $1,498,414, and is equal, after provision for preferred dividends, to $1.06 per share on 1,000,000 common shares outstanding December 31, 1946, compared with $1.82 per share on 800,000 shares outstanding December 31, 1945. Though far below the 1945 wartime peak of $91,309,854, the 1946 sales were almost four times the $10,351,013 of pre-war sales reported for 1940, declared **R. S. Rheem,** company president. Net sales for 1946 were $39,268,335, of which $22,539,245 represented appliances and $16,729,090 steel shipping containers.

NEW EQUIPMENT



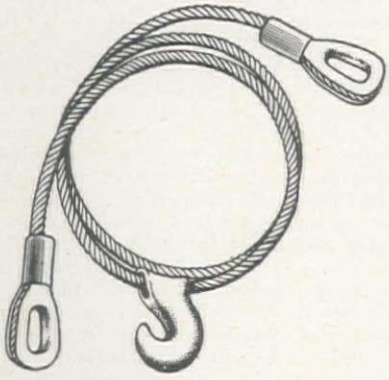
MORE COMPLETE information on any of the new products or equipment briefly described on these pages may be had by sending your request to the Advertising Manager, Western Construction News, 503 Market Street, San Francisco 5, California.

Light Weight Heavy Duty Cable

Manufacturer: Wire & Cable Division, Wind Turbine Co., West Chester, Pa.

Equipment: All-purpose light weight cable.

Features claimed: Made of flexible wire rope, the Bulldozer Tenton All-Purpose cable has a minimum breaking strength of 20,000 lb., and is only 1/5 the weight of chain of equal strength. It will handle



4,000-lb. loads safely under all towing conditions, and heat treated aluminum alloy thimbles as well as Pres-Tite cable connectors holding them, are rustless. Each thimble will fit through the other, thus permitting the cable to be used either as a slip noose or as an ordinary tow cable. If desired, it is also furnished with a sliding choker hook. The cable comes in standard lengths of 10, 12, 15, 20, 25, and 35 ft. It is ½-in. 6 x 19 improved plow steel wire rope, galvanized against rust.

Two-Wheel Scraper

Manufacturer: American Tractor Equipment Corp., Oakland, Calif.

Equipment: Two-wheel scraper for wheel tractor.

Features claimed: Designed for high-speed use with large wheel tractors, this new scraper is made in 3 sizes—H52 (4.5 heaped yds.); H62 (5.6 heaped yds.); and

H72 (6.9 heaped yds.)—for International 9, Oliver 900, and other heavy-duty tractors. Outstanding features include a low center of gravity, independent front apron, and a rear apron that wipes the scraper bowl sides clean as load is dumped. Pulling tractor carries part of the scraper load, since a special hitch assembly eliminates the front trucks of the scraper. Self-loading and self-spreading, travel speed is limited only by the speed of the tractor.

Steel Piling Using Alloy Steel

Manufacturer: Caine Steel Co., Chicago, Ill.

Equipment: New alloy steel used in Caine Corr-Plate steel piling.

Features claimed: Addition of the new alloy to the Caine Corr-Plate Steel Piling claims to make it 25 per cent stronger than the same piling made of mild steel. It is also said to have double the corrosion resistance and thus an indicated life of twice that of mild steel piling. The new alloy used has been approved by highway departments and U. S. Engineers.

New Timber Grip

Manufacturer: Oliver Iron and Steel Corp., Pittsburgh, Pa.

Equipment: Timber grip for railroad ties and laminated timber.

Features claimed: The Oliver Timber Grip consists of two interlocking steel members, and claims to provide a simple means of preventing ties from opening up or splitting, and also for holding closed any timber already cracked or split. The two interlocking steel members are inserted from opposite sides of a timber in a prebored hole. Toothed ends of the grip members are caused to engage. The grip will withstand a 5000-lb. pull stress. Variation in widths of timber is accommodated since engagement of all the teeth is not necessary. For laminated construction, grips are used as stitch bolts to hold separate timbers together. Grips are made to fit timbers up to 12 in. in width.

Battery Preservative

Manufacturer: Pioneers, Oakland, Calif.

Equipment: Protecto-Charge, a disulphating and paste preservative.

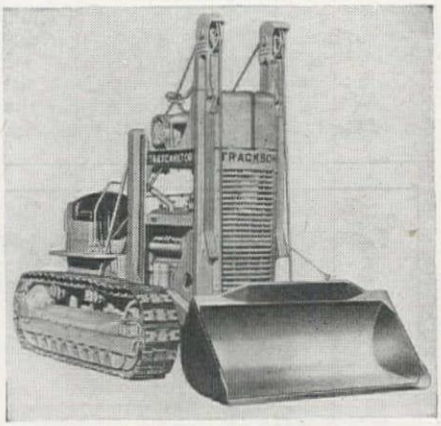
Features claimed: By treating a battery with Protecto-Charge sulphation is eliminated from the plates, 90% of the mud is picked up from the bottom of the battery and held harmlessly in solution, and much less battery water is required; the battery will run 3 to 4 times longer without recharging, and accept a new charge more readily. The treatment lessens the danger of split separators and buckled plates, and prevents corrosion around battery posts; also lessens load on the generator by giving more energy output to the battery. It is claimed that seven out of ten batteries with one, two, or three dead cells (if not broken) can be reclaimed and made to serve many more months. New batteries, when treated, will last much longer and operate with greater efficiency.

New Tractor-Excavator

Manufacturer: Trackson Company, Milwaukee, Wisc.

Equipment: The new T6 Traxcavator.

Features claimed: With this latest addition, the Trackson Co.'s line of tractor-excavators has been expanded to four for



four sizes of "Caterpillar" track-type tractors ranging from ½ to 4 cu. yd. The T6 is for use as a unit with the "Caterpillar" D6 tractor, and have buckets of 1½ or 1¾ cu. yd. rated capacity. It will load big hauling units or small dump trucks with equal ease, and combines the usefulness of a shovel, loader, scraper and bulldozer.

Colored Joint Sealing Compound

Manufacturer: Servicised Products Corp., Chicago, Ill.

Equipment: Hot-poured rubber seal in colors.

Features claimed: Colored Para-Plastic, the original Hot-Poured rubber seal, is now available for waterproofing material. In addition to the black, the colors green, red, gray, cream and yellow Para-Plastic are now available. With the introduction of these new colors, new uses are expected to result for this seal which conforms to Federal specifications and is used to seal expansion joints in all types of concrete construction.

Cement Carrier

Manufacturer: Hercules Steel Products Corp., Galion, O.

Equipment: Bulk cement carrier.

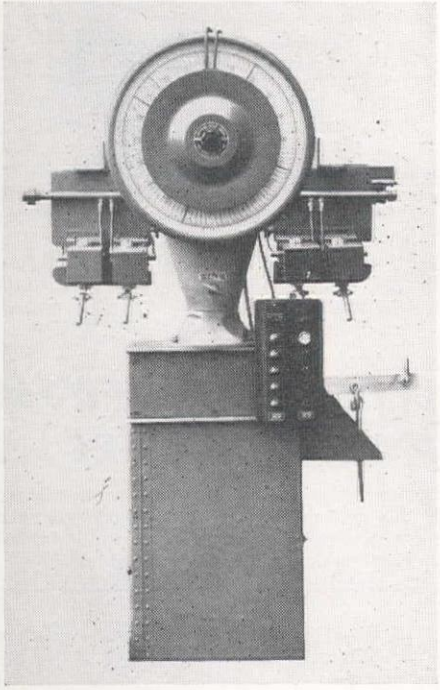
Features claimed: The new Model 100-B transports a load of from 100 to 110 barrels of dry cement and is powered to discharge the full load in four minutes. Three manhole filler openings are incorporated in the body of the new Hercules cement carrier, each with a hinged cover with manual locking device and fitted with a tubular rubber gasket. Discharge door at rear end of the body is equipped with a circular door, also fitted with a rubber gasket to prevent leakage. A threaded shaft which is turned by a large handwheel operates this door, thus offering control of the rate of discharge. Power unit is a Wisconsin air-cooled four-cylinder gasoline engine, and the carrier is mounted on a trailer.

Weigh Batching Unit

Manufacturer: Conveyor Company, Los Angeles.

Equipment: New automatic weigh batching machine.

Features claimed: The Conveyco Electronic Weight Control Unit, designed for use on all batchers, ready mix plants and asphalt hot plants, operates around standard electrical equipment and uses a dial scale with single indicator hand and one photo-electric cell. Entire electrical system



is located in a small removable panel on the base of scale. An ingeniously guided light beam transfers the signal to the photo-electric eye activating batcher bin gates for each kind of material as the arm on the dial scale reaches pre-selected weights. Adjustment of weights for each type of aggregate is made from the front of the dial. Adaptable to either semi-automatic or fully automatic batching, a change to manual operation may be made at any time by throwing a switch.

Powered Closing Arms

Manufacturer: Fleming Steel Co., New Castle, Pa.

Equipment: Device to close large and small swing type crane doors.

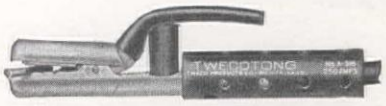
Features claimed: This new design insures positive power closing of large and small swing type crane doors, and does away with the difficulty encountered with doors of this type which are closed only by the force of gravity. Built in combination with a 14-ft. wide x 18-ft. high motorized slide door, which permits passage of the crane load and railroad cars, the illustration shows a crane door 83 ft. wide x 10 ft. high, recently installed at the car repair plant of the North Pacific Railroad at Brainard, Minn. In operation, the lower door slides completely to the right where it engages a combination interlock. This unlatches the upper door which is then swung up into open position by means of six heavy duty cables. Operations are automatically reversed in closing.

Electrode Holder

Manufacturer: Tweco Products Co., Wichita, Kans.

Equipment: No. A-316 Twecotong electrode holder.

Features claimed: A smaller companion to the A-14 and the A-38 holders, the A-316



features light weight, compactness, and ease of operation with a 95-lb. bite on a 3/16-in. electrode. Tip and body insulation is molded laminated glass cloth Bakelite and uses the "Tubular-keyed" Tweco design.

General specifications are: Capacity 1/16-in. through 3/16-in. electrodes; 250 amperes; weight, 18 oz.; length, 9 in.; palm span 2¾ in.

Odorless Sanitary Cleaner

Manufacturer: Gorman-Rupp Co., Mansfield, Ohio.

Equipment: Odorless sanitary cleaner unit.

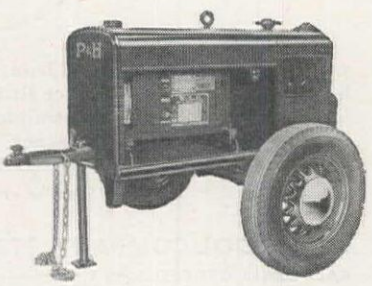
Features claimed: Consisting of an 1100 gal. steel tank served by a new Gorman-Rupp self-priming, centrifugal sewage pump and driven by a 20 hp., 4 cylinder Wisconsin air-cooled gasoline engine, the new odorless sanitary cleaner promises to be a great boon to public living outside the city sewer service limit. The entire unit mounts on any standard truck chassis of 158 to 161 in. in length. The O.S.C. operator then backs his truck near the open septic tank, and the fluid in the septic tank is drawn into the pump and jetted back into the septic tank until all solids are held in suspension. Then by turning a valve the contents of the septic tank are quickly pumped into the truck tank. A versatile machine, the O.S.C. unit may also be used for street flushing, race track sprinkling, emergency fire fighting, dewatering flooded basements or hauling water for concrete construction work.

Portable Welder

Manufacturer: Harnischfeger Corp., Milwaukee, Wis.

Equipment: New portable welder.

Features claimed: This self-powered arc welder, designed for shop, yard and field service, is an N.E.M.A. rated machine of 200 amperes. The P&H Model WN-200 Welder, which is available at a stationary or trailer unit, also has a Welding Service Range of from 30 to 260 amperes. Both types have engine and welder securely mounted on an all-welded frame of steel



P&H Model WN-200
Trailer Welder

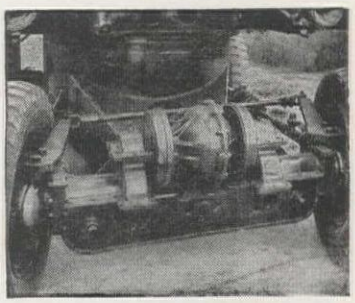
tubing and heavy angle iron. The skid model is ideal for carrying on trucks. A large lifting eye for crane lifting is provided. The trailer model welder has standard size pneumatic tires, running reflectors on the trailer body, and a ball and socket hitch and safety chains. Both models are equipped with the square frame arc welding generators, having a Welding Service Range of from 30 to 260 amperes.

Hydraulic Steering Addition

Manufacturer: Wayne Crane Division, American Steel Dredge Co., Inc., Ft. Wayne, Ind.

Equipment: Addition of hydraulic steering to Wayne equipment.

Features claimed: All crane units used as a shovel, trench hoe, dragline, clamshell or crane are now being manufactured with hydraulic steering. Hydraulic assembly is equipped with a Vickers pump. A lever control operates a 4-way valve which includes a built-in relief valve. The 4-gal. hydraulic fluid tank with the Vickers filter



and pump has a capacity of 4 g.p.m. at 1,000 lb. with the relief valve set at 500 lb., and operates at a normal pressure of 250 lb. The new steering is claimed to be especially helpful in digging basements, short-stub sewers, and for close maneuvering in material handling yards.

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.

ELECTRIC FISH SCREEN—**Electric Fish Screen Co.,** Los Angeles, Calif., recently released a booklet entitled "Stopped." The simplicity of their equipment and its application in the control of fish are illustrated and concisely described. It also covers the ability to fence off a section of a stream, the outlet of a lake, or a power intake, so that fish cannot pass, yet permits the passage of water and debris.

BUILD WITH WOOD—**Timber Engineering Co.,** Washington, D. C., has recently released a new 40 page pictorial booklet featuring peace-time building with wood, entitled "Modern Building with Wood." The booklet presents to the architect, engineer, contractor and builder a wide range of light and heavy frame wood structures employing the Teco connector type of construction, Lamella construction, and glued laminated construction. A number of well-designed, small prefabricated homes are illustrated as well as beautiful church interiors and exteriors, amusement places, stores, towers of various types, overpasses, ship keels and various research jobs.

NEW MODEL TRACTORS—**Caterpillar Tractor Co.,** of Peoria, Ill., has published two folders describing the power and work features of the new more powerful Caterpillar Diesel D6 and D4 Tractors. Outlining the design and manufacturing features which have brought increased power to the two tractors and increased earning capacity to users, the folders include specifications of the machines and graphic illustrations of their physical makeup.

LIGHTWEIGHT TIRE PUMP—**The Gorman-Rupp Co.,** Mansfield, Ohio, has sent off the press three new bulletins describing and illustrating the new lightweight pump for liquid-filling tractor, implement and construction equipment tires.

These pumps will evacuate tires of liquid or air and then fill with water or calcium chloride solution as recommended by tire manufacturers. Bulletin No. 6TF-11 fully describes both the electric motor driven and the gasoline engine driven tire filling pump. Complete instructions on its use and operation as well as tire liquid capacity charts and calcium chloride solution charts are contained in Bulletin 7TF-21 for electric driven and 7TF-22 for gasoline driven pump.

PORTABLE POWER SAW — **Nordberg Manufacturing Co.** of Milwaukee, Wis., describes in Bulletin 132, the new Nordberg-Buday Portable Power Saw, and outlines its uses and advantages. This four-page bulletin, printed in color, is illustrated with pictures showing capacity, and various cuts that can be made without rehandling the lumber. Operating features, specifications and weights are also given.

TYPE 71 — **The Osgood Company,** Marion, Ohio, has issued an amply illustrated, 12-page color booklet describing the Type 71 air control shovels, cranes, draglines, clamshells and backhoes. Special attention is given to the air control mechanism, live boom hoist, deck machinery and the crawler.

MECHANICAL SCREEN — **Gilson Screen Company** of Mercer, Pa., has released a brochure describing the advantages of the Gilson mechanical testing screen. The screen has been designed for efficient sizing of test samples of crushed stone, gravel, slag and similar materials. To meet the current demand for controlled aggregates and concrete products it provides a rapid testing method which will be of interest to those who are not satisfied with hand methods. Also recently perfected is a sand attachment which uses standard 8-in. dia. testing sieves in conjunction with the vibrating unit.

PRECISION FILES—**Grobet File Co. of America,** New York, N. Y., has just released a 24-page, tabloid catalog. This purchasing guide and reference booklet lists 3,566 different patterns, sizes and cuts of hand and machine files and rifflers, not counting Grobet rotary and deburring files and countersinks which are also described. A great many of the different styles of Swiss hand files are illustrated and it is a very simple matter for the customer to select the style or pattern, size and cut desired for his purpose.

ROOFS FOR PETROLEUM—**Graver Tank & Mfg. Co., Inc.,** East Chicago, Indiana, have made available an 8-page, illustrated bulletin titled "Vapor Saving Roofs." The floating roof, an improved double deck design, for more complete volatile product conservation, is recommended for the wide range of single or multiple tank installations where filling losses greatly exceed standing or breathing losses. Floating roof accessories which may be supplied are: flexible drain, emergency drains, and automatic float gauge. The expansion roof will prevent all breathing or standing losses, and in addition, when vapor volumes are balanced during filling and emptying operations, will eliminate filling losses as well.

DIESEL ELECTRIC SETS — **Caterpillar Tractor Co.,** Peoria, Ill., has published an 8-page color booklet enumerating applications of electric sets in construction, manufacturing, hatchery, business and domestic fields. It shows sets producing lighting facilities and powering tools in vast construction projects; sets powering industries and serving laundries, service stations, restaurants, ice plants and tourist cabins.

HYDROCIDE COLORLESS—**L. Sonneborn Sons., Inc.,** New York, tells the story of Hydrocide Colorless, an invisible water-repellent treatment for exterior concrete and masonry building walls above grade. It helps to preserve the original appearance of building exteriors by checking the absorption of dust, soot and dirt. Comparative test data are included in the folder. Results of water-repellency tests made on concrete, masonry and Celotex are also included. Application data and coverage figures are given.

CAUSTIC SODA — **Pittsburgh Plate Glass Company,** Columbia Chemical Division, Pittsburgh, Pa., has recently sent off the presses an elaborate 72-page text designed for use by technical men, buyers and executives, operations men, engineers and students or laymen who are interested in acquiring pertinent data about Caustic Soda. The book is printed in three colors throughout and contains many useful graphs, charts and diagrams as well as being profusely illustrated with descriptive photographs.

"HIGHWAYS AHEAD" — A MOTION PICTURE — **Caterpillar Tractor Co.,** Peoria, Ill., is presenting a film intended to awaken the public to a need for maintaining and building superior roadways. Entitled "Highways Ahead", in 16mm full color with sound, the picture successfully incorporates beauty and education in a way that is surprisingly pleasing and different. The theme of the picture is the close conjunction of our national roadway system with the development of trade

and travel throughout the nation. The famed Pulaski Skyway in New Jersey and the Pennsylvania Turnpike are used to show how some of our highway problems can be solved. The importance of safety and efficiency in our future highway construction is stressed throughout the picture.

RAILROAD ARC WELDING — **Hobart Brothers Company** of Troy, Ohio, has just published a color folder giving information concerning their railway welders, the Weldmobile and the Rail-type Welder. Action photographs of the welders show how they may be used to weld frogs, repair freight cars, as well as putting hopper covers on cars for dry bulk commodities, or strengthening bridges, and for general maintenance in and around the shop.

WORTHINGTON PRODUCTS — **Worthington Pump and Machinery Corporation,** Harrison, N. J., has published three booklets, editorially and pictorially describing the functions, types and giving specifications and dimensions of the Air King compressors, the Blue Brute wagon drill and Blue Brute drifter, and the different types of air and gas aftercoolers.