WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED
WESTERN HIGHWAYS BUILDER

PUBLISHED MONTHLY
VOLUME XXIV, No. 5

MAY 15 • 1949

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$4.00 PER YEAR

IN THIS ISSUE

SPRING THAWS have begun the snow-melt to swell run-off in this small stream on an Oregon watershed. For analytical forecast of the amount and distribution of the runoff in each Western state for 1949, turn to page 71.

NUTE, J. WARREN
1711 LINCOLN AVE.
SAN RAFAEL, CALIF.
2A-A-3-54

CHASSIS PARTS LAST LONGER

AND maintenance costs come down when you lubricate with long-lasting Texaco Marfak

HEAVY loads won't squeeze *Texaco Marfak* out of bearings. Rough service won't jar it out. *Texaco Marfak* seals out dirt and road splash, keeps rust-forming moisture off metal. Bearings get full protection, parts last longer, maintenance costs less.

In wheel bearings, *Texaco Marfak Heavy Duty* is the stay-on-the-job lubricant to use. It seals itself in, seals out dirt, protects against rust. It won't leak onto brakes . . . requires no seasonal re-packing. *Texaco Marfak Heavy Duty* will save you many a wheel bearing replacement . . . sharply reduce your maintenance costs.

The line-up of Texaco lubricants for contractors' equipment also includes *Texaco Ursa Oil X★★*, designed to keep Diesel and heavy-duty gasoline engines clean . . . and *Texaco Track Roll Lubricant* to give rollers extra protection against dirt and moisture.

Use Texaco's Simplified Lubrication Plan to get better, more economical performance from *all* your equipment. A Texaco Lubrication Engineer will gladly tell you about it. Just call the nearest of the more than 2300 Texaco Wholesale Distributing Plants in the 48 States, or write The Texas Company, 135 East 42nd Street, New York 17, New York.

MORE THAN 300 MILLION POUNDS OF TEXACO MARFAK HAVE BEEN SOLD!

HIT IT! *Marfak* won't splatter like ordinary chassis grease — proof that it stays in the bearings under heavy loads and pounding service.

STRETCH IT! *Marfak* holds together where ordinary grease comes apart — proof that it can't work out of bearings, gives longer-lasting protection.

RUB IT! See how *Marfak* liquefies under friction while retaining its tough outer "collar" — proof that it seals itself in, seals out dirt and moisture.

TEXACO

TEXACO Lubricants and Fuels

FOR ALL CONTRACTORS' EQUIPMENT

Tune in . . . TEXACO STAR THEATRE every Wednesday night starring Milton Berle. See newspaper for time and station.

ANOTHER ROCK SHOVEL for EATON & SMITH!

12

Eaton & Smith can tell you about Rock digging. They have had plenty of it. Performance in rock digging is one of the reasons why they have just bought their 12th Northwest.

There is no better testimonial than a repeat order from a successful outfit like Eaton & Smith and you can base your future plans on the opinions and experience of people like them. You can check this clear across the country! Note the names of successful contractors, large and small. Note how many of them are repeat order buyers of Northwest equipment based on high type service and low cost operation.

You are planning ahead. You can't afford anything but the best for the heart of your job. Why not place your order and be sure of a *real* Rock Shovel for the *Key Spots* where profit begins.

NORTHWEST ENGINEERING COMPANY
135 South LaSalle Street, Chicago 3, Illinois

Twelve Northwests for Eaton & Smith San Francisco, California

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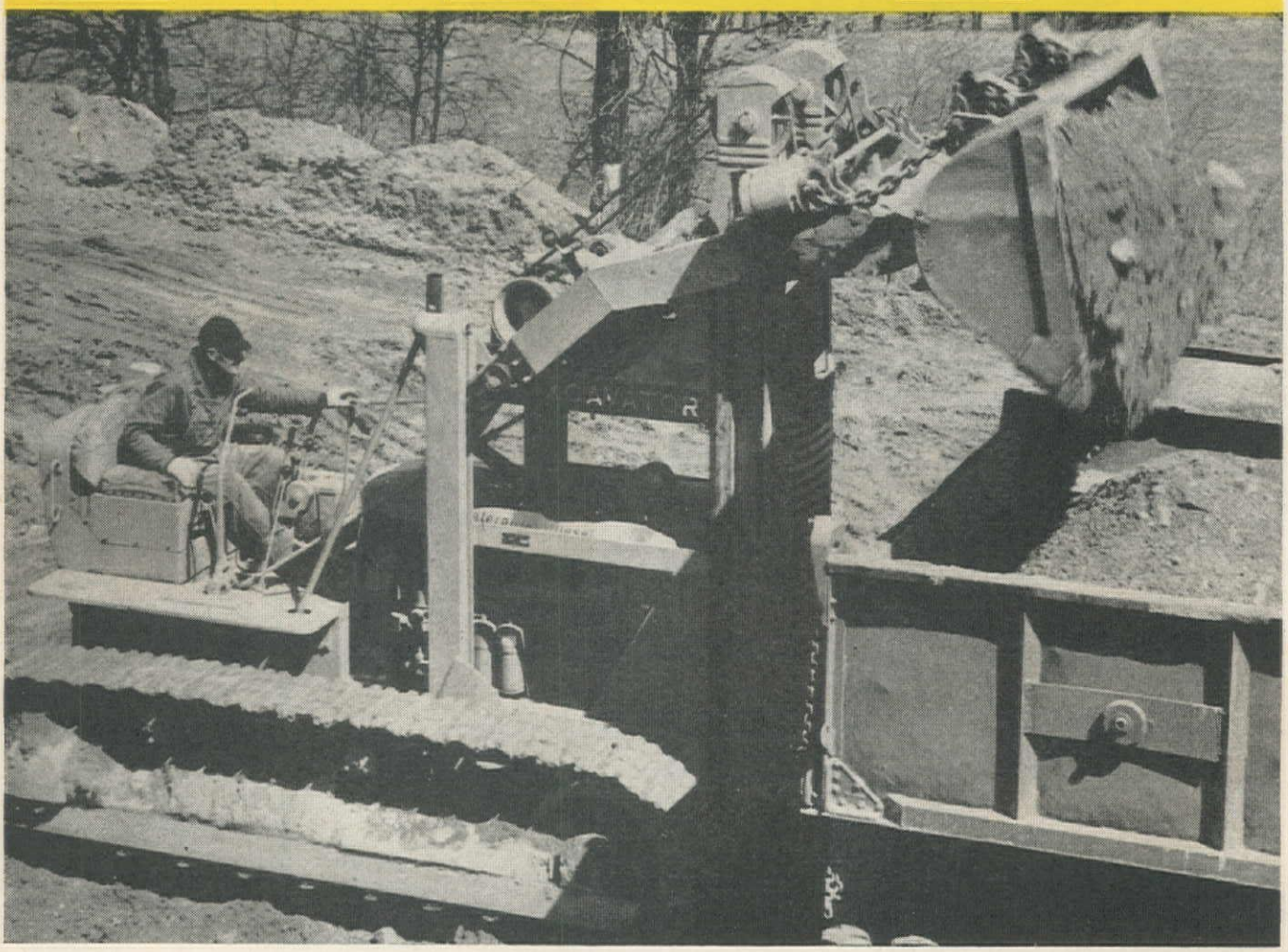
MORE WORK . . . MORE UTILITY . . . MORE PROFITS



You get more for your equipment dollar with TRAXCAVATORS doing all your digging, loading, carrying and grading work — they have the extra stamina and speed that gets more work done in less time and produces more profits on more jobs. Whether they're excavating basements, grading housing sites or loading trucks with bulk material, TRAXCAVATORS give you maximum efficiency and unlimited versatility at all times — the ability to handle any assignment under the toughest conditions.

TRAXCAVATORS are built in sizes to fit every job and purpose — with bucket capacities from ½ to 2½ cubic yards. Every TRAXCAVATOR is engineered to match the power and speed of the rugged "Caterpillar" track-type tractor on which it's mounted. Bulldozer Blade and ANGLEGRADER attachments are also available to further increase TRAXCAVATOR's usefulness. Call on your TRACKSON-"Caterpillar" dealer for complete details or write to the TRACKSON COMPANY, Dept. WC-59, Milwaukee 1, Wis.

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REG. U. S. PAT. OFF.

The Original Tractor Excavator

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WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

Volume 24 | MAY 15 • 1949 | Number 5

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Covering Construction in the Western Half of the United States

Cut Costs

Not tied down to specialized duty –

LOADING FROM PIT

LOADING SNOW

PLOWING SNOW

WINCH AND HOIST WORK

PULLING SCRAPERS

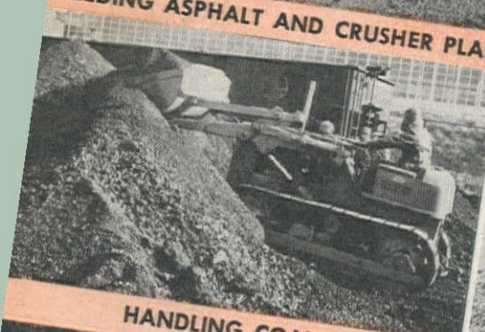
CLEARING

FEEDING ASPHALT AND CRUSHER PLANTS

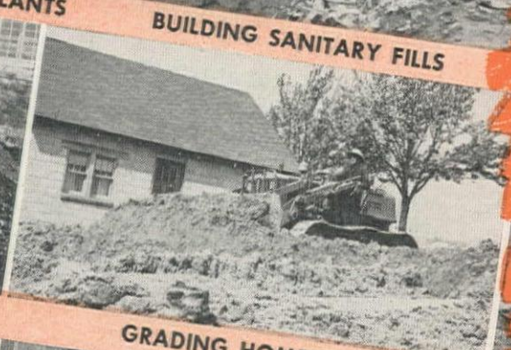
BUILDING SANITARY FILLS

A *Great Tractor* WITH A GREAT ALLIED LINE

Available with fully matched Baker, Gar Wood and Carco bulldozers . . . Drott Skid-Loader . . . Baker snowplow . . . Gar Wood scraper . . . Carco winch . . . Tractomotive Tracto-Shovel with interchangeable attachments—1 cu. yd. standard bucket, ¾ cu. yd. narrow bucket, 2 cu. yd. light materials bucket, 1 cu. yd. rock bucket, 1 cu. yd. magnesium bucket, teeth for all buckets, heavy-duty bulldozer blades (narrow and wide) and V-type snowplow.



HANDLING COAL



GRADING HOMESITES

FLOOD CONTROL

LIFTING WORK

CLEANING BEACHES

On All Kinds of Work.

WITH THE VERSATILE ALLIS-CHALMERS HD-5

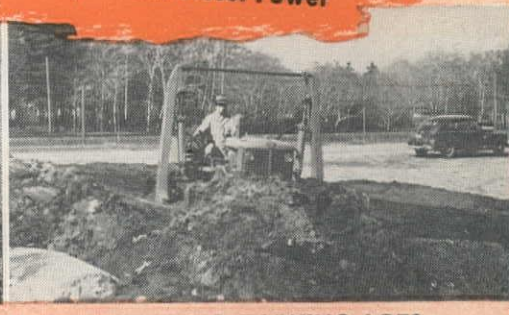
Completely New IN DESIGN

- New Performance . . .
- New Work Capacity . . .
- New Simplified Servicing
- Weighs 11,250 lbs.
- Provides 40.26 drawbar hp., 50.25 on belt
- 2-Cycle GM Diesel Power

- Yet gives special performance on every job

HANDLING TIMBER, LUMBER, ETC.

BACKFILLING

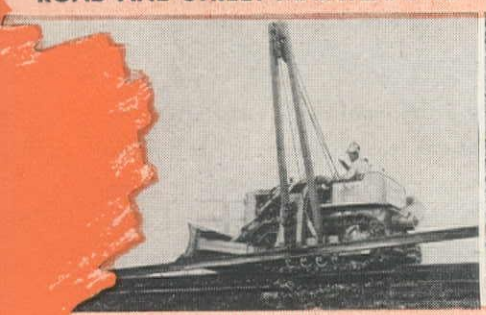


GRADING PARKING LOTS

ROAD AND STREET MAINTENANCE

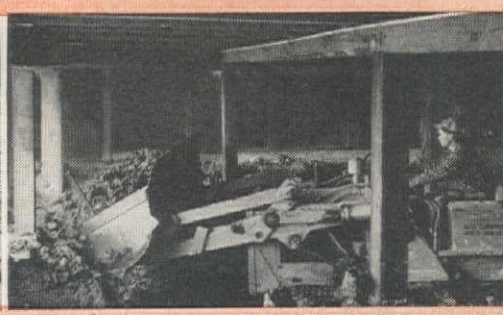
MATERIAL HANDLING

INDUSTRIAL PLANT WORK



CRANE WORK

LOADING ROCK



TUNNEL AND SUBWAY EXCAVATION

DIGGING BASEMENTS, CULVERTS, ETC.

LANDSCAPING AND STRIPPING

UNDERGROUND MINING

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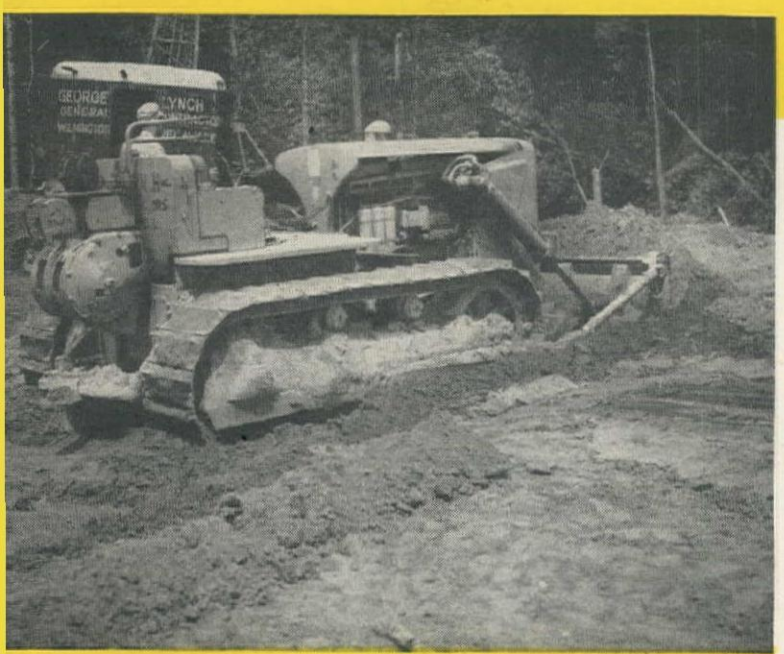
"Caterpillar"



This D8 Tractor with hydraulic-controlled No. 8S Bulldozer, owned by George & Lynch, Inc., Wilmington, Del., is working on a road near Cambridge, Md.

A "Caterpillar" Diesel D8 Tractor with cable-controlled No. 8S Bulldozer at work on a highway at Davis Dam, Arizona. Owned by Utah Construction Co., Kingman, Arizona.

MOVE

THERE are five good reasons why "Caterpillar" Bulldozers — cable or hydraulic controlled — regularly out-produce other units and get the call from owners everywhere.

1 The blade is scientifically curved to keep material rolling smoothly ahead. "Caterpillar's" long experience with motor grader blades helped in its design. It's a lot easier to *roll* dirt than to push it.

2 Controls (cable or hydraulic) give the operator instant, accurate control of the cut. No time is wasted in spinning tracks or excessive lugging down. Only "Caterpillar" cable control has multiple-disc, metallic-lined clutches for easy engagement and disengagement. There's no clutch drag.

3 Angling, tilt and tip adjustments are easy to make — a quick, one-man job for the operator.

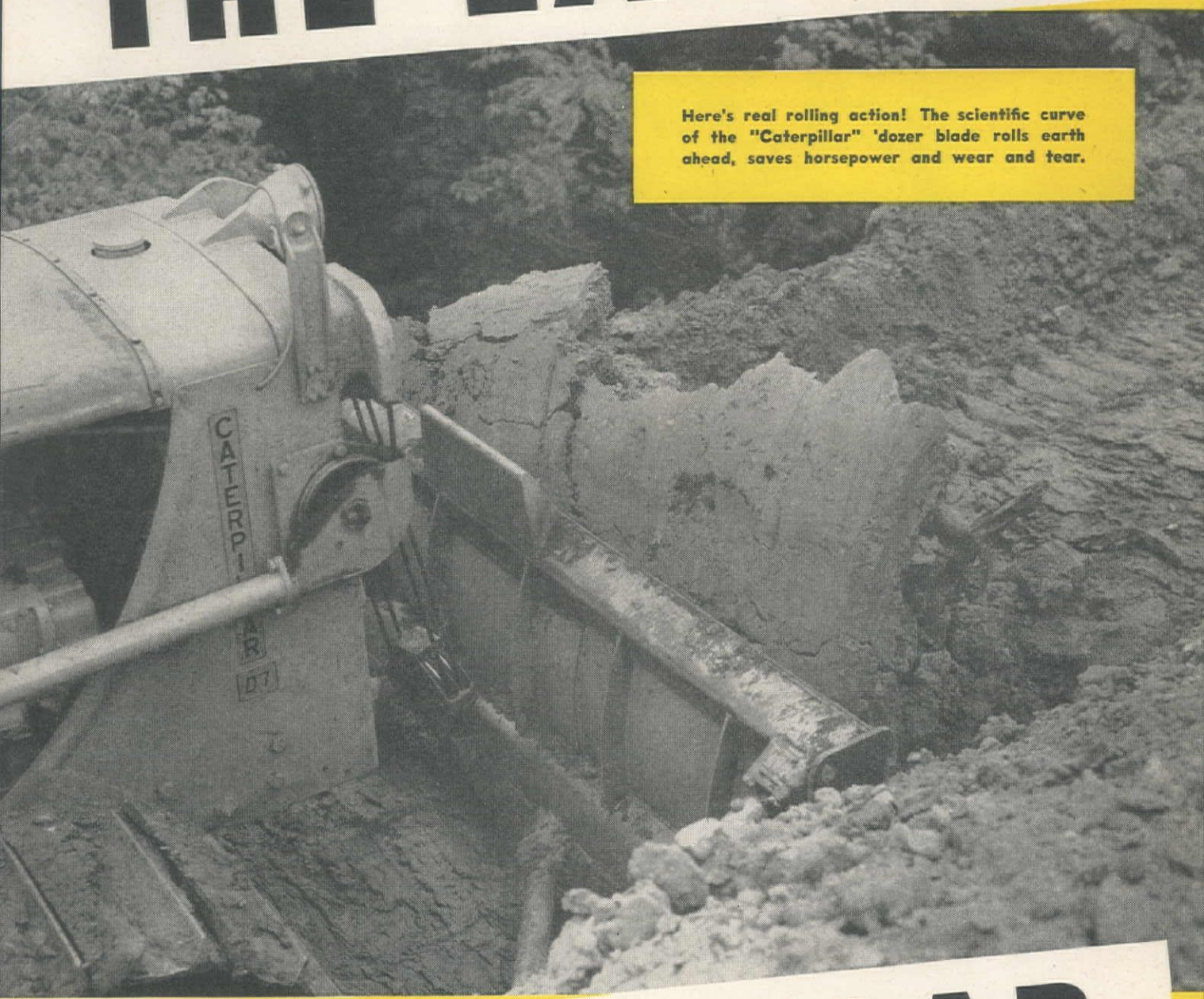
4 There's long life in every blade. "Caterpillar" pays up to 30% premium for the high tensile steels that go into these 'dozers.

5 No overhead frame to interfere with visibility. The operator has a full view of the job.

Your "Caterpillar" dealer is as near as your telephone. He can advise you on your bulldozer needs, and he can get 'dozers for quick delivery. It will pay you to get your order in today.

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

'Dozers THE EARTH



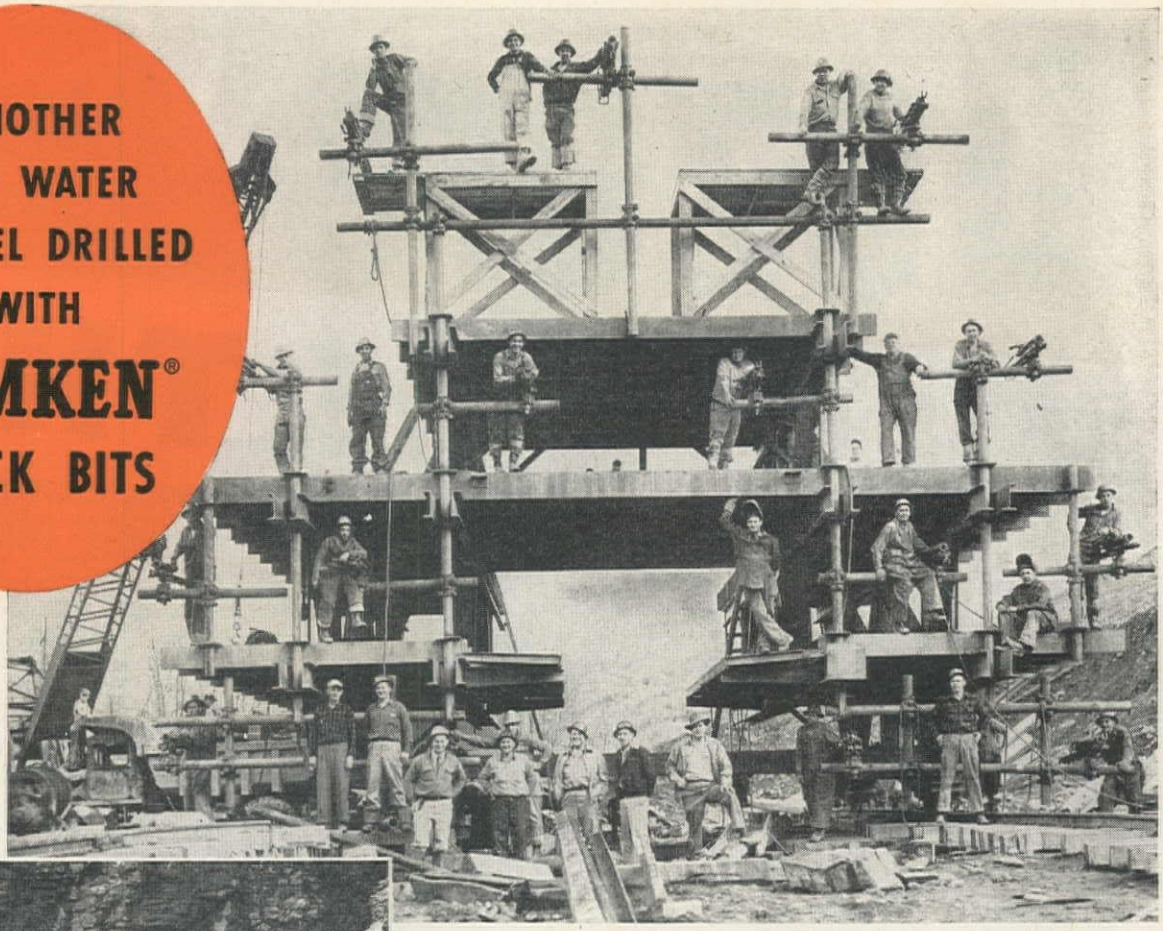
Here's real rolling action! The scientific curve of the "Caterpillar" 'dozer blade rolls earth ahead, saves horsepower and wear and tear.

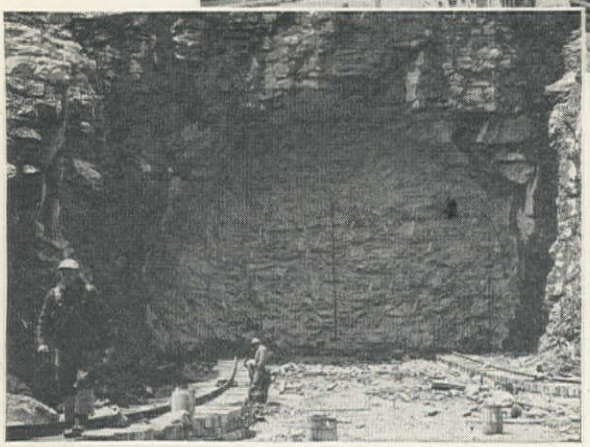
CATERPILLAR

REG U S PAT OFF.

DIESEL ENGINES • TRACTORS • MOTOR GRADERS • EARTHMOVING EQUIPMENT

ANOTHER BIG WATER TUNNEL DRILLED WITH TIMKEN® ROCK BITS





Photographs courtesy Gardner-Denver Company, Quincy, Illinois

Walsh-Perini Construction Company, Downsville, New York, recently completed the drilling of one of the largest rock tunnels ever constructed — the largest since the construction of the Hoover dam.

This big water diversion tunnel is 2,200 feet long. It is part of a $13,700,510 project to bring water from the East branch of the Delaware river to New York City. 165,000 cubic yards of rock were excavated in the construction of the tunnel.

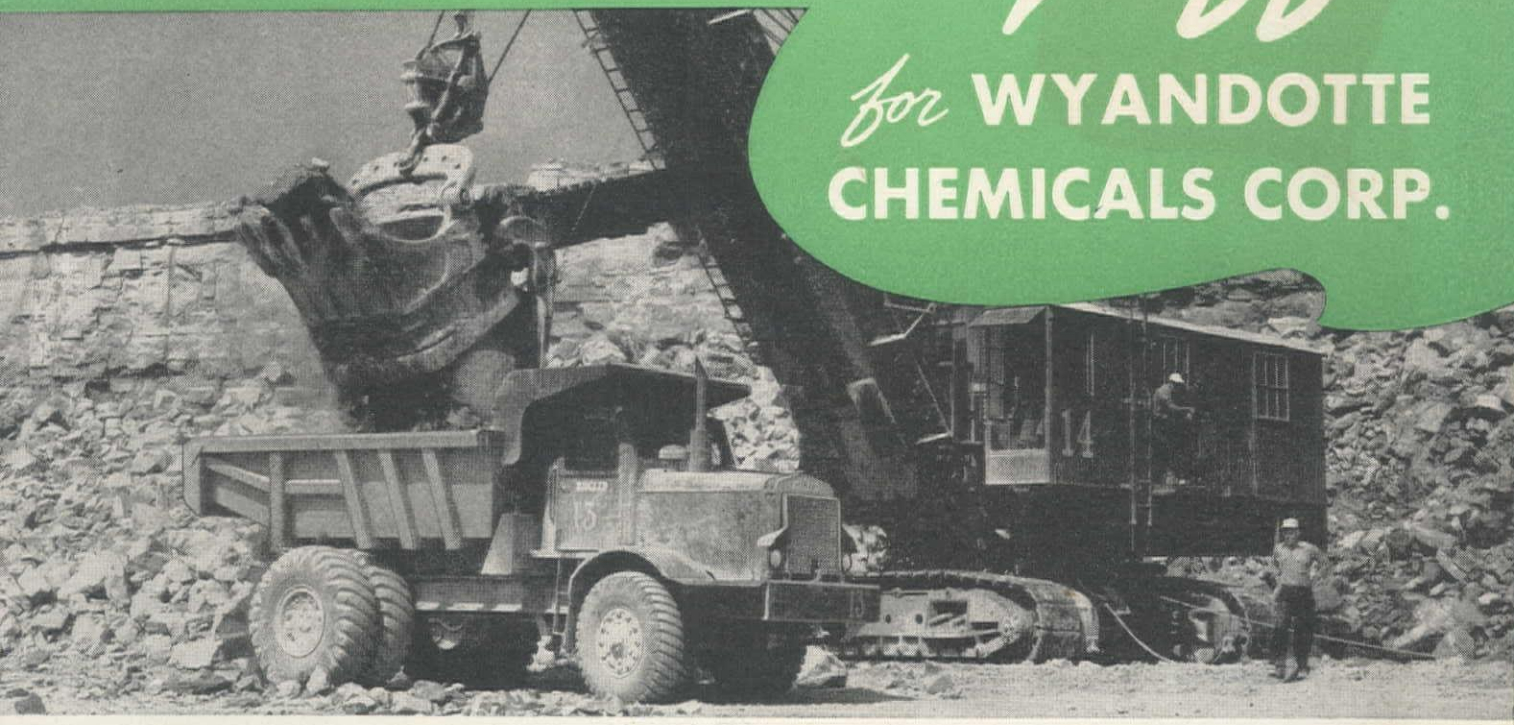
Top heading was drilled with Timken Rock Bits in Gardner-Denver CF99N Automatic Feed Drifters. The drifters, 20 in number, were mounted on the world's largest jumbo. The 17 ft. bench was drilled with Timken Bits in 8 Gardner-Denver D99D Wagon Drills. In finishing the job within the time set, the contractor has expressed complete satisfaction with the performance and economy of Timken Bits.

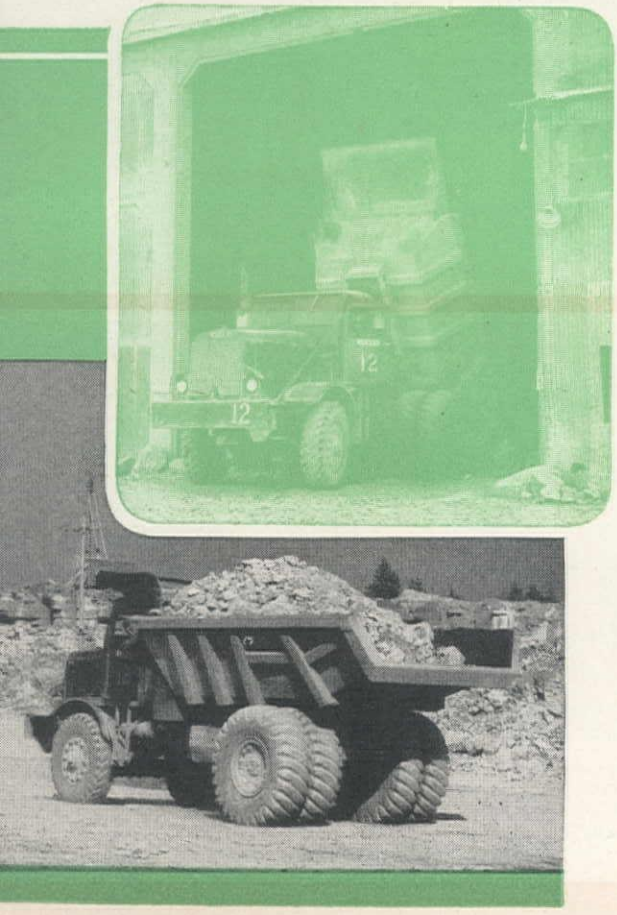
TIMKEN
TRADE-MARK REG. U. S. PAT. OFF.
ROCK BITS

THE TIMKEN ROLLER BEARING COMPANY, CANTON 6, OHIO - CABLE ADDRESS "TIMROSCO"

"EUCS" Pay Off

for WYANDOTTE CHEMICALS CORP.





At Alpena, Mich., Wyandotte Chemicals Corporation operates one of the world's largest limestone quarries — another job where "Eucs" are paying off by doing more work at less operating and maintenance cost.

Thirteen Rear-Dump Euclids of 22-Ton capacity replaced an electric haulage system for moving the rock from quarry to plant. Operating two shifts per day and six days per week, the "Eucs" haul approximately 800 tons per hour. The round trip averages 1¾ miles, with a maximum grade of 4 per cent. The "Eucs" are loaded with stone by shovels of 5 and 6 yd. capacity, and are used for removing overburden during winter months.

Wyandotte standardized on Rear-Dump Euclids because of their proved dependability and efficiency in mine and quarry operations. Their large capacity and fast travel speeds have increased production and lowered hauling costs at Alpena.

Euclid equipment has proved profitable for hundreds of owners on a wide range of off-the-road work. Your Euclid Distributor or Representative will be glad to discuss your requirements and show you how Euclids can do a better job for you.

The EUCLID ROAD MACHINERY Co., Cleveland 17, Ohio

EUCLIDS *Move the Earth*

NO time-out for CLUTCH ADJUSTMENTS

KOEHRING DUMPTORS* have the same heavy-duty qualities and big-production ability as Koehring excavators . . . combined, they give you matched excavating-hauling efficiency. Rugged 6-yard rock body . . . plus a ton of Dumptor strength for every ton of payload, withstand severest shocks of shovel loading and roughest off-road hauling. Constant-mesh transmission and 3 fast speeds, forward and reverse, provide no-turn shuttle hauling. 1-second gravity dump saves more time every trip.

*Trademark Reg. U. S. Pat. Off.

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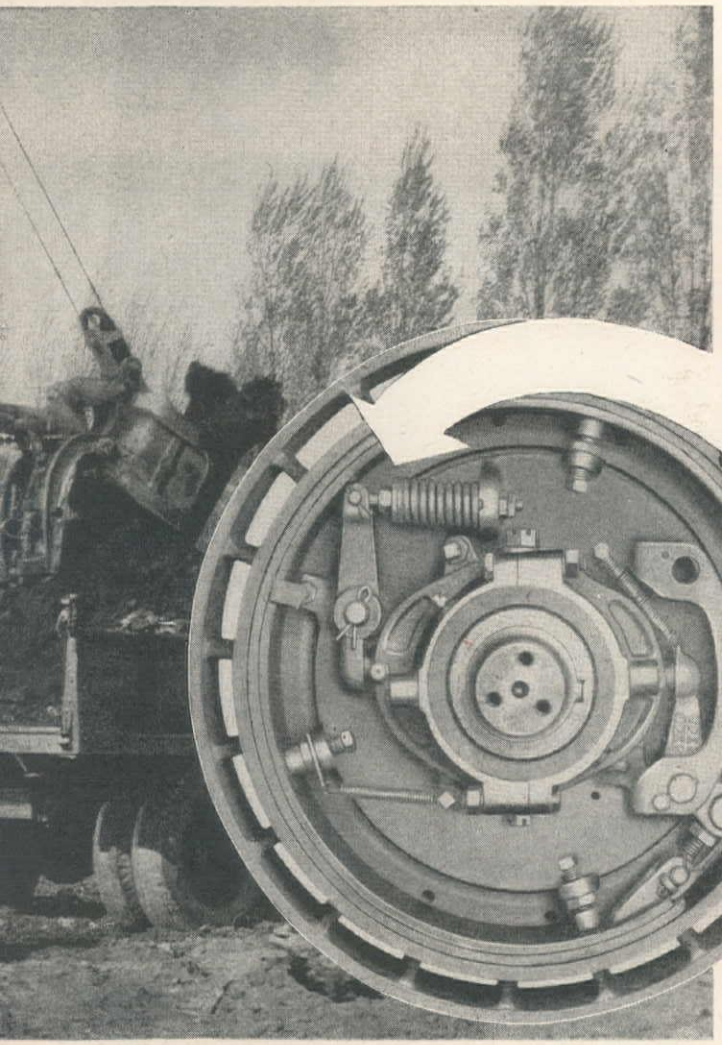
Bay Cities Equipment, Inc.
Oakland, Calif.

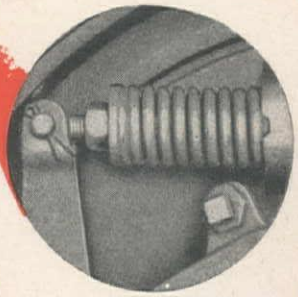
The Harry Cornelius Co.
Albuquerque, N. M.

Neil B. McGinnis Co.
Phoenix, Arizona

with KOEHRING HALF-YARD 205



HEAT COMPENSATOR SPRING CHANGES TENSION . . . *Automatically!*



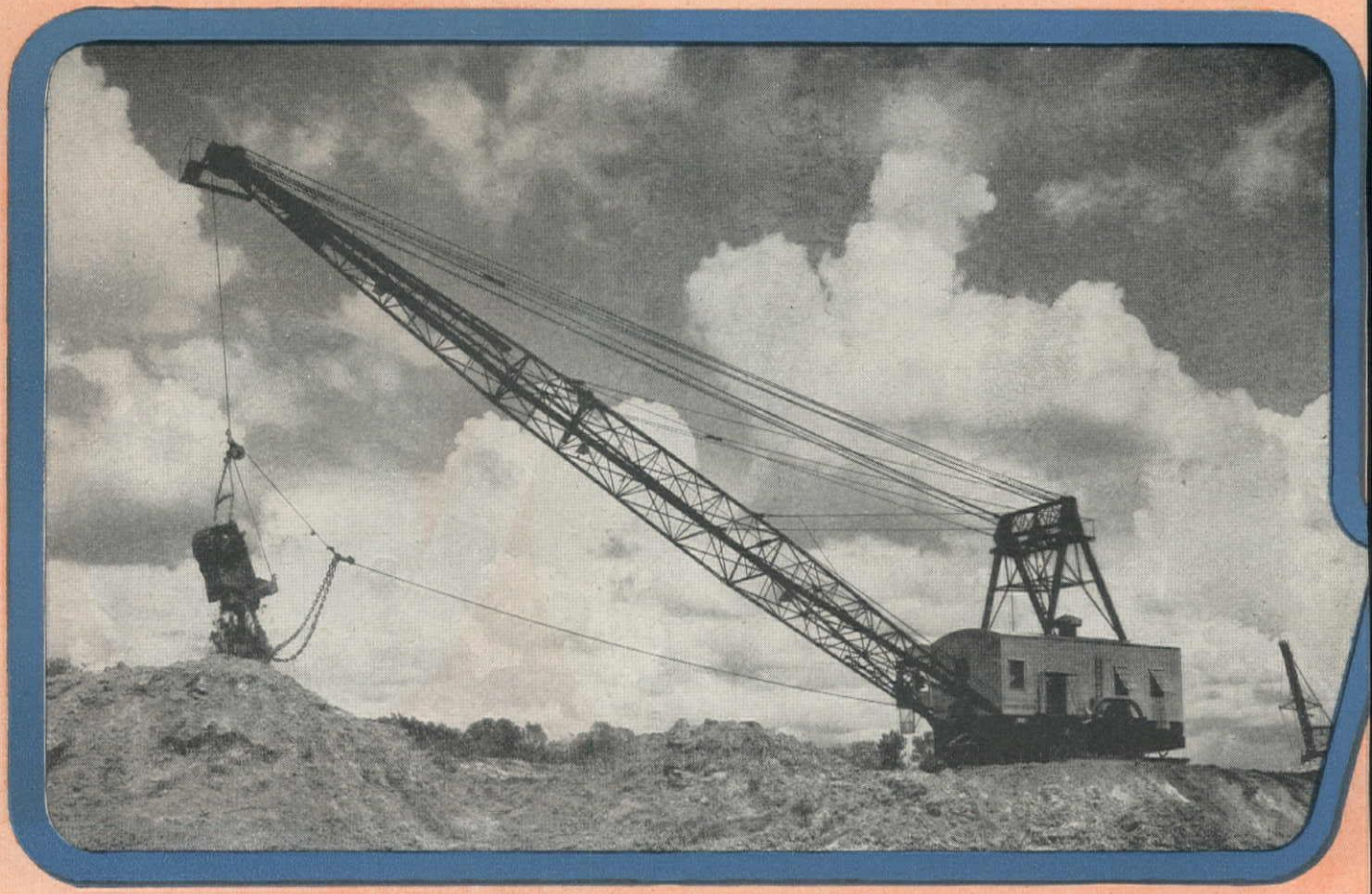
With Koehring ½-yard 205, there's no time-out for continuous manual clutch adjustments. It's no longer necessary for operator to tighten cold clutches when he starts in the morning, or between shifts . . . then loosen them again when clutches warm up. Large compensator springs on the 205's main drum (above), swing and traction clutches automatically make all tension changes . . . maintain full clutch efficiency. No "compromise" settings . . . you get top production all through the shift . . . have accurate, smooth control at all times. Gives you bigger daily yardage as shovel, dragline or pull shovel . . . is equally important on clamshell and heavy lift crane service, where you have intermittent usage.

Also, with Koehring 205 you get double-fulcrum control linkage on crowd-retract and traction that eliminates overtravel, drag and chatter . . . independent traction, to travel, swing and operate boom all at same time . . . full choice of crawler, truck or cruiser mounting to best fit your operating requirements. Your local Koehring distributor can show you many other 205 features that will save time and assure more production at lower cost on *your* work. See him *today*.

K900

OTHER KOEHRING EXCAVATOR SIZES: ¾ yd. 304 • 1½ yd. 605 • 2½ yd. 1005

Now! When You Order Forget



Tests Prove Service Life of Tuffy is Greater

"After moving 1,834,000 cu. yds., the superintendent is very pleased with Tuffy Draglines, especially because they are digging back from a very steep slope in a 70 ft. hole under tough abrasive action. On basis of this performance, another set of 2½", 280 ′ Tuffys, a set of 2", 225 ′ Tuffys and a 2⅛", 216 ′ and 2⅛", 224 ′ Tuffy for a twin drag machine have been ordered to replace competitive ropes."

"Tuffy Dragline's ruggedness gave well over 300 percent improvement in performance plus considerable time saved changing lines."

From all parts of the country, replies such as these verified the claims made by Union Wire Rope engineering specialists who designed Tuffy Draglines. In-the-field tests were made under severe operating conditions where Tuffy handled many types of material on different equipment. Tuffy's extra flexibility, abrasive resistance and stamina were challenged in digging, casting, and loading operations. Yet results of the tests were the same in all cases: Longer Life, Better Performance, Greater Economy.

Tuffy is a special rope for any and all dragline jobs. It is designed by the same specialists who have made hundreds of other Union Wire Rope products the standard of quality in the construction field.

UNION WIRE ROPE CORP

union *Wire Rope*

DRAGLINES . . .
Everything Except

the **NAME** Tuffy

the **SIZE** ? inch

the **LENGTH** ? feet

Just These 3 Specifications

Tuffy . . . Size . . . Length—that's all you order to get the RIGHT dragline for your particular job. No more confusing specifications, only to end up with a rope that is restricted to use under limited operating conditions. Now—in one simplified order—you get Tuffy Draglines designed to give maximum performance in *all* operations.

Always specify Tuffy when you order. (Example: 225' 1¾". "Tuffy" Dragline). Mail coupon today for illustrated folder.

Tuffy DRAGLINES

are Built Tough to Meet all Operating Conditions

Extra flexibility and maximum abrasive resistance are built into Tuffy Draglines to assure dependable performance on any type of equipment—handling any type of material. Wet and dry dirt, sand, rock, gravel, cement, minerals, all give way to Tuffy's structurally tough construction. At high speeds or low speeds, Tuffy Draglines give top operating efficiency; they hold securely to drum when casting, ride better on grooves and are easier and safer to use. Put Tuffy to the test! He's built tough!

UNION WIRE ROPE CORPORATION

2146 MANCHESTER AVENUE **KANSAS CITY 3, MO.**

☐ Send Complete Illustrated Folder on Tuffy Draglines.

For Tuffy Draglines — See Your Union Wire Rope Distributor (Listed in Yellow Section of Your Telephone Directory) and/or Send This Coupon.

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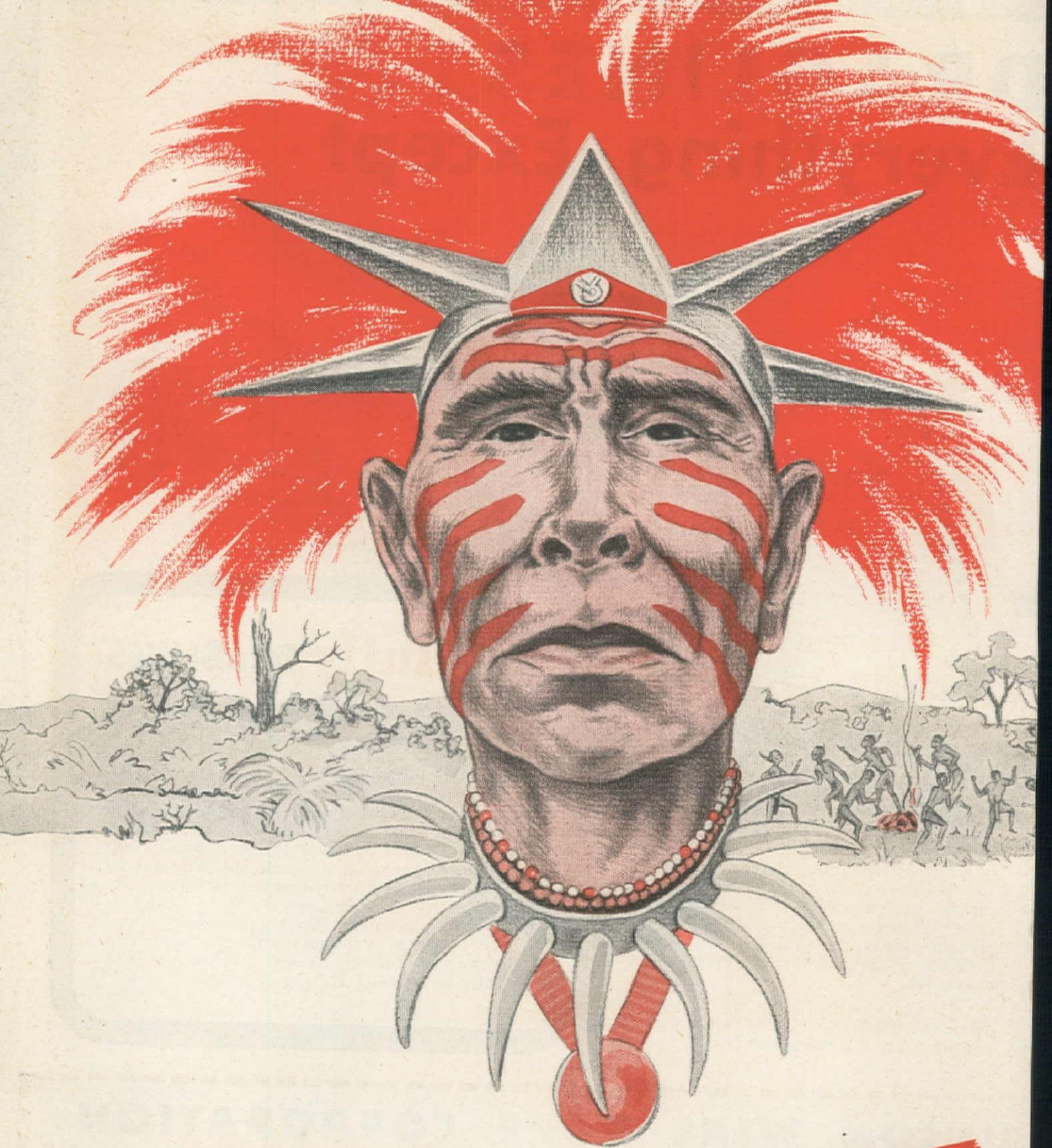
ADDRESS .....

CITY ..... ZONE .....

STATE .....



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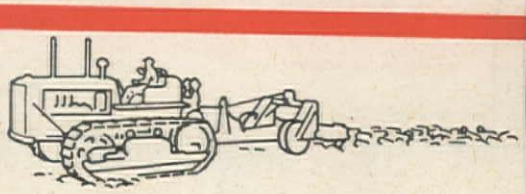
Standardize on Power that Pays

CRAWLER TRACTORS • WHEEL TRACTORS • DIESEL ENGINES • POWER UNITS



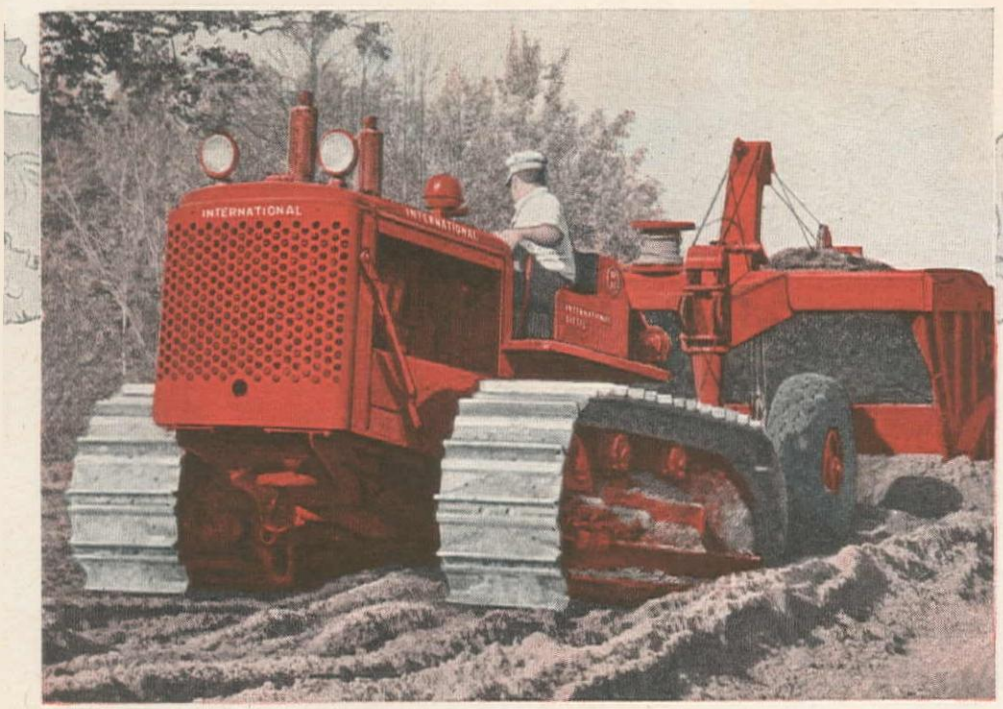
GOOD MEDICINE

Just what the doctor ordered . . . *red-painted* International Diesel Crawlers keep balance sheets healthy by boosting production and guarding costs. They deliver their full-rated horsepower on every job, yet hold in reserve additional lugging ability for handling sudden overloads that would otherwise kill.

Their starting and combustion systems, fuel feed, speed governing, torque control, lubricating methods and overall rugged construction account for their superior performance and long-lived stamina.

Since reliable, economical power is "good medicine" for any power-using business, it will pay you to contact your International Industrial Power Distributor. Get International Diesels on your jobs now.

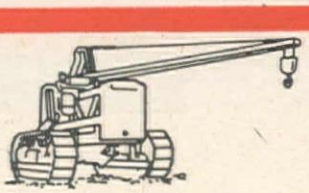
INTERNATIONAL HARVESTER COMPANY, Chicago

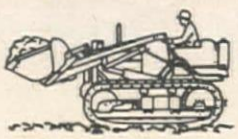


An International TD-18 Diesel Crawler fills its 8-yard scraper quickly on this tough, deep-sand road job. Latest model, with increased drawbar horsepower and many improvements, is now available.

INTERNATIONAL HARVESTER

INTERNATIONAL
INDUSTRIAL POWER





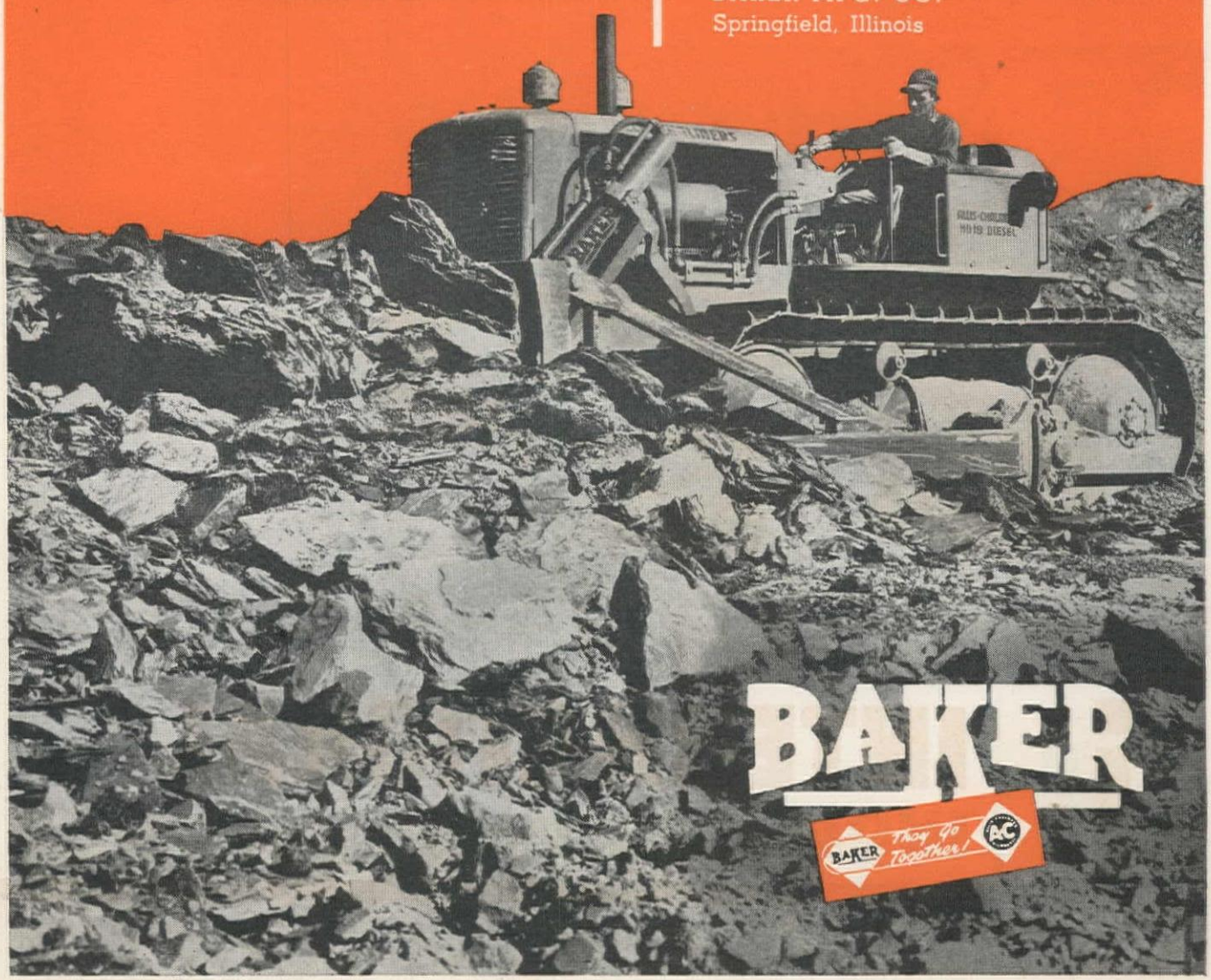
IT TAKES A BAKER FOR THE MAN SIZE JOBS

It is significant that today on the BIG TOUGH JOBS you'll find Baker Bulldozers and the A-C HD-19 in the key spots . . . where the going is toughest, where big yardages must be moved fast and at lowest cost.

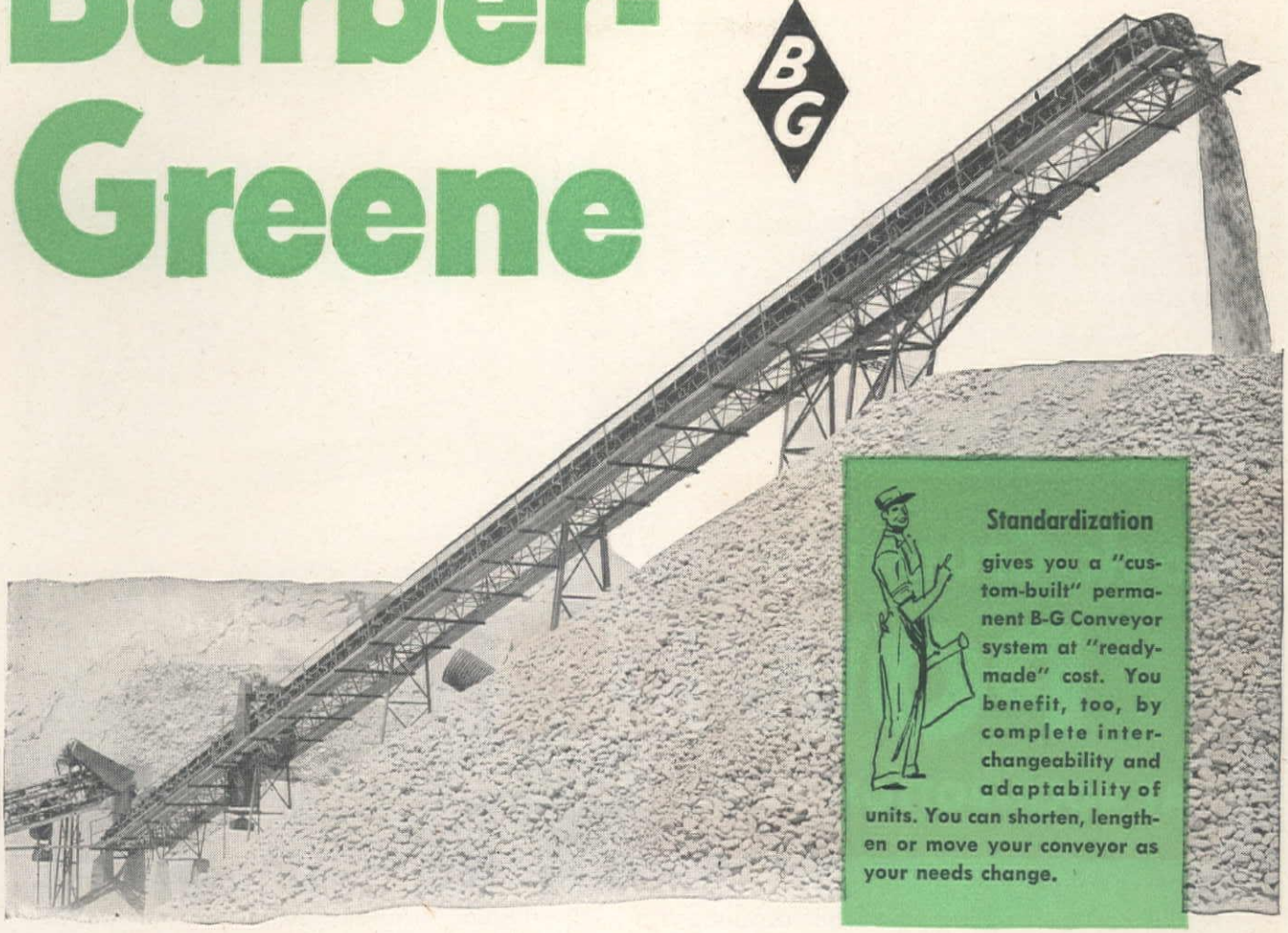
And it's not the color of the paint that makes Baker the favorite — it's the reputation they've been building up among experienced users — for out-dozing anything in the field — for more yardage per pass — for easier operation — for rugged dependability.

These are facts that can be proved in the field, on your job. If you are still using your regular bulldozers, it will pay you to investigate this great, new Baker. See your friendly Baker Allis-Chalmers dealer today.

BAKER MFG. CO.
Springfield, Illinois



Barber-Greene



Standardization gives you a "custom-built" permanent B-G Conveyor system at "ready-made" cost. You benefit, too, by complete interchangeability and adaptability of units. You can shorten, lengthen or move your conveyor as your needs change.

less "blueprint work" easier assembly with standardized conveyors . . . .

It's easier to select the right B-G Conveyor for your particular job—and easier to install it. That's because B-G Conveyors are *pre-engineered* and built of simple *standard* units.

Erection is little more than a matter of bolting the *standardized* units together. Frames and terminals are *pre-fabricated* . . . delivered to you, clearly marked, as complete, self-contained units. Drives and take-ups are factory-assembled, checked, tested and rated for load. B-G *pre-engineering* assures proper alignment and smooth, dependable operation on the job. What's more, you have a wide choice of equipment in the sizes and types that best meet your requirements.

Here's a "packaged" plan that may well provide the practical solution to one or more of your haulage problems. Why not call on our engineers to help you work out an efficient, economical system?

BARBER · GREENE COMPANY · AURORA, ILLINOIS

FOR SALE BY:

BROWN-BEVIS EQUIPMENT CO., Los Angeles 11, California; COLUMBIA EQUIPMENT CO., Spokane, Washington, Seattle, Washington, Boise, Idaho, Portland 14, Oregon; WILSON EQUIPMENT & SUPPLY CO., Cheyenne, Wyoming, Casper, Wyoming; CONTRACTORS' EQUIPMENT & SUPPLY CO., Albuquerque, New Mexico; RAY CORSON MACHINERY CO., Denver 9, Colorado; JENISON MACHINERY CO., San Francisco 7, California; WESTERN CONSTRUCTION EQUIPMENT CO., Billings, Montana, Missoula, Montana; KIMBALL EQUIPMENT COMPANY, Salt Lake City 10, Utah; STATE TRACTOR & EQUIPMENT CO., Phoenix, Arizona.

Ada County's Universal No. 880 Master gravel plant with 24" twin dual roll crusher and No. 1024 jaw crusher, powered with a 6-71 GM Diesel engine.

Rock-Crushing POWER AT ROCK-BOTTOM COST

Here's a rock-crushing plant that produces up to 200 three-yard truck loads a day using only 45 gallons of fuel in 8 hours. It's owned by Ada County, Idaho, and it is powered with a 6-cylinder General Motors Series 71 Diesel.

In applications like this, all over the country, these rugged 2-cycle GM Diesels are getting more work done—and getting it done for less cost. With power at every downstroke, they deliver a sturdy, dependable flow of power. They're smooth, easy to start and quick to adjust to varying load demands.

As for upkeep—it is always low because of the clean, simple design and precision manufacture found in GM Diesel engines. They are built to "take it" on tough jobs like this—are given rigid "run-in" tests. Then too, they are backed by Detroit Diesel's well-known owner service policy and the ready availability of factory engineered replacement parts.

All this makes a GM Diesel a natural for any job you may have. It's an engine you'll want to learn about, so write today for the complete story.

DETROIT DIESEL ENGINE DIVISION

SINGLE ENGINES.. *Up to 200 H.P.* **DETROIT 28, MICHIGAN** MULTIPLE UNITS.. *Up to 800 H.P.*

GENERAL MOTORS

DIESEL BRAWN WITHOUT THE BULK

GM GENERAL MOTORS DIESEL POWER

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.

Special shock-resistant wind-braced girders—weighing 3½ tons each—are being riveted into the new building of the Standard Oil Company of California now going up in San Francisco. Shaped from U·S·S steel, they will give the 22-story frame added toughness and strength.

Steel is building the West—for Today—for the Future

This powerful wind-braced girder was planned for Standard Oil's new West Coast skyscraper to assure extra durability. Hundreds of other steel products also were ordered special—floors, rods, plates, pipe, siding, roofing—weighing more than 3,500 tons in all.

All over the West steel is going to work—in mighty steel bridges that handle ever-increasing traffic...in giant steel power lines that carry more electricity to farms and factories...in small homes—reinforced with steel—that shelter thousands of new Western families.

Only steel, with its strength and durability, can meet the need for history's greatest construction assignments—both large and small. Columbia, as Western producing member of United States Steel, combines its own producing facilities with the rest of the U·S·S family to supply the West with everything in steel. For complete information, get in touch with the Columbia Steel Company office nearest you.

Only STEEL can give you all 7 of these structural advantages: Extra toughness and shock resistance • Incombustibility • High strength-weight ratio • Highest modulus of elasticity • Versatility of application • Great durability • Ultimate economy

Help boost steel production—TURN IN YOUR SCRAP

Columbia Steel Company

San Francisco Los Angeles Portland Seattle Salt Lake City

UNITED STATES STEEL

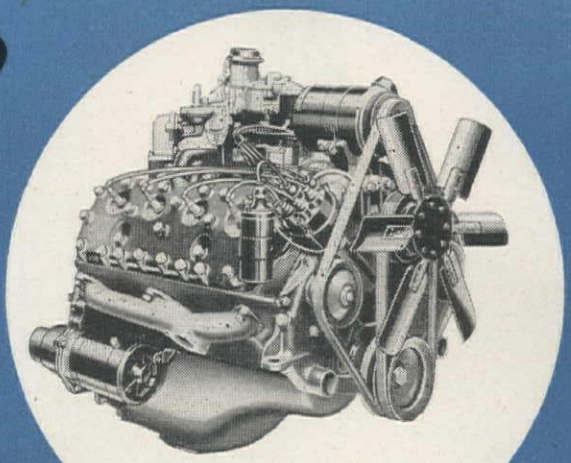
Be Right 3 Ways...

PICK FORD POWER!

1 **RIGHT POWER** for your job in the five models of Ford's Industrial Engine line!

2 **RIGHT FEATURES**—the best of the latest, right from Ford Industrial Power "Headquarters"!

3 **RIGHT SERVICE,** right around the corner from you . . . at Ford Dealers' everywhere!



Ford 239 V-8 Industrial Engine
(239 cu. in. displacement)

On streets, parking lots, playgrounds—any paved surface—the Wayne Motor Sweeper gives a clean sweep at less cost per mile, handles easily in restricted quarters. Made by the Wayne Motor Sweeper Division of Brown-Bevis Co., Los Angeles, this equipment uses, for motive and sweeping power, the Ford 239 V-8 Industrial Engine—a prime factor in the economical operation, reliable performance and simplified maintenance of the unit.

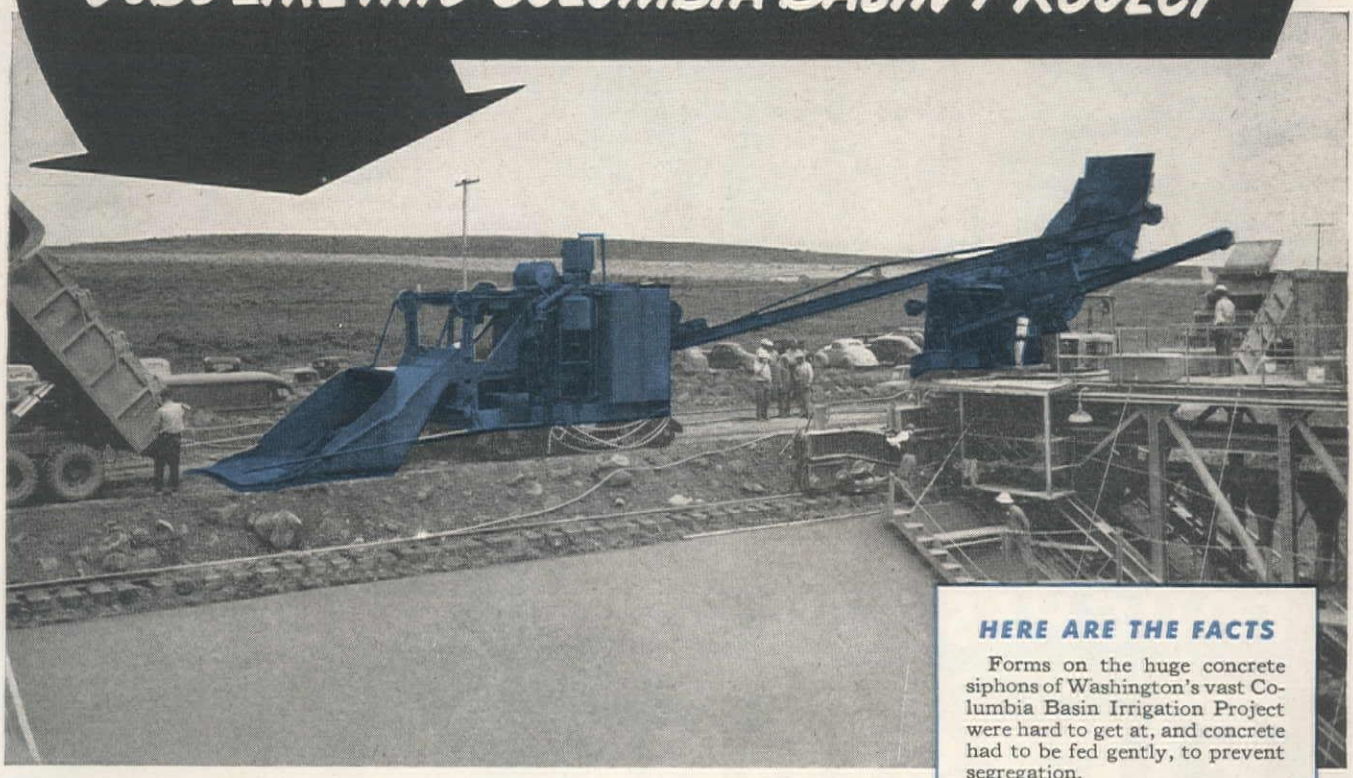
Ford
INDUSTRIAL ENGINES

Now—5 great engines in the Ford Industrial Power "family." A "four" of 120 cu. in. displacement . . . two "sixes"—226 cu. in. and 254 cu. in. displacement . . . two "V-eights"—239 cu. in. and 337 cu. in. Every one completely new, with the *right* power for your job—farm implement power; construction; standby units; material handling; pumping, etc. Send a post card today for specifications.

FORD MOTOR COMPANY
INDUSTRIAL AND MARINE ENGINE SALES DEPARTMENT
Dearborn, Michigan

YOUR JOB IS WELL-POWERED WHEN IT'S FORD-POWERED

BLUE BRUTE PRECISION-PLACING--VITAL ON JOBS LIKE THIS COLUMBIA BASIN PROJECT



Watch a Ransome 34E Blue Brute Paver in action and you'll get an education in *precision-placing*. There's no fumbling, no lost motion, no "wrestling" with heavy control levers. The hydraulic "live" boom with controllable discharge bucket — found only on Ransome Pavers — operates easily and accurately . . . swings swiftly to the exact spot and discharges at just the required rate, spreading evenly to the inch inside the forms!

You can forget the split-batch nuisance, too. Load up the bucket to capacity, run it out wherever needed, and open its doors with positive hydraulic control, to discharge only the amount you want — and no more!

Nothing can equal this patented Ransome control-feature for cutting down spillage, hand shovelling and the time-wasting struggle to reach out-of-the-way forms. You can save up to $100 a day with this feature alone. With other Blue Brute design advancements . . . Ransome's famous mixing action, accurate water measuring, all-weather batchmeter and foolproof, self-cleaning, fast-charging skip . . . it means faster, smoother progress and greatly reduced costs on every type of concreting job.

Ask your nearby Worthington-Ransome Distributor about Blue Brute Pavers, Single and Dual Drum. Or, Bulletin 208 will bring you further facts proving *there's more worth in a Blue Brute.*

R9-1

WORTHINGTON PUMP AND MACHINERY CORPORATION
Construction Equipment Department, Harrison, New Jersey
Distributors In All Principal Cities

HERE ARE THE FACTS

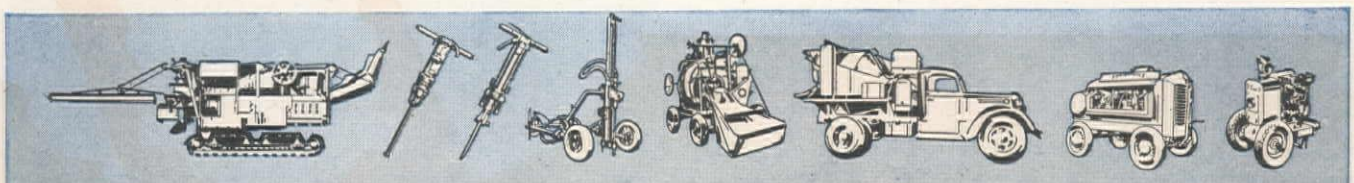
Forms on the huge concrete siphons of Washington's vast Columbia Basin Irrigation Project were hard to get at, and concrete had to be fed gently, to prevent segregation.

Utah Construction Co. and Winston Brothers Co., joint-venture firms, solved the problem with Ransome Blue Brute 34E Dual Drum Pavers. The two shown, on the West Canal, have their standard booms elevated, for discharging into a travelling hopper. The hopper travels across the open cut on a steel gantry, discharging in any position required. On the East Canal, a Ransome Dual Drum Paver discharged into big steel pipe forms, with a special 70-ft. boom that hooked to a steel tower on the form.

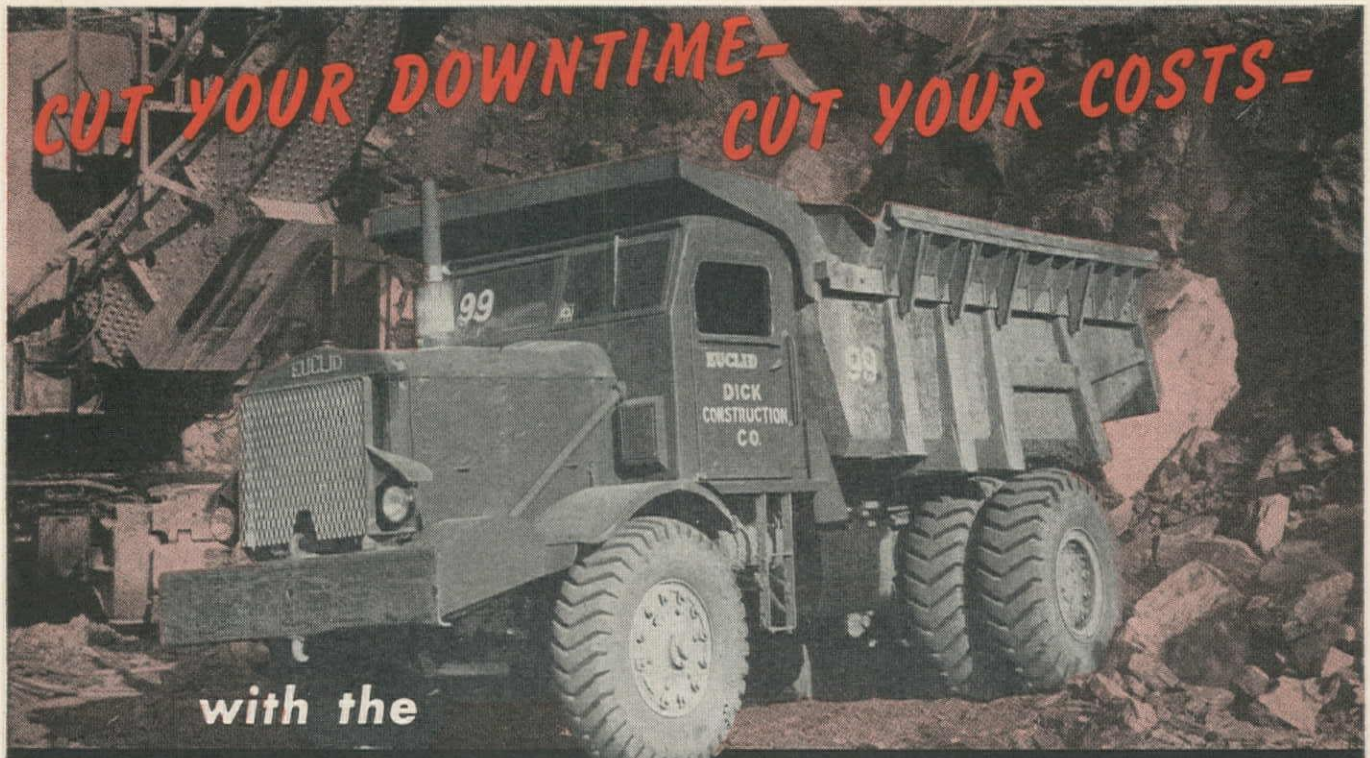
Thanks to Ransome's exclusive, hydraulic "live" boom with controllable discharge bucket, pouring was under positive, accurate control at all times — a vital factor in the speedy, economical completion of this huge non-paving job, totalling 164,900 cu. yds. of concrete!

WORTHINGTON

BUY BLUE BRUTES



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



TOUGHEST TIRE EVER BUILT . . .

THE

Firestone

ROCK GRIP

DOWNTIME is a profit killer. To cut costs you've got to have a tire that is tough enough and strong enough to stand up on the job day in and day out without time loss. Firestone tires do that.

There's a Firestone tire for every off-the-highway job. There's the strong, rugged Rock Grip with a tough, massive tread for rock work, strip mining — for every job where punishment is severe. There's the Ground Grip with long, strong traction bars for earth biting power and maximum traction. There's the Earth Mover for free rolling wheels where maximum flotation and carrying capacity are required.

Firestone Off-the-Highway tires and Firestone service are cutting costs for contractors everywhere. They will cut your costs too. A trial on your equipment will prove it.

Listen to the Voice of Firestone every Monday evening over NBC and Americana over NBC Network Television Stations

Copyright, 1949, The Firestone Tire & Rubber Co.

Firestone

OFF-THE-HIGHWAY TIRES

Model "DI" Case Tractor with hydraulically operated dozer, backfilling utility trenches in a Pacific Coast housing project.

Model "SI" with hydraulic shoveloader handling crushed rock in Wisconsin. In large picture, with sheepsfoot roller, is Model "LAI."

MAN SAVERS...

with Dozer, Loader, Sheepsfoot

Whether it's handling material with mounted equipment or pulling drawbar loads, your results per man-hour depend mainly on the tractor that powers your outfit. It's the sum total of eager power, easy handling, quick maneuvering and freedom from "time out" that earns for Case Industrial Tractors the respect of experienced officials and contractors.

The Case-built engines in these tractors are of the long-stroke, heavy-duty type. They develop full power at moderate piston speed, pull still stronger when slowed down. They pick up full load promptly at part throttle, respond rapidly to accelerator, encourage quick and confident operation. They are known for ENDURANCE that assures steady work with a minimum of maintenance.

Case Industrial Tractors are built in four basic sizes covering a weight range from 2500 to more than 10,000 pounds. Ask for full description and specifications. J. I. Case Co., Racine, Wis.

State Tractor & Equipment Co.....Phoenix, Arizona
Brown-Bevis Equipment Co.....Los Angeles, California
Coast Equipment Company.....San Francisco, California
Mitchell's.....Bakersfield, California
Liberty Truck & Parts Co.....Denver, Colorado
Western Equipment Co.
Boise and Idaho Falls, Idaho and Spokane, Washington
Hilton's Inc.....Las Vegas, New Mexico
Growers Supply & Equip. Co.....Fresno, California
Electric Tool & Supply Co.....San Bernardino, California
Growers Tractor & Implement Co.....Sacramento, California
Nelson Equipment Co.....Portland, Oregon - Seattle, Wash.
Robison Machinery Co.....Salt Lake City, Utah
Wortham Machinery Co.
Cheyenne, Sheridan and Greybull, Wyo. - Billings, Mont.

CASE

YOU CAN QUICKLY CONVERT
VICTOR
WELDING TORCHES TO CUTTING WORK

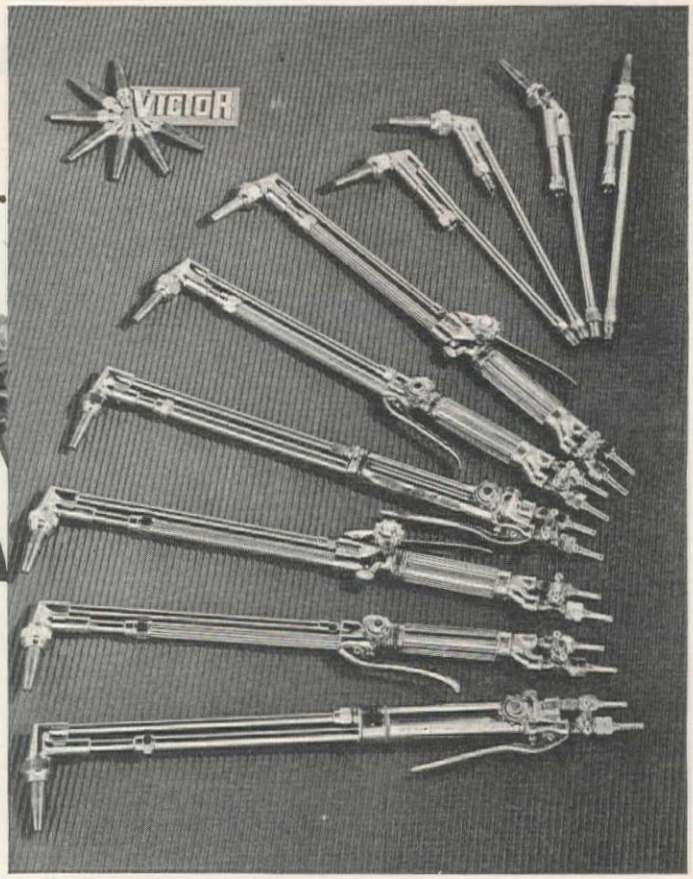
This VICTOR welding torch butt Model 310 and cutting attachment Model 2450 is one of many you can use for converting from welding to cutting. No wrench needed

VICTOR attachments are made so you can change quickly from welding to cutting operations. You simply select the attachment, tip type, and tip size suited to your job and gas supply. Tips are available for oxy-acetylene, natural and city gas, and LP gases (butane and propane).

ONE TORCH HANDLES MANY JOBS

A complete range of tips and sizes permits you to use your VICTOR welding torch for such varied field and shop jobs as plate, general and heavy cutting; cast iron, rivet and boiler tube cutting; scarfing, deseaming, descaling, and rivet piercing.

VICTOR also makes regulators for all gases; a full line of machine and hand torches, cylinder manifolds, cylinder trucks, emergency pack-type flame cutting outfits, and fluxes.



Here are other VICTOR hand cutting torches. As shown, these torches come with high-pressure valve lever in 4 different positions—top, bottom, front, or rear of torch handle—so operator may choose position best suited to him. Note, too, torch head can be purchased with 90°, 75°, 45°, or straight head. Head and tube assemblies are easily interchangeable.

SEE VICTOR DISTRIBUTOR

For help in selecting the VICTOR equipment best suited to your needs, see your nearest VICTOR distributor NOW.

It costs less to own and operate VICTOR!

VICTOR FOR WELDING

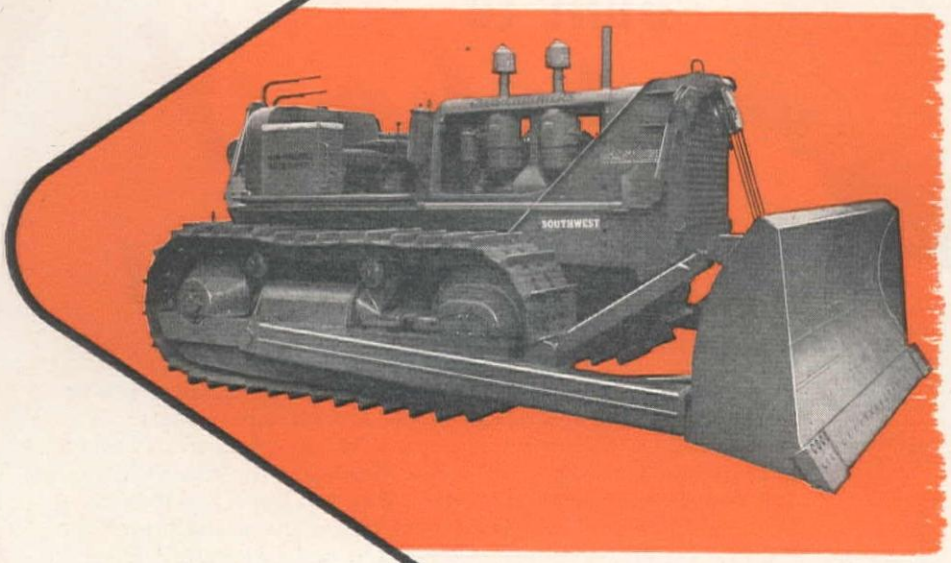
VICTOR EQUIPMENT COMPANY

844 FOLSOM STREET • SAN FRANCISCO 7, CALIFORNIA

3821 SANTA FE AVE., LOS ANGELES 11, CALIF. • 1312 W. LAKE ST., CHICAGO 7, ILL.

There's a Branch or Distributor to serve you in Portland, Spokane, Seattle, Salt Lake City, Casper, Great Falls, Anchorage, Boise, Denver, Tucson, Phoenix, Albuquerque, Oakland, San Diego, Fresno, Ventura, Sacramento.

SOUTHWEST

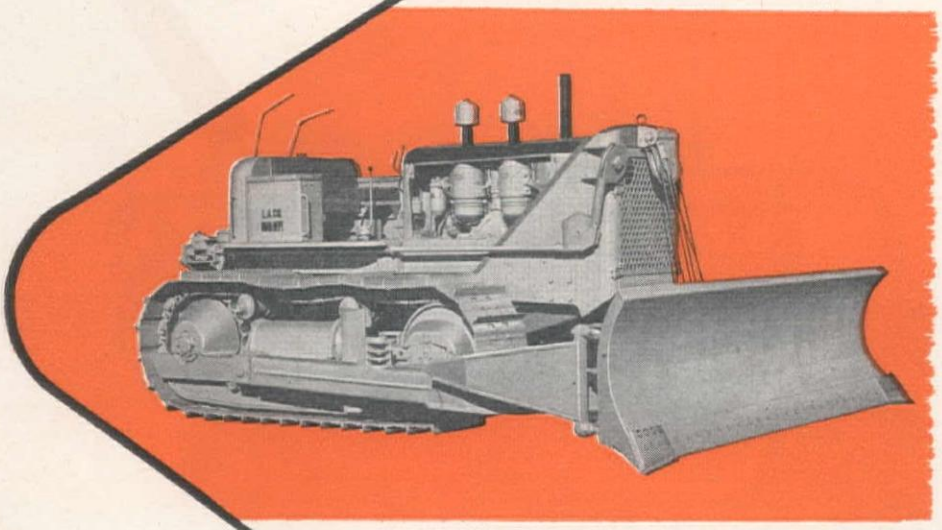


The new bulldozer and trailbuilder equipment developed by SOUTHWEST for use with Allis-Chalmers HD-19 tractors have proved exceptionally efficient and reliable in all types of operations. These are rugged, dependable units that provide outstanding economy and long service life.

Type "AFB" Bulldozers and Type "AFT" Trailbuilders for use with Allis-Chalmers Tractors.

"QUARRY-TYPE"

BULLDOZERS AND TRAILBUILDERS NOW AVAILABLE FOR ALLIS-CHALMERS HD-19 TRACTORS



NOTE THESE FEATURES...

Overhead "A" frame structures entirely eliminated.

New, rugged radiator guard type mounting.

Furnished for either rear or front mounted control units.

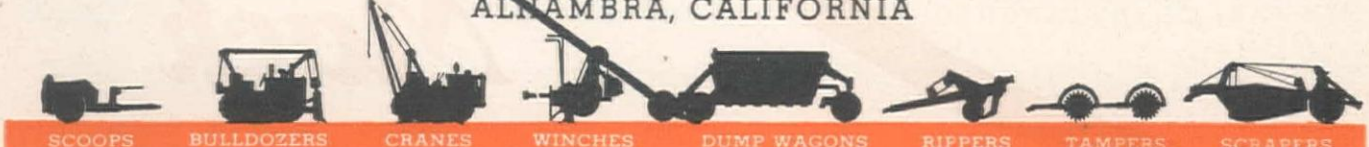
Bulldozers can be furnished with either adjustable arms or with side arms welded to blade.

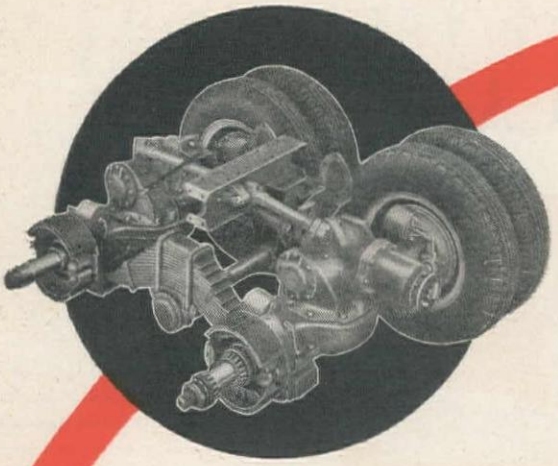
WRITE FOR BULLETIN CM23

CONSTRUCTION MACHINERY DIVISION

Southwest Welding & Manufacturing Co.

ALHAMBRA, CALIFORNIA





ONLY MACK offers this matchless Balanced Bogie with exclusive Power Divider. Unusual flexibility and balance insure even tire loading and uniform braking; cancel out weight transfer. Mack Power Divider assures good going by transferring power to wheels maintaining the best traction.

MACK TRUCKS
Built to *take it*
...and TAKE IT AWAY

in bigger loads . . . on faster schedules . . . with greater profits

Mack six-wheel trucks are built to "take it" when it comes to taking out the big loads with power and stamina to spare.

Powerful gasoline or diesel engines! Massive, heat-treated alloy steel frames! Flexible rubber Shock Insulators! Air Assist Clutch and Power Steering! Mack's famed Balanced Bogie and Power Divider! These are your assurance of power and strength for the heaviest loads; maneuverability and ease of control for fast loading and unloading; flotation and traction for the most slippery mud or sand.

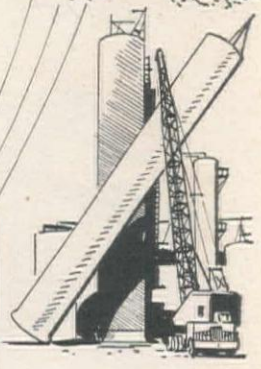
Whether for heavy highway hauling or super-duty off-highway work, Macks are designed with more outstanding and exclusive features than any other truck—features that mean greater profits through stepped-up tonnage on faster schedules. It will pay you to get the full story in terms of your particular operation.

IT'S PART OF THE LANGUAGE: *Built Like a* **Mack** *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.

get around

to more profits



with P&H Truck Cranes

Faster Traveling • Faster Working
Greater Lifting Ability

Think of those *extra* jobs you can handle with a P&H Truck Crane . . . and the *extra* profits it makes possible.

The P&H Truck Crane, wholly built by P&H, truck and all, can handle a lot more on the hook . . . and with other front end equipment has more digging power at the tooth point.

You have dual power . . . an engine built for travel and a second engine for sustained hard work.

Ask any P&H Truck Crane owner and you'll understand why it is his biggest money maker. Get the full story. Write for literature today!

P&H Added Values

- **Hydraulic control—a new peak in operating ease and safety.**
- **Greater stability—with exclusive torsion bar-mounted front axle and lower center of gravity.**
- **Independent planetary boom hoist — raises or lowers crane boom smoothly and safely, with or without load.**
- **Planetary load lowering — permits "inching" of loads accurately.**
- **All-welded construction — greater strength.**

Size for size no P&H Truck Crane has ever been outlifted

P&H REMOTE CONTROL with this unit you can control all functions (even the horn!) by electric push-buttons — from the operator's position inside the crane cab.

P&H TRUCK CRANES

4490 West National Avenue
Milwaukee 14, Wisconsin

HARNISCHFEGER CORPORATION

EXCAVATORS • ELECTRIC CRANES • ARC WELDERS • HOISTS • WELDING ELECTRODES • MOTORS

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

Warehouses Service Stations: SEATTLE, LOS ANGELES, SAN FRANCISCO

PORTLAND 14, Oregon, Loggers & Contractors Machinery Co., 240 S.E. Clay St.; **WILLOWS, Calif.,** Willows Motor Sales Co.; **BAKERSFIELD, Calif.,** Kern Tractor & Equipment Co., 24th & N. 99 Highway, P. O. Box 1695; **NAPA, Calif.,** Berglund Tractor & Equipment Co., 1016 Soscol Ave.; **SALT LAKE CITY, Utah,** Western Machinery Co., 748 West 8th, South; **BOISE, Idaho,** Olson Manufacturing Co., 2223 Fairview Ave.; **EL CENTRO, Calif.,** Faure Tractor & Equipment Co., 1414 Main St.; **FRESNO, Calif.,** Allied Equipment Co., 1824 Santa Clara St.; **SAN DIEGO, Calif.,** Southern Equipment & Supply Co., 2025 South Harbor Drive; **SPOKANE 8, Washington,** F. M. Viles & Co., Inc., East 124 Trent Ave.; **RENO, Nevada,** Dennison Tractor & Supply Co., 559 East Fourth St.; **SEATTLE 4, Washington,** Glenn Carrington & Co., 91 Columbia St.; **LOS ANGELES, Calif.,** Lee & Thatro Equipment Co., Inc., 820 S. Santa Fe Ave.


SHOVEL


CLAMSHELL


CRANE


DRAGLINE

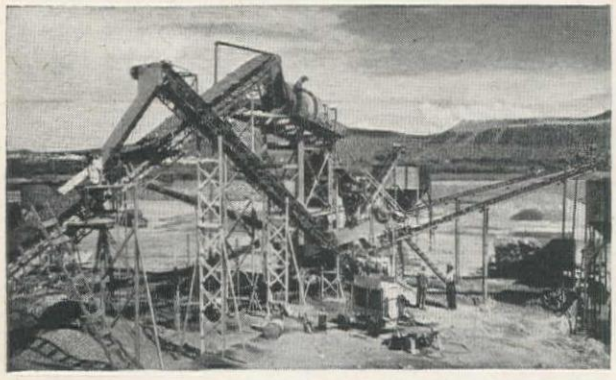

TRENCH HOE


PILE DRIVER

UNIVERSAL

HAS THE ANSWER TO YOUR WASHING PROBLEMS WITH *"STREAM-FLO"* ENGINEERED WASHING PLANTS

Stationary washing plant with mechanical feed, conveyors, vibrating screen; water sprays, sand screws, loading bin, primary and secondary crushers, and stock piling conveyors. Electric powered.



Crushing screening and washing plant with primary jaw crusher, secondary roll crusher, scrubber classifier, conveyors, and bins.

Universal washing and screening plant with plate feeder, conveyor, two deck screen, 3-compartment bin, sand screw, and miscellaneous sprays, chutes and flumes. Gasoline or diesel power.

WRITE FOR COMPLETE FACTS

● Universal builds stationary and portable plants to meet any washing need. "Basic Unit" construction means lower initial cost, and "Stream-Flo" engineering assures a well balanced, smooth operating plant. Result—more yards per hour at less cost per yard. For profit-making production of clean, properly sized aggregate, investigate Universal.

UNIVERSAL ENGINEERING CORPORATION

323 - 8TH STREET N. W., CEDAR RAPIDS, IOWA

DIVISION OF PETTIBONE MULLIKEN CORPORATION

ENGINEERS AND BUILDERS OF "STREAM-FLO" ROCK, GRAVEL, AND LIME PLANTS SCREENING AND WASHING PLANTS, CONVEYORS, APRON FEEDERS

State Tractor and Equipment Co. ..... **Phoenix, Arizona**

Industrial Equipment Co. ..... **Los Angeles 11, California**

Moore Equipment Co. ..... **Stockton and Fresno, California**

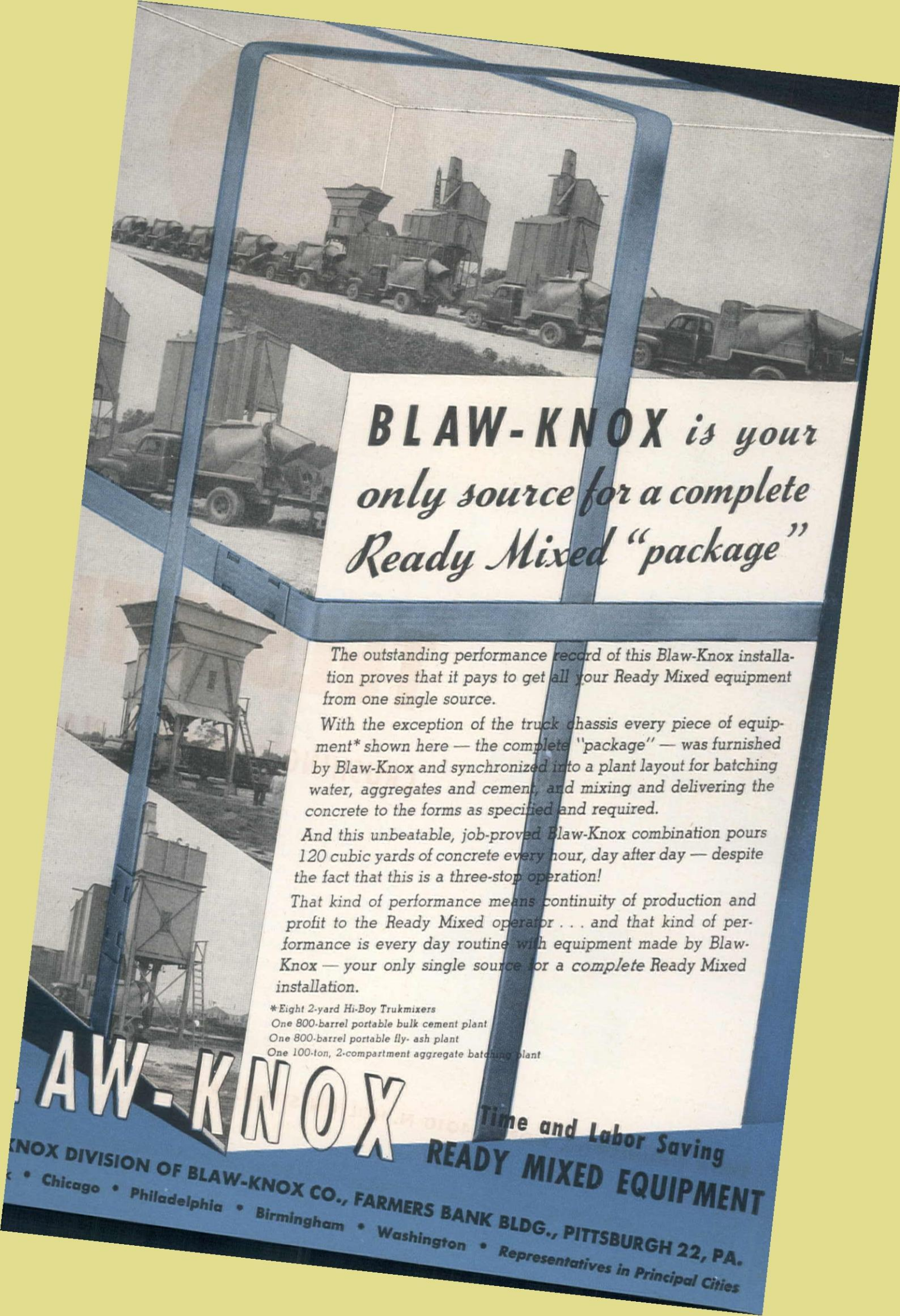
Bay Cities Equipment Inc. ..... **Oakland 7, California**

Nevada Equipment Service Inc. ..... **Reno, Nevada**

The Harry Cornelius Co. ..... **Albuquerque, New Mexico**

J. D. Evans Equipment Co. ..... **Rapid City, South Dakota**

J. K. Wheeler Machinery Co. ..... **Salt Lake City 1, Utah**



BLAW-KNOX *is your only source for a complete Ready Mixed "package"*

The outstanding performance record of this Blaw-Knox installation proves that it pays to get all your Ready Mixed equipment from one single source.

With the exception of the truck chassis every piece of equipment shown here — the complete "package" — was furnished by Blaw-Knox and synchronized into a plant layout for batching water, aggregates and cement, and mixing and delivering the concrete to the forms as specified and required.*

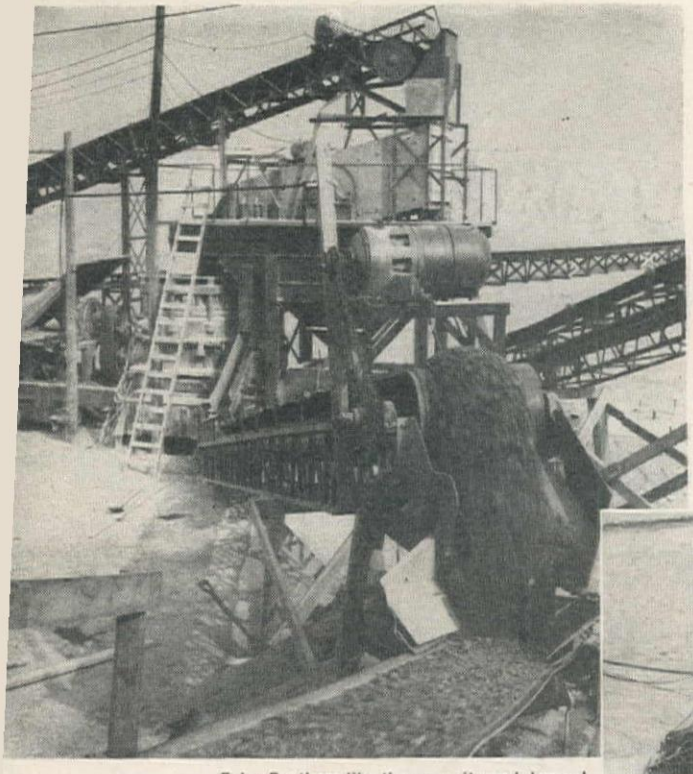
And this unbeatable, job-proved Blaw-Knox combination pours 120 cubic yards of concrete every hour, day after day — despite the fact that this is a three-stop operation!

That kind of performance means continuity of production and profit to the Ready Mixed operator . . . and that kind of performance is every day routine with equipment made by Blaw-Knox — your only single source for a complete Ready Mixed installation.

*Eight 2-yard Hi-Boy Trukmixers
One 800-barrel portable bulk cement plant
One 800-barrel portable fly- ash plant
One 100-ton, 2-compartment aggregate batching plant

AW-KNOX Time and Labor Saving
READY MIXED EQUIPMENT

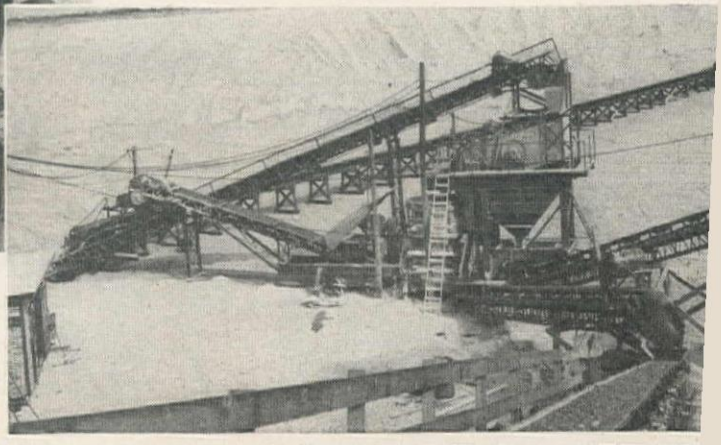
KNOX DIVISION OF BLAW-KNOX CO., FARMERS BANK BLDG., PITTSBURGH 22, PA.
• Chicago • Philadelphia • Birmingham • Washington • Representatives in Principal Cities

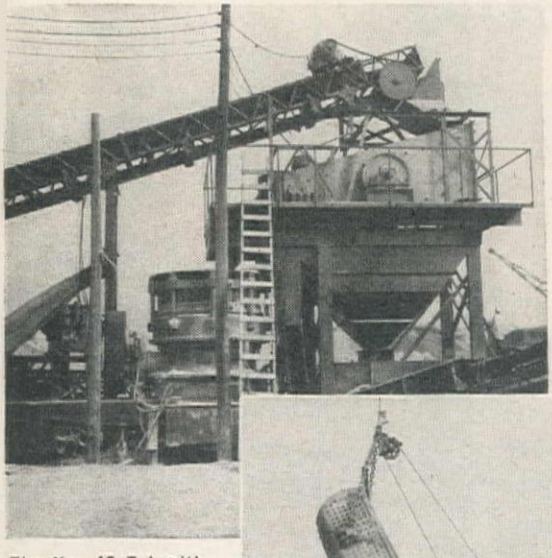


Foley Brothers like the capacity and dependability of their Telsmith Portable Plant.

every 15 minutes...

A 50-yd. CAR OF BALLAST!





The No. 48 Telsmith Standard Gyrasphere Crusher in closed circuit with 5′ x 12′ Telsmith 3-deck Pulsator, make up this portable plant's crushing-screening unit.

The portable feeder-hopper unit has a 36″ x 6′ Telsmith Heavy-Duty Plate Feeder.

AT FOLEY BROTHERS'

TELSMITH

Portable

CRUSHING-SCREENING PLA

● Turning out ballast for the C & NW Ry.—that's n 1¼″ sand and gravel with oversize crushed and sand eliminated — this Telsmith Portable Crus Screening-Loading Plant of Foley Brothers, Algonquin, Ill., has a capacity of 2000 cu. yds 9½ hrs. They load a 50-yd. car in 15 minutes. No. 48 Telsmith Standard Gyrasphere Crusher in c circuit with a 5′ x 12′ Telsmith 3-deck Pulsator, 30″ x 70′ Telsmith steel truss Conveyor give the a compact, mobile crushing-screening unit of max capacity. Dependable, even flow is provided b portable hopper-feeder unit with its 36″ x 6′ Te Heavy-Duty Plate Feeder. Find out about Te Portables with Gyrasphere Crushers in Bulletin

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

Mines Engineering & Equipment Co.
369 Pine St., San Francisco 4, Calif.

Garlinghouse Bros.
2416 E. 16th St., Los Angeles 21, Calif.

Lee Redman Equipment C
Phoenix, Arizona

Hamilton Equipment Co.
Salt Lake City 1, Utah

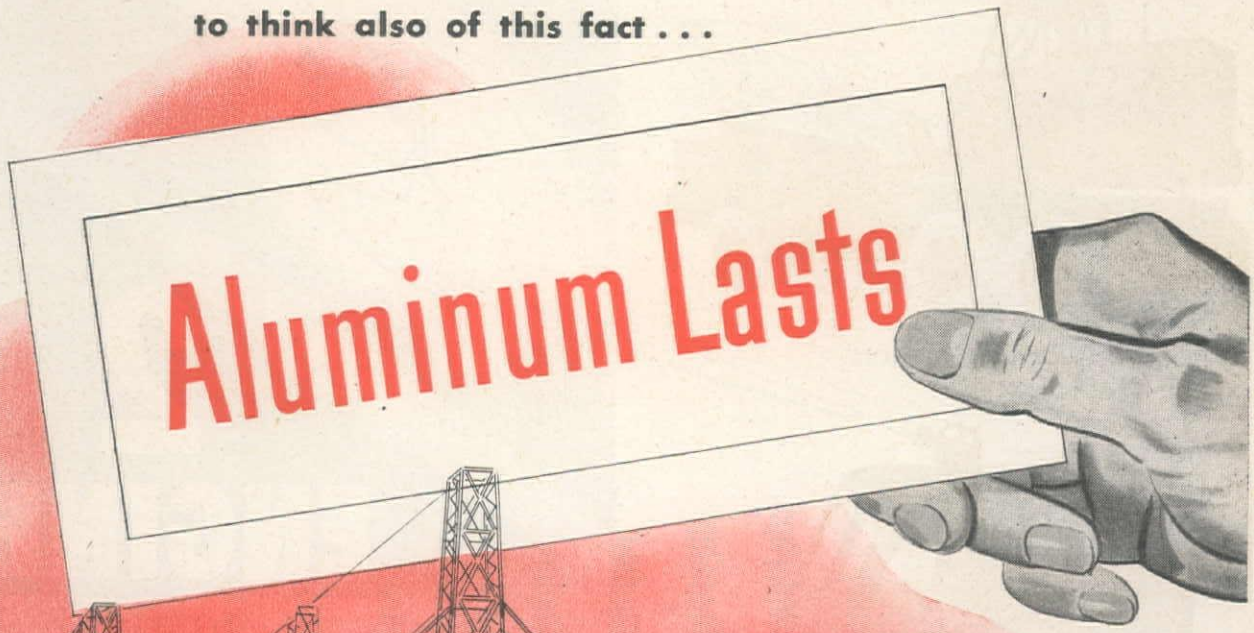
Clyde Equipment Co.
Portland 9, Ore. Seattle 4, Wash.

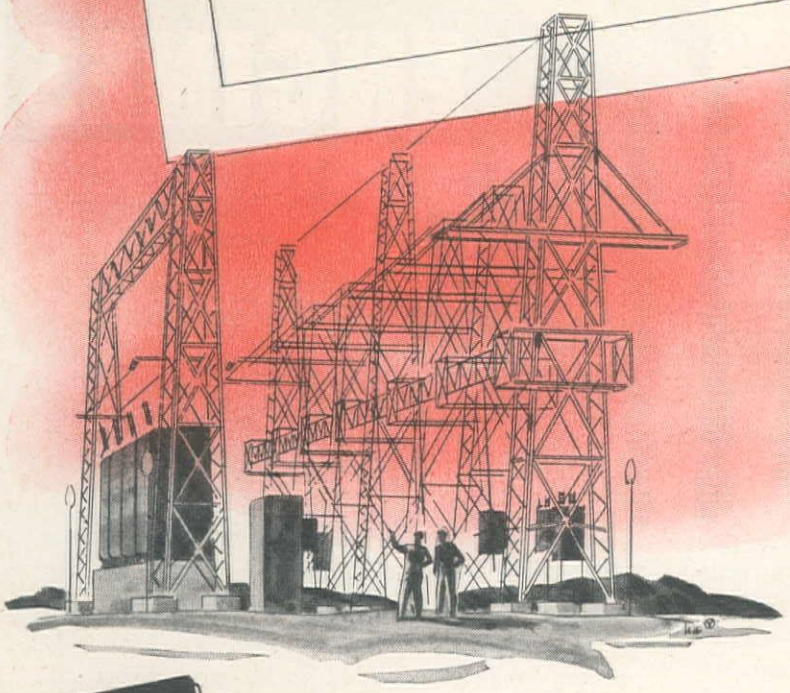
General Machinery Co.
Spokane 1, Wash.

The Sawtooth Co.
Boise, Idaho

Gordon Russ
Vancouver

Planners.. who think only of the light weight of aluminum are urged to think also of this fact . . .





in terms of a SUBSTATION, for example

The one direction for major improvement of the substation is in release from maintenance. Eliminate shutdowns for painting? You can do it with an aluminum structure.

Such substation planning should start now, with the kind of help our Development Division is equipped to give. Help based on sixty years of knowledge of alloys, of fabricating methods, of thousands of tests that permit us to say "Alcoa Aluminum Lasts!"— and mean it. Your first step is to write for the Alcoa Structural Handbook. ALUMINUM COMPANY OF AMERICA, 1811 Gulf Building, Pittsburgh 19, Pennsylvania.

GET THIS *FREE* ENGINEER'S HANDBOOK

It contains 229 pages of design information, specifications and technical data on structural aluminum products; plus available structural shapes.

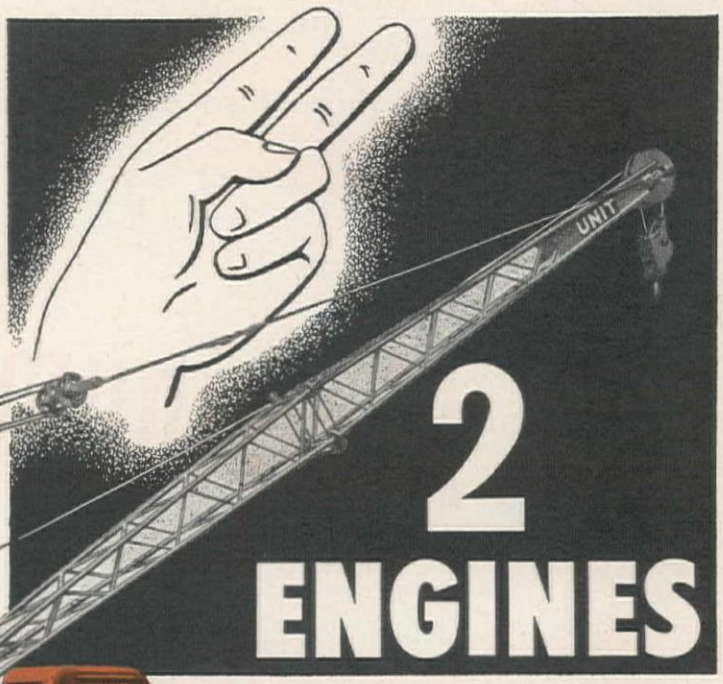
ALCOA **FIRST IN ALUMINUM**
THE METAL THAT LASTS

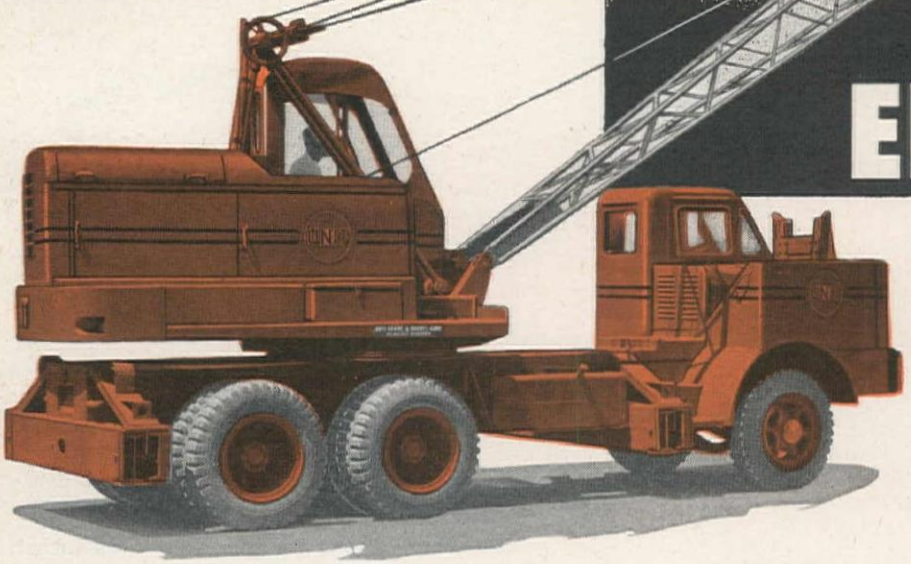
ALCOA ALUMINUM

UNIT 1014

10 TON TRUCK CRANE WITH DUAL POWER

BOOM IN FOLDED POSITION FOR TRAVELING





- One Engine for Speed and Mobility
- Another Engine for Lifting or Digging
- Gas or Diesel Power
- Road Speed: 32 M.P.H.
- Capacity: 10 Tons

One look at the UNIT 1014 will convince you that here is Truck Crane design at its best. Perfectly balanced, it has modern, adjustable hook-roller construction. Power flows from the truck engine in a direct straight-line drive to the tandem rear axles, both of which drive. A separate engine powers the upper structure, and may be either gas or diesel. Double, full-width outriggers provide added stability. This streamlined unit has 5 speeds forward and one reverse, with an auxiliary transmission offering 10 speeds forward and 2 speeds reverse. A road speed of up to 32 M.P.H. makes "going from job to job in a hurry" a simple matter. Large diameter, wide-faced air brakes are used on all 4 rear wheels. A hand operated, shoe type parking brake is provided on the propeller shaft. A short turning radius increases its value in close-quarter operations, and all dimensions meet highway requirements.

UNIT CRANE & SHOVEL CORP.
6421 W. BURNHAM STREET, MILWAUKEE 14, WISCONSIN, U.S.A.

● Other UNIT Models are available in ½ and ¾ Yd. Excavators and Cranes up to 15 Tons . . . Crawler or Mobile Types . . . Fully convertible to ALL attachments.

SHOVELS • DRAGLINES • CLAMSHELLS • CRANES • TRENCHOES • MAGNETS

A 5523-1P-C

Smooth going on a rocky road

It takes a shovel with rugged dependability to make profitable headway on a rock cut like this. That's why the machine on the job is a Bucyrus-Erie 54-B, for the 2½-yd. 54-B combines big-shovel strength, power and durability with small-shovel speed and efficiency. The result is more passes per shift, more cubic yards of dirt or rock moved every hour, more profits on your excavating contracts.

You can't go wrong by following the choice of the nation's top contractors, for their experience has proved the dependability, efficiency and economy of Bucyrus-Eries. See them in action for yourself, then see your Bucyrus-Erie distributor for more information on the ⅜- to 2½-yd. line. Bucyrus-Erie Co., South Milwaukee, Wis.

152E49

The BEST buy Bucyrus, the best BUY in excavators

SEE YOUR BUCYRUS ERIE DISTRIBUTOR

EXC-2

BROWNING-FERRIS MACHINERY CO.	DALLAS & HOUSTON
CLYDE EQUIPMENT COMPANY	PORTLAND & SEATTLE
THE COLORADO BUILDERS' SUPPLY CO.	DENVER
CROOK COMPANY	LOS ANGELES
GREAT NORTHERN TOOL & SUPPLY CO.	BILLINGS
R. L. HARRISON COMPANY, INC.	ALBUQUERQUE
INTERMOUNTAIN EQUIPMENT COMPANY	BOISE, POCATELLO, SPOKANE
THE LANG COMPANY	SALT LAKE CITY
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NEVADA EQUIPMENT SERVICE	RENO, NEVADA
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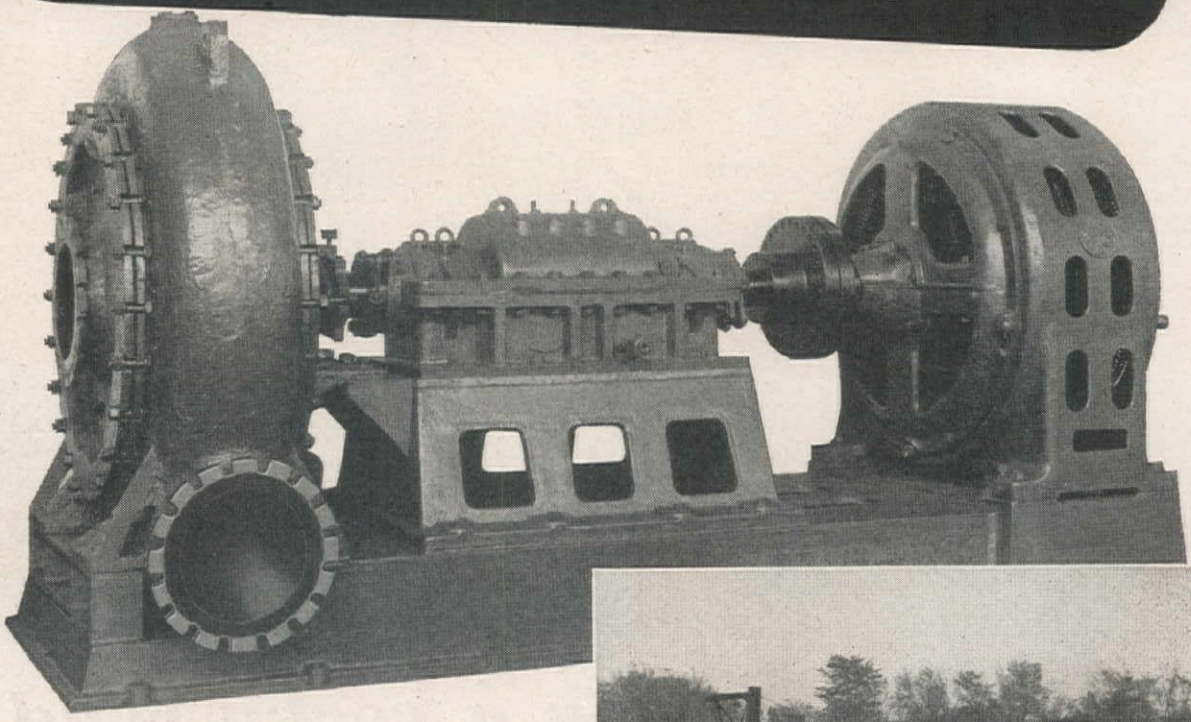
TRI-STATE EQUIPMENT COMPANY	EL PASO
WESTMONT TRACTOR & EQUIPMENT COMPANY	MISSOULA & KALISPELL

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

700,000 Ton Shell Life....



with an AMSCO DREDGE PUMP

Kershaw Mining Co.'s dredge "Chickasaw" pumping aggregate (45% gravel, 55% sand) on the Illinois River. Amsco type XH 15" pump is used.

The record of this Amsco Pump is impressive. Built in 1929, it has been in almost constant use ever since . . . and is still giving "excellent service", according to reports from Kershaw Mining Co. For example, the latest replacement was a shell after the pump had handled about 700,000 tons of material through it.

Long life and efficient service are the rule, rather than the exception, with Amsco pumps. Simple, rugged design is one reason. Another is the use of manganese steel castings for the water end . . . for only manganese steel can withstand the shocks of sucked-in boulders combined with the drastic wearing action of sharp sand and gravel. For complete information concerning Amsco dredge pumps, write us.

AMERICAN Brake Shoe COMPANY

AMERICAN MANGANESE STEEL DIVISION
CHICAGO HEIGHTS, ILL.

Foundries at Chicago Heights, Ill., New Castle, Del., Denver, Colo., Oakland, Calif., Los Angeles, Calif., St. Louis, Mo. Offices in principal cities. In Canada: Joliette Steel Limited, Joliette, Que.

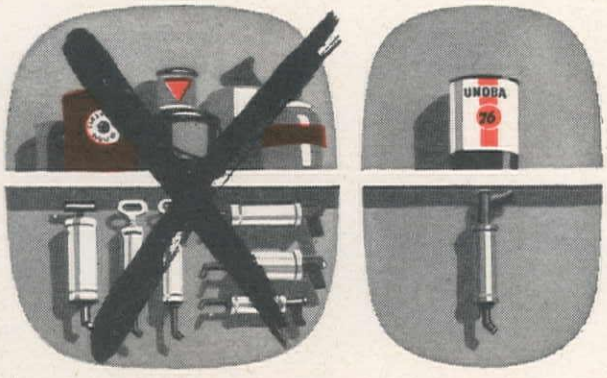
SIMPLIFY YOUR LUBRICATION with MULTI-PURPOSE UNOBA!

Unoba is Union Oil Company's multi-purpose barium base grease that resists *both* heat and water! Unoba simplifies your lubrication because it performs the jobs that formerly required many different greases.

HERE'S WHY UNOBA IS TOPS FOR AUTOMOTIVE AND INDUSTRIAL USE:

1. UNOBA is heat and water resistant! Neither boiling water nor dry heat can cut its protective coating. Unoba gives thorough protection at temperatures from much below freezing to 300° F.

2. UNOBA protects against rust and corrosion! Because of its remarkable resistance to moisture and heat and its unusual adhesiveness to metal, Unoba protects even idle equipment over long periods.



3. UNOBA reduces costs, saves time! With Unoba only one gun and one container need be used in most cases. Thus Unoba holds stock inventory to a minimum, saves you time and cuts equipment costs.

For full information phone your local Union Oil Representative or write Sales Department, Union Oil Company, 617 W. Seventh St., Los Angeles 14, Calif.

ANOTHER

UNION OIL

SUCCESS-TESTED

PRODUCT

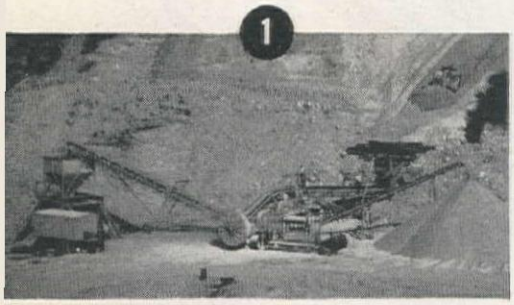
Year after year Cedarapids gives

1923

BACK in 1923, the Cedarapids One-Piece-Outfit put high capacity aggregate production *on wheels* for the first time. Year after year since then, Cedarapids portable plants have been improved, increasing production from 20 to 250 tons per hour and even more. The use of big roller bearings, manganese steel, rubber tires, V-belts, universal drives, horizontal vibrating screens and hundreds of other improvements have resulted in aggregate producing plants that are world famous for big volume production with the lowest possible operating and maintenance costs, easy portability and highest quality aggregates. Today, there's a full line of Cedarapids Portable Crushing and Screening Plants, in sizes and types to fit every product requirement and every job.

20 tons per hour with this Cedarapids "first", built in 1923...the One-Piece-Outfit consisting of a bucket elevator, a jaw crusher and a revolving screen, all on wheels. With this first really portable unit, the aggregate plant could be moved wherever necessary to crush and screen whatever was closest to the job, without loss of time or profit-eating costs.

1949 CRUSHING and SCREENING PLANTS



1 Cedarapids Master Tandem producing aggregate for paving a new 4-lane free way through Santa Ana Canyon. With capacities up to *250 tons per hour,* the Master Tandem is the all-purpose gravel plant with the versatility to handle many different contract requirements.

2 This Cedarapids Junior Tandem makes traffic-bound material for a modern stone and sand company, whose postwar renovation program has raised the plant capacity from *500 tons* to *1500 tons per day.*

3 Cedarapids Pitmaster on a Canadian job easily produces 35 *cu. yds. per hour,* with 55% crushing. The Pitmaster Straightline is the smallest complete Iowa portable crushing and screening plant.

4 Capacities of *250 tons per hour, and more,* with Cedarapids Unitized Crushing and Screening Plants, consisting of any combination of the basic primary crushing, scalping, secondary crushing, and wet or dry screening units. Each unit can be used alone or in combination with the others to handle *every* aggregate job.

Buy the Best . . .

Cedarapids Built by IOWA

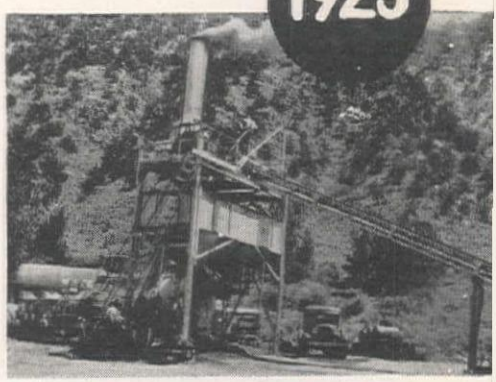
The IOWA LINE *of Material Handling Equipment Is Distributed by:*

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

See Your Cedarapids Distributor For Full Details

YOU more production more profit less maintenance!

TIME has brought many changes in machines and methods since the first Cedarapids Pre-Mix Asphalt Plant was setting records of 30 tons per hour . . . high production for the first portable plant of the 20's! Now the need for output as high as 100 tons per hour of accurately batched materials has resulted in the modern Cedarapids line of Bituminous Mixing Plants, known throughout the industry for their great capacities, low upkeep and low operation costs. Made up of matched screens, pugmills, batchers, elevators and other component parts, they are built for maximum efficiency, easy portability and economy. They produce a steady flow of thoroughly mixed materials.



30 tons per hour with the first Cedarapids Pre-Mix Asphalt Plant. Continuing research and the development of increasingly better machines have enabled Cedarapids to give you greater production of bituminous mixes at lower operating costs that assure good profits.

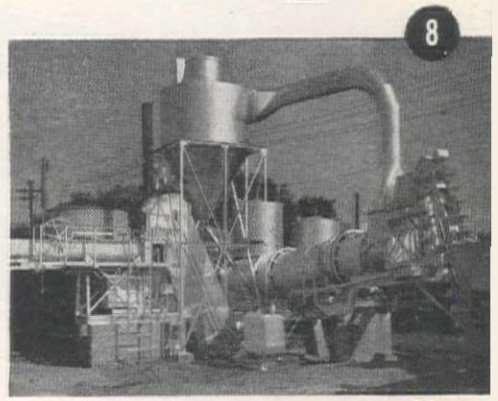
BITUMINOUS MIXING PLANTS 1949

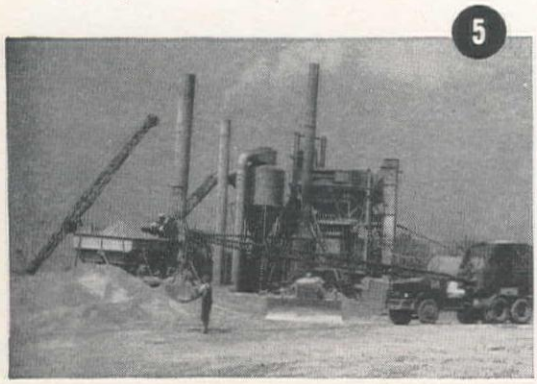
5 Cedarapids Model "E" Batch Type Bituminous Mixing Plant produced an average output of *700 to 800 tons per day* on an airport job that called for mixing 305,700 sq. yds. of flexible base and asphalt surface runways.

6 Model "FA" is the most portable Batch-Type Bituminous Mixing Plant in the Iowa line. Can be set up ready for operation in a few hours. This plant, operating in Ohio, produces *450 tons* of bituminous materials per day.

7 This Cedarapids 1000 lb. Model "A" Bituminous Mixing Plant produces a steady *200 to 250 tons per day.* Accurate batching, thorough mixing and simplicity of operation keep product quality high and costs low.

8 Cedarapids Patchmaster, a rugged, low-cost continuous-mix Bituminous Mixing Plant, produces *30 tons per hour and more* of uniform, thoroughly coated and mixed aggregate. This Patchmaster can be equipped with a 48" x 16' Cedarapids Drier and Dust Collector.



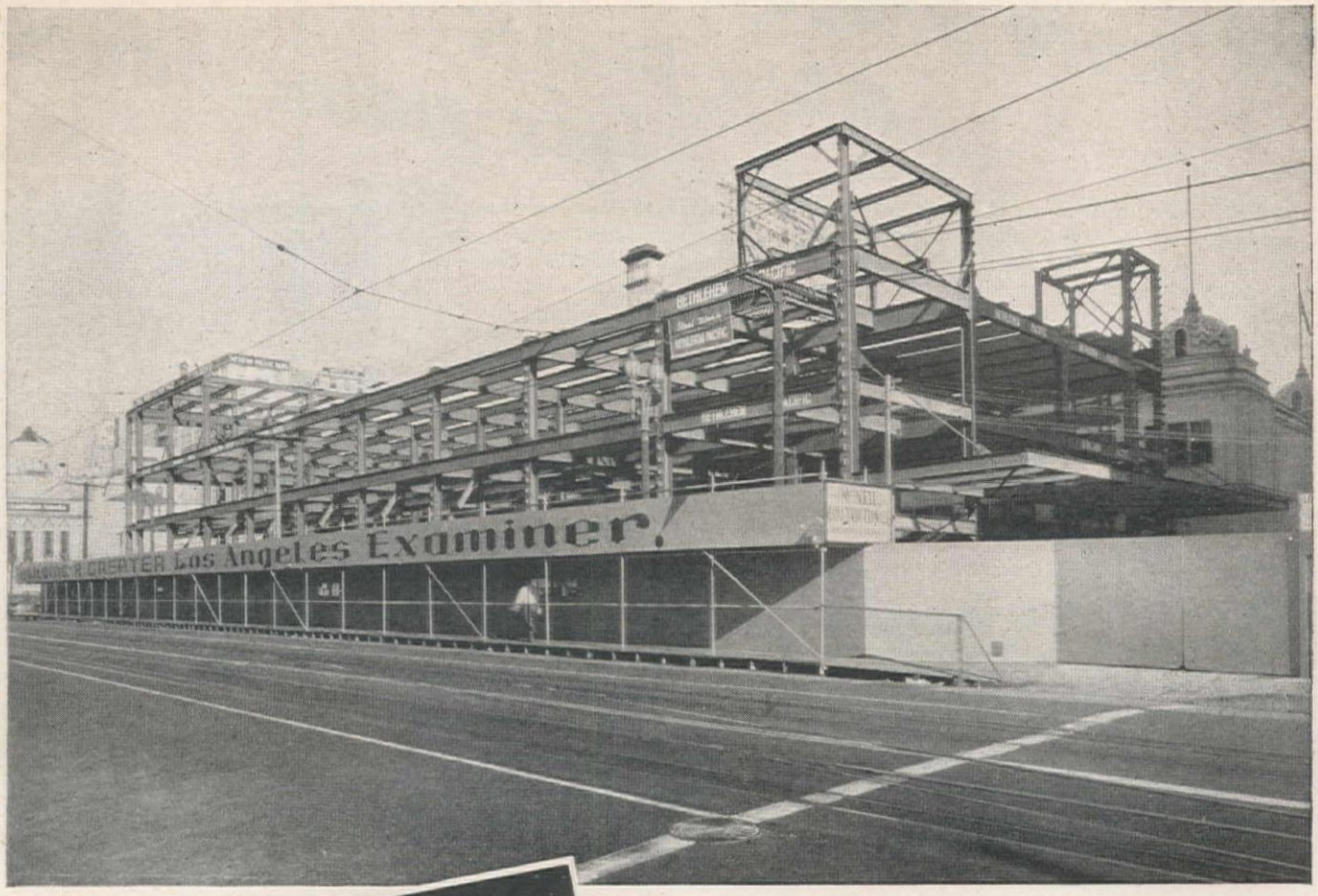


buy Cedarapids . . .

See Your Cedarapids Distributor For Full Details

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa, U.S.A.



Structural steel fabricated and erected by Bethlehem Pacific for the Los Angeles Examiner press building. General Contractor: McNeil Construction Co., Los Angeles. Architects and Engineers: Lockwood Greene Engineers, Inc., New York.

NEW PRESS BUILDING

for Los Angeles Examiner

This is the steel framework for the new press building of the Los Angeles Examiner. When completed the structure will house the heavy, high-speed printing presses and provide paper storage space required for this large metropolitan daily.

As in hundreds of other important industrial buildings in the far West, the structural steel for the Examiner's new press building was fabricated at Bethlehem Pacific's Los Angeles Works and erected by Bethlehem Pacific's Erection Department.

BETHLEHEM STEEL

BETHLEHEM PACIFIC COAST STEEL CORPORATION

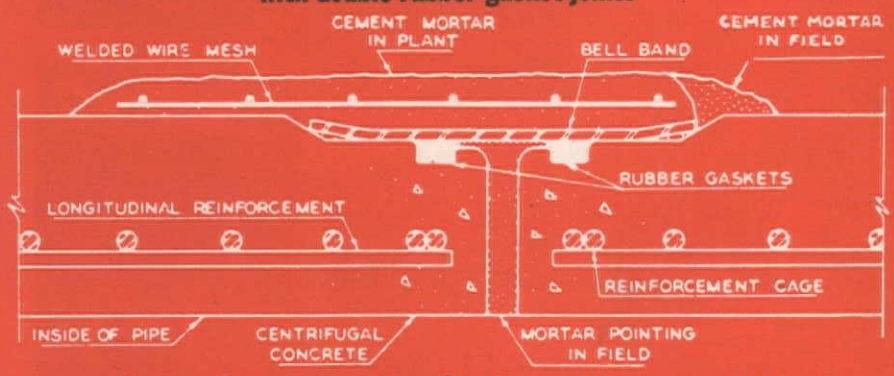
Fabricated Steel Construction

Fabricating Works: Alameda, South San Francisco, Los Angeles
Sales Offices: San Francisco, Los Angeles, Portland, Seattle, Honolulu

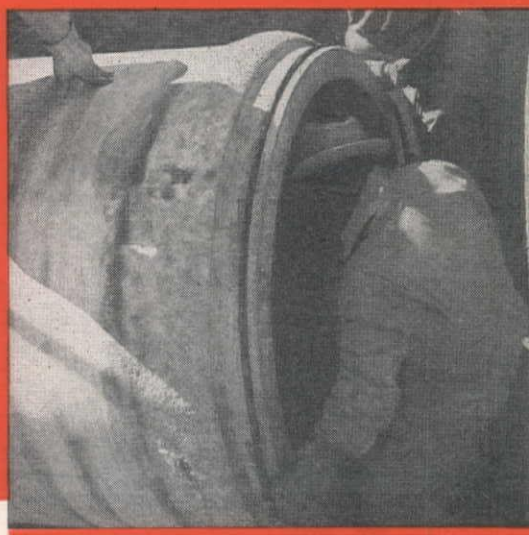
BETHLEHEM PACIFIC

DON'T OVERLOOK SAVINGS in pipeline construction costs to reduce cost of delivered water

CENTRIFUGALLY SPUN REINFORCED CONCRETE PRESSURE PIPE
with double rubber gasket joints



for moderate operating heads ranging up to 150'



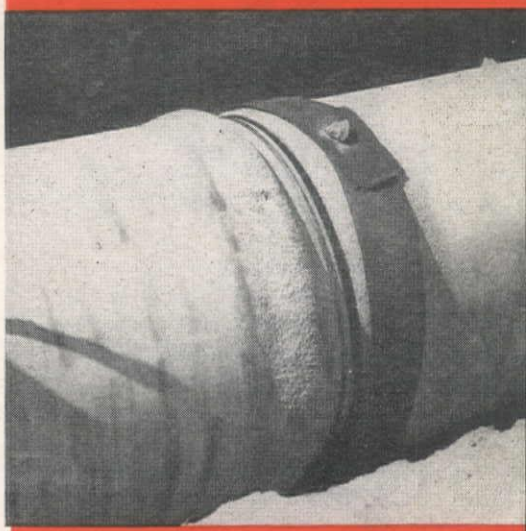
Installing rubber gasket in groove on spigot end of pipe.

These savings are important to everyone concerned with main water supply line design, construction and operation:

1. **To Design Engineers** who want a watertight closure simple in design, rugged in construction, flexible and positive in service. Straight steel joint sleeves permit some pulling of joints to allow for minor changes in alignment or grade, while angle sleeves may be used to provide for larger deflections. This unique joint is also adaptable for connecting to fabricated elbows, reducers and other fittings.

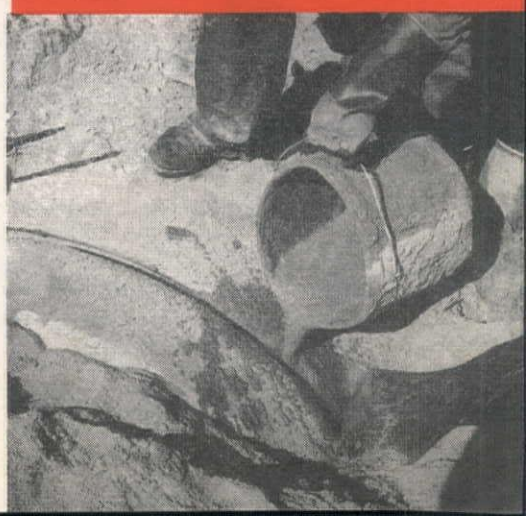
2. **To Contractors** who desire ease and speed of installation. Steel joint sleeve is fitted in the plant to one end of each section of pipe — in effect a bell and spigot rubber gasket joint. 12 ft. sections facilitate laying. There's no need to dig bell-holes, no circumferential welding, no laborious and costly caulking. Immediate back-filling is recommended — an important cost-saving factor in itself.

3. **To Owners, Water Users and Taxpayers** who desire maximum economies in cost of delivered water. Low first costs, plus the proven advantages of performance, sustained carrying capacity and freedom from maintenance expense assure substantial savings.



(Above) Joint sections ready to slip into place — as a cork fits in a bottle.

(Below) Pouring soupy mortar into outside annular space — tar paper confines mortar to joint area. Inside space is pointed by hand in pipe 24" and larger, or "buttered" and swabbed in pipe under 24" diameter.



This type of centrifugally spun reinforced concrete pressure pipe is helping to make substantial savings in construction costs on Unit 5, Coachella Valley Distribution System, a U. S. Bureau of Reclamation project. Information and specifications regarding this class of pipe are available on request.

American PIPE AND CONSTRUCTION CO.

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

P. O. Box 3428, Terminal Annex • Los Angeles 54, California

QUALITY PIPE LINE PRODUCTS MANUFACTURED AND INSTALLED BY AMERICAN INCLUDE HUME CENTRIFUGAL CONCRETE PRESSURE PIPE, AMERICAN CONCRETE CYLINDER PIPE, PRESTRESSED LOCK JOINT CONCRETE CYLINDER PIPE, LOCK JOINT CONCRETE CYLINDER PIPE.

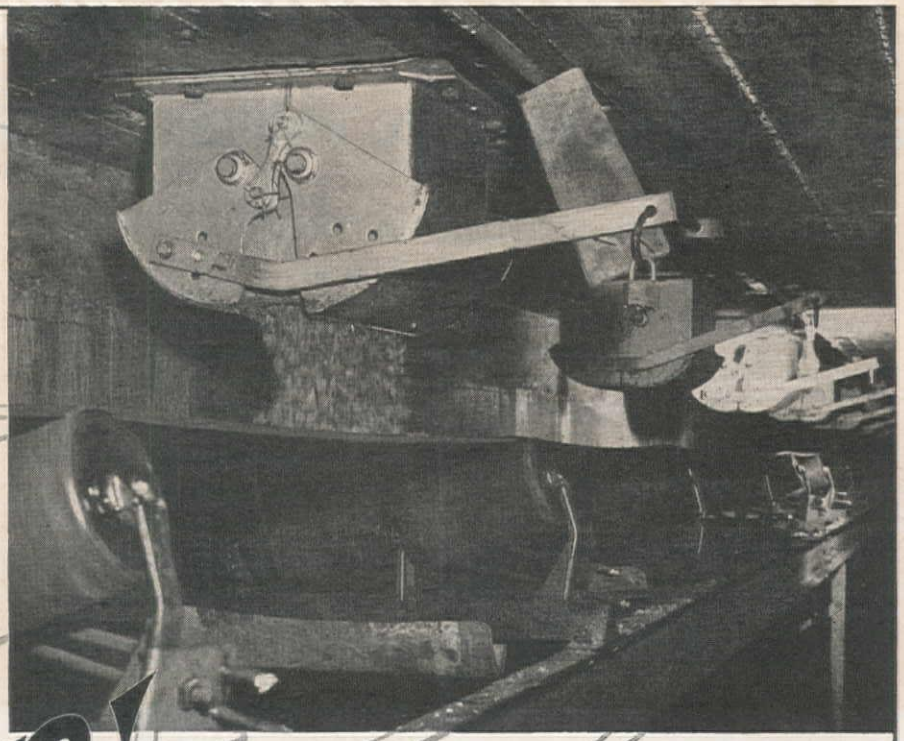
Main Offices and Plant — 4635 Firestone Boulevard, South Gate, California
District Offices and Plants — Oakland — San Diego — Portland, Oregon

AGGREGATE

IS A

NOTORIOUS

GATE CRASHER!

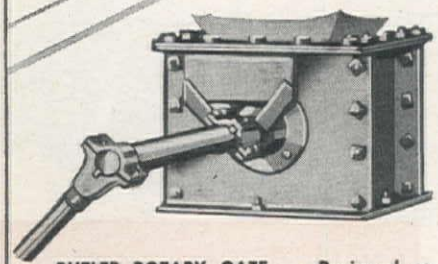


TREMENDOUS impact and tremendous wear, — those are the forces against which all gates on concrete plants, batching plants and sand and gravel plants must fight.

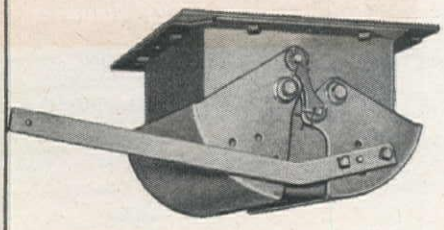
High volume production demands filling and discharge gates that operate smoothly, quickly and accurately; — gates *engineered* to take punishment and like it.

Long-lived BUTLER Gates are jam-proof and clog-proof. And quick-acting BUTLER Gates actually increase an operator's speed, — all characteristics that mean a welcome, extra profit.

BUTLER foresaw the upward swing in concrete production and diverted critical steel to building a stock of gate equipment. A limited stock, — it's true, for steel deliveries are still uncertain, — but for those who place their orders now, immediate shipments are possible.



BUTLER ROTARY GATE — Designed especially for handling cement. Carefully machined rotor fits tightly yet operates easily, — allows no leakage. Rotor may be removed for cleaning.



BUTLER CLAMSHELL GATE — Ideal for sand, gravel, crushed stone. All steel construction, electric arc welded. No cast gears to break or jam. Easily and quickly operated by a simple, fast-acting toggle.

BUTLER BIN COMPANY

WAUKESHA, WISCONSIN

P&H SINGLE PASS SOIL STABILIZERS

17,000 Square Yards

of airport sub-base a Day!

In airport work, as in road making, the P&H Single Pass Soil Stabilizer is setting new standards of performance, speed and economy.

For example, on runway construction of the Omaha Municipal Airport, the P&H Stabilizer processed 1900 sq. yds. per hour — for a total of 17,000 sq. yds. in *one 9-hour working day.*

Three materials — gravel, sand, clay — were required to make an 8-inch soil-aggregate subbase for a 12-inch concrete pavement. The subbase was laid in two 4-inch layers (compacted).

The *one* P&H Stabilizer in *one* pass per layer with just *one* operator performed all stabilizing operations — to meet specifications exactly. Less equipment was required for the job, less supervision was needed because equipment was "bunched" in a smaller area.

AIRPORT PROJECT FACTS

LOCATION — Omaha, Nebr. Municipal Airport.
SIZE OF PROJECT — Runway 7,000 by 155 feet wide.
DEPTH OF SUB-BASE — 8-inches (compacted) laid in two 4-inch layers.
TYPE OF SOIL AGGREGATE — Gravel (from commercial source), fine sand (from deposit on site), clay (imported from source 3 miles from airport). Mixed, including water, compacted to density of 142 lb. per cu. ft.
RATE OF PRODUCTION — Reached 1900 sq. yds. per hr., 17,000 sq. yds. per 9-hour day.

You can build excellent, all-weather surfaces — secondary highways, streets, base courses, airport runways, etc.—more quickly with the P&H Stabilizer. Ask for the facts.

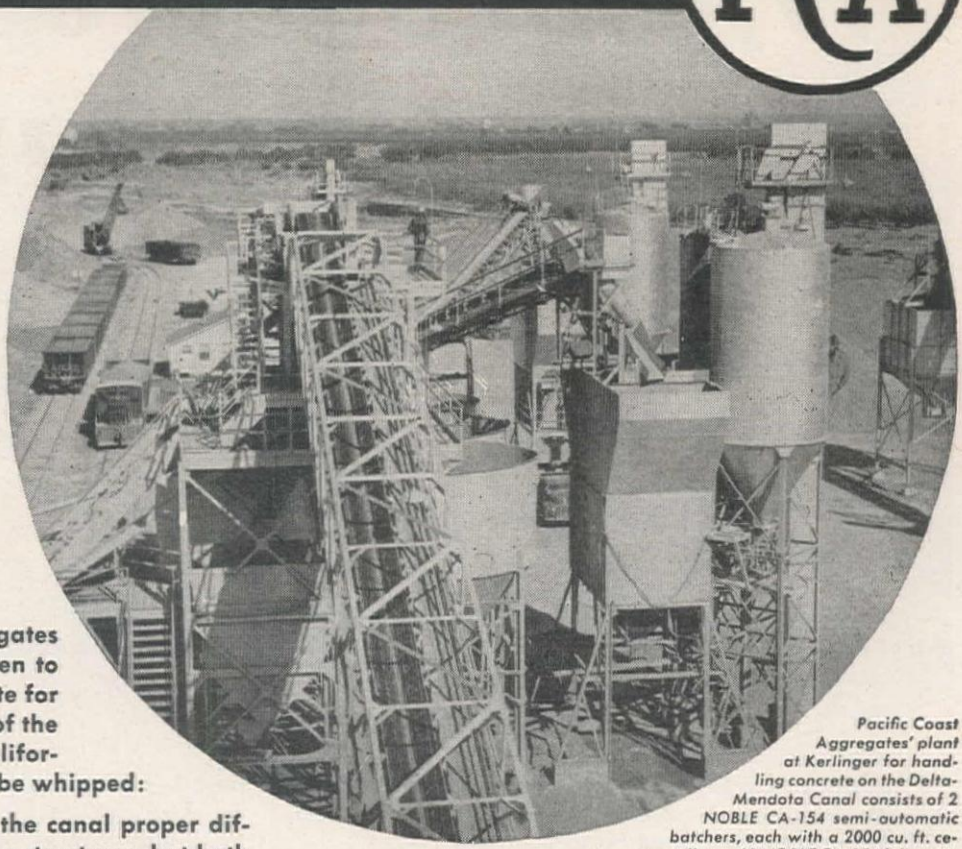
Color sound pictures on P&H Stabilizers are available. Write for information today.

Making maximum use of native materials, the P&H Stabilizer shaves and pulverizes, maintains true subgrade, applies liquid, final mixes, and spreads to a uniform depth — and does it rapidly.

P&H
SINGLE PASS SOIL STABILIZERS
4490 West National Avenue
Milwaukee 14, Wisconsin
HARNISCHFEGER CORPORATION
EXCAVATORS · ELECTRIC CRANES · ARC WELDERS · P&H · HOISTS · WELDING ELECTRODES · MOTORS

NOBLE STANDARD UNITS MAKE *Custom-Built* BATCHING SETUP FOR PCA

They Solve Two Special Concrete Batching Problems on Delta-Mendota Canal



Pacific Coast Aggregates' plant at Kerlinger for handling concrete on the Delta-Mendota Canal consists of 2 NOBLE CA-154 semi-automatic batchers, each with a 2000 cu. ft. cement silo, and 1 NOBLE CA-154 full-automatic batcher with 2 2000 cu. ft silos All the aggregate for the Delta-Mendota Canal is produced at this Kerlinger plant

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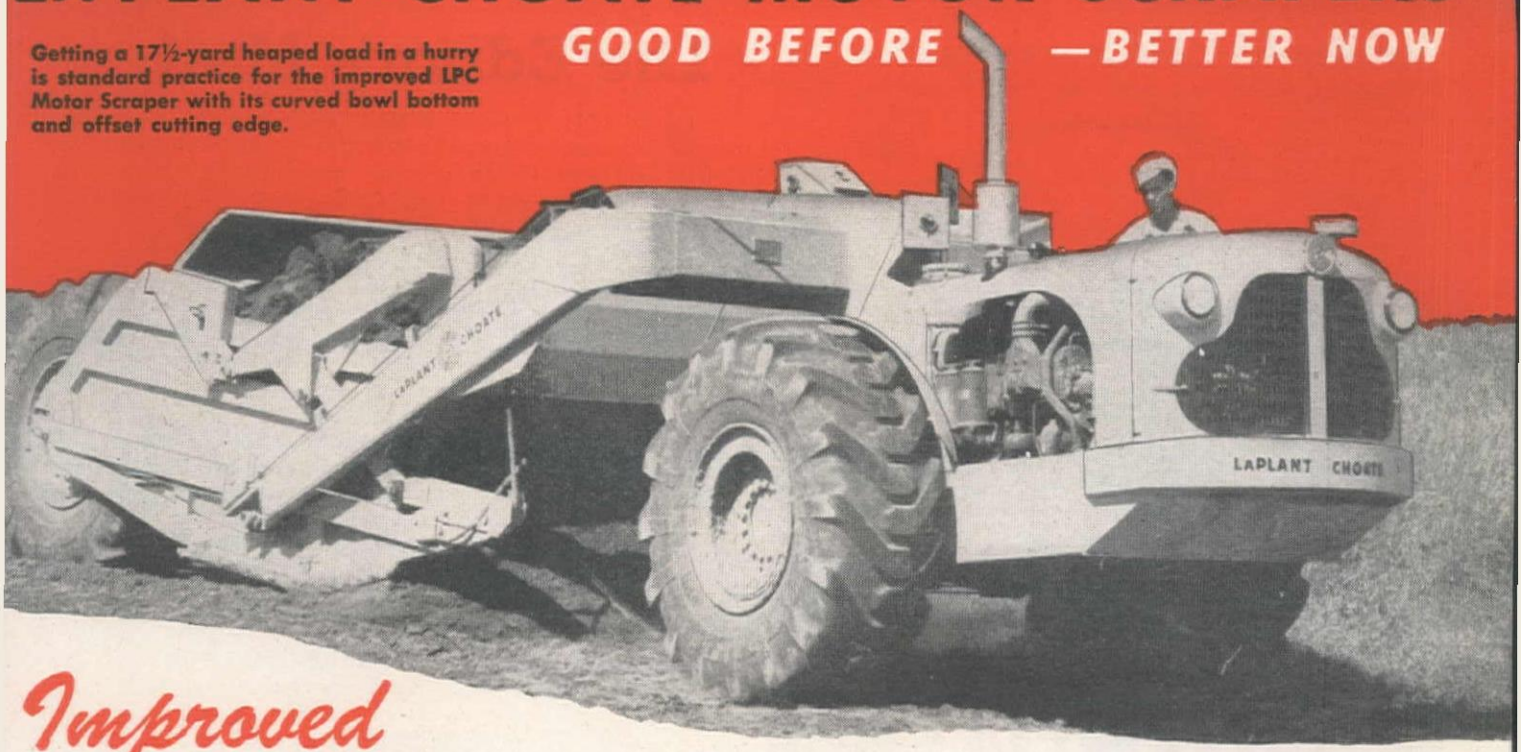

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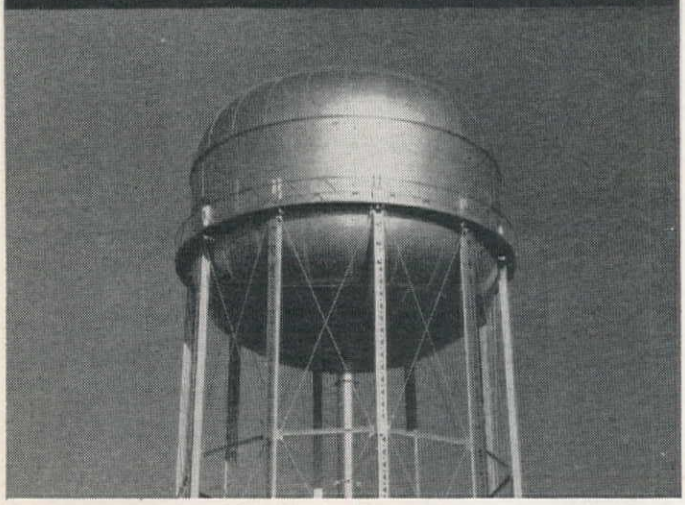

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The Editor's Mail . . .

THE ENTIRE "Editor's Mail" column this month is devoted to comments on the WCN proposal, published in the April 15 issue, for an amicable settlement of the Arizona-California controversy over the Colorado River. Additional letters and comments will be found on page 77.

Nevada Says:

Editor, Western Construction News

Your letter and a copy of an editorial reprint from your April 15th issue has been received in Governor Pittman's absence from his office.

At the present time the Governor is holding meetings in Las Vegas and he will remain there until the latter part of this week in order that he may confer with members of the Nevada Colorado River Commission. I am sending him a copy of your letter and the reprint, as I am of the opinion that he would desire to discuss this matter with the other members of the commission.

I wish to convey the Governor's kind regards.

Carson City, Nev. — ALICE C. MAHER
Secretary to the Governor.

Editor, Western Construction News

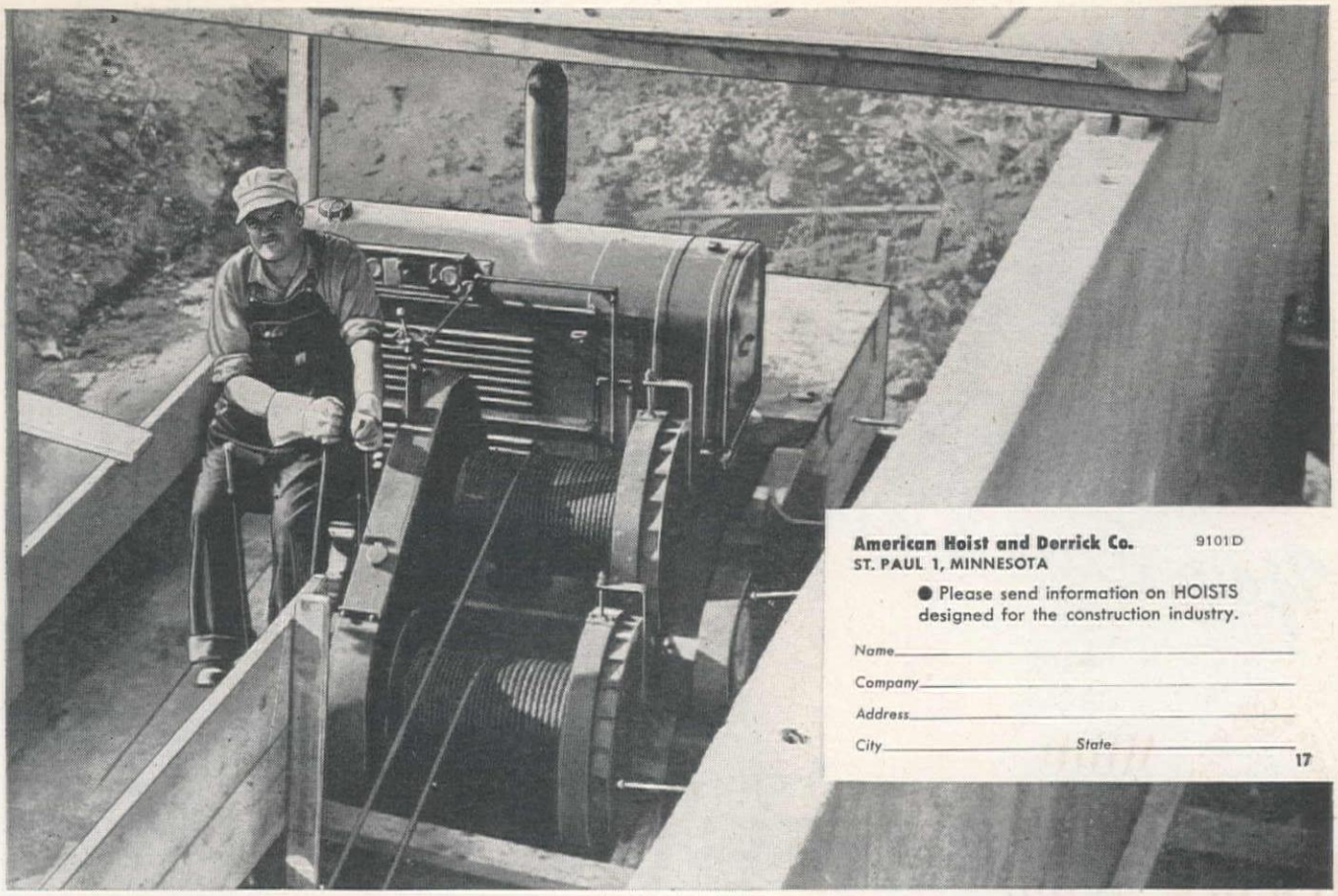
Replying to your letter in regard to the controversy between Arizona and California as to division of down-stream Colorado River water between these two states, will say I think your suggestion has much merit.

Inasmuch as there is no agreement by Compact between the five down-stream states which take water south of Lee Ferry under the Colorado River Compact, it might be well to have the whole matter re-opened for negotiation. Presumably this can be done by unanimous agreement of the said states to re-open the matter. I say the five down-stream states advisedly, because both Utah and New Mexico are entitled to a portion of the down-stream water. You are familiar with the Arizona Project under which Arizona would divert water by means of pumping and canals, originating at Parker, below Boulder Dam. Power for pumping would be supplied by a power dam to be built at Bridge Canyon site above Hoover Dam. The cost of irrigating the land in the Salt River Valley would be in the order of $2,000 per acre and this would be for supplemental irrigation only. No new land would be reclaimed or developed.

The Bureau of Reclamation does not seem to think the project unsound, but it seems to me that any project which must be subsidized to the extent this one will have to be belongs in that category. It is certain that if this type of project is looked upon with favor by the Bureau for Arizona, then Nevada has approximately 150,000 ac. of land bordering the Colorado River which can be irrigated with a pumping lift not to exceed 800 ft. Furthermore, it is easy to visualize a growth in Southern Nevada that will increase its population to 100,000 within the next 25 years as a result of abundant power from other dams to be constructed on the Colorado above Hoover Dam, and use of the water that will be available for pumping from Mead Lake and Davis Lake. The growth of the Las Vegas and Boulder City areas and the development at Henderson, Nev., indicate strongly that such a prediction is reasonable.

There is a steadily increasing tendency for the United States population to move westward and when that Nevada area is given abundant low-cost power and sufficient water, there can be no question as to its rapid growth. Thirteen years ago the Bureau of Reclamation made a careful study and report on the cost of pumping water from Mead Lake into Las Vegas Valley through a lift of 800 ft. for irrigation which indicated that it could be done for $33 per ac., including amortization over a 40-year period. At that time the cost was too high, but at this date, with vastly increased suburban development, manufacturing possibilities and a desire of many wealthy people to create estates in this warm

Continued on page 50



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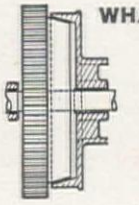

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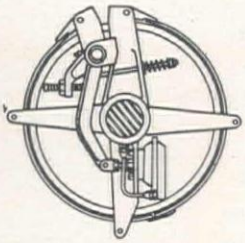

When the chips are down, and you have to call on men and machines for "impossible" performance . . . it's a pleasure to own an AMERICAN hoist. In that kind of a situation, you'll notice some amazing differences in the way a hoist can behave. First—you'll notice extra production without a sign of strain. Second—an effortless, precise operation that keeps the operator fresh and rested. Third—your AMERICAN hoist stays cool and quiet while another may be smoking hot, noisy and seeming to labor in every part.

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desert area, it is not too high. Certain it is, that if Arizona contemplates using all surplus water from the River on a project which appears to be fantastic, Nevada—and perhaps Utah and New Mexico—may be entitled to more water from the main stream than was allocated to them under the provisions of the Boulder Canyon Project Act.

As the so called Tri-State Compact is not a Compact at all, but merely a promise by Congress to ratify a Compact on the stipulated basis, it seems that the whole matter may well be thrown open for re-negotiation. Nevada tentatively received only 300,000 ac. ft. per year because the Bureau of Reclamation stated that Nevada could not economically use more than that much water at any time in the future. It now appears that Nevada could use one million acre-feet of water per year. It is interesting to note that in the preliminary negotiations for a downstream Compact, a group of the states in the Colorado River Basin signified their willingness to place Nevada's allotment at 900,000 ac. ft., but because of the Bureau's statement and limitation, which now does not appear to be valid, this was not done.

ALFRED MERRITT SMITH
Carson City, Nev.

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An Arizona Publisher Says:

Editor, Western Construction News

Your letter and its enclosure have been read with much interest.

At the outset let me say that I am not a do-gooder. What is more, I do not like them. No paper in the country is more outspoken against them than I am.

I am one of those who took an open and positive position advocating the ratification of the treaty with Mexico, granting Mexico 1,500,000 ac. ft. I did that for two general reasons. The first is that, above everything else, I am an American citizen, and in our international negotiations, while I favor following a tough, firm policy, I do not think we should violate a basic principle of justice. Such a principle is involved in the negotiations with Mexico concerning the Colorado River.

In line with that statement, for a powerful nation such as ourselves to deny a weaker nation the right to the use of the waters of a river that flows through both countries, would have been wrong. We cannot ask for one rule of justice on the Colorado river and another on the Rio Grande and other international rivers. . . .

Moreover, at the present time, largely in order to keep a power plant operating at Pilot Knob, the Imperial Valley irrigation district is drawing water from the river, running it through its canals and pumping 1,000,000 ac. ft. per year of surplus water into the Salton Sea.

Now, as to Arizona's side of the question: At the present time, Arizona is using annually 400,000 ac. ft. of main stream flow that comes across into Arizona at Lee's Ferry. Arizona feels that her demands are modest and just when she asks for 1,250,000 ac. ft. per annum to maintain the productivity of the Central valley. California denies that we are entitled to that water, and is using all of her power to block Arizona. Under California's limitation act, passed by her own legislature, California limited her use to water in the river to 4,400,000 ac. ft. The Boulder Canyon Project act specifically allotted Arizona 2,750,000 ac. ft. Arizona believes that she is entitled to that amount of water, and Congress said that she was entitled to it. We believe that so long as California gets the amount of water set forth in her own limitation law, she should not fight us.

As a matter of fairness, we hope you will investigate this situation. We believe that if you will give all of the facts careful appraisal, you will see overwhelming justice on the side of Arizona, and maybe you could mitigate the violence with which California attacks us . . . .

I make this proposition to you. If you can, as you propose, get the governor of California to "appoint committees of men with a fresh approach and with a will to end this ridiculous deadlock and disharmony," I believe that I can get the governor of Arizona to do likewise.

Continued on page 52

OVER ROUGH JAGGED ROCKS–IN MUD, GRAVEL, SAND–ON SMOOTH HIGHWAYS–

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Where you have to go in off-the-highway to get the load, bring it out and over the road, use the *General H. C. T.* The sturdy, zig-zag tread digs deep for more traction in toughest going. Carries loads faster, safer, cheaper over the highway.

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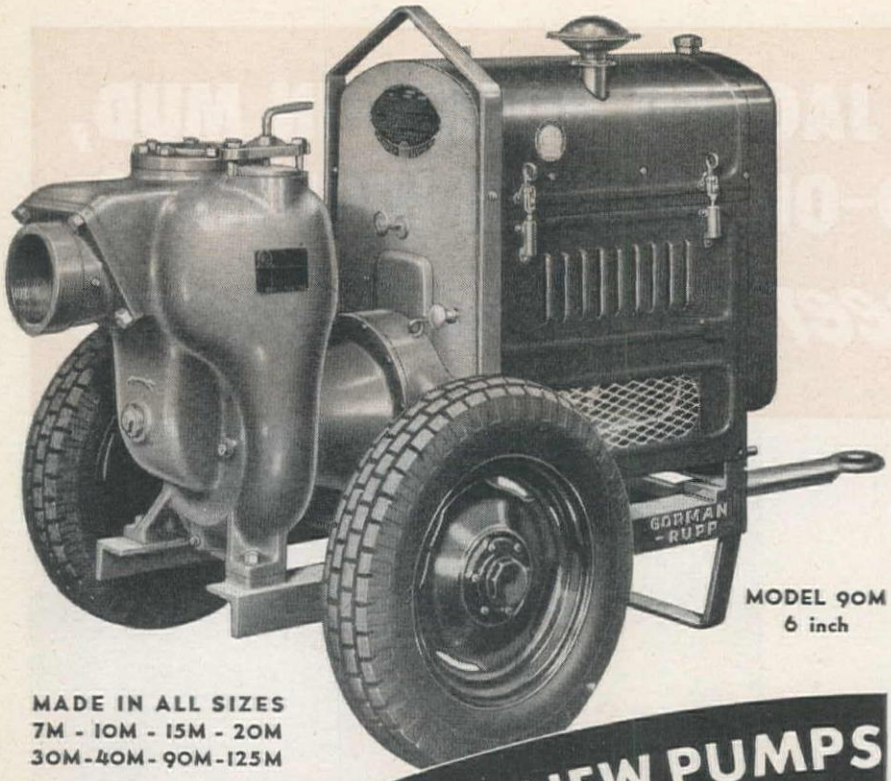

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WILLIAM R. MATHEWS
Publisher, Arizona Daily Star.
Tucson, Ariz.

A Western Magazine Says:

Editor, Western Construction News

Yesterday when I was in his office, Bill Beadle at Byron Jackson Company showed me a preprint of your April article proposing a solution to the Colorado River controversy. You have really got something there. I would like to request ten or a dozen additional copies of this preprint, if you have them available. Congratulations on this job.

WINSTON R. UPDEGRAFF,
Editor, Western City.
Los Angeles, Calif.

State Engineers Say:

Editor, Western Construction News

Thanks for a copy of your editorial in the April 15th issue of *Western Construction News*. I will first compliment you on a well prepared and well written editorial.

I do not agree with your statement with reference to what you term the loss of 1,500,000 acre feet of water annually through the ratification of the Mexican Treaty and later in the same paragraph your reference to unscrupulous do-gooders in Washington, etc....

I was convinced at the time that Mexico as a sovereign nation on an international stream was entitled to an equitable share of the water of that stream. Also I was convinced that 1,500,000 ac. ft. was a fair share for Mexico. I am still of that opinion.

Since I know all of the representatives of the states quite well, including those from California and Nevada, I am sure that each and every one represented what was his honest opinion and when California and Nevada representatives withdrew from the committee it was a keen disappointment to me as well as most of the others. I for one still hope these states will join us in the Colorado River Basin States Committee in working together for the common good of all.

I agree fully with the balance of your editorial and I believe the men you have suggested could probably settle the California-Arizona fight if given the authority to do so.

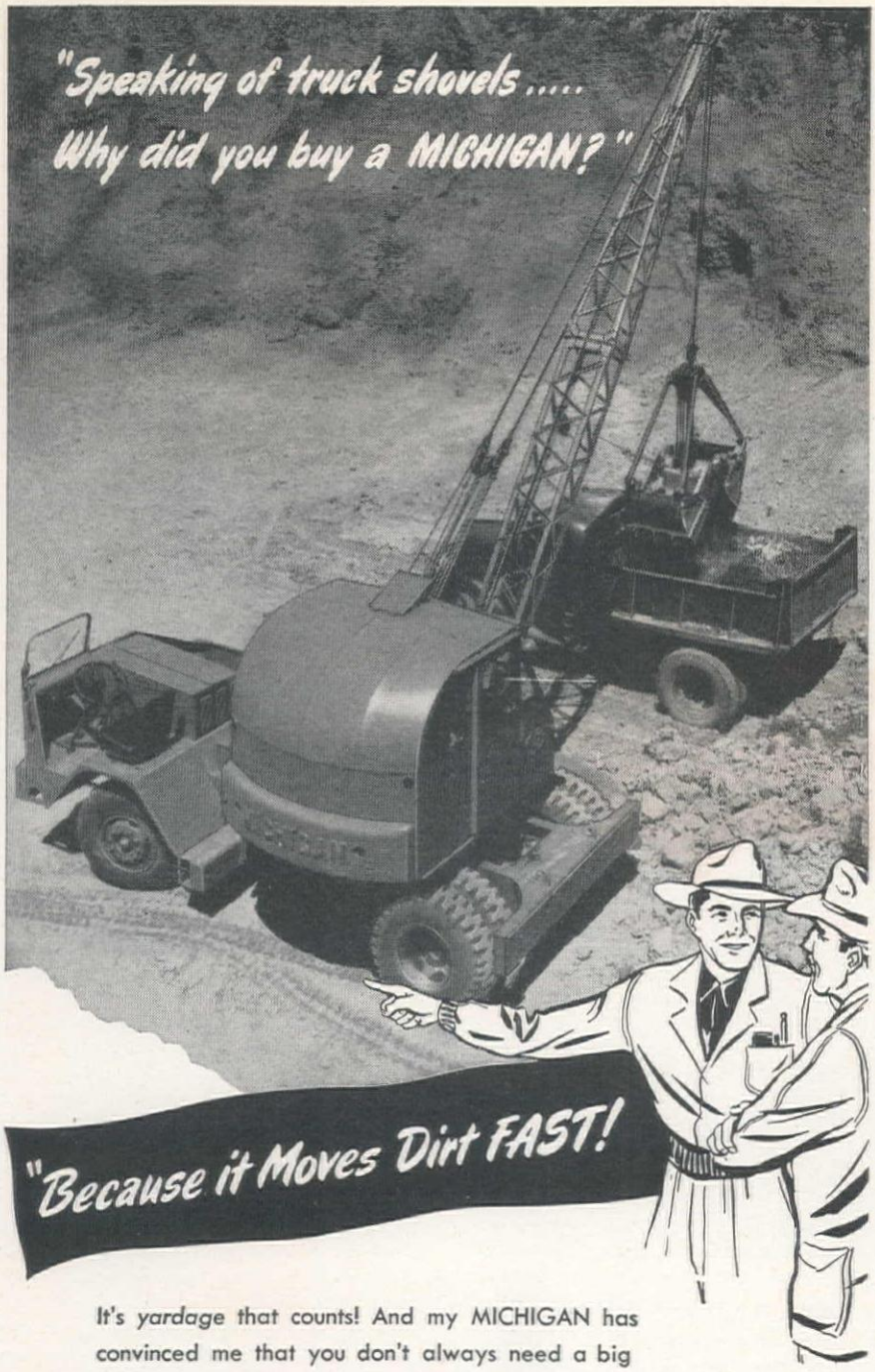
I have found that in most of our water controversies, a group of reasonable minded men have found a fair solution to the problems.

L. C. BISHOP
Cheyenne, Wyo.

Editor, Western Construction News

I have read with interest your article on the Arizona-California difficulties regarding the allocation of the waters of

Continued on page 54



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the lower Colorado River Basin. Your conclusion that the only satisfactory way this matter can be settled is by agreement between the lower basin states is well taken. This would be a considerable undertaking considering the many issues which have been raised by the two states; however, I do not feel that the compact method of settling the matter is yet beyond hope. Probably the best way to start such negotiations would be by a joint engineering study between the States of Arizona, California and Nevada of the available water supply and the water supply which may be available assuming full development of the basin. The two parties seem to have entirely different sets of figures for these conditions and I believe that a joint determination would go far towards solving many of the questions which have been raised.

I cannot agree with you that the bickering between the two states has resulted in the loss of 1,500,000 ac. ft. of water annually to Mexico by virtue of the Mexican Water Treaty. The Republic of Mexico is unquestionably entitled to a reasonable amount of water of the Colorado River and it seems to me that the amount given to her under the Treaty was not excessive.

I noted in the current Congressional hearings on the proposed Central Arizona Project that there was a tendency in the thinking of the Committee toward the idea that the water supply question between the two states should be settled, if possible. Whether or not this is necessary at the present time may be questionable. I do feel, however, that if the two states would make a sincere effort to get together on this question they would find the problem not insurmountable and their differences could be settled mutually and equitably so that new developments on the stream could proceed without further delay.

Your list of negotiators should include Nevada representatives as well.

JOHN H. BLISS

Santa Fe, N. Mex.

Editor, Western Construction News

I have taken considerable interest in this fight between California and Arizona over the division of water of the lower Colorado River. I worked two years for the Bureau of Reclamation in Arizona and have traveled over a considerable part of the State as well as practically all of southern California, so I am somewhat informed as to the physical conditions and the demands for Colorado water in these two states.

I agree with you that a compact is the only way to settle this controversy. A settlement of this kind would certainly be much more reasonable and practical of operation than a decree handed down by the Supreme Court.

It is too bad that such a friction has developed between peoples and communities of the two states. Even a stranger traveling in the Southwest comes in contact with this friction even though he is uninformed on what it is all about. I think your editorial has put its finger on the right spot and that is to scrap the present compact organization and start over again from scratch. After wrangling so long over a question of this kind which crystallizes opinions and desires, it is hard for individuals to lose face while making concessions on both sides that would be necessary to end the controversy. . . .

An engineering fact-finding board to work with and be advisers to a compact commission, I believe, would save a great deal of time and certainly would be a big assistance to the commission in arriving at an equitable solution. This is the principle that is being used in the dispute between Canada and the United States over international water-ways. . . .

I note in your editorial that the opening paragraph speaks of the Roosevelt Dam on the Gila River. Also the caption under the picture of the Roosevelt Dam speaks of the Gila River. I think if you will look at the map you will find that the Roosevelt Dam is located on the Salt River which in turn is a tributary of the Gila River. This is a mere technicality.

FRED E. BUCK

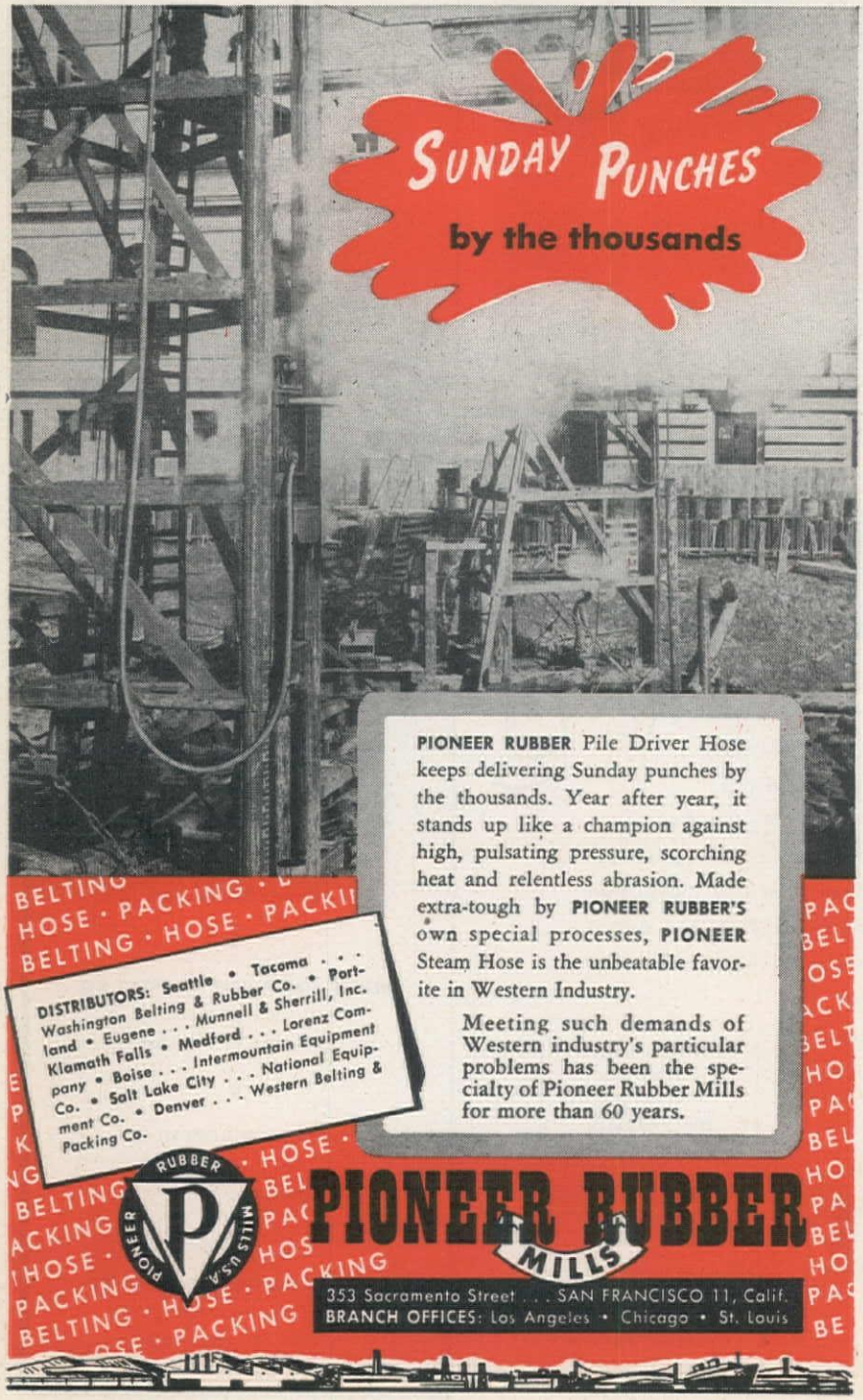
Helena, Mont.

Editor, Western Construction News

I was much interested in reading your editorial and noting the suggestion you

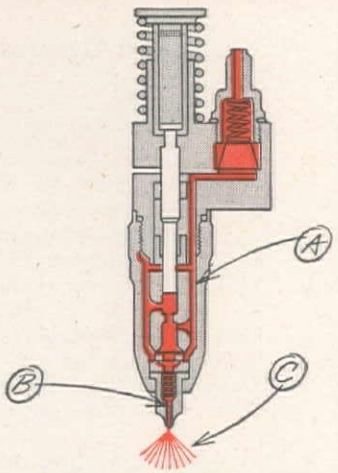
Continued on page 56

How Pioneer Rubber helps Western Industry...



STANDARD ENGINEER'S CASE FILE

Case 1105—Obtaining Full Power in High Speed Diesels



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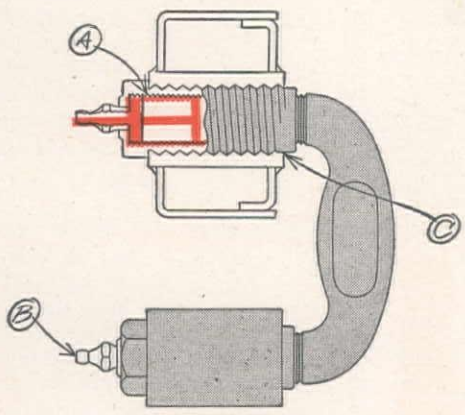
Standard Automotive Diesel Fuel has a low pour point which allows free flowing in the coldest weather.

Case 1128—Reducing Chassis Bearing Wear



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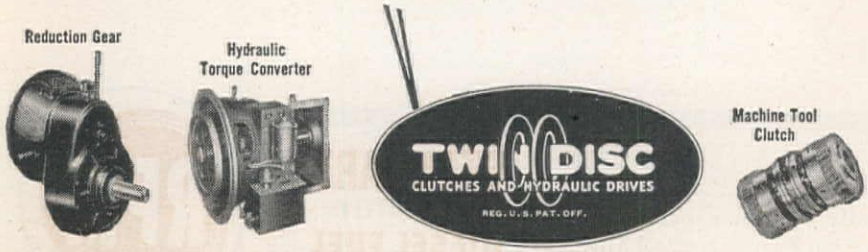

SPECIALISTS IN INDUSTRIAL CLUTCHES SINCE 1918

make therein. The suggestion is constructive.

However, it is my impression that the lines in this controversy have been so closely drawn that it would be difficult to reach a compact adjustment which had any chance of ratification in the two states.

As you probably know, it has always been my belief that these interstate water problems can be more effectively and satisfactorily adjusted through compact than through litigation in the Supreme Court of the United States. I shall be interested in knowing the reaction which grows out of your suggestion.

CLIFFORD H. STONE, Director,
Colorado Water Conservation Board
Denver, Colo.

Suggested Committeemen Say:

Editor, Western Construction News

Your editorial appeals to me as a most excellent summary of the Colorado situation, and your proposal that the time has arrived for serious effort to compromise the conflicting claims of Arizona and California merits the most thoughtful attention by all interests. Since approval of the Mexican Treaty and gradual dissipation of the belief that the Upper Basin States would **never** accomplish consumptive use of their full allotment, it has become clear that the prospective projects in the Lower Basin would have to be trimmed down; certainly it would seem better to accomplish this trimming by friendly arbitration, if at all practicable, than by the neighborhood warfare methods now in vogue. Your leadership toward such a move is commendable.

I feel complimented, of course, by your mention of my name as a possible designate to the group from California. I can't say that I should welcome such an assignment, but if there appeared hope that such a body could help toward resolving the differences I might accept service. FRANK E. BONNER

San Francisco, Calif.

Editor, Western Construction News

I have just received your letter and the editorial from the April 15 issue of *Western Construction News*. Although I know well several men whom you have nominated for the job of trying to settle the Colorado River controversy, including some of the California men, and know that I could work amicably with them, I have not the slightest hope that your proposal will be approved by the governors of the states involved, and I am even somewhat doubtful whether Arizona, at least, could legally place the matter in the hands of a group of men that would be without legislative sanctions of any kind. Nevertheless, as stated, I feel flattered that you included my name among your nominations, and wish to thank you. G. M. BUTLER

Tucson, Ariz.

Continued on page 58

BIG BUY

of the Medium Duty Field

BIG "Army Workhorse" Engine

the same famous GMC "270" that performed so dependably and economically in nearly 600,000 military GMCs . . . with such quality features as Full-Pressure Lubrication, Tocco-Hardened Crankshafts, Airplane-type Main Bearings.

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eight inches wider and seven inches longer than prewar, all steel-welded with 22 per cent greater vision, seats with double the number of springs, automatic built-in ventilation system, ccmplete insulation and soundproofing.

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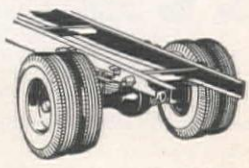

with heavy duty frame of 10.1 section modulus . . . big husky axles, clutch, transmission, brakes and springs. Built to handle gross vehicle weights up to 21,500 pounds and truck and trailer weights up to 37,000 pounds.

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No drilling or plugging for JOE RAMSETTER. In 30 seconds, he does the complete job of setting pins or studs to accurate positions in steel, concrete, masonry. Just load the light, portable RAMSET TOOL, press against the work and RAM! Fastener sets quicker than a wink—tightly, easily.

No electric lines or air compressors! RAMSET is self-powered, carried in one hand from job to job, always ready to set, instantly, pins and threaded studs up to 6″ long and ⅝″ diameter. On continuous work, any good workman can "RAMSET" up to 50 fasteners per hour.

Ask for a 15-minute RAMSET demonstration. You'll see why it breaks all records for speed and economy on fastening jobs, pays a profit on every setting.

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Editor, Western Construction News

I appreciate very much your expression of confidence in me by suggesting my name to the Governor as a member of a committee to endeavor to resolve the controversy between Arizona and California on their water rights to the Colorado River. I heartily agree that this difference of opinion should be settled.

Outside of the few who have had close contact with the controversy, it seems that there are a very few who know the other side of the question. We hear considerable about California's rights and only the statements that Arizona's rights are mostly fictitious. There was an endeavor, at one time, to invite some person from Arizona who could speak authoritatively on the subject, to come to Los Angeles and tell us their side of the question, but this was so vigorously frowned upon by our leaders in water development that the thought was abandoned and we still do not know the full story.

If the matter is one of legal interpretation of rights, then I am afraid that I would not qualify for the appointment you suggest for me; however, if such a committee was to be appointed and the Governor, after full knowledge of my qualifications wished me to act, I would, of course, do so.

D. LEE NARVER
Los Angeles, Calif.

Citizens Say:

Editor, Western Construction News

"The Colorado River is flowing merrily out to the sea."

I do not know of any single problem in southern California, and probably in the entire state that is so important as the above subject, and its implications.

I am sure we can both agree that there has been too much delay, and too many "factions" that are taking narrow viewpoints without the vitally necessary comprehensive approach which is indicated.

The committee you have suggested is outstanding; and it would be virtually impossible to get a chairman who has experience and engineering ability comparable to that of Mr. Walker R. Young. It has been our privilege to know and to work with Mr. Young for over twenty-five years past.

W. N. BEADLE,
Byron Jackson Co.
Los Angeles, Calif.

Editor, Western Construction News

There are controversies that can be ended in no other manner than the complete defeat of one party. Whether the Arizona-California controversy over the waters of the Colorado is one such I do not know. If not it certainly would be desirable to have it settled amicably and your proposal offers a possible approach.

ROBERT W. SAWYER
Bend, Ore.

"Lube Logic"

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- ☐ **SLUDGE IN LUBRICATING SYSTEM** — results: *plugged oil lines, clogged oil screen*
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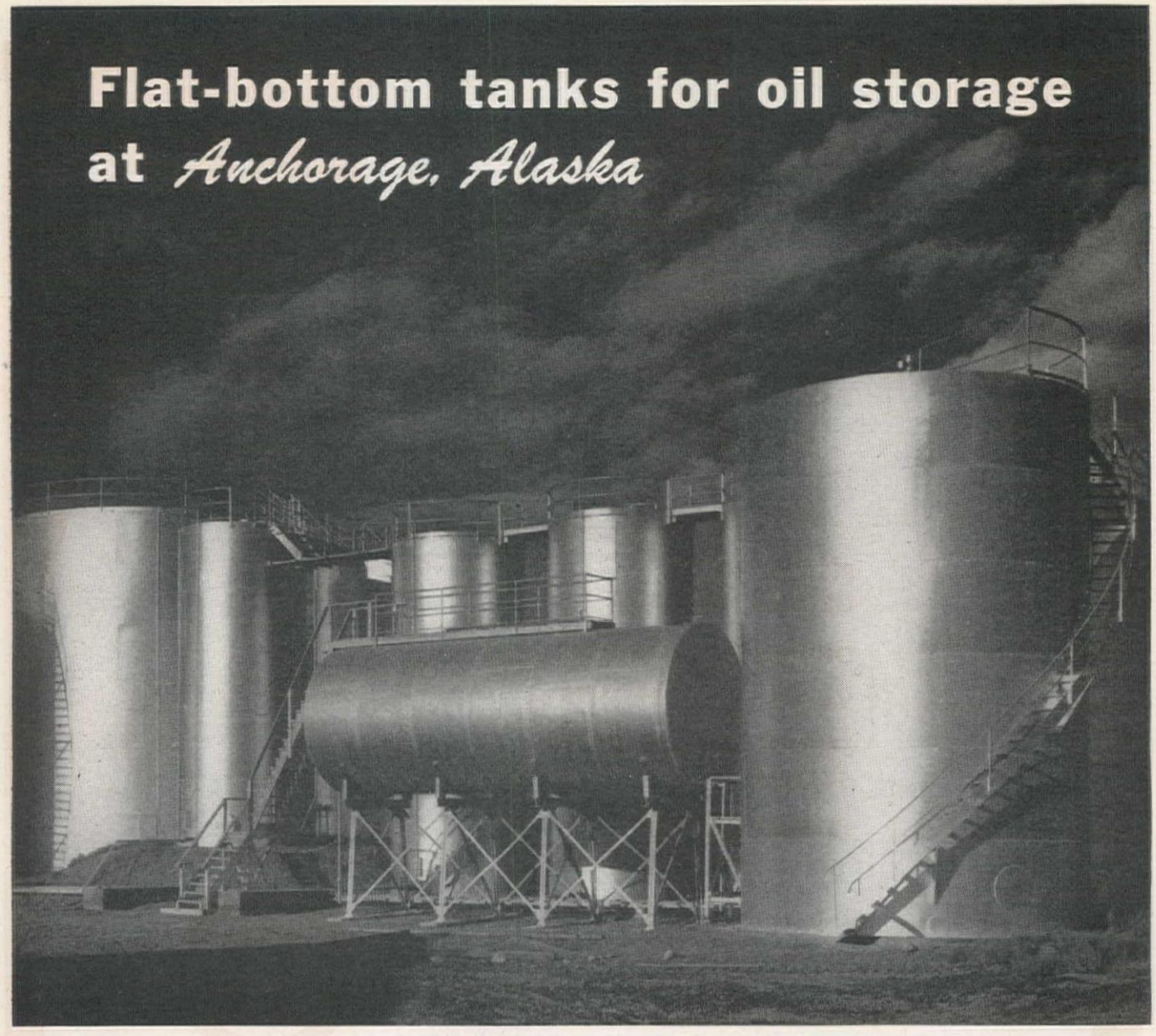
THERE IS A SCIENTIFIC RICHFIELD LUBRICANT FOR EVERY MACHINE IN EVERY TYPE OF SERVICE

Richfield

Flat-bottom tanks for oil storage at *Anchorage, Alaska*



STANDARD Oil Company of California has installed the tanks shown in the above view at its Anchorage, Alaska, bulk plant for the storage of petroleum products. Welded-steel flat-bottom tanks of this kind are used extensively in the oil industry. They are available with cone, dome or umbrella roofs, and with special vapor-saving roofs such as Horton Floating Roofs or Horton Liquid-Seal Lifter Roofs. Other industries use flat-bottom tanks for general storage purposes—for water, fuel oil, molasses, chemicals and finished liquid products awaiting shipment.

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WESTERN CONSTRUCTION NEWS

WITH WHICH IS CONSOLIDATED WESTERN HIGHWAYS BUILDER

May 15, 1949 Vol. 24, No. 5

JOHN M. SERVER, JR. . . . . Editor
JOHN J. TIMMER . . . . . Managing Editor
RICHARD C. CLARK . . . . . Associate Editor

Always There When the Call Comes

THE WORLD was shocked last month by the story of little Kathy Fiscus and her dreadful death at the bottom of an abandoned well casing in San Marino, Calif. We do not propose to review the circumstances again, or to editorialize about the necessity for keeping covers on the old wells and the thousands and thousands of abandoned prospect and mine shafts to be found everywhere in the West. The daily papers and radio, as well as numerous more or less sincere state and federal legislators, have made countless statements about correcting the dangerous man-traps. We could add nothing except a recollection that many of the old shafts around southern Arizona, where we spent our boyhood, were covered by their owners at the time of abandonment by planks, but as years passed, the planks rotted away to mere shells, and the holes became more dangerous both to man and beast even than when merely standing open.

But in the sadness of Kathy's misfortune, we want to express a measure of pride in the heroic self-sacrifice and courage of her rescuers, who were, as in most misfortunes, engineers and construction men. We shan't even recite their names, for they, too, have been named over and over in press and radio. But the wonder of it is that without solicitation, without hope of reward (though this probably is coming now) they came from far and near, and worked without rest until the job was finished. Machinery dealers and contractors made almost unlimited numbers of pieces of equipment available.

That all seemed wonderful to the general public, but actually is just another in an unending parade of selfless public services by the giants of construction. No other class or profession can point to such a continuous and immediate response to the call of duty, of service, or of distress. From the tie-ups of last year's great winter storms, the floods along the Columbia and its tributaries last summer, to the Northwest's earthquake a few weeks ago—the great builders of the West are always there to help.

We're proud to be associated with 'em!

Somebody Else Wrote It

GOOD OLD "Cap Krug," authoritarian-minded college football hero, who became Secretary of Interior at the political demise of Harold Ickes, has another paper besides *Western Construction News* after his scalp. We've been trying for two years to have him replaced by someone who understands something of Western history, ideals, and needs, so far unsuccessfully.

On March 29, the Imperial Valley Press of El Centro, Calif., published the following editorial. We reprint it without further comment than to say we do not intend it as indicating any preference in the battle between Arizona and California, discussed elsewhere in this issue, but only for its allusions to our friend Cap:

"Interior Secretary J. A. Krug has declared himself finally in his true colors—a power-grabbing bureaucrat seeking to build his own petty dictatorship by running roughshod over the wishes of the people.

"Congress should take immediate action to see that its orders are carried out and not disregarded by the obviously misguided man who is willing to sacrifice honor, promise and sound policy for the sake of enlarging his own domain.

"Our representatives in the Congress should demand that this cabinet member, who should above all be a person of personal integrity and one who can be trusted, be removed from office.

"Bureaucrat Krug has at last expressed the policy which has guided the actions of his department for many years where Imperial Valley is concerned. He has been able no longer to hide behind excuses and alibis, half truths and downright misrepresentations. He has at last taken an open stand, and it is that Imperial Valley will get nothing but a kick in the pants from the interior department, from here on.

"In declaring that his department will never permit irrigation of the East Mesa, Bureaucrat Krug has presumed to disobey flagrantly the instructions of Congress—the direct representative of the people who pay his salary. The Boulder Canyon Project act, the All-American canal contract, the federally-approved Colorado river compact, every sacred agreement since the beginning of irrigation from the Colorado river, has been based on the presumption that the East Mesa would be opened and irrigated.

"Now Bureaucrat Krug says no. In the face of all historical precedent, all Congressional wishes, all logic and all sound judgment, he says no.

"So firmly entrenched is he in his opinion that he will not permit, according to his own statement, even an experiment to determine the truth. He does not want the truth. He is relying upon half-hearted surveys which daily are being proved inaccurate by actual practice as the basis for forever shutting off the possibility of irrigating the East Mesa.

"This gigantic fraud which is being attempted by Bureaucrat Krug can mean only one thing—that he has decided that it will be more advantageous to him personally to sink taxpayers' money into the Central Arizona Project, which he would be able to control because it would be a federal undertaking from start to finish, than into the East Mesa which would be underwritten by financially sound localized enterprise.

"Krug is not the type of a man that we should have in a high place in our federal government.

"We beseech our Congress to demand that its orders be carried out, and that means that Krug should be removed from his bureaucratic throne."

"...Controls People"...Lilienthal

THE QUESTION has been raised why federal officials are continually trying so hard to socialize the electric power industry. The desire to enact Authorities where they're not wanted, the demand for a steam power plant in Tennessee, though it could have no possible connection with flood control, and the constant attempt to build transmission lines parallel to existing lines, are all branches of the same tree.

It was, of course, once explained most succinctly by David Lilienthal, one of socialization's leading advocates and now in personal control of the greatest power in the world, atomic energy. Lilienthal said, "Whoever controls energy controls people." When power is generated and sold by competing private power companies, regulated by boards of local citizens and contributing tax money in large amounts to local government, **all** the people benefit. When the energy is manufactured and marketed by a bureaucratic clique responsible only to other bureaucrats in Washington, and operating on a tax-free basis so that both local and national tax rates are boosted, no local benefit can be shown. But soon, as Lilienthal boasted, the local people lose all semblance of control over government, while government gains complete control over the people. The historic conception of the United States is reversed.

PORTABLE GRAVEL PLANTS

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Whatever your production requirement may be—there's an Austin-Western Portable Crushing and Screening Plant to meet it. From the smallest single-unit plants to the magnificent two- and three-unit combinations every Austin-Western Portable Plant is correctly balanced from feed to delivery conveyor, equipped with high-capacity crushers, and engineered for maximum output at the lowest cost per ton. No matter what size or quantity you want—there's an Austin-Western plant "tailored" to fit your needs—designed to do your particular job with speed and efficiency.

"50" The "50" Plant illustrated is one of the many smaller sizes of Austin-Western Portable Plants. Bins, Crushers, Screens, Elevators and Conveyors are available in a wide variety of sizes and may be easily combined to meet any individual production problem.

"81" A 1036 Roller Bearing Jaw Crusher, combined with perfectly matched screens and conveyors, make the compact, efficient "81" the ideal plant for many installations. It's engineered from end to end for continuous "low-cost tonnage."

"101" The unrivalled production of the "101" is due to its high-speed Jaw and Roll Crushers, and its completely "balanced" design which provides unusually wide conveyors and extra-large positive-throw type vibrating screen.

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WESTERN CONSTRUCTION NEWS
MAY 15 • 1949

WOODEN water tank above cold storage warehouse collapsed when its 18-ft. reinforced concrete columns failed. One of the columns was hurled 50 ft. Water ruined material stored below.

Northwest Quake—
Building Codes Lax, Damage Is Heavy

"Never Happen Here" attitude has hindered passage of adequate requirements for earthquake-resistant design, so buildings, bridges, stacks, and tanks suffered seriously, but schools and libraries were special victims

By HARLAN H. EDWARDS
Civil Engineer
Seattle, Wash.

SEVEN PERSONS were killed, 65 injured, and property damage estimated at $15 million in Washington was the toll of the state's most severe earthquake, which occurred April 13 at 11:55 a. m. Minor damage occurred elsewhere. The epicenter of the quake was located in the south Olympic Mountains about 90 mi. southwest of Seattle near the town of Shelton. This was also the location of the February, 1946, earthquake which damaged old masonry buildings in low areas in and around Puget Sound. The intensity of the temblor was tentatively rated at 7 in Seattle and Tacoma and 8 in Olympia, Centralia and Chehalis, based on the Mercalli scale. Damaging shocks were felt throughout the state and in northwestern Oregon.

The error of acceptance by the engineer and architect of Chamber of Commerce propaganda to the effect that "earthquakes couldn't happen here" was never more forcefully illustrated. Building codes in the Northwest states had no provision for earthquake-resistant design, being based on this head-in-the-sand theory.

Had this earthquake been slightly stronger or continued a little longer, or had the initial shock been more shattering as in the Long Beach earthquake of 1933, the number of people killed and maimed would have been appalling. It would have gone down in history as one of the most disastrous in property damage and loss of life known. As it was, the damage done was grossly exaggerated by the radio throughout the nation, great injustice was done to Western Washington, and undue worry and expense was caused to relatives and friends of people in the earthquake area.

Comparison with Long Beach

Comparison of this shock with the Long Beach shock of 1933 is of interest. The earthquake started there with a strong, almost vertical shattering movement, followed by rapid horizontal shaking. This was spectacularly demonstrated by the movement of a heavy rotary press in the print shop of the Compton Junior High School. The shop was housed in a 1-story frame stucco building with the concrete floor on the ground overlaid by a wood floor. The building was not damaged at all, but well-constructed masonry buildings all around it were thoroughly wrecked. The press, however, showed what happened. As evidenced by the undisturbed, sharp-edged oily dust that had originally surrounded the press feet, the heavy equipment had been thrown upward and slightly to one side, and landed 6 to 8 in. away, thereafter leaving deep zigzag and circular scratches in the wood floor ending where the press finally came to rest.

The Shelton earthquake which just occurred, on the other hand, had a less intense vertical motion, accompanied by

EXAMPLES OF building damage in the Northwest earthquake include typical high wall damage at a garage in Chehalis, where no reinforcement of brick walls was required, upper left; unfinished buildings in West Seattle, built on a fill failed almost completely, as foundations fell out and structures sagged, upper right; thin foundations of other West Seattle residences cracked badly as the buildings shook off the walls, center right; particularly noticeable as a hazard to life and limb in an earthquake is the early dislodgment of heavy ornamentation over entrances of public buildings, where occupants will probably be attempting to rush outside—center left is the entrance to the Chehalis library, and bottom left is the Methodist Church in Chehalis, in both cases showing litter of fallen masonry on the entrance; lower center shows the chimney of Chehalis Jr. High School ready to fall—school was in session here; wall damage at Lafayette School, Seattle, lower right.

horizontal shaking, and ceased before many cracked buildings could proceed to failure. In Chehalis, where the author was at the time of the quake, and in Seattle too, the quake felt and sounded like heavy trucks bumping rapidly over an old cobblestone pavement near by. Weak walls fell out or were battered out by unbraced, flexible wood framing which was not tied solidly to the masonry.

Chimney damage

The degree of damage to residence chimneys was a good measure of the intensity of the shock. In Chehalis, chimneys on almost all residences were broken off at the ridge or building line and fell southerly. A large chimney at the Junior High School was fractured so badly that it would have fallen through the wood roof had there been another shake or two. Another large chimney at the Chehalis Brick Co. plant was similarly damaged.

In Centralia, 4 mi. north, which is underlain by hard gravel having ground water level about 6 ft. below the surface as compared with the water-bearing clay of Chehalis, fewer chimneys were broken. In Olympia, on clay, and in Tacoma, on coarse dry gravel, less than half of the existing chimneys were broken, and these fell to the east and northwest. In Seattle comparatively few were damaged. In Puyallup, 30 mi. south of Seattle and 10 mi. east of Tacoma, about one-quarter of the chimneys were damaged, many of them being sheared and rotated clockwise, up to ¼ turn. One chimney about 2 ft. square and 15 ft. high on a reinforced concrete and brick veneer building moved 5/16 in. southerly, sliding on the through-wall flashing and apparently being held by the fire clay flue lining which had been set in concrete below the parapet and was surrounded by a 1-in. fiberglass-board insulation.

PAVEMENT FAILURE on a fill along Spokane St. approach to West Seattle, was followed two days later by failure of a water main beneath the pavement, which sent water gushing 100 ft. into the air and washed out a considerable portion of road.

Comments of H. J. Brunnier, Consulting Engineer, San Francisco:

"A building will never be a hazard in an earthquake if it is given a little thought in design to provide lateral stability, to tie together all the component parts of the structure, and to build it well. Too often roofs are not securely fastened to walls, and thus permit the walls to fall outward in a shock."

Comments of Homer Hadley, Consulting Engineer, Seattle:

"Damages suffered by buildings in this earthquake were typical of such occurrences the world over. In general, structures built on soft ground are more severely damaged by an earthquake than those on a firm foundation, but it is folly to assume that a structure is free from danger solely because it is located on solid material. These have failed, too.

"The shape of a building and whether it is designed and braced to withstand the impact of horizontal forces play important parts in determining its safety. Well-braced structures placed on soft soil have gone through heavy earthquakes without damage, while other structures not designed to resist shock have failed miserably even though they were founded on rock."

General damage of cracked partitions, plaster and exterior walls occurred in all cities, the degree being dependent upon the intensity of the shock.

In Olympia, the old capitol building was damaged, other buildings in the capitol group were damaged to some extent, the Insurance Building was said to have been badly shattered, and a tall chimney broken in two near the waterfront. In all cities there has been substantial hidden damage done to the structural frames of larger office and commercial buildings that has not been uncovered, and that doubtless will be repaired but not made public.

In North Bend, east of Seattle, a part of the high school smokestack was broken, necessitating its removal.

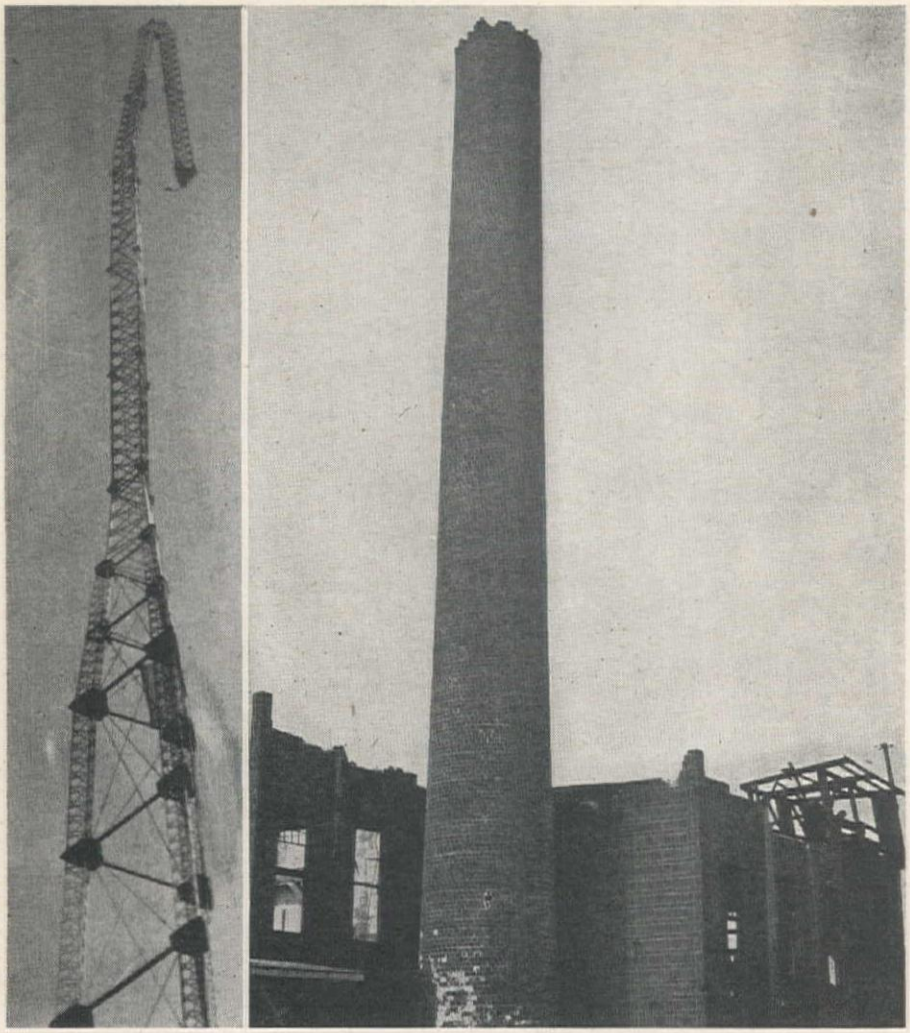
Older buildings failed first

In Seattle, many old buildings, particularly in the old 1st and Yesler district and to the south, were cracked, parapet walls and upper building walls were thrown off and miscellaneous minor damage was done to streets, bridges and underground utilities. Very little damage occurred north of Seattle.

As in practically all earthquakes of consequence, old brick parapet walls fell in every city. In many places, gable end walls of schools and at least a part of the upper story walls failed, definitely battered out by the movement of the roof framing which had not been anchored to the walls. Two-story buildings battered against 1-story buildings and were fractured above the low-building line. One-story store buildings built against each other were not generally damaged as long as they were supported by each other and were the same height, but the end structure was sometimes broken, from the roof line down below the window head. Two-story store buildings were often fractured horizontally at the window heads and were starting to pivot to failure on the narrow front columns and corner sections. Poorly designed, shoddily built unit block store construction with inadequate foundations and no ties or bracing failed or was progressing toward failure. One group of residences in West Seattle built on a fill failed most spectacularly and miserably, before they had been completed.

Earthquakes of recent times have all taught the same lessons, yet few communities, school boards and individuals have strengthened their present buildings. Due to apparently inevitable characteristics in design, the school building is inherently of a weak type. High ceilings and large rooms with many high windows create a structural shell which is unable to resist the lateral forces unless it is strongly braced. Classrooms, shops, libraries, gymnasiums, laboratories and auditoriums all contribute to the schoolhouse architect's difficult problem of gaining structural stability at minimum cost.

Architects for years have designed



HIGH DAMAGE is illustrated by the 573-ft. steel tower of Radio Station KJR in Seattle, left, and the stack of an abandoned mill building on the tideflats near Tacoma. Despite the odd twist to the top 40 ft. of the radio tower, the station stayed on the air.

ornate entrances to schools, usually embellished with much terra cotta, brick, natural or cast stone. This is heavy, often insecurely fastened and so placed that a sharp, heavy shock will loosen it and catapult it down upon persons escaping from the building. What was intended to be a thing of beauty becomes an instrument of death. Such entrances failed this time the same as they have in all previous earthquakes.

Damage to school buildings in Western Washington was estimated by Mrs. Pearl Wanamaker, State Superintendent of Public Instruction, to be between $6 million and $10 million, with at least 30 buildings housing 10,000 children damaged. In spite of this, the people of this area have not yet realized how near they came to having their children killed and maimed by falling walls and chimneys without a chance to escape.

Elevated water tanks and the structures they rest upon took a beating, as is illustrated by the following item. They all showed the necessity of heavy bracing, tying into the structure, and bracing the structure to bring the center of mass to coincide with the center of resistance. Anything less than this brought torsional damage to the building, as well as disaster to the tank or heavy machinery.

Waterfront structures are usually in a vulnerable position, being on soft ground or on piling. Those in Seattle rocked severely, and were doubtless typical of all the Puget Sound waterfront area which was affected by the quake. Damage totaling $250,000 was suffered on three installations, the outstanding one being the Spokane Street cold storage warehouse.

Water tank crashes

On the roof of the Spokane St. storage plant on East Waterway a 50,000-gal. wood stave water tank rested on a heavy reinforced concrete slab and girder base sitting on heavy columns 20 ft. high, 96 ft. above the ground. Under the influence of the shock and the surging water, the tank broke from its moorings and slid easterly off its platform into the head house of the east elevator, breaking up the drums, motors and supporting beams and driving them down the shaft to the first floor. The unbalanced load tilted the platform upward and kicked it back over the other head house onto the machinery, while the lower end broke through the roof slab and came to rest in a pile of rubble. An 18-ft. column was broken off and thrown 50 ft. due north to the roof parapet without touching the slab. The flood of water released went over the roof and down into the building, inundating several floors. Ammonia lines were severed, putting the refrigeration on five floors out of commission and ammonia gas filled the area. The only access to the roof was the fire escape until the gas cleared out sufficiently to permit the use of the interior stair, because both elevators were wrecked.

Repairs, necessarily slow, are now in progress, first breaking up the concrete slab and girder by jackhammer, piece by piece and lowering the debris in a metal sling by means of a truck crane having a 128-ft. boom.

On Pier 42, built during the war as an earth fill between sheet steel piling driven into a 60-ft. fill on the floor of Elliott Bay, the fill material shook down or consolidated and settled 8 in. The building itself was not damaged, as it was built on piles, but all pipe lines extending up into the building were pulled apart. Asphalt ramps have been installed until the area can be filled and repaved. On Pier 25, Hanford Street, a large grain elevator was thoroughly shaken, miscellaneous parts dislocated, two water lines broken and galleries damaged. The main scales, high atop the workhouse, jumped out of their sockets and broke the castings.

Spokane St. water line breaks

Water and sewer lines in the damage area were cracked and broken, but the extent and exact location of many breaks will not be known for some time to come. A settlement of the pavement on the west lane of Spokane St. where the Admiral Way traffic takes off to go northerly up the West Seattle hill was followed two days later by a heavy washout from a broken main from which the water spouted 100 ft. into the air. Several days were taken to make the repair. No listing of the detailed damage of this type in the various cities was made.

Three Seattle bridges were damaged by shifting of abutments or superstructure, or cracking of adjoining floor sections due to impact.

Other than the hazard of rolling rock landing on the tracks most railways had little damage. The Northern Pacific, however, on their line between Tacoma and Portland had several cases of settlement of bridge abutments and pile trestles which caused several hours' delay to trains.

The quake gave rise to miscellaneous predictions for future temblors and elicited the questionable advice that structures built on high and solid ground would receive no damage from future shocks. To those who had experienced major earthquakes and were qualified by structural training to advise, the quake was evidence and warning that **all** structures should be built to resist the horizontal forces induced by earth movement. It was also a "word to the wise" to examine present structures and strengthen them, if necessary.

Adequate design sadly lacking

Adequate and competent structural examination and analysis of existing

Continued on page 136

Diamond Drills Pay at Hungry Horse

FROM A "SLOT" excavated beyond full tunnel diameter, a diamond drill bites a hole 60 ft. deep parallel to tunnel centerline.

Contractors for 35-ft. diameter spillway tunnel at Hungry Horse Project in Montana follow carefully developed plans to excavate rapidly and economically using diamond drill setups

By W. E. WHEELER
Kalispell, Mont.

PRINCIPAL construction work carried on at the Bureau of Reclamation's Hungry Horse Project in northwestern Montana during the past winter was the excavation for the glory-hole type spillway tunnel which will carry the overflow from the reservoir past the dam.

Third glory-hole spillway

The Hungry Horse spillway (sometimes referred to as the Morning-Glory type) is the third such spillway to be constructed by the Bureau. The first of this type was constructed at Gibson Dam on the Sun River Project, also in Montana, and was completed in 1929. The Gibson spillway drops water through a vertical transition shaft similar to a gigantic funnel to a 90-deg. elbow, with a 59-ft. radius on centerline, to come out a horizontal tunnel 29.5 ft. in diameter. The average hydraulic drop amounts to approximately 160 ft. This spillway was designed to pass a flood of 50,000 c.f.s.

A second was constructed at Owyhee Dam in southwestern Oregon, and was completed in 1932. This structure also has a vertical shaft with a transition from 52.3 ft. at the inside lip of the crest structure to 22.6 ft. at a point 156 ft. below the crest. At a point 103 ft. lower is the beginning of the 90-deg. elbow which has a radius of 50 ft. on the tunnel centerline. The spillway tunnel utilizes the lower portion of the diversion tunnel which passed the river flow around the damsite during construction of the dam. The diversion tunnel was blocked with a concrete plug similar to the manner in which the Hungry Horse diversion tunnel will be blocked following the start of storage in the spring of 1952. The Owyhee spillway was designed for a capacity of 40,000 c.f.s. and has a total hydraulic drop of 313 ft.

A glory-hole type tunnel similar to Gibson and Owyhee is being designed for use at the Shadehill Dam in the Missouri River Basin.

Scale model tests change design

With each increase in hydraulic height for this type of spillway, problems and perplexities are also increased. Designs are being constantly perfected and improved upon with the use of scale models in the hydraulic laboratory in the Denver Central Design Offices of the Bureau of Reclamation. To illustrate, a scale model of plexiglass was made of the Hungry Horse spillway tunnel using the 55-ft. radius for the lower elbow as shown in the specifications. Operation of the model revealed choking and vacuum "drag" at the elbow. Hydraulic studies have shown that turbulence and vacuums caused by fast flowing water cause cavitation which can be very detrimental to the structure.

INTAKE END of the spillway tunnel on the right abutment is through dense, massive layers of limestone which dip at 30- to 45-deg. angles to the tunnel line and are extensively jointed to complicate drilling. Road on the left abutment, across the Flathead River, may be seen in background.

A second model, using a radius of 120 ft., completely eliminated turbulence and vacuum "drag." As a result, a change of radius was made in the field, in a matter of hours before the drills were to be moved from drilling of the elbow to a location in the raise.

Spillway water will drop 490 ft.

The Hungry Horse spillway tunnel differs from the two previously described tunnels, in that the hydraulic drop of 490 ft. is considerably greater. A second difference is the use of an inclined tunnel section immediately following a short transitional section at the intake end. Inclined tunnels for spillways, having approximately the same slope as the one at Hungry Horse were used at the Seminoe Dam in Wyoming and at Hoover Dam. The Hungry Horse spillway is designed to pass a flood of 53,000 c.f.s. During the 1948 flood, the maximum discharge of the South Fork of the Flathead was 42,500 c.f.s.

The control gate at the mouth of the spillway tunnel will be a gigantic annular ring which will be raised or lowered in a float-well to regulate the elevation of the reservoir when it approaches maximum capacity or during flood periods. The lower end of the spillway will use approximately 200 ft. of the diversion tunnel which was constructed by the Guy F. Atkinson Co. during the winter of 1947-48. This portion is a horse-shoe shaped tunnel with an unlined diameter of 36 ft. The diversion tunnel is the only portion of the work at the damsite which was not covered by the prime contract held by General-Shea-Morrison.

Faults complicate drilling

The South Fork of the Flathead River runs in a northwesterly direction, but at the damsite it bends to flow almost due west, so that the right abutment is on the north side of the river. The spillway and diversion tunnels are located in the right abutment in Siyeh limestone foundation rock, this being the only foundation rock present at the damsite. The Siyeh limestone is composed of dense, massive layers that range from one foot to 14 ft. in thickness. The rock is bluish grey to greenish grey in color and is extensively jointed by four major joint sets. The bedding planes dip into the north abutment in a northeasterly direction at angles varying from 30 to 45 deg. Drilling to line in rock of such blocky nature obviously would be quite difficult.

When the Boyles Brothers Drilling Co. of Salt Lake City were awarded the subcontract for excavation of the spillway tunnel, they brought to Hungry Horse an aggregation of specialists in the use of the diamond drill. They have devised many shortcuts and unusual methods in tunnel construction which have really paid off. By drilling the Hungry Horse tunnel with diamond drills they used a method that is of interest to "hard rock" miners everywhere, and therein lies a story.

Diamond drills pay off

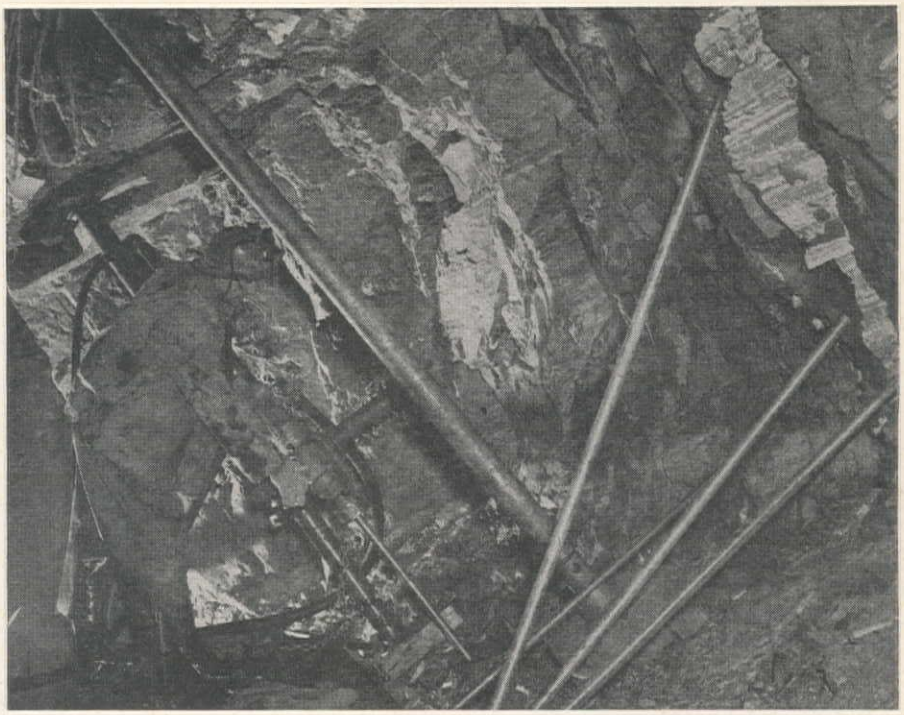
Boyles Brothers knew the characteristics of the rock as mentioned above, as the diversion tunnel was open for observation; nevertheless they confidently took the job on. Proceeding under carefully developed plans, the company completed the excavation of the 955-ft. long tunnel in approximately 200 days, conclusively proving that large diameter tunnels can be excavated rapidly and economically by using the diamond drill. Excavation of the spillway tunnel required the removal of 31,000 cu. yd. of rock, of which 2,500 was removed by the pilot bore excavation. It took 140 days to hole through with the pilot tunnel and to excavate the first four diamond drill slots.

The unusual feature of the Boyles Brothers' operations consisted of diamond drilling from slots 8 ft. wide which are excavated to one foot beyond the full tunnel diameter. These slots are placed at right angles to the tunnel centerline at intervals of approximately 120 ft. From the slots, diamond drill holes 60 ft. deep are run in each direction parallel to the tunnel centerline. The holes on the periphery of the tun-

nel were drilled on the "B" line spaced at 5.5 ft. apart. Pay for excavation was figured to the "A" line, while the "B" line, six inches beyond the "A," was the line from which overbreak was figured.

Enough muck for a week

The interior holes were drilled using pilot plug bits while the ones around the tunnel periphery were drilled using core bits which minimized wandering. The drills were set on the "B" line as a direct break between the adjoining holes would then be along the chord which touched on the "A" line. Working from the two slots at each end of a bay, the intermediate area would be drilled by running 60-ft. holes which met in the center of the bay. Accuracy of drilling of the periphery holes was shown in several instances where holes drilled from opposite directions met virtually head-on. After the entire section was drilled, the holes were loaded full with Atlas 1¼ x 12, 60% gelatin, with Prima-Cord. The bays (area between slots) were shot in sections, working outward from the pilot tunnel. After the preceding shots had been mucked out, the final shot was made, which took out more than one-half of the tunnel section at one time. There was only one instance in which "bootlegging" occurred, and this was to one of the interior holes. Spacing of holes and manner of placing relays served to get good fragmentation and clean breaks between periphery holes in spite of the blocky nature of the rock.



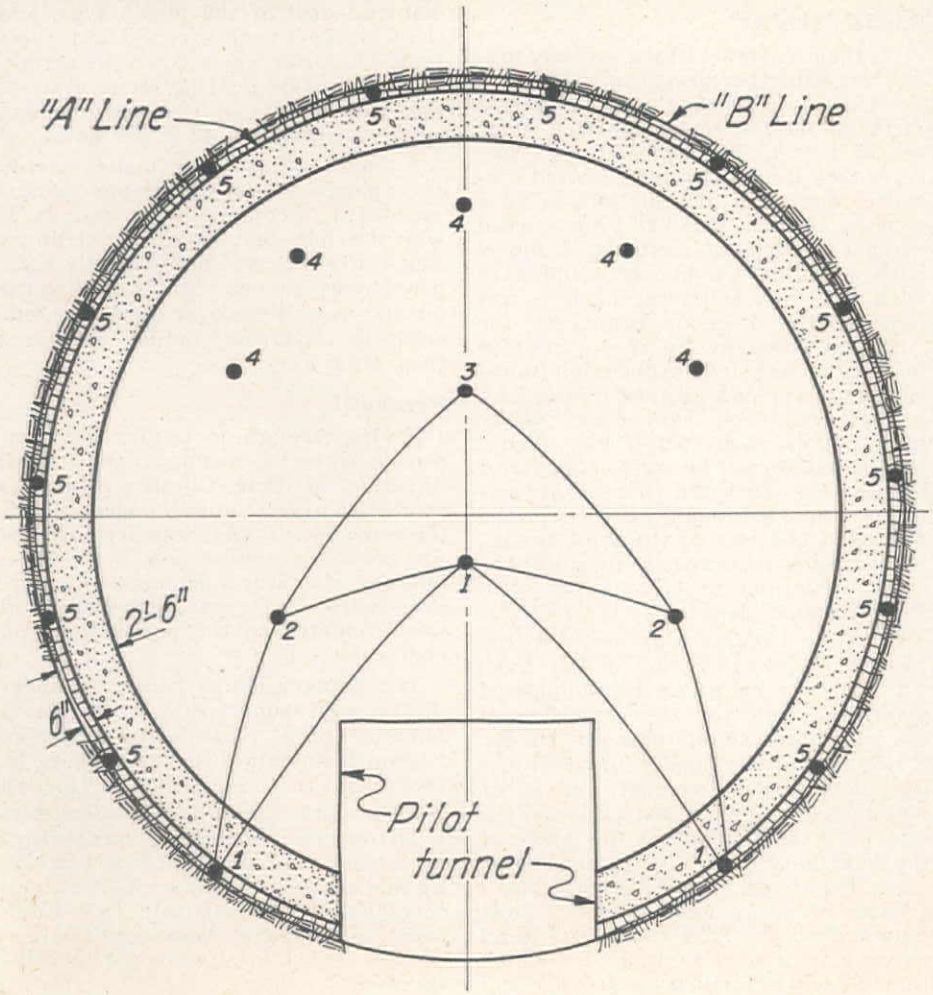
DIAMOND DRILL rig being operated in a slot by WILLARD TUCKER, employee for Boyles Brothers. Note how the drill is set on pipes and jacked against the slot's opposite wall.

After the No. 1 and No. 2 shots were made and mucked out, the remaining holes in the bay were shot. This provided enough muck for the slusher to operate a week. Two 10-yd. Euclid rear-dump trucks, rented from General-Shea-Morrison, hauled the muck to a waste area a quarter of a mile downstream from the portal. The switchyard will be built on this waste area near completion of the project.

Eight slots were utilized for diamond drill setups. Had conventional methods been used, it is estimated that from 80 to 100 setups would have been required to completely shoot the face.

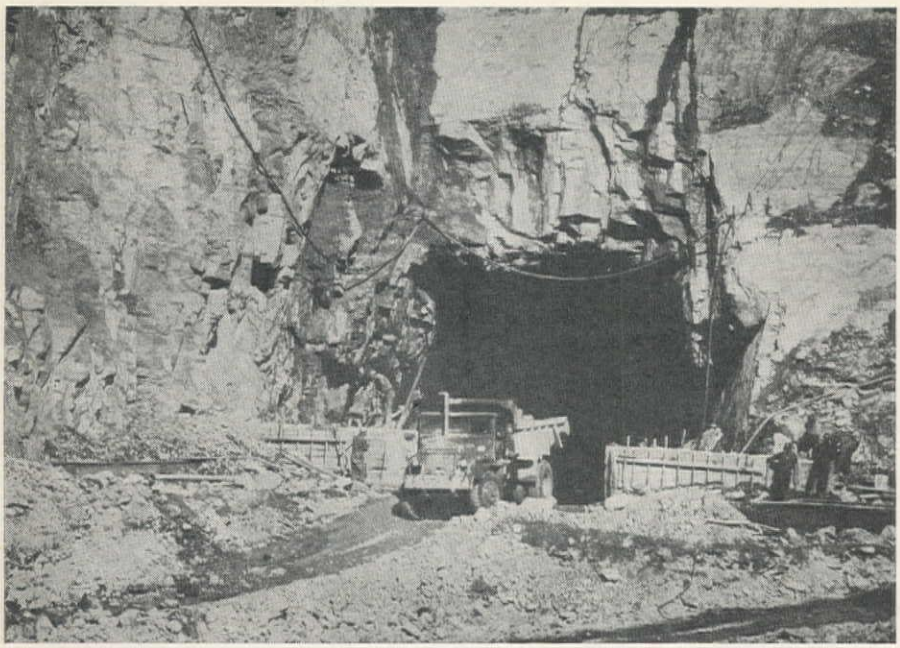
In discussing the method with Vic Stevens, superintendent for Boyles Brothers, shortly after start of drilling operations, Vic emphasized the importance of "relieving" the rock pressures in order to obtain the shearing action between holes. The correctness of this theory is attested by the fact that the imprint of half the holes may be seen along the sides and roof of the completed bore.

TYPICAL PATTERN for spacing of diamond drill holes and delays in shooting, as shown in sketch, enabled good fragmentation and clean breaks despite the blocky nature of the rock.



Pilot tunnel speedily driven

To start the operations and to provide the required slots for the diamond drill setups, it was necessary to excavate a pilot tunnel 11 ft. wide by 9 ft. high, along the invert of the bore. The pilot tunnel and slots were drilled by conventional methods and standard equipment and drills (Gardner - Denver, Worthington and Ingersoll - Rand) mounted on steel pipe jumbo on an old Marmon-Herrington truck. This provided considerable amount of flexibility and speed in moving the equipment out and back to the working face after each shot. Drifters and stoppers with throw-away steel bits were employed. The pilot to the raise was drilled using 11-ft. steel in the liners. An 8½-ft. round consisting of 20 to 29 holes drilled in a pattern of uniform spacing with one extra lifter



DOWNSTREAM PORTAL of the diversion tunnel. The spillway tunnel joins with this tunnel 200 ft. inside. The cofferdam barriers across the portals of the diversion tunnel are being removed to permit partial diversion of river flow during the ensuing high water season.

and one extra back hole could be completed in 4½ hr. This permitted loading, shooting and mucking at the average speed of one round per day.

The pilot continued up the raise with the same 11-ft. width divided into two stulled compartments. One compartment provided access for workmen, air and water lines to the heading, and the other was used for slushing the muck down the raise to the elbow. The height of the pilot at right angles to the tunnel was only 5.5 ft., but due to the steep angle, ample headroom was available for the drillers.

As good fragmentation was required to permit efficient use of the slusher, and there was no need for watching overbreak, the holes for the pilot were loaded with 1⅛ x 8-in. sticks, Atlas 40% gelatin.

Pilot and main bore drilled simultaneously

Actually, drilling operations started at a point approximately 150 ft. in from the outlet portal of the 36-ft. diameter horseshoe shaped diversion tunnel which was completed by the Atkinson Co. in June of 1948. At this point the diversion tunnel swings to the left 30 deg. to discharge back into the river. As previously mentioned the diversion tunnel could thus be used as the lower portion of the spillway works. When lined, this part of the spillway tunnel will be horseshoe shaped, 31 ft. in diameter.

As soon as the pilot had progressed to the first and each subsequent slot, drilling was also done to enlarge the slot to full tunnel diameter. As soon as this was done, diamond drilling equipment was set up in the slots and operations carried on simultaneously with the drilling of the pilot tunnel. As the diamond drills were set on pipes which were jacked against opposite walls of the slot and bays were above the pilot tunnel drilling operations, it was not necessary to remove the equipment in order to make shots in the pilot bore. Likewise the lower bays could be shot without removing the diamond drilling equipment. After the pilot was holed through on January 21, the air, water and electric lines were run in from the top and it was then no longer necessary to remove them before blasting.

Special "slusher"

As the excavation of the spillway tunnel was being performed in two operations, it would appear that two different methods for the removal of the muck would have to be employed. To overcome this, Boyles Brothers devised special equipment to do this job, called a slusher. If a full face had been worked using conventional methods, a shovel with a 1½-cu. yd. bucket could have been used for loading out muck, as was done in the diversion tunnel by the Atkinson Company. To open a full face heading directly off the diversion tunnel would have made a gigantic cavern with a 60-ft. wide arch. Due to the blocky nature of the rock, such a wide unsupported roof would be apt to collapse or be unsafe to workmen. The slusher setup as employed, could be used in the restricted quarters of the pilot tunnel, yet with sufficient capacity to handle the larger quantities to be removed from the full tunnel diameter.

For this, a slusher constructed by the Sharpe Engineering Co. of Salt Lake City was set up inside the completed diversion tunnel on the centerline of the pilot bore. Ample room was left for trucks to pass the slusher for the trucking of aggregate, cement and other materials during the construction of the stop-log gate structure at the intake of the diversion tunnel. The slusher bucket was a 1¼-cu. yd. bucket controlled by a 75-h.p. Sullivan double-drum hoist mounted on an "A"-frame ahead of an opening in a steel ramp under which the 10-cu. yd. Euclids could back and load. The endless cable was run through a sheave at the back of the ramp so that the muck was dragged under the hoist motor to the opening. Following a blast, an anchor was set near the heading to which was attached a block carrying the endless cable. One setup of the slusher was used for cleaning out the pilot tunnel and the first two bays up to the beginning of the raise. Following this, the slusher was moved into the spillway tunnel proper to a point approximately 75 ft. from the raise. At such a location, short hauls for loading the balance of the excavated material would be possible. Before the slusher was moved into the last position, the pilot bore between Slot No. 1 and the diversion tunnel was enlarged to permit passage of trucks to the new location of the slusher.

G-S-M's big compressor plant

Air for the operation of the drills was from General - Shea - Morrison's main compressor plant, which has a capacity of over 7,000 c.f.m. at 100 lb. Water was obtained from a tank on the hillside for the diamond drills and liners. A Coppus fan of 22,000 c.f.m. capacity provided ventilation air through a 20-in. bag. It was necessary at times, however, to depend upon air from the compressors for ventilation, as smoke from salamanders and wood fires keeping the concrete at the diversion tunnel intake structure warm was picked up by the ventilating fan.

Two makes of diamond drills were used in the drilling—the Boyles Junior diamond drill of the piston type, and the Chicago Pneumatic 55-DD turbine type. The latter was used on the periphery holes as it could be set in close to the wall. Both had the same drilling speed of from 10 to 12 ft. per hour.

A bonus of $100 per man for each crew member working the pilot tunnel speeded it to completion on Jan. 21. It was the one feature of the Hungry Horse job that was not seriously hampered by weather conditions. Coiling the air and water lines over open fires outside the diversion tunnel prevented them from freezing.

Personnel

Holing through operations and completion of the job was under the general direction of Pete Chesler, who was promoted to job superintendent simultaneously with the transfer of Vic Stevens to a similar job near Albuquerque. Pete was a diamond drill foreman under Vic Stevens. Jack Fitzgerald was promoted to the position of job engineer.

The Hungry Horse Project is under the general supervision of Regional Director R. J. Newell, Boise, Idaho, Region 1, Bureau of Reclamation. L. N. McClellan is Chief Engineer for all Bureau operations, with headquarters at Denver, Colo. Bureau project personnel include C. H. Spencer, Construction Engineer; David S. Culver, Office Engineer; E. J. "Jake" Nieman, Field Engineer; John Officer, Assistant Field Engineer; and John Vertrees, Chief Inspector.

Run-off Forecasts—
1949 Water Supply in Western States

SNOW SURVEYORS lay out one of their courses prior to measuring depth and water content in a Nevada mountain pass.

Water supplies for 1949 irrigation season seen as ample in most Western areas by snow surveyors, and Northwest may be in danger of a repetition of last year's disastrous floods

By R. A. WORK
Senior Irrigation Engineer
Oregon Agricultural Experiment Station
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and

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AMPLE WATER supplies for irrigation and other major uses are foreseen by the Division of Irrigation and Water Conservation, U. S. Soil Conservation Service, from its analysis of April snow surveys.* Improvement is still hoped for in areas dependent upon the snow pack of the Southern Sierra in California and Nevada, while, as in 1948, the Northwestern states face the danger of damaging peak flows if spring weather should cause abnormally rapid melting of the heavy snow pack; but barring that possibility the general West-wide outlook is for a highly beneficial water supply.

A brief analysis of the April records, prepared for *Western Construction News*, resulted in the following forecast. (Similar forecast summaries were published in this magazine in the May issues of 1946, 1947, and 1948.)

In the following paragraphs the prospects are described, State by State, as they were viewed on April 1. The two charts illustrate the situation graphically.

Arizona

The past six years of continuous drought in Arizona came to an end during the past snow season and the outlook for irrigated areas of the State is very good. As of April 1 the water held in the eight important reservoirs was 30 per cent of capacity, or three times the amount of water stored on April 1, 1948. San Carlos Reservoir, which last year was practically empty, now contains about 25 per cent of capacity.

The extremely heavy storms of January and February combined with low temperatures resulted in a record snow pack at the higher elevations throughout the winter. The water content of the snow remaining on the principal watersheds is over 200 per cent of normal, indicating that with normal precipitation run-off will continue good.

California

The Sierra snow pack is satisfactory. Over-all run-off will average 90 per cent of normal, which should provide a water supply sufficient for all reasonable uses of agriculture and industry. In Sacramento and San Joaquin valleys there should be enough water to fill all reservoirs except Shasta, with water spilling at the peak of the snow-melt run-off. At the southern end of San Joaquin Valley, which lacks storage, some water will probably reach Tulare Lake Basin. Lake Tahoe is expected to reach the 6225.9-foot level, the lowest summer peak since 1937.

*The Division of Irrigation and Water Conservation is the Federal coordinating agency of snow surveys conducted by its staff and many cooperators, including the Forest Service, Bureau of Reclamation, National Park Service, Geological Survey, various departments of the several Western States, irrigation districts, power companies, and others. The California State Division of Water Resources conducts and coordinates snow surveys in that State, while the British Columbia Department of Lands and Forests, Water Rights Branch has charge of the snow surveys in that province.

Total April 1 storage in 27 reservoirs serving the Sacramento and San Joaquin valleys was 4,796,000 acre-feet, which is 67 per cent of capacity. Excluding Shasta Reservoir, Millerton Lake and three smaller storages, water in the remaining 22 reservoirs is 42 per cent of capacity, which is 69 per cent of their normal April total.

Expected run-off of the principal rivers, in proportions of the recent 10-year averages, is as follows: Sacramento at Shasta Dam, 90 per cent; Feather at Oroville, 92; Yuba at Smartsville, 107; American at Fairoaks, 110; Mokelumne at Mokelumne Hill, 102; Stanislaus at Melones, 103; Tuolumne at LaGrange, 97; Merced at Exchequer, 87; San Joaquin at Friant, 88; Kings at Piedra, 89; Kaweah at Three Rivers, 65; Kern at Bakersfield, 58.

Colorado

Except for the Arkansas and Upper South Platte, snow cover on the mountain watersheds of Colorado was well above normal on April 1. Unusually heavy snow exists on the headwaters of the North Platte, Yampa, White, San Juan, Dolores and Rio Grande. The 1949 summer flow should equal or exceed any of the past ten years. In the South Platte drainage 125 per cent of normal flow is expected in the Poudre, Big Thompson and Saint Vrain tributaries and normal to slightly below in Boulder Creek, Clear Creek and Upper South Platte River. The flow of the North Platte should be very high with peak flows around 12,000 sec. ft. at the gaging station at Saratoga, Wyo. Unless April snow accumulation is above normal, the total and peak flows of Rio Grande and its main tributaries in Colorado should about equal those of 1941.

The summer flow of the Arkansas is expected to be slightly less than normal and about 70 per cent of each of the past two years.

Seasonal precipitation over the State has been about average. Western Colorado has received somewhat more than normal. On the eastern slope precipitation has ranged from slightly below normal for the South Platte to very light in the Arkansas Valley.

Idaho

Snow cover throughout Columbia Basin was high during the entire winter. Snow surveys on April 1 showed a water content generally ranging well above normal. In the basin as a whole the snow cover is heavier this year than for any previous year of record.

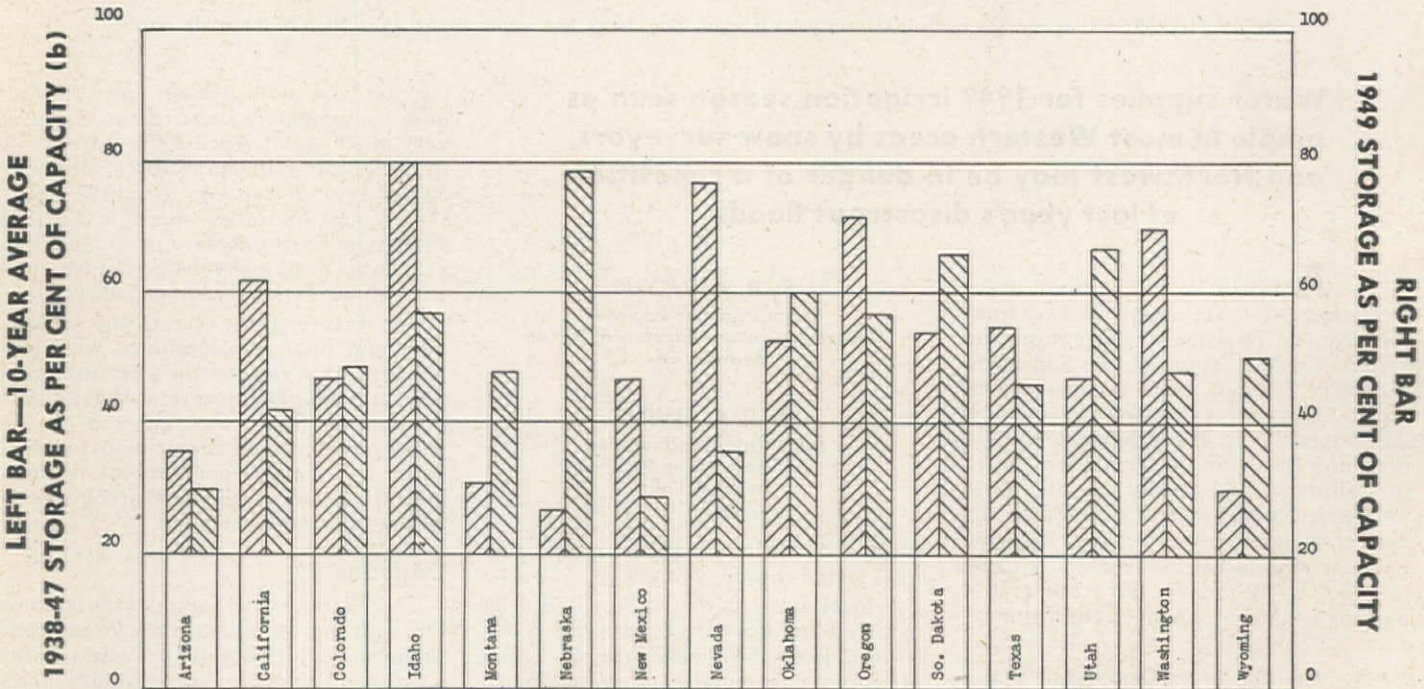
Stream flow during March was below normal for most of the basin. Any snow that may have melted presumably was held in the watershed soil mantle. However, extremely heavy run-off will occur down the main stem of the Columbia River during the next six months, and damaging peaks will occur, provided the various tributaries peak more or less simultaneously. Under normal weather and run-off conditions the southern tributaries peak and pass down the Columbia before the northern streams rise. Abnormally cool weather over the southern part of the Basin during April, with normal or above-normal precipitation, would greatly increase the prospects of high-water damage.

Valley precipitation accumulated since last October is now normal to slightly less than normal in Columbia Basin. Precipitation was slightly less than normal during March.

Reservoir storage in Idaho was below normal for April 1, but reservoirs will be filled readily when the spring run-off begins.

Montana

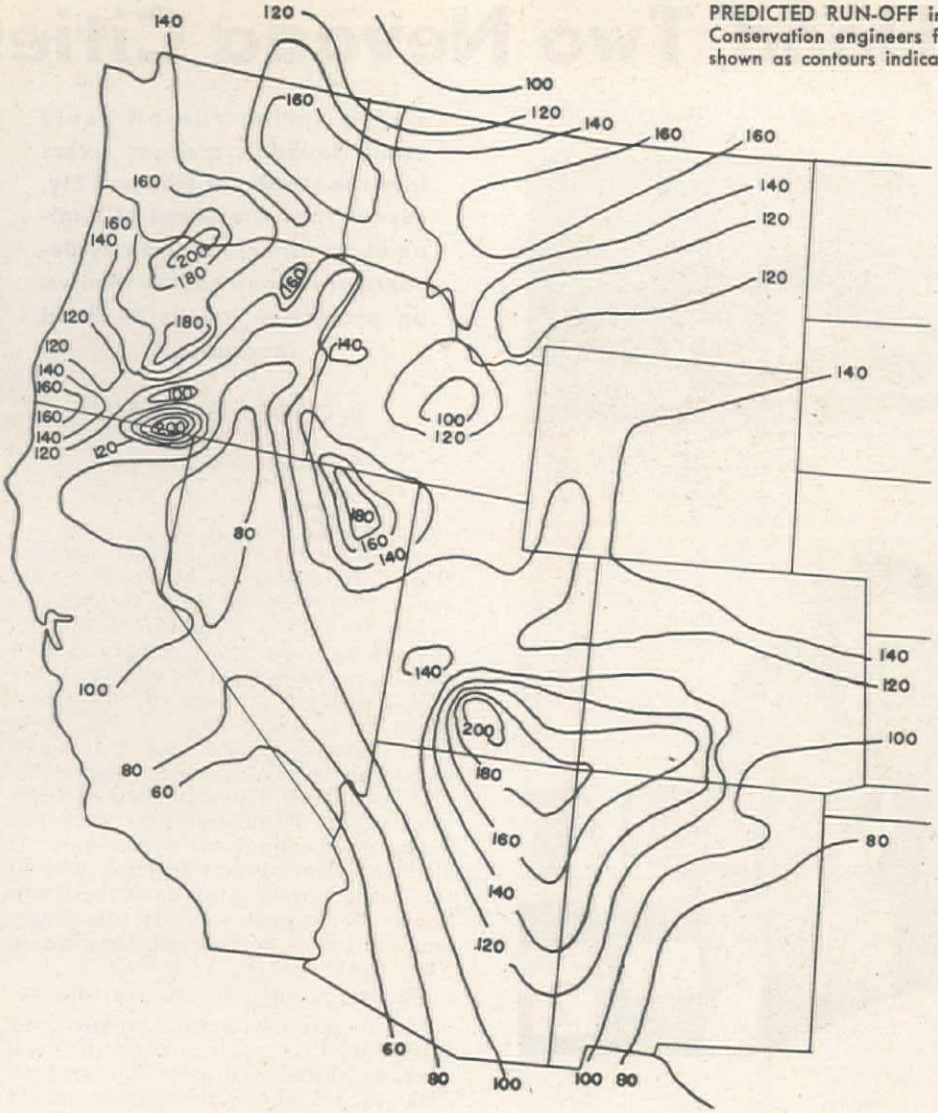
Snow surveys throughout the Upper Missouri Basin promise excellent irrigation supplies for the tributaries of Missouri River above Fort Benton. Water content is approximately 40 per cent above the 12-year average. Valley precipitation was generally below normal during the winter months. Jefferson River and its western tributaries are likely to produce extremely high peak flows. In upper Columbia River basin the snow pack ranges from 125 per cent of normal in Canada and 150 per cent of normal on the Flathead to 160 per cent of normal on the upper Clarks Fork. The threat of extremely high peak flows lies in the unusually high percentage of water content at low elevation courses. High courses show more water content than in 1948 and the low courses double the threat of damaging peak flows, especially in the event of warm weather accompanied by rains.



	Arizona	California	Colorado	Idaho	Montana	Nebraska	New Mexico	Nevada	Oklahoma	Oregon	So. Dakota	Texas	Utah	Washington	Wyoming
Res. reported	8	22	47	7	10	3	6	7	1	26	1	2	14	7	8
Capacity of reported res. (1000 ac. ft.)	3358.0	2817.6 (c)	1742.3 (d)	3401.8	2057.2 (e)(g)	2240.8	3647.8	1375.0 (f)	140.4	2950.4	198.1	2844.0	3349.6	1082.0	3018.0

RESERVOIR STORAGE AS OF APRIL 1, 1949

Not all reservoirs in all States are reported, but enough to give a reliable index of each State's storage supply. Explanation: (b) Most State averages for reported reservoirs are for full ten-year period, but in a few cases reservoirs having shorter records are included. (c) Does not include Friant or Shasta reservoirs. April 1 storage in those two reservoirs is 3,548,800 acre-feet, which is 84 per cent of their capacity. (d) Does not include John Martin reservoir (capacity 655,000 acre-feet; April 1 storage 142,900 acre-feet. (e) Does not include Fort Peck reservoir (capacity 19,000,000 acre-feet); April 1 storage 13,140,000 acre-feet. (f) Does not include Lake Mead (usable capacity 27,935,000 acre-feet); April 1 usable storage 17,735,000 acre-feet, which is 63 per cent of usable capacity. (g) Average used in 1940-49 rather than 1938-47.



PREDICTED RUN-OFF in the Western United States, as tabulated by Soil Conservation engineers from study of snow survey reports on April 1, and shown as contours indicating percentages of normal run-off over ten years.

Nevada

Irrigation water supplies will range from fair in western Nevada to excellent in the eastern portions of the State. Snow-water run-off of eastern Sierra streams will vary from 70 to 100 per cent of normal, while Humboldt Basin streams will flow from 100 to 200 per cent. Groundwater levels continue low and subnormal temperatures have retarded early-season streamflow. Reservoir storage is low with total storage on April 1 about 80 per cent of last year, 45 per cent of the 1938-47 average, and 35 per cent of the usable capacity, but under normal weather conditions during the summer all reservoirs except Tahoe should fill. Lake Mead holds about 95 per cent of last year's April 1 storage.

New Mexico

In northern New Mexico between the Rio Grande and the Continental Divide the snow accumulation is very heavy. East of the Rio Grande and on the Canadian River tributaries, the snow cover is normal to slightly below. Soil-moisture conditions are reported good throughout the irrigated areas of the State. Storage in Elephant Butte Reservoir is rather low but should increase substantially. El Vado Reservoir on the Chama River has been drained in anticipation of high inflow during the 1949 season.

Oregon

The 1949 water supply outlook is good throughout the State, deficiencies not being expected anywhere provided snow-melt and run-off conditions are normal. In fact, unusually high flows are likely to be recorded on most streams, especially the Walla Walla, Crooked, Upper Deschutes, White, Clackamas, North and South Santiam, Sandy, Applegate, Hood, and Umatilla Rivers. Watershed soils are believed to be wetter than usual, a condition favoring increased run-off from the snow pack. Soil moisture in valley soils is also reported as favorable, although recent drying winds have caused a demand for irrigation in some places. Reservoir supplies are rated as generally good to excellent. While total storage in all reservoirs is only slightly more than at this period in 1948, 17 per cent less than in 1947, and 20 per cent less than the 10-year average, futher substantial inflows are expected. Many small reservoirs are already full.

South Dakota

Snow cover in the Black Hills is 50 per cent above normal and the highest for the past six years.

Utah

At the opening of the snow-accumulation period the watershed soils were very dry, but an abnormally high accumulation of snow and water was finally attained. While the dry soil cover has the effect of lessening somewhat the threat of excessively high water, there is still danger that considerable damage may result from peak flows of various streams. All watersheds will yield nearly 120 per cent of average water supplies, with the East Fork of the Sevier expected to yield at least 200 per cent of its average.

All reservoirs are expected to fill even though the smaller ones have been drawn down to provide flood protection.

Washington

Washington shares the generally favorable outlook of other Columbia Basin States, the heavy snow pack in the Cascades having been increased during March. While storage was lower than normal on April 1, the reservoirs are expected to be filled rapidly by spring run-off.

Wyoming

Snow cover is well above normal and is especially heavy on the North Platte watershed. Although fall rains and winter snow brought the total precipitation just above average, soil moisture conditions are good throughout the State. Summer flow of all Bighorn River tributaries should be well above normal. There is a slight deficiency of snow cover on Powder River tributaries. Reservoir storage is about 25 per cent less than last year's total.

British Columbia

The water supply prospects for southern British Columbia are very good. The Coastal, Lower Fraser, Skagit, Similkameen, and Okanogan areas should have high run-off with possibilities of flooding unless cool weather ends and more melting begins very soon.

The main Columbia and West Kootenai are expected to have more than normal run-off, while the East Kootenai and Upper Columbia should experience a run-off with proportions less than a 10-year normal. The latter is based, to some extent, on less than normal soil moistures on the western slope of the Rocky Mountains and in the Lardeau and Duncan River basins.

Snow water-content is more than normal throughout the entire southern part of the province.

General flooding is not expected, although local floods will probably result from the reduced capacity of channels brought about by the flood of last year. Okanogan Lake, a difficult reservoir to regulate, will probably experience high water again, with attendant flooding.

Flood or No Flood, Two Nevada Cities

Heavy spring run-off could swell Nevada's meager rivers into the streets of Elko and Ely, except that the Corps of Engineers, contractors and city departments have hastily thrown up protective levees as flood insurance

By CLYDE J. GORMAN
Corps of Engineers
Sacramento, Calif.

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ELKO, ALONG with Ely, Nevada, focal points in this winter's "Hay Lift" operations by the U. S. Air Force, may be in for more trouble.

The idea of a flood in Nevada is enough to make the ordinary citizen pick up his newspaper twice. But those who know the streams of this Great Basin area, where none of the rivers reach the sea, know also that these rivers can be just as rip-roaring as the Old West itself. Characteristic of these streams, the Humboldt River has low banks, good enough for normal flow. If alternate thawing and freezing will let the spring run-off down easy, the Humboldt's banks will hold. If this happy condition does not prevail, they won't. They can't.

The story, shown in pictures, follows:

1. This severe winter has endowed the people of Elko with a pack of snow liberally distributed over an area of 2,900 sq. mi. above their town on the Humboldt River.

2. The water content of this snow, according to a statement made by Allen B. Carter, City Manager, right, to Ray C. Sorenson, Corps of Engineers specialist, is three times normal. In an ordinary winter, the river would have come up in the regular thaws of December, January, and February. On Apr. 15, the river was lying low in its banks, frozen

Are Prepared

over and nearly solid. It has not come up once, and yet there is more ice and snow, or at least as much, as has ever been recorded.

An Engineer field party headed by Sorensen found that the city of Elko had been flooded in 1943, again in 1945, and was now preparing to swing a real haymaker.

3. It was decided to protect the town against a recurrence of the 1943 water stages with another foot or two for good measure. This meant increasing the size and strength of some old levees raised by the town, and throwing in a few new levees, or extensions to the existing system. The first job was to doze off the snow blanket and crack through 3½ ft. of frozen ground to reach suitable fill material.

4. On Elko's Ninth Street, the mere threat of a 1949 flood has claimed its first victim. The casualty is an iron river crossing where once a charge of fifty cents was made for each span of horses, and half that amount for each rider. The county bought the bridge in 1882. The city agreed to pull the ancient span out of the way now, rather than be required to fish it out of the river later. It now sits unused beside the road it once served.

5. This gave the Engineers a chance to rip away earthen approaches that also presented a serious bottleneck for any flood that will move through town.

6. The contractors, Hunt & Frandsen, and Pete Hostetler, local firms, were recruited by the Army for a fight on home ground. The city threw its street maintaining equipment into the struggle. The fight was against time and the river—the greatest danger was the possibility of a warm rain on the snow fields.

7. The new levee system, flood or no flood this year, is not wasted effort, say Army Engineers. It will fit in with a scheme of upstream controls by way of storage dams proposed earlier this year in a study they made of the Humboldt River.

In any event, the citizens of Elko, after a winter of fighting to save their livestock, now have a place to stand and fight to save their town.

8. Ely, Nev., has experienced floods in 1910, 1935, 1937, and in 1945. If Ely has a flood in 1949, men from the Corps of Engineers expect it to go down the main street of town. It is the lowest street in town and the flood waters would fan over that way anyhow. But this time, the water is to be handled like any other traffic problem. Two tiers of sandbags have been placed along the curb line, and stockpiled at intersections for blocking off side streets when word is flashed by fire department sirens.

9. Then, where the expected flood waters will swing off the main street and head through a district known as Central Ely, city workmen have cleaned out obstructions, and Army Engineers have installed side-boards along the channel. The whole business is purely an


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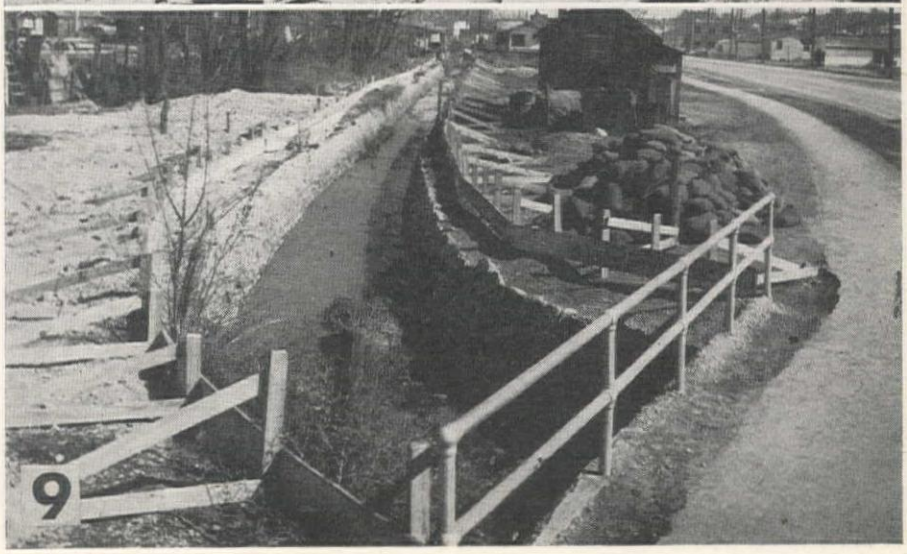
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emergency operation.

10. When it comes to floods, Ely's big trouble is its location. The city itself lies at the mouth of two canyons. Murray canyon is drained by Murray Creek, brings in a run-off of only nine square miles and doesn't amount to much unless it wants to come down when water in Robinson Canyon is on the move. Robinson Canyon, lying west of town, is something else again. Here, a stream of the same name, together with Gleason Creek, attempts to handle a drainage area of some 75 sq. mi.

11. If the present snow pack in this watershed were converted into water, it would stand 6.4 in. deep. And if all that water tries to go too fast through the 4 by 4-ft. storm drain, and two auxiliary 15-in. pipes, it will never make it. Most of the time the storm drain does the job. But if debris gets caught in the grates, or the flow even approaches 200 cu. ft. per sec., the storm sewers can't handle it.

Col. Dwight F. Johns, Division Engineer for the Corps' South Pacific Division, and Col. Joseph S. Gorlinski, head of the Sacramento District, made a physical check of the Ely situation. L. E. Christensen of the Salt Lake Field Office was brought in to do the job. According to Christensen, 65,000 sand bags were brought in. 57,000 bags have been filled and placed in position, the rest are held in reserve.

12. Christensen recruited and maintained a payroll that averaged 38 men a day. The city chipped in eight men, two dump trucks, a Scoopmobile, and a power shovel, and everyone went to work. Old men tied sacks until their hands were raw. Young men threw them on the trucks and stacked them along the curbs. They managed to lay the sacks at the rate of 5,500 a day. George Presse, from the Engineers in Salt Lake City, supervised work in the pit. Joe Norton and Abe Cariker came over from the Corps in Sacramento to attend to the flume job.

Main springs of support in Ely itself included Mayor N. E. Broadbent, Councilman J. E. Huron and Robert W. Millard, City Engineer.

13. The Army Engineers have done their job and departed. Ely sits and waits. If a flood comes, it is almost sure to come at night following a heavy thaw. Means of alerting volunteers to close the intersections have been worked out. The town is prepared to divide itself in half, its fire fighting equipment parked on each side of the temporary river. Newcomers are skeptical. Old timers have their fingers crossed.

In the center of town, the regular storm drain emerges into an open flume and is joined by another flume carrying Murray Creek across the park in front of the White Pine County Courthouse. Sandbags are higher here, and the whole scene has something of the aspect of preparations for a military encounter.

What if no flood occurs? Write it off as insurance, and store the bags. Most of the sacks are of treated material, and they can be racked up without being emptied. Past experience indicates that Ely's flood problems are not over.

WCN's Editorial on Colorado River Impasse Waking Up Tweedle-Players

Reactions to plan for amicable settlement of the Arizona-California squabble show that the fire has been lit

IN RESPONSE to the special editorial in the April 15 issue of *Western Construction News* entitled, "Water's Wastin' Away, Arizona and California!" Some 49 letters and telegrams bearing comments have been received to date (Apr. 30), numerous verbal reactions have been given us, and various newspapers and magazines have reprinted or commented on the piece.

To review, the editorial expressed our impatience with the men and organizations who for more than 20 years have represented Arizona and California in the discussions over division of the limited water supply in the lower Colorado River, and who have, in our opinion, become so involved in personalities and minor details that they no longer possess a desire to settle the matter amicably and fairly. We suggested appointment of new committees from each state to approach the matter from a fresh viewpoint and strive to settle it on some reasonable basis, thereby stopping the costly waste of water which has continued for these 20 years and apparently will continue for 20 more if some forthright step isn't taken soon. We suggested the names of 19 men, including 9 from each state and a federal mediator, who we felt admirably qualified to attack the problem afresh. In not one of the comments were our suggested committee members disapproved, and in many of the letters, the selections were given high praise.

Reprints of the editorial were made and distributed widely among federal and state law-makers, newspapers, Chambers of Commerce, engineers, and citizens. The reprint was given a special title: "The Colorado is Flowing Merrily Out to the Sea, While Arizona and California Play Tweedle-Dum and Tweedle-Dee." Many requests for additional copies were received and filled. A limited number are still available.

Congressmen cool

The character of the comments, however, is what interested the editors most. Citizens and business men generally are anxious to get a settlement, and are, like the editors, of the opinion that the present negotiators, capable men that they may be, will never achieve this end. Congressmen and legislators in general were completely non-commital, although a couple who have supported Supreme Court adjudication reiterated their intention to pursue that time-consuming and quite possibly ineffective course.

There is hope in the attitude of such men as Norris Poulson, Congressman from Los Angeles, who wrote:

"I have read with interest your article entitled 'The Colorado is Flowing Merrily Out to the Sea' and think you have made a very fair statement.

"While I am in the middle of this fight and am one of those who happens to be throwing epithets at Arizona, I sincerely feel that this should and could be settled through arbitration. But since Arizona refuses to arbitrate, we naturally have only one alternative and that is the Supreme Court."

But Harry Sheppard, Congressman from Yucaipa, Calif., expresses the give-no-quarter attitude from California:

"Your communication with enclosed sheet re 'The Colorado is Flowing Merrily Out to the Sea' noted.

"The comments incorporated are all well enough; the proposals under the heading 'Let's start again from scratch' are, also, all right. This controversy has been raging by and between the two States in excess of fifteen years. Governors of the two respective States have always had the authority, and I assume the interest, to appoint committees such as you suggest, yet to date the controversy still pertains. While the Governors of the respective States may or may not exercise their prerogatives, I am not going to take any future chances but fully intend to do my utmost to see H. J. Res. 3, which authorizes the Supreme Court to adjudicate the Colorado River Compact, is enacted at the earliest possible moment. Somewhere and somehow there is an answer to that problem and as heretofore the States and representatives have not been able to accomplish an amiable settlement, I feel it is high time we take it to the court of last appeal in this country. If my efforts are to bear any fruit, we will, at least, have that step in advance and whatever the decision of the Supreme Court may be, it will at least resolve the problem so we in California will know what to do as our next step in securing adequate water."

Two views in Arizona

Among Arizonans, too, both views were expressed. W. J. Crozer, Chairman of the Board of Supervisors of Yavapai County, is very hopeful that the problem can be solved, as shown by his letter:

"Congratulations for the able and practical suggestion recently published in the Holbrook Tribune.

"Passing up all the controversy which has aroused considerable feeling on both sides of the river, and coming to the urgent and important thing, that is developing the basin, in the most economical way for the most of the people. Our very system of government, our desire to adhere to political lines have worked against honest and able men who are regarded as our responsible officers, and who have tossed this vital question from one Congress to another. They have become mired in a mixed coherent mass over which no one has any control, that is protracted drouth, the influx of population, the need to develop an economy to feed and shelter these people. To close your eyes to such an important need—Well we don't do business that way.

"In so far as the settlement of this urgent matter is concerned we find ourselves in the wilderness, and we are looking for some one with a lighted torch to show the way out. We hope you have the torch, and we hope we find the way out. We hope some way can be found."

On the other hand, Phoenix columnist Bill Turnbow published almost a full column on our proposal, calling our editor a special representative of California, and stating that our proposal constitutes encouragement for Arizona, because, he says, California is on the losing end of the argument and is using our suggestion as "a road block for Arizona progress." There is, of course, nothing in the editorial to suggest any such point, and much that proves it utterly fallacious. But Turnbow, as State Capitol political columnist for his paper, is exactly the type of person we hope can be eliminated from future discussions of the problem, being one of those whose livelihood or whose pride is extended by continuation of the fruitless struggle.

Turnbow did do us one service, however, as did several others, including a telegram from New York, by pointing out an error in the editorial, in that we referred to "Roosevelt Dam on the Gila River," whereas it is actually on the Salt, one of the Gila's main tributaries. We stand corrected, but the slip makes no difference in the whole picture, that is the full utilization of all the water of the Colorado and its tributaries.

But the governors!

Most disappointing was the "silent treatment" accorded our proposal by the two governors, the two men who must

energize the new committees we have suggested. With such attitudes, naturally nothing can be accomplished. Here are the letters:

"This is to acknowledge receipt of your letter and thank you for your thoughtfulness in sending me the enclosed editorial. I am passing it on to Mr. Wayne Akin, Chairman of the Arizona Interstate Stream Commission, for his consideration as I know he, too, will be interested.

"I wish to commend you on your interest in the water situation and your action concerning it."

DAN E. GARVEY,
Governor of Arizona.

"Pending a personal reply to your letter concerning a division of the waters of the Colorado River, the Governor has sent the article printed in *Western Construction News* on April 15 to the State Engineer for his comments."

M. F. SMALL,
Secretary to Governor Warren, California

Committee nominees approve

Good letters have come from most of the suggested committee members. Typical is the following from Neal Van Sooy, Santa Paula, Calif., publisher:

"Thank you for your letter with the copy of your editorial.

"Naturally, I was highly surprised. And very flattered. I realize that nothing may come of your suggestion to the two governors, but it is an honor to be nominated by your magazine for such an important task. If Governor Warren adopts your plan, I shall accept any assignment he might request.

"Aside from the personal angle, I believe that you have an excellent editorial. Certainly it is foolish for two great states to quibble over the Colorado River. It should, as you so ably point out, be settled by compromise and not by legislation or court decisions. I believe your editorial will help to arouse renewed interest in a peaceful and proper solution."

Also of interest is this excerpt from a letter from Donald M. Baker, consulting engineer of Los Angeles:

"I have, particularly during the time I was with the State Water Commission and also later, seen many of these water controversies. They usually divide themselves into two classes:

1. Where both sides are definitely determined to fight.

2. Where both sides want to compromise but on reaching such compromise must save their faces.

"In controversies of the first class the only thing to do is to let both sides fight until they are exhausted and then step in and suggest a reasonable compromise. In the second class I have always been able to find a ground for compromise which is satisfactory and which saves everybody's face."

John A. Baumgartner, president of the Arizona Section of the American Society of Civil Engineers, expresses approval of our suggestion, but sees little hope for its success:

"I was interested in your letter concerning the recommendation for settlement of the Colorado River dispute.

"Your suggestion has merit, but probably little else at the present stage of the proceedings. I certainly couldn't conceive of either state agreeing to having this dispute settled in such a straightforward manner. For some reason, we make our democratic way of life very complicated in many respects. Whether these complications are really necessary, often seems doubtful, and would require a better student on the subject than I to decide. At any rate, I feel flattered at being included on your proposed committee."

From the newspapers

We are pleased with a letter from Kimmis Hendrick, Pacific News Bureau chief for The Christian Science Monitor, a wholly neutral paper:

"Your editorial strikes me as the best thing said in California about the Colorado for at least ten years.

"It began to seem to me about ten years ago that if and when California ever took the lead for a regional appraisal of our water possibilities out West, we would really go places. I should like to keep on rooting for you in whatever you do further in this direction."

But a comment we really can't understand appeared in the Somerton, Ariz., Star. In a column entitled "Reflections" the editor mentions receiving a copy of our editorial, and quotes the name in full—"The Colorado is Flowing Merrily Out to the Sea, While Arizona and California Play Tweedle-Dum and Tweedle-Dee." Then he adds the comment, "Maybe, there would be fireworks, if it were poker, huh??" Explain, please!

Speaking of newspapers, we were amused at the Burbank, Calif., News, who quoted much of our editorial on its front page, including the title, but put on the by-line of its own editorial writer!

Additional letters are presented in "The Editor's Mail" columns, starting on page 48 of this issue.

But the job MUST be done

We are encouraged tremendously by the responses to the editorial. We hope we've started a fire which in spite of themselves will make the governors and legislators move toward settlement of this nasty, expensive, and wasteful dispute, which has been delaying development of two great states for 20 years, and if present conditions are allowed to continue, will prolong that delay for generations more. The people want is settled; the Tweedle-players must wake up. It is a matter of small importance whether the men we named are assigned the job—although we believe them outstandingly qualified—but it must be undertaken at once, and with a real determination for agreement.

Diversion Tunnel Carries River Flow During Hungry Horse Cofferdam Work

A PREVIEW of a major event scheduled for later this spring at the Bureau of Reclamation's Hungry Horse project in northwestern Montana was held April 11 when the South Fork of the Flathead River was turned temporarily through the 1,180-ft. long diversion tunnel.

The temporary diversion, accomplished by a rock and earthfill dike constructed across the river, permitted construction crews to fill in the center section of the upstream cofferdam. Wing sections for the cofferdam have been completed to a height of 30 ft., and it is planned to bring the center section up to a height of 20 ft. above the river bed before the spring run-off, expected in June.

During the spring run-off, the waters of the South Fork will flow through the diversion tunnel and over the cofferdam down the river channel.

Permanent diversion of the river will take place after the spring flood. As soon as possible after the flood peak subsides, the upper cofferdam will be raised to a height of 60 to 100 ft. depending on river flow conditions, to shunt the entire flow of the river through the 36-ft. diameter diversion tunnel. A second cofferdam will be constructed approximately 1,100 ft. downstream and the section of river channel between the two dams will be pumped dry. Excavation crews of the General-Shea-Morrison Company, prime contractor for the big dam and powerhouse, then will begin removal of earth and rock from the river channel to expose the solid bedrock, upon which the first concrete for the 520-ft. high dam will be placed late this summer.

Under the present construction schedule, the diversion tunnel will carry the entire flow of the river until the fall of 1951. At that time heavy steel gates will be dropped into place to block the upstream entrance of the diversion tunnel, and storage of water behind the dam will be started.

PORTABLE gunite units half way up the building, left. Completed structure with facing of terra cotta, right.

.ofty Office Building Has—

Gunited Lightweight Spandrel Walls

Concrete forms and placing problems eliminated by use of lightweight gunite to form spandrels of exterior walls for General Petroleum's impressive new office building in Los Angeles

A COMPLETELY new ype of design, incorporating light-veight gunite, was introduced by Struc-ural Engineer Murray Erick, in the onstruction of the largest completely nodern office building in downtown Los ngeles, just completed for the General 'etroleum Corporation. One of the nost outstanding features of the design vas the use of lightweight gunite se-ured to the structural steel frame to orm the spandrels of the exterior walls.

By taking advantage of the placing lexibility of gunite, the following ad-antages were obtained:

1. Complete elimination of the build-ng of concrete forms for spandrels.

2. Elimination of the problems in-erent in the placing of concrete around pandrel beams.

3. A substantial reduction in the size nd weight of structural steel members nd consequent reduction in size and veight of the foundation.

4. A hollow fire-proofed spandrel sec-ion.

5. An accessible and much more eco-nomical method of securing the exterior erra cotta tile blocks.

6. A continuous gunite operation which afforded a subsequent adherence to schedules by other trades.

7. A large overall reduction in man hours and a much earlier completion date.

This type of construction was selected only after exhaustive research in the Johnson Western Co. laboratories on full scale models built to simulate actual structural steel members and working conditions.

Frame erected in record time

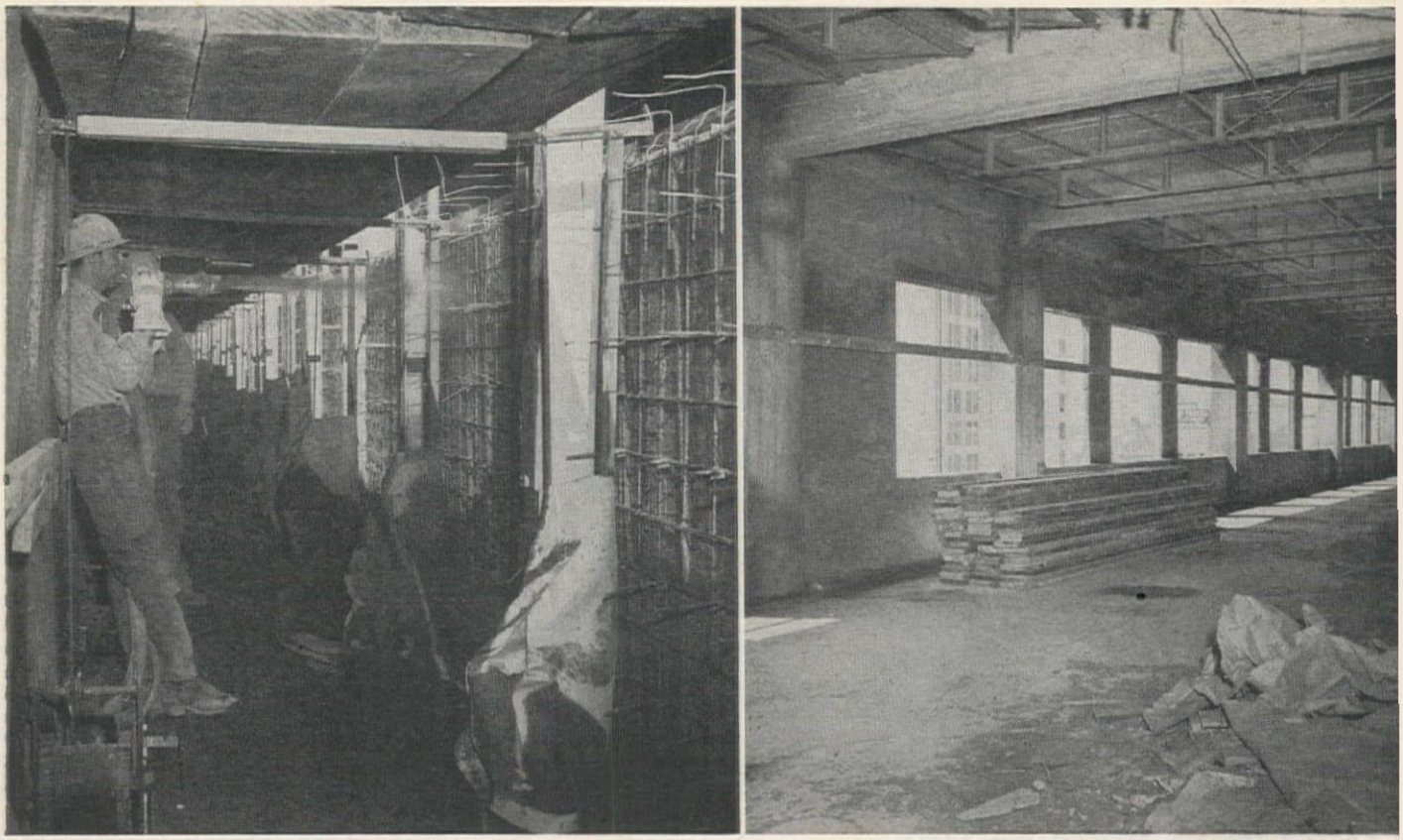
After a record breaking job of pouring footings and erecting structural steel members, by P. J. Walker Co., general contractors, construction on the building proceeded until steel framing, poured columns and floor slabs were substantially completed. Then the exterior walls were ready for guniting.

The spandrel sections between columns extended from the top of the windows on one floor upward to the bottom of the windows on the floor above. They were first wrapped with Steeltex mesh as a backing, over which was placed a mat of 6 x 6-in. electrically welded wire mesh. Forms for the window sills and headers were installed, and steel anchor ties for the support terra cotta were set in the outside face of the wall. This preparation was followed by an application of gunite 2 in. thick on the inside and 4 in. thick on the outside, from the first to the 13th floor of the building. For scaffolding, horses and planks were utilized on the interior, while swinging masonry scaffold was necessary on the outside, moving upward from floor to floor as the work progressed. The inside face of the lightweight gunite wall was screeded to true and even lines to provide for the interior lath and plaster, using preset screed wires for accurate guides. In like manner the outside was screeded to close specifications but also grooved to make a further tie for the terra cotta facing.

Plant on ground floor

The main plant for the gunite operation was installed on the ground floor. Both water and compressed air were piped to all floors, and portable gunite units were moved from floor to floor as the work progressed. By this procedure all material was mixed in a dry state on the ground floor, elevated as needed to the working floor in concrete buggies, and immediately delivered to the special gunite crews.

Two crews were kept busy at all times, working on the same floor, different floors, or inside and outside at the same time. On this job, without making any allowances for the unusual conditions of operation and set-up, the relative difficulty of working on a large building, or for the new technique employed, the gunite work was completed and all



DRY-MIX GUNITE was lifted to portable gunite units supported on scaffolding. At left, the gunite is sprayed on an interior wall after mixing with air and water under pressure from ground floor. Right, the new technique leaves a smooth finish and eliminates a great deal of form work.

equipment removed within the time schedule set for the operation.

The general contract of P. J. Walker Company was carried out under the capable supervision of Carl Larsen. The placing of gunite was handled by Johnson Western Company and directed by Nick Saunders.

Feeder Line May Bring Natural Gas in Arizona

A PROPOSAL to serve natural gas to six northern Arizona communities has been submitted to the Federal Power Commission by El Paso Natural Gas Co. in an amended application requesting FPC authorization to construct a 451-mi. pipeline extending from northwestern New Mexico to a point near the Arizona-California border.

In addition to the 451-mi. line, the project as now proposed would consist of approximately 95.5 mi. of feeder line; two compressor stations with a total horsepower of 7,640; a gasoline extraction plant and gas dehydration plant; and six branch lines, with a total length of about 174.7 mi., extending from the main 451-mi. line to the Arizona communities which the company proposes to serve. Estimated cost of the facilities is $32,000,000.

The application states that the line would have an initial capacity of 165,000,000 cu. ft. a day

Davis Dam Embankment and Spillway Near Completion Ahead of Schedule

IN LESS than ten months after the Colorado River was diverted at the Davis Dam site, the earth-and-rock-fill embankment across the old river bed is substantially completed, Bureau of Reclamation Regional Director E. A. Moritz has announced at Boulder City, Nev.

Moritz said he received word from Construction Engineer H. F. Bahmeier that the dam has been brought to its maximum elevation of 655 ft., or approximately 138 ft. above the original river bed level. The spillway, exclusive of downstream spilling basin, and the powerhouse intake structure are about 95 per cent complete, and the powerhouse is about 20 per cent complete. The spillway and intake will be finished this summer. The powerhouse will not be completed until early in 1950. Installation of the generators, turbines and other powerplant equipment will be carried on concurrently with work on the powerhouse. The first energy is expected to be generated in the late summer of 1950.

Since early last July, when the river was turned into its new channel and the construction area between the cofferdams was pumped dry and excavated, the Utah Construction Co., main contractor, has placed approximately 3,700,000 cu. yd. of earth material in the embankment. The earth work was completed three months ahead of the schedule set at the beginning of the operation. The embankment, with a structural height of 200 ft. and a hydraulic height of 138 ft., is 1600 ft. long, 1400 ft. wide at its base, and 50 ft. wide at its crest. A two-lane roadway connecting Arizona Highway 68 and Nevada Highway 77 will be constructed across the top of the embankment. A contract for furnishing and erecting steel for the two span bridge across the upper end of the forebay channel has been awarded. The 152-ft. high concrete bridge pier in this channel was completed several months ago.

At present, the river at Davis Dam is being diverted through six openings left in the spillway structure. After completion of the dam embankment and installation of necessary gates to control the flow, these six openings will be bulkheaded with stop-logs, thereby raising the water in the diversion channel about 40 ft. During this stage the water will flow through two outlets, one on each side of the spillway. This second-stage diversion will permit the completion of concrete work in the six openings to the elevation of the spillway crest. At the end of this year or early next year, the radial gates controlling these two outlets will be initially operated to start water storage in the reservoir.

All powerplant equipment is on order and much of it has already been delivered to the damsite where it is stored, awaiting installation, with the first generating unit scheduled to go on the line in the summer of 1950, construction of the backbone transmission lines will be completed in time to enable these facili-

Continued on page 140

CRATER-LIKE reservoir is being built by reinforcing topography with Proctor-compacted earthfill.

Safety Is Main Item on—

First Membrane-Lined Earth Reservoir

Uncontrolled drainage will be zero on the Los Angeles Dept. of Water and Power membrane-lined Baldwin Hills Reservoir

ATOP THE BALDWIN HILLS and overlooking the city, the Baldwin Hills Reservoir is being cut from a small plateau by the Los Angeles Department of Water and Power. The floor of the reservoir coincides with a canyon in the topography, with three of the sides cut from slopes of hill peaks and the remaining sides constructed of earthfill. Interest is running high at the department's engineering offices right now, since tests are under way to determine what type of impervious membrane will be used on the bottom and sides of the earth structure.

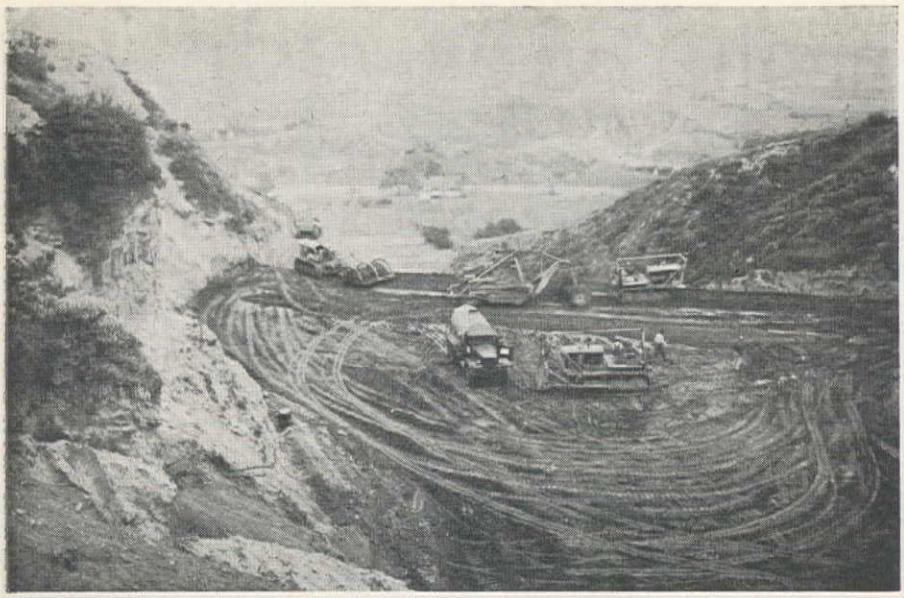
Unusual design

The area surrounding the base of the Baldwin Hills is heavily populated on three sides and is growing rapidly on the fourth. Because the hills themselves are composed of sand, sandy loam, and silt, the reservoir is designed with a special factor of safety in the form of an impervious compacted earthfill lining of selected materials separated from the foundation material by a blanket drain and an impervious (waterproof) membrane designed to catch and deliver to the drainage system any small amount of seepage which may occur, thus preventing percolation and consolidation.

To determine the proper materials to use in the lower waterproof membrane field tests on layers of rubberized asphalt, plain asphalt, asphalt gunite, asphalt spray, mastics, and impregnated cotton fabric are being conducted. In the latter method under test at the reservoir site, the bitumen is sprayed at some 400 deg. F. on grade, the special cotton fabric laid in place, and the top layer of bitumen then sprayed on. About one million sq. ft. of reservoir surface will be covered with one or another of the previously mentioned waterproof courses.

The reservoir covers a maximum area of 18 ac. and will have a capacity of 900 ac. ft., considered totally as water storage in transit to serve the fast-growing area near the southern city limits. The project consists of one main dam and five fills. The main dam, of compacted earthfill, rises 155 ft. above the canyon floor at the axis and its crest is 232 ft. above the downstream toe. Its length is 650 ft. and its crest 66 ft. wide, with a spillway capacity of 181 sec. ft. There will be one inlet-outlet tower, 93 ft. high

RESERVOIR DRAINAGE TRENCH contains manometer tubes imbedded in concrete saddles under drain pipe. See detail, "How It Was Done," page 99.



VIEWED FROM TOP of reservoir, this small canyon near the main structure is being filled and compacted for additional foundation strength and insurance against movement of the hills.

LOOKING UP from toe of main dam toward reservoir, this view shows many partly completed berms being compacted on downstream slope. Haul road will be access road and storm drain.

and 14 ft. inside diameter, connected to the shore by a 102-ft. bridge and fed and emptied by two 400-ft. tunnels.

Reservoir and lining

To form the reservoir, a draw between two peaks was cleared and excavated to grade and the main dam built of compacted layers of this material. Other compacted fills were needed to increase the height of the wall at the other end and to fill in breaks in the surrounding topography. All of the excavation and compacted fill necessary to construct the reservoir up to subgrade elevation, including subgrade drains and lower portions of the spillway, has been completed by force account using rental equipment.

All work above the subgrade, such as the impervious membrane, pea gravel drain, compacted reservoir lining, tower, and inlet-outlet tunnels will be completed by contract. The first work under contract will be the construction of the reservoir lining which consists of: the placing of the waterproof membrane; covering the membrane with 4 in. of cemented gravel, topped with a course of partly-sealing cemented roofing gravels; covering the cemented gravels with 10 ft. of selected compacted fill; and paving the fill with 3-in. surface of asphaltic concrete. Any water seeping through the asphaltic paving and the 10-ft. rolled blanket will be collected in the cemented gravel drain on the waterproof membrane. The floor of the reservoir slopes on a one per cent grade to the center, where seepage will be delivered by the membrane to the measuring vault at the base of the tower by means of the collecting drains.

Underdrainage system

The 12-in. tile drain was laid up the main canyon under the dam. This drain was designed to collect ground water that might be developed under the embankment at the subgrade elevation.

The bottom 3 in. of the tile drain trench was covered with cemented sand and upon this rests the drain encased in regular concrete to a point slightly above the center line. The trench was then filled with cemented pea gravel and topped with another layer of cemented sand. Both the cemented sand and pea gravel were designed to be very porous. The sand was specially selected so that it was lacking in fines below the No. 28 mesh. It was made with 1 part of cement with 12 to 16 parts of sand, by volume, dampened and packed into place.

The cemented pea gravel was a mixture of clean pea gravel and cement with 6 gal. of water per sack of cement. About 1½ sacks of cement were used per cubic yard of mix. Water can flow through the cemented sand and cemented pea gravel and into the open joints of the tile pipe. Once in the pipe it drains on down the canyon and finally into the spillway pipe and to the main storm drain.

Embankment construction

Earth excavation on the job totals 1,450,000 cu. yd. of which over 1,100,000 cu. yd. has been placed in compacted embankments, the balance having been placed in select stockpiles and will be placed in the lining. Excavation proceeded at an average rate of 90,000 cu. yd. per month, the high month hitting 114,000 cu. yd. This particular job is one of many jobs that developed the saying "Size limits the number of cans which limits speed." Average equipment and crew for the job included 10 scraper-graders and D-8 tractors, five D-8 bulldozers, three water wagons, one motor patrol, and four sheepsfoot rollers (two double drum and two three-drum) each drum weighing 15,000 lbs.

Of great importance with the Proctor compaction method is the care used to achieve homogeneous character of the fill material. After spreading in 9-in. loose layers and checking the moisture, the earth is mixed thoroughly with a Seaman Pulvi-Mixer and a Wood Mfg. Co. custom-built mixer and then compacted by 16 passes with the sheepsfoot rollers.

Continued on page 138

SUPERVISING the reservoir job for the Los Angeles Department of Water and Power are, left to right, ROBERT E. BRADY, Resident Engineer, NORMAN M. IMBERTSON, Supervising Engineer, and LORING E. TABOR, Assistant Supervising Engineer.

Grid of Channels to Control Floods

Expected to serve as a model for future flood control work in the nation, a grid of channels from mountains to sea will protect thousands of acres in Los Angeles River watershed

By CHARLES W. THOMAS
Construction Engineer
U. S. Soil Conservation Service
San Fernando, Calif.

FLOOD CONTROL from the mountain tops to the sea is approaching reality in the watershed of the Los Angeles River, one of the first major watersheds in the country in which "upstream" engineering on farm, grazing, and watershed lands is being carried forward as an integral part of a comprehensive master plan of flood control for the entire basin.

When completed, the Los Angeles River watershed which includes a large part of the metropolitan area of Los Angeles and many thousands of acres of valuable orchard, truck garden, crop, and pasture land, is expected to serve as a model for much of the future flood control work in the nation. The undertaking is among the first of its kind authorized by Congress. It is a coordinated program of the U. S. Corps of Engineers, the Soil Conservation Service and Forestry Service of the U. S. Department of Agriculture, the Los Angeles County Flood Control District, and numerous cooperating local agencies. It is being financed jointly by Federal, state, county, city and private funds.

Upstream and downstream work coordinated

Work in the upper watershed of the Los Angeles River is unique in that it represents a large-scale attempt to combine upstream engineering with heavy construction downstream on the main flood arteries. The program will show how soil conservation and the control of small waters on agricultural lands and hilly mountainous areas can help control flood flows and protect downstream flood control works from silt and other debris washed in from eroding farm land, raw road cuts, and other debris source areas above.

The upstream flood control work is being carried forward under direction of the U. S. Soil Conservation Service. It covers practically all of the agricultural land in the San Fernando Valley west of Sepulveda Boulevard and extends to the ridge of circling mountains to the south, west, and north. Bell and Calabasas Creeks which join in the valley near Canoga Park to form the Los Angeles River proper, together with scores of minor streams and tributaries, are included.

Grid of flood channels

Everything done in the upper watershed will ultimately fit together as part of the comprehensive plan for the complete Los Angeles River drainage. As a first step in this direction, soil conservation engineers, in cooperation with local flood control agencies, laid out a grid of flood channels for the valley floor to route flood waters into the downstream flood control system of the Los Angeles River. A new kind of flood control survey which took into account the types of soil, their water-holding capacity, fire control of watersheds, irrigation methods, farming practices, and the kinds of crops grown on each tiny watershed, determined the location of the master drains. Wherever possible, existing channels which included countless meandering streams and wandering gullies were selected as new drainways to avoid the necessity of cutting across existing farm lands.

GRADING the 1½:1 channel banks looked like a profit-eating job until the idea of suspending a motor grader on the slope by steel cable from a dozer on the bank was devised.

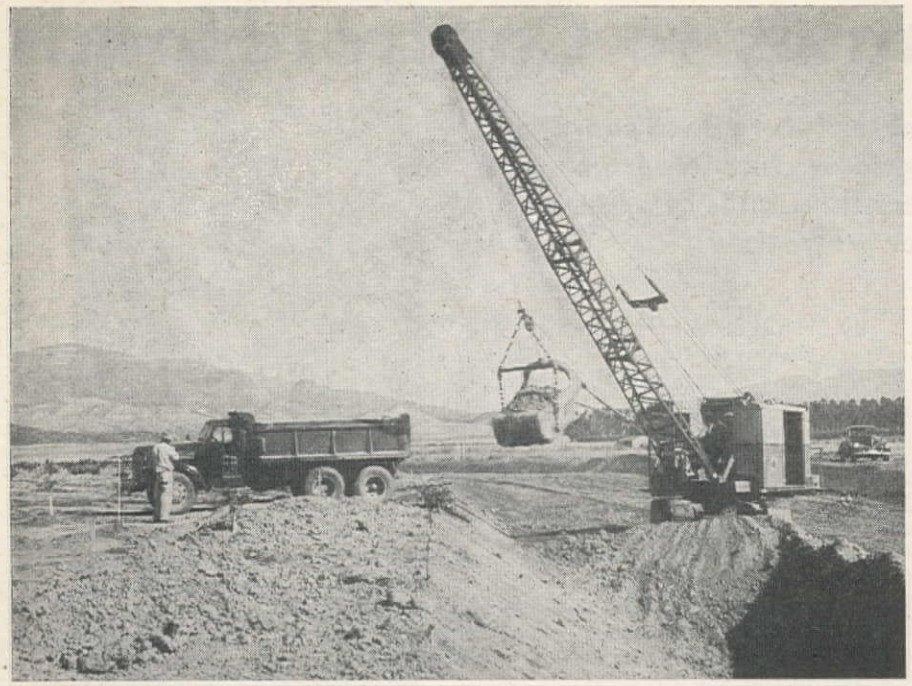
Since much of the flood damage in the upper watershed in the past has resulted from the inability of natural drainageways to carry storm waters, first priority construction work has centered on straightening, widening, and deepening the flood channels and protecting them against scour and cutting by peak flows.

Two main contracts upstream

To date, work has been completed on 8¼ mi. of the flood channel system at a total cost of approximately $100,000 per mile. It includes 6 mi. of straightening, widening, deepening, and construction of revetments in old channels of Aliso, Wilbur and Browns Creeks which now serve as the principal north-south channels in the center of the project area, and work on approximately 2¼ mi. of Bell and Calabasas Creeks to the west above the point where they join to form the Los Angeles River.

Work on the Wilbur Creek drainage was divided into two main contracts totaling in excess of $200,000. Garn L. Moody, contractor of North Hollywood, Calif., was low bidder on the first contract covering the lower 2 mi. of channel, and S. Edmondson & Sons of Los Angeles was awarded the second contract for the upper 2 mi. of channel to the foothills of the Santa Susana Mountains. Garn L. Moody was also awarded the first Bell Creek contract

COMPLETED SECTION of upstream channel. Wire revetments serve as the principal bank protection. The corrugated metal pipes over revetment fence will accommodate side inflow.



A DRAGLINE crane with 1½-cu. yd. bucket is being used on the job by S. Edmondson & Sons, Los Angeles contractors. The dragline establishes 1½:1 slopes as excavation progresses.

with a bid just under $85,000, the second Bell Creek contract going to Foster & McHarg of Riverside, Calif., for $35,000.

Waste fills hollows

An early problem in executing contracts was how to dispose of some 254,000 cu. yd. of waste excavation. The problem was whipped when leg work on the part of Jim Alexander, superintendent for Moody, and Bert Lee, superintendent for Edmondson, resulted in permits to fill hollows and washes on adjacent farms leaving fields dressed off to smooth irrigation grades.

Jim Alexander pushed the Wilbur and Bell Creek jobs through on schedule moving the bulk of the excavation with Caterpillar D-8's and 12- and 15-cu. yd. carrier-scrapers supported by D-8 bulldozers. Cutoff trenches for channel structures were excavated using a Northwest crane equipped with clamshell bucket. Revetment posts of 30-ft., 60-lb. railroad rail were pushed 25 ft. into the ground in rapid succession with a Northwest pile driver. Channel slopes were trimmed as excavation progressed downward with a Caterpillar No. 12 motor grader. A maintenance crew and mobile repair shop, backhoe, 8-cu. yd. dump trucks, scarifier, welding truck, and 30-ft. bed tractor trailer all helped maintain schedules.

Paul Moe, equipment contractor of Los Angeles, furnished the D-8 Caterpillar tractors and scrapers for the Edmondson contract. While a large part of the excavation was "panned" out, a 1¼-cu. yd. American Gopher dragline loaded excavation from ½ mi. of the channel into 8-cu. yd. dump trucks for distribution to sites away from the channel. Farmers in the vicinity took advantage of Edmondson's availability and hired part of his forces to build and surface one-half mile of road and build two surface reservoirs. The usual procession of maintenance men, shop truck, welding truck, Northwest pile driver and Caterpillar No. 12 motor grader worked together to complete the pipe and wire-revetted flood channel on schedule.

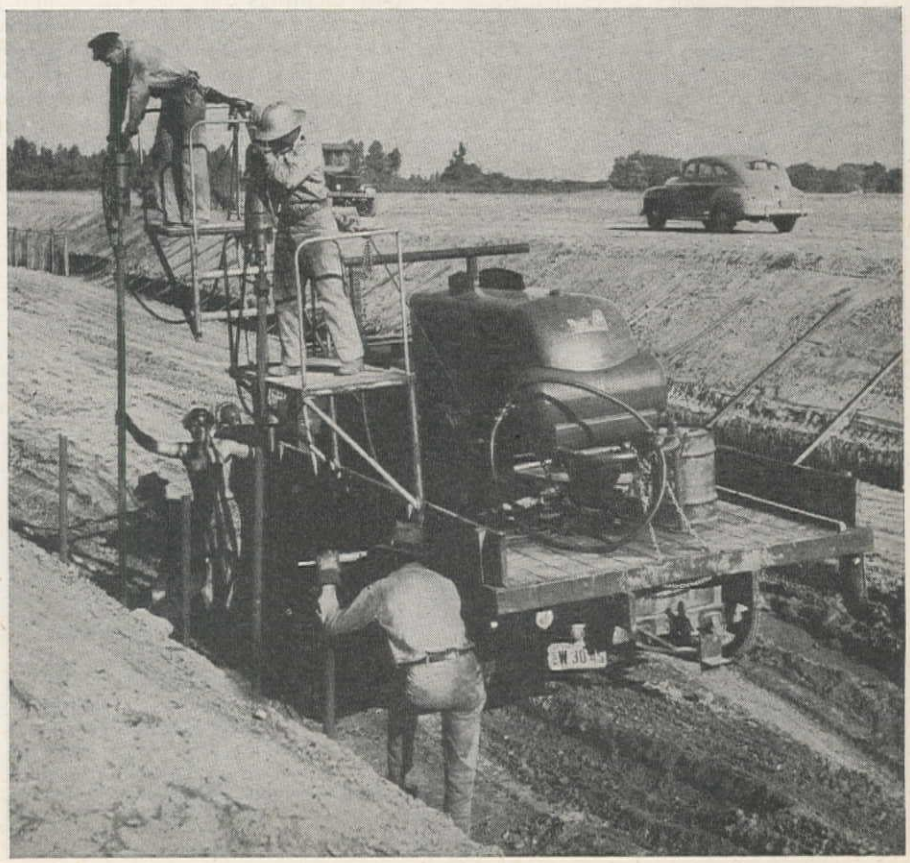
New wrinkle for post driving

Burkett Fence Co. of Los Angeles subcontracted the placing of revetment fencing and posts on both Moody's and Edmondson's contracts, working through one job into the next. The 2¼-in., 12 to 14 ft. tubing was driven with surprising speed using 90-lb. pavement breakers equipped with a machined tool to fit over the tube heads. Driving was done from high and low platforms mounted on a 1½-ton truck bed carrying the Schramm 105-cu. ft. air compressor. The truck moved up the channel bottom in 8-ft. stops. This is a good wrinkle for tough driving conditions; without exception, all tubes were driven to grade in less time than it takes to describe the operation, even in areas where a drop hammer bent the tubes faster than they could be set in position.

Wire revetments, doubled at critical points, serve as the principal bank protection for the flood channels. The revetments vary in height and construction with the calculated volume of water to be carried. They consist of 6-ft. sections of Keystone Steel and Wire Company non-climbable fence fastened to posts of 2¼-in. boiler tube driven at 8-ft. centers in the channel bottom along the toe of the slope on each side. In the larger channels, 10-ft. sections of wire are supported by 30-ft. posts of 60-lb. railroad rails driven on 10-ft. centers along the toes of slopes. Debris which collects on the wire confines high-velocity flow to the channel protecting the banks from scour and cutting.

Grading the 1½:1 channel banks through fill areas looked like a profit-eating job to Edmondson until Bert Lee hit on the idea of suspending a No. 12 Caterpillar motor grader on the bank slope by a steel cable attached to a D-7 Caterpillar dozer which moved along

SPECIAL RIG developed by Burkett Fence Co., subcontractor on Wilbur Creek contract, drives tubular posts for revetment fence with remarkable speed using 90-lb. pavement breakers.



Bennett Murray of Newhall. Murray used an Austin-Western motor grader with a hydraulic back-sloping blade for dressing, and 4¼-cu. yd. carrier-scrapers with International ID9-41 h.p. tractors as prime movers for the main excavation, spreading surplus soil in adjacent citrus orchards. This type of waterway consists largely of graded channels or diversion ditches seeded to permanent vegetation, which cross several farms and pick up surplus water for delivery to the nearest flood channel.

Farmers cooperating to save water

Throughout the length of all flood channels, farmers are cooperating in the unique flood control project by installing soil and water conservation practices that hold field runoff to a minimum. Local drainage enters the main channel through corrugated metal pipes extended into the channel a sufficient distance to protect the channel slopes.

Officials of the San Fernando Valley Soil Conservation District have also played a leading role in spurring farmers to change their methods to fit the new conservation pattern. With technical help made available to them by the Soil Conservation Service, they have helped farmers re-align their irrigation systems to eliminate soil washing and water waste, lay out fields and orchards for contour cultivation which retards erosion and checks water runoff, adopt systematic crop rotations for soil improvement, install field terrace systems, strip cropping, and countless other good farming practices that are vital to success of the flood control program.

Dramatic results

The value of "upstream" flood control was dramatically underscored in 1948. Wilbur Creek, one of the flood channels of the valley, has its source in the foothills of the Santa Susana Mountains which hem in the valley on the north. It is fed by two main branches, the East branch and West branch. All vegetative cover on the watershed of the East branch was gone as a result of fire the year before. The West Branch watershed was covered with a dense growth of grass and brush.

progressing on the mountainous parts flood control system.

Rehabilitation Completed on Hawaii Pier Shed Damaged by Seismic Waves

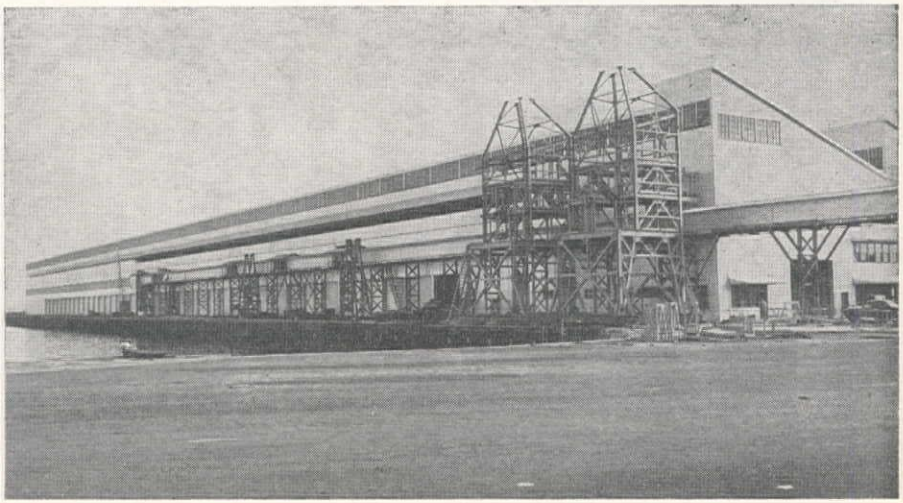
RECONSTRUCTION of the pier sheds at Hilo Harbor, Hawaii, damaged by the violent seismic waves of April 1, 1946, has been completed at a cost of $1,615,336 of which $806,934 was contained in a Federal Works Agency grant. Repairs also have been completed on a second damaged pier shed. The balance of the cost was borne by the Territorial Board of Harbor Commissioners.

Rehabilitation of the harbor installations was one of several projects for rebuilding and restoration of public works facilities damaged in the disaster which cost 200 lives and property damage exceeding $25,000,000. The 79th Congress appropriated $11,300,000 for rehabilitation work, including that of roads, highways and bridges damaged by the War and defense efforts and the seismic disaster.

The major contract for construction in the rehabilitation of the harbor works was awarded to E. E. Black, Ltd., of Honolulu, and work was started August 25, 1947. The specification called for rebuilding of the pier sheds, construction of retaining walls, pavement and fill, and removal of railroad tracks. Pier shed No. 2, is 1,040 ft. long and 145 ft. in width. Reinforced concrete was used for curbs, column-bases, footings and walls, with concrete piles for column foundations. The doors are of the steel rolling type and the sashes are of fixed, pivoting, hinged-at-bottom and double-hung types.

Contract for dredging for Piers 1, 2 and 3 was awarded to the Hawaiian Dredging Company, with certain miscellaneous work awarded to J. W. Glover. The contract for the gantry crane over the bulk sugar beds and the conveyor system to the pier sheds was not included within the scope of the Federal-grant contract. The anchorage system was installed by the Harbor Commission as appurtenant to the sheet piling for the hydraulic fill, and the sprinkler system will soon be installed.

REBUILT Pier No. 2 at Hilo Harbor is a big improvement over the former facilities.



Eggshell Shape Gives High Strength to—

Tunnel-like Wood Arch Theater

TWIN ARCHES at entrance have important structural use as well as unusual eye appeal

Functional design of Los Angeles theater cuts construction cost and creates eye-appeal by use of graduated-arch wall and roofing components

By LEWIS EUGENE WILSON
Architect, Los Angeles

WHAT IS BELIEVED to be at least one of the first practical designs for prefabricated theatrical structures is that of Baldwin Hills Theater, construction of which was recently completed at La Brea and Coliseum Streets in the Leimert Park district of Los Angeles.

It is fundamentally a functional design, developed to reduce high construction costs which have seriously limited the number of new theaters erected since the end of World War II, without a sacrifice of structural strength or other desirable qualities. Current computations indicate that its total cost will average only about $150 per seat, whereas more conventional structures require an expenditure of $200 to $250 per seat, and most of the savings can be attributed to lowered material requirements due to the use of graduated-arch wall and roofing components. Other advantages:

(1) Unusual and attractive appearance, as indicated by accompanying photographs.

(2) Better air-conditioning qualities, due to the fact that a strong draft is not required to heat or cool a graduated tunnel structure.

(3) Ideal acoustics, due to the absence of internal surfaces which sometimes ricochet or distort the more subtle nuances of a motion picture sound track.

(4) Special provisions for indirect neon lighting whereby the indoor color schemes can be varied from day to day, if desired, at a negligible cost.

(5) Fireproofness, due to the use of recently-developed asbestos finishing materials on indoor surfaces.

(6) Structural soundness of the type that has been repeatedly demonstrated in the construction of lightweight aircraft, due to the inherent ability of "eggshell" or rounded structures to resist the loads than can be imposed thereon from all directions. This feature was initially recognized by ancient Moslems, who are accredited with having erected the first arch-type buildings to resist strong winds and earthquakes.

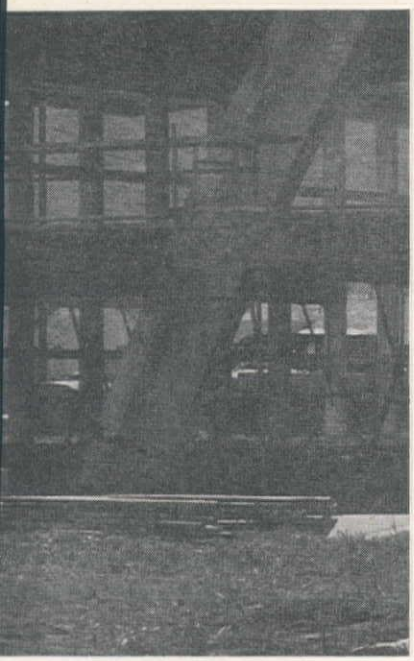
PARTLY COMPLETED screen end of Baldwin Hills Theater, where arches are supported by columns over stubby-wall segments to minimize the amount of indoor space that serves no functional purpose.

A tapering tunnel

The building has been constructed on a site that is 318 by 131 ft. in overall dimensions, and its 22,000 sq. ft. of indoor floor space will provide room for 1,800 seats at intervals of 36 in., back to back. Its funnel shape is due to the use of 10 x 20-in. glued-wood arches, whose span is graduated from 85 ft. at the screen end of the structure to 110 ft. at the entrance. Ceiling heights conversely range from 45 ft. at the screen to 25 ft. at the entrance.

Trusses were made to order by Summerbell Roof Structures, and are composed of wood strips adhered in suitable sequence by means of plastic resins and contact or low-pressure laminating techniques. Indoor arches were assembled with casein resins for high strength and low cost, while the outdoor arches were glued with phenolic adhesives for high strength and maximum weather resistance.

At first glance, the two outdoor



LAMINATED wooden arch trusses at the entrance of structure are based on reinforced concrete foundations. These highly decorative arches effected savings on supporting columns and gave patrons an unrestricted entrance.

arches seem to serve no purpose other than to improve the building's front appearance; but actually each eliminates the need for many supporting columns beneath the flat roof that covers the area around the ticket booth by providing a sequence of vertical steel rod hangers.

Footing, foundation, and flooring components of the building are comprised of concrete reinforced with steel as necessary in a more or less conventional manner. The ten overhead arch or truss members are attached directly to the foundation by means of concrete-embedded dowels or bolts, or (where low walls were provided to prevent indoor crowding) to columns which are actually concrete extensions of the foundation designed to provide truss attachment bolts at heights averaging about 10 ft. above the floor.

Outer-frame covering supported by the trusses is constructed of wood shielded with asphalt-composition roofing materials, over which a chlorinated rubber finish will be applied. Inner-frame covering is also of wood (with breaks at each arch for indirect lighting, as previously noted), coated with blown asbestos for fireproofing.

The 117-ft. wide foyer will be faced with plate glass, and a combination of latticework and ceiling apertures will enable a portion of the lobby to be decorated with live garden foliage. Signs over the lobby will be supported by the lobby roof and the two outdoor arches.

Structural engineer Frank Ropp specified a unit stress rating in the arches of 3000 p.s.i. and bearing stress in the footings of 2000 p.s.i. for the building.

Construction specialties

Construction work was supervised by J. B. Houston and Jean Martin of Baruch Construction Corp., Los Angeles contracting firm which built the structure for Fanchon and Marco, and has been characterized by the following noteworthy innovations:

(1) The use of clips in attaching joists to arches—a labor-saving technique, which will no doubt eventually be adopted by many other contractors.

(2) The preparation of integrally-colored and hardened concrete floors.

(3) An extensive use of impact wrenches to speed construction operations.

Republic glass partitions were installed in the structure by Tuf-Flex Glass Door Co. National Theater Supply Co. furnished the building with mohair-upholstered seats. Air conditioning and plumbing fixtures were installed by Universal Plumbing Company and A. H. Berg & Sons.

All work was finished several days prior to the scheduled May 1 deadline, and the total cost amounted to less than $270,000.

Popular demand

Meantime, another theatrical concern has requested a set of standardized plans that can be used in prefabricating a series of ten similar buildings, each with a seating capacity of 1,200, for erection in varied localities between Los Angeles and Chicago.

It does seem safe to say that greater economies can be anticipated for future projects—not only through savings in the use of prefabricated structural components, but through the development of a design which will facilitate the installation of more steel structural members.

California's Solons Start Season With Brand New Ball Park and Headquarters

SACRAMENTO'S new baseball park got its Pacific Coast League baptism on March 30 with a season's opener between the Solons and the Oakland Oaks. Possibly exhibiting its pride in the new facilities, the Sacramento team won the first four games of its opening series.

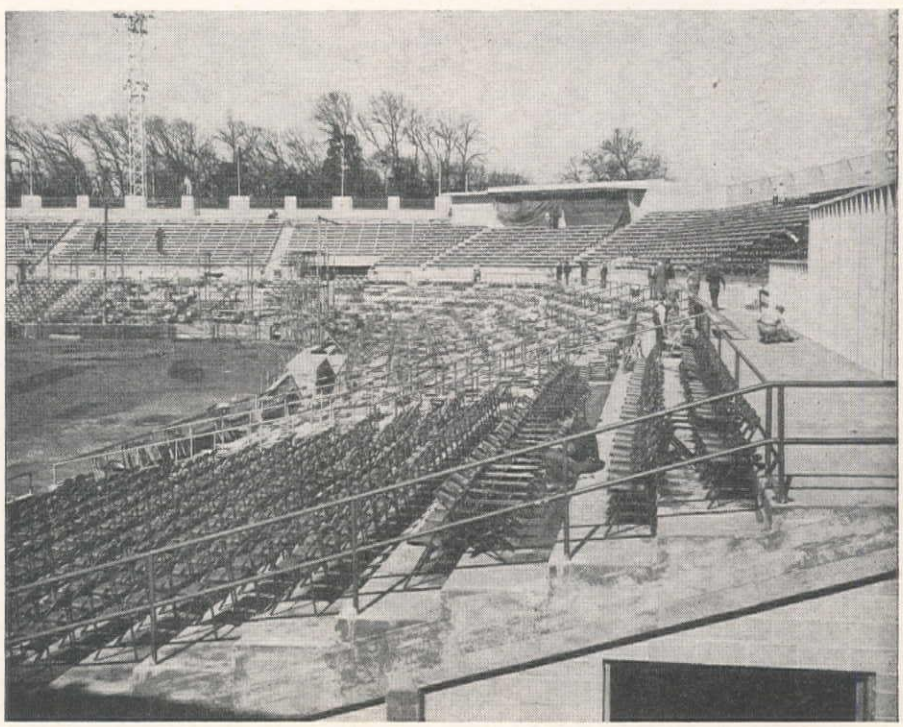
The new home of the Solons, built at a cost of $314,000, replaces a wooden structure which was burned to the ground last July. There is very little in the new grandstand to remind fans of the old park.

The new stadium is built of reinforced concrete throughout, artistically designed and comfortable. Partition work under the grandstand is of concrete block. It has a luxurious players' clubhouse, a special suite for the umpires, administrative offices, commissary, and other features, and will seat nearly 10,000 people. Temporary seats for another thousand can be added when required. The stands are not roofed. Adequate lighting was installed for night games.

The plant was constructed by Lawrence Construction Co., and Edwin J. Mackey, general contractors of Sacramento. The structure contract amounted to $257,000, and electrical installations cost another $57,000.

Harry J. Devine of Sacramento was the architect on the job, and Ernest D. Francis was the structural engineer. All cement was furnished by Calaveras Cement Co.

TRUST in mild weather is indicated in the design of Sacramento's new uncovered baseball park. With construction and other costs averaging about $35.00 per permanent seat, the new structure features many luxurious comforts for players and staff as well as for the fans. The 5½-month construction time continued right on through the cold winter months.



Construction Design Chart

CVII . . . Lumber Quantity Estimates

By JAMES R. GRIFFITH
Dean of Engineering
University of Portland
Portland, Oregon

I KNOW THAT a board one inch thick by twelve inches wide, is taken as the unit of measure for a board-foot, or a foot board measure (F.B.M.). However, in my infrequent computations of such units, I am always a little uncertain of the results. I know this confusion in making such a simple computation seems ridiculous to those with constant practice. But in talking to others, I find that I am not alone in my confusion.

I recently had occasion to estimate a quantity of dock timbers involving over a million board feet, when time was very limited. I have a handy little concrete and lumber computer distributed by one of the cement companies. This computer gives, for various sizes of lumber, the total board feet in one piece of various standard lengths varying from 10 ft. to 22 ft.

My first problem on the estimate, involved the computation of board feet in 400 braces, 4 × 10 in section, and 32 ft. long. Right away I noted that my computer would not cover the length, so I figured that I could add the board feet in a 20-ft. length, to that in a 12-ft. length, and thereby arrive at the value for a single piece. So I then turned the dial and to my consternation found that 4 × 10 sizes were not included. It did, however, include 2 × 10 lumber. I could then double the value obtained for a 2 × 10 in order to obtain the quantity in a 4 × 10. Therefore the following computations were made:

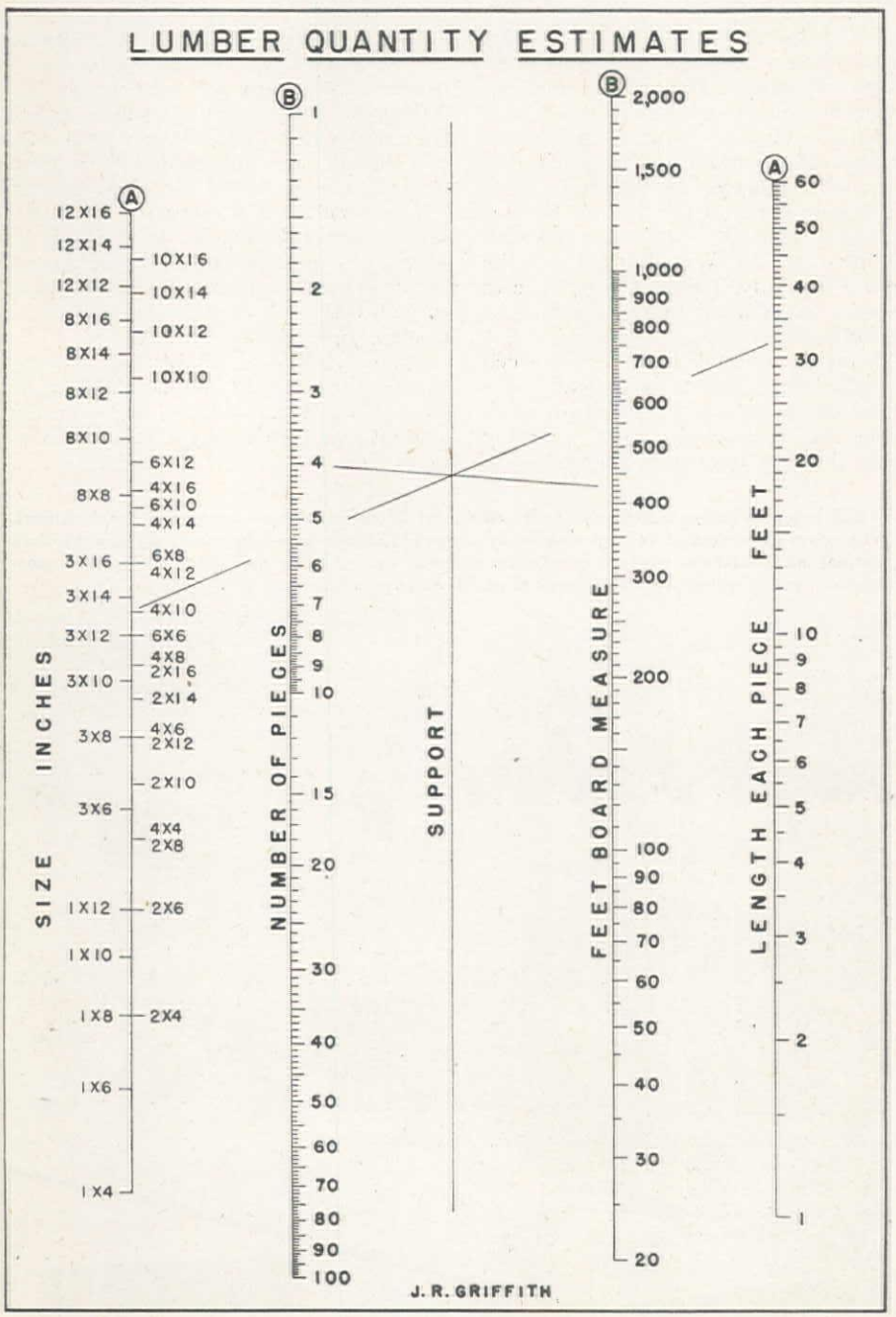
1 piece, 2 × 10, 20 ft. long = 33⅓ FBM
12 ft. long = 20
32 ft. long = 53⅓ FBM

1 piece, 4 × 10, 32 ft. long = 53.33 × 2
= 106.66 FBM

400 pieces, 4 × 10, 32 ft. long = 400 × 106.66
= 42,664 FBM.

I decided at once that I would have a chart available for the next time such an occasion arose. The accompanying chart is the result, and is solved by the use of two lines intersecting on the SUPPORT: One solution line is drawn between the (A) scales, and one between the (B) scales. Solution lines have been drawn on the chart for the problem solved above. The first solution line has been drawn between the 4 × 10 size and a length of 32 ft. The intersection of this first line with the SUPPORT, is a rotation point for that particular size and length. The second solution line has been drawn through "4" on the scale for the number of pieces, through the intersection on the SUPPORT. On the scale of Board Feet, a value of 425 FBM will be noted. Since 400 pieces are involved, instead of the 4 used on the chart, it will be necessary to add two digits to the result obtained making it 42,500 FBM. This is a reasonable check on the value of 42,664 obtained above in the computations. When we consider that a factor is usually added to cover cutting and shipping wastage, such a chart will give results well within the accuracy demanded by the construction man.

No doubt there are tables available for such computations. However, in my hurry, I could not find any such tables. By the use of this chart future problems can be solved quickly.



Another Coast Quake Due

CONDITIONS are ripe for another major earthquake somewhere along the West Coast, according to Dr. Beno Gutenberg, professor of geophysics and meteorology at the California Institute of Technology. He points out that a major quake must come because stresses have built up along the San Andreas fault (which passes through the deserts of Mexico northward across California to meet the ocean near San Francisco and along the Oregon coast in the Pacific Ocean) and these stresses have not been relieved since the San Francisco quake of 1906.

The gloomy forecast was based on measurements on both sides of the fault. Mountain ranges along each side of the fault are shifting apart, and seismologist records show a steady decline in the release of underground energies through tremors. Geophysicists claim that a big quake, like the San Francisco quake of 1906, releases tensions but sets up new strains and the cycle repeats itself. Sketchy records show this cycle to be about 40 years, so the West Coast—theoretically—is overdue for another quake. Seismologists say the time, place and extent are entirely unpredictable.

Portrait of a Traffic Expert

J. W. Arch Bollong, Traffic Engineer for Seattle and a dominant personality, is backed by 30 years of experience as he embarks on one of the most aggressive city traffic programs in the West

By LLOYD THORPE
Seattle, Wash.

CONSTRUCTION will start June 1 on the first phases of a $4,000,000 program that will ultimately provide modern illumination for over 337 mi. of heavily-traveled streets in Seattle, Wash. This aggressive program has all come about because a veteran engineer long ago became convinced that it was not enough merely to have an idea and a plan.

J. W. Arch Bollong, popularly credited with being the first Traffic Engineer in the United States, last year went out and personally sold the $4,000,000 arterial lighting job to the people of Seattle. He was armed with statistical proof that the accident and crime rate flourished best in the dark. He spoke on scores of occasions, before audiences of many kinds. The people responded at the polls by casting an 80% vote in favor of the necessary bond issue.

Zero as a speaker

Of his earlier years in the engineering profession, which date back to a beginning in the Seattle offices of Stone & Webster in 1905, Bollong admits he scored slightly above zero as a speaker. "But I took courses in public speaking and forced myself to speak before just about any audience that would have me, so I could get practice. I gradually developed confidence and even came to enjoy speaking."

In his 44-year career, following academic training in civil and electrical engineering at the University of Washington, the pleasant, alert Traffic Engineer has witnessed a complete metamorphosis of urban transportation, the development of an entirely new profession to cope with the attendant problems, the creation of a new and distinct terminology, and the springing up of a host of auxiliary industries, services and laboratories that were non-existent and unsuspected only a short generation ago.

Professional ancestry

Asked to define a Traffic Engineer, Bollong said he "was kind of a cross between an electrical engineer and a civil engineer." His personal history supports that professional ancestry. The Seattle expert moved from Stone & Webster in 1906 to serve in the Seattle City Engineer's office until 1908. Then followed five years in Canada as engineer and superintendent of construction for the Franco-Canadian Corporation, Ltd., at Victoria, British Columbia.

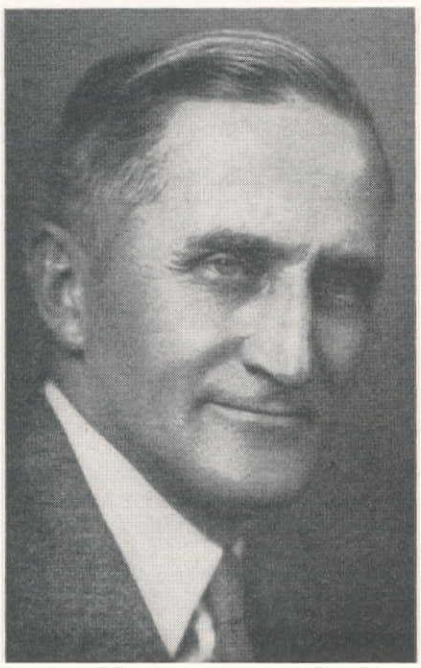
"I had an ambition to be a city manager and was out to get a wide range of experience. On the Victoria job I handled all types of municipal construction and design, including water mains, sewers, paving and street lighting. Then I came back to Seattle, put in a short time as appraisal engineer for the telephone company before coming back here to the city-county building in 1916 as structural and electrical inspector in the building department."

Holds temporary position 30 years

With further experience acquired first as sanitary engineer and later as maintenance engineer for the city, Bollong was a logical choice to work up some answers for newly acquired traffic problems when a strong wave of public ownership sentiment resulted in the city taking over the somewhat antiquated street railway system from a private company. His new duties, taken on in 1919 as a somewhat temporary assignment, were clothed in the title Traffic Engineer, and that title he has held for the last 30 years.

Newly-titled Traffic Engineer Bollong, delegated in 1919 to draw up a traffic code, found there were no standard codes, no standard signs, and but little precedent on which to proceed. But certainly Seattle was an excellent laboratory in which to probe traffic problems. In 1919, it had a war-swollen population; it had a mixture of horse-drawn, street railway, cable car and automobile vehicular traffic; all North End traffic came in over four draw-bridges; topographically, it had a downtown business section squeezed in between Puget Sound and Lake Washington at the neck of an hourglass profile, and many streets were nearly as perpendicular as they were horizontal.

J. W. ARCH BOLLONG



"We had less than 25,000 cars and trucks in Seattle 30 years ago," Bollong recalls, "as compared with 179,000 today—a present ratio of one automobile to every 2.7 persons. (Exceeded nationally only by Los Angeles.) We simply had to keep abreast with traffic engineering to keep this mounting volume moving."

As a single example of problems that had to be met, the Montlake bridge across the Lake Washington Ship Canal in the north end of the city handled only 1,000 cars daily in 1920. Today the traffic flow at this point is 25,000 cars every 24 hours.

His job is his hobby

In meeting Seattle's traffic problems and building up a national reputation as a Traffic Engineer over the past three decades, Arch Bollong has been constantly alert for ideas wherever he could find them. The present $4,000,000 arterial lighting program, for example, sprang in part from some illumination he saw in Denver on a cross-country trip five years ago.

Bollong is perennially taking busman holidays. This is because he is so steeped in, so enthused about, so cognizant of the necessity for traffic engineering that that subject is not only his work-a-day profession, but it is also his hobby. For 20 years he has been making trips around the country to see what he could see that was new in traffic control and facilitation and all related activities. The City of Seattle financed three of these trips, but 17 were on Bollong's own time and expense. Last year he made detailed visits to just about every major manufacturing plant and research center in the Midwest and industrial East specializing in one phase or another of traffic engineering.

"Bollong's gongs" ire public

In his long career he has come up with many "firsts." These have not always been accepted with open welcome by the public. He was one of the first to paint traffic guide lines on the pavements and, for this pioneering, the public howled about "lines that started nowhere and went nowhere." He ventured to put bells on his intersection control lights and became the subject of a bitter attack by the Seattle press who called this infernal invention "hell's bells" and "Bollong's gongs."

"The public is often stubbornly resistant to new ideas and to change. They usually have to be sold. Traffic flow and its attendant traffic problems has developed in such staggering fashion in the past generation that the scene has been one of continual change. To get along with the public we found it necessary to explain to the public, and that's

J. W. ARCH BOLLONG points out some details of latest type traffic channelization installations being made in Seattle under his direction. Public safety has figured prominently in his long career.

why I had to develop some proficiency as a public speaker—an accomplishment that was not at all a natural ability with me."

Bollong's know-how in traffic has not been kept under any Seattle bushel. In 1929 he was appointed by ex-President Herbert Hoover, who was then Secretary of Commerce, as a member of the National Conference on Street and Highway Safety. Hoover, with his orderly engineering mind, was a great proponent of standards and he assigned to this Conference the task of trying to develop some traffic standards out of the chaotic maze smothering a nation that was hell-bent on complete and sudden conversion from hay to gas and from iron shoes to rubber. The Seattle expert has remained on that panel to the present time.

No professional recluse

And here is a quick review of other services Bollong has been called upon to render and which have added their bit in building him to national stature in his fledgling profession: Director of City Officials' Division of American Road Builders' Association; Director of Institute of Traffic Engineers for two terms; President in 1941 of the Eleven Western States Safety Conference and now on the Board of Governors; President for four years of the Seattle Chapter, American Association of Engineers; attended Traffic Officers' Training School conducted by the International Association of Chiefs of Police, held at Northwestern University in 1936; traffic consultant for the City of Vancouver, British Columbia, since 1930, and vice-chairman, Western Region, National Institute for Traffic Training, held at Oregon State College in 1946. He is now, and has been for the past ten years, serving as Consultant on Traffic to the Association of Washington Cities.

A recent and signal honor for Bollong was his appointment to serve on the national body known as the Engineer's Committee of the President's Highway Safety Conference. As one of four men representing the 11 Western states, Bollong will meet with this group in Washington, D. C., on June 3-4-5, 1949. He also served on this committee in 1946. He is also serving as President of the Western Section, Institute of Traffic Engineers for the 1948-1949 term.

No professional recluse, Traffic Engineer Bollong holds memberships in the following: Institute of Traffic Engineers, American Association of Engineers, International Municipal Signal Association, Inc., American Road Builders Association, Highway Research Board, American Public Works Association, and the Engineers' Club of Seattle.

Showmanship

Despite 30 years of high concentration on traffic engineering, the Seattle veteran has found time to take an interest in things fraternal. He is a Past Potentate of Nile Temple of the Shrine, Seattle. He put that organization into the ice follies business and those famous entrepreneurs of the flashing skates, Shipstad and Johnson, concede a considerable debt of gratitude to Bollong for giving them some early momentum in the direction of a brilliant career. That was back in the four years 1932-1935 when things were real tough. Bollong, who has a good sense of showmanship, dipped into his professional knowledge as an electrical engineer and "spectacularized" what had up to then been just a bunch of clever skaters. He put colored lights under the ice and over the ice and, with a lot of other tricks, made a glamour show out of it.

To those who hold hope in reading a sketch about a Traffic Engineer that maybe the future will give a man a better chance at a parking spot, Bollong considerably dampens things when he is asked to do a bit of crystal ball gazing. He says: "I foresee a 50% increase in traffic by 1970. By comparison the traffic problem will be greater in the West because the West lacks the mass transportation of Eastern metropolitan centers. Trolley buses and Diesel-electric coaches will push street cars on fixed rails out because the modern vehicles are fast, through curb loading they cut down accidents by 75%, and they add 30% to the capacity of the street."

No retirement

James William Arch Bollong, having delivered most of his 44 years of professional life to the City of Seattle, has plans of retiring from his present position as City Traffic Engineer "as soon as it can be conveniently arranged." To lean back and take a well-earned rest? Not at all. He plans to set up his own offices as J. W. Arch Bollong and Associates, Traffic and Transport Consultants. He already has consulting offices at 111 Sutter in San Francisco, at 3974 Wilshire Boulevard in Los Angeles, and in the Smith Tower, Seattle.

From the Smith Tower he can look down a couple blocks to the Elliot Bay waterfront where less than 100 years ago, at the end of what is now Yesler Way, Henry Yesler had not yet built the little sawmill around which Seattle mushroomed into a teeming industrial center and seaport. The only conceivable traffic problem then was when two Indian canoes might happen to ride down the Elliot bay shore on the same misty morning.

Canyon Ferry Dam Contracted After Second Bid Call Brings Cost Cuts

THE CONTRACT for construction of Canyon Ferry dam and power plant in Montana, a unit of the Missouri River Basin project, has been awarded by the Bureau of Reclamation to Canyon Constructors on a bid of $11,896,425.

The award was made on a second call for bids after all original bids had been rejected as excessive. This action will result in a substantial saving. The low bid at the first opening, Dec. 1, amounted to $12,940,845 and was also submitted by Canyon Constructors.

However, the $1,044,420 difference between the bids is not all savings since the revised specifications eliminated certain work estimated to cost about $353,500 and also contain a price adjustment or escalator clause. Because of the leveling off of construction costs, it is believed that payments under the price adjustment clause will amount to less than the $690,920 difference in the respective low bids, thereby resulting in a saving to the Government.

Canyon Constructors is a joint venture consisting of the following construction firms: Brown & Root, Inc., Houston, Texas; Wunderlich Contracting Co., Jefferson City, Mo.; and the J. C. Maguire and Griffith Companies, both of Los Angeles, Calif.

Canyon Ferry dam, which will create a reservoir of 2,050,000-ac. ft. capacity, will be located on the Missouri River approximately 17 mi. east of Helena, Mont., and about 1¼ mi. below the existing antiquated Canyon Ferry dam. Negotiations are now under way to purchase that site which will be inundated by the larger, multiple-purpose Federal structure.

Flood water will be impounded to permit the irrigation development of 310,700 ac. of new land and provide supplemental water for 196,300 ac. above Fort Benton, Mont. The project will provide irrigation storage in connection with the Helena Valley unit of the Helena-Great Falls division. Water for this area will be pumped from the reservoir.

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HENRY HAGMAN, CASHMERE, WASH. "GOES LORAIN TL-20" ON STEEL ERECTION JOB

When Henry Hagman winds up this steel erection job for a manufacturing plant on the Columbia River, near Wenatchee, Wash. he'll roll on rubber at 30 m.p.h. to his next job. His new Lorain TL-20 Moto-Crane enables him to look ahead to future jobs with profit — because of its high speed mobility and many-job versatility. Equipped with "Dual Control," the TL-20 converts to a self propelled unit on the job — so that one man in the operator's cab controls both travel and turntable operations.

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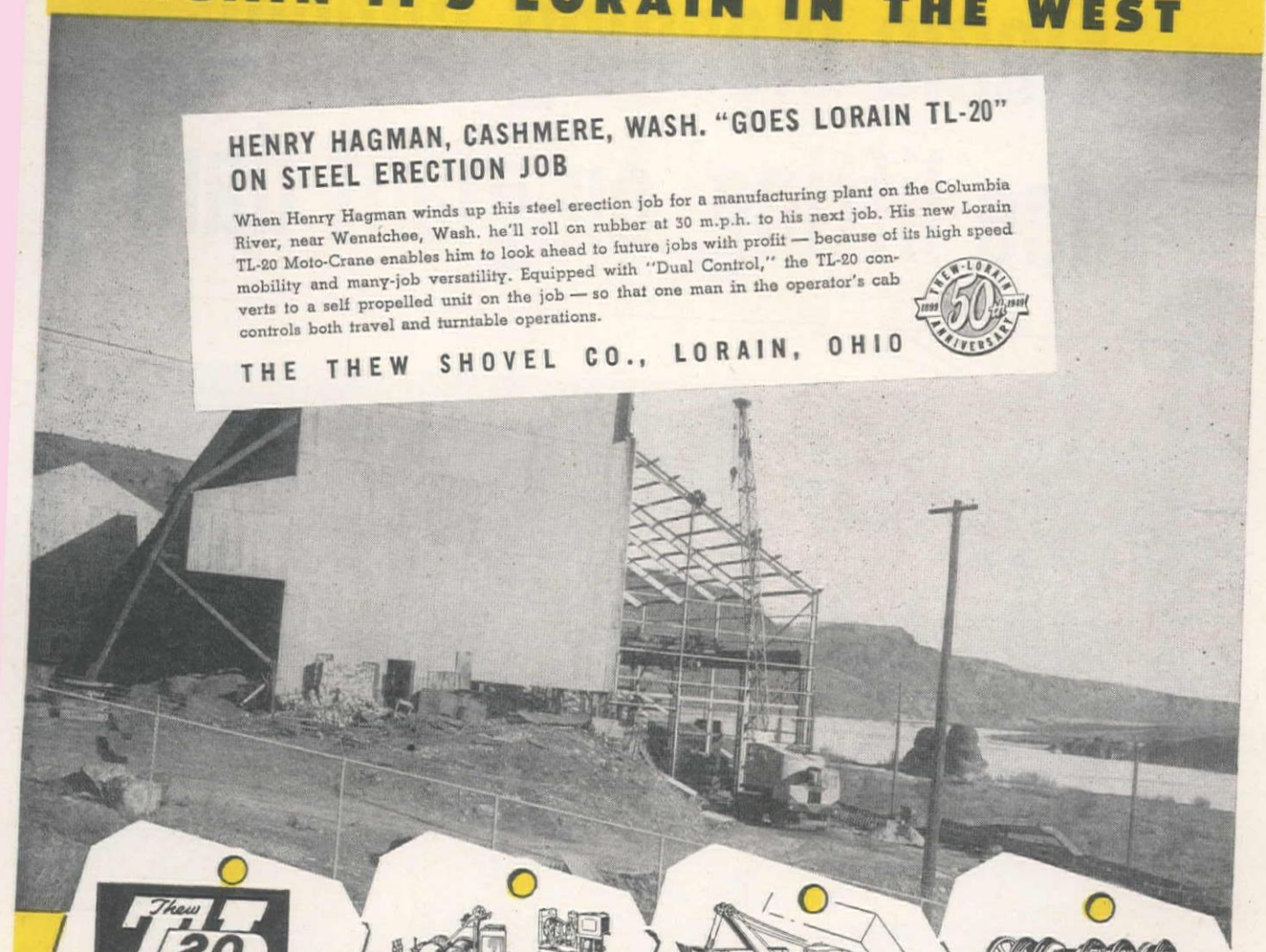

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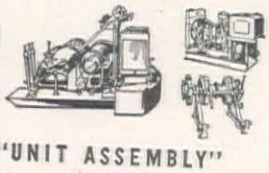

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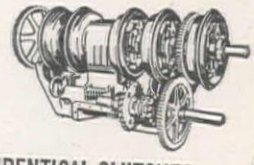

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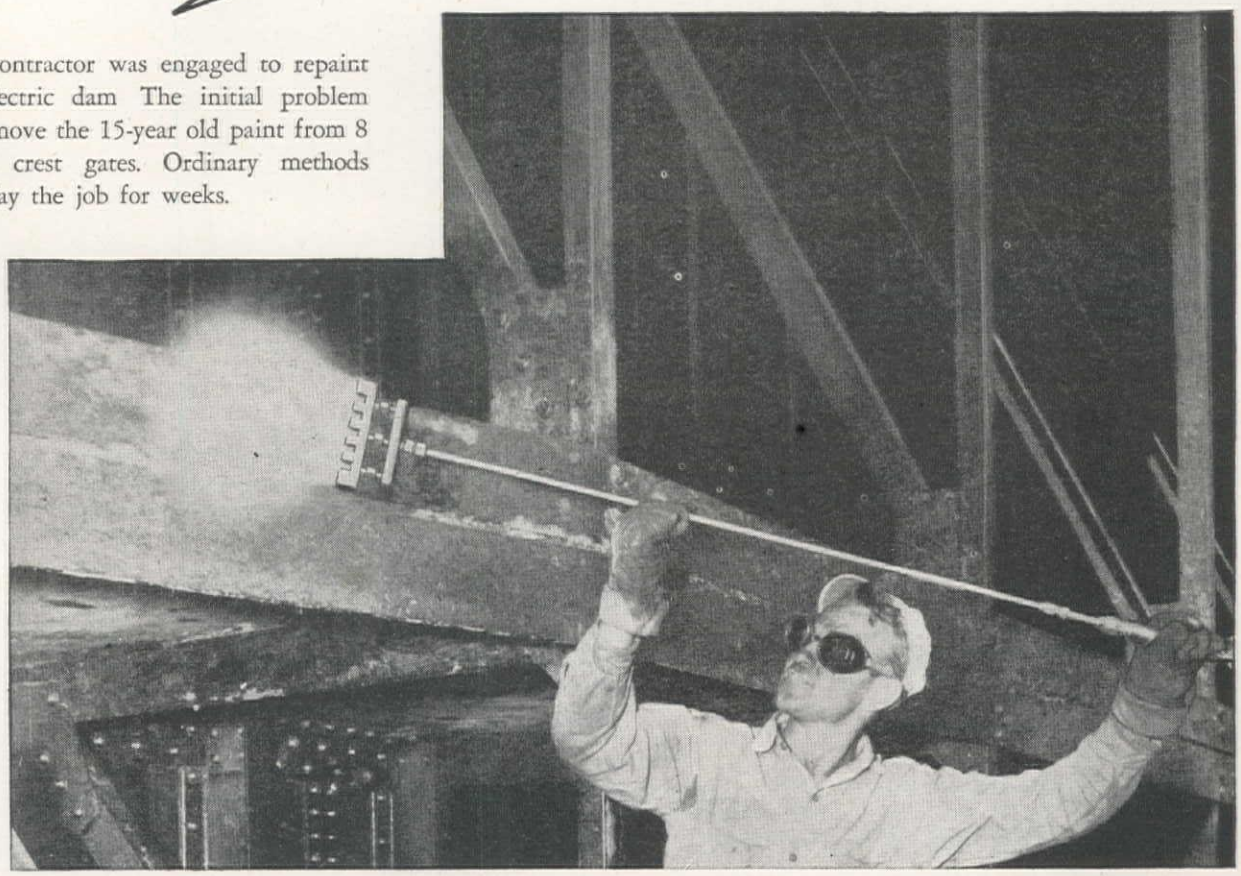
Flame cleaning speeds 'face lifting' on giant dam

A paint contractor was engaged to repaint a hydroelectric dam The initial problem was to remove the 15-year old paint from 8 enormous crest gates. Ordinary methods would delay the job for weeks.



The Airco Technical Sales Representative suggested oxyacetylene flame cleaning with Series 9200 Torches and Airco Style 120 tips. Quickly and easily applied, the intense heat of the flame cockled the old paint, loosened scale and drove off surface moisture in a single operation.

The Company found that a flame cleaned surface made for a better finished paint job. An executive said, "We're convinced that flame cleaning is the most efficient and economical method of preparing steel surfaces prior to painting. We now use it almost exclusively in our rust and scale removing work."

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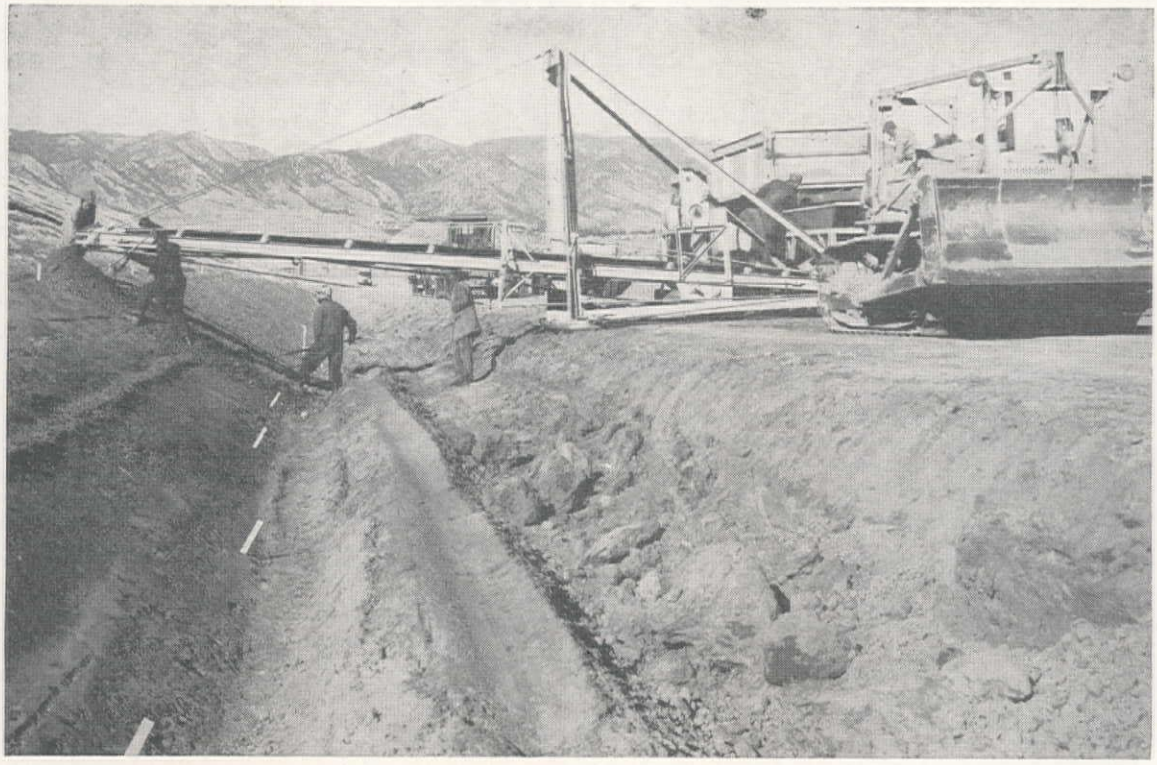
Floodway to Protect Colorado City



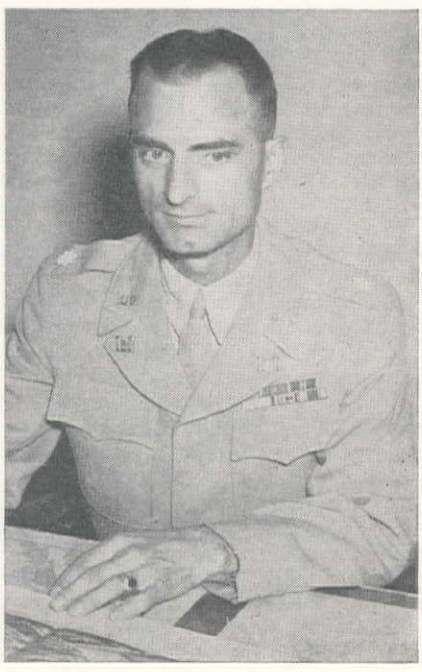
FILTER MATERIAL is being placed on the floodway's side slopes by a unique machine designed expressly for the job.

Possibility of flash-flood damage to the growing city of Colorado Springs to be eliminated by new floodway that will divert high flow into nearby creek—Route crosses old mine workings to create some construction problems

By LT. COL. JOSEPH O. KILLIAN
District Engineer, Corps of Engineers
Albuquerque, N. Mex.

THE TEMPLETON GAP Floodway Project, located approximately five miles north of Colorado Springs, Colo., on an intermittent tributary of Monument Creek just above its confluence with the Fountain River, was authorized by Congress in 1944 for the purpose of alleviating floods in northern Colorado Springs. The Templeton Gap drainage basin is an eight square mile area lying northeast of Colorado Springs. The drainage basin is surrounded by a range of hills or bluffs of Dawson Arkose with a maximum elevation of seven hundred feet above the Monument Creek Flood plain to the west. The run-off from this concave area concentrates in Templeton Gap Wash, which conducts the flow to the reach in the hills known as Templeton Gap where the wash carries its flood waters southward into the northern section of Colorado Springs. The project as designed will divert these flash-flood waters from Templeton Gap westward into Monument Creek.

Since 1885 the damages caused by floods from this area have amounted to an estimated $600,000. The worst flood, which occurred in July, 1932, caused losses of approximately $280,000. A flood flow equal to that of July, 1932, would cause damage many times as great, because of the rapid growth of Colorado Springs and the subsequent increase in property values.



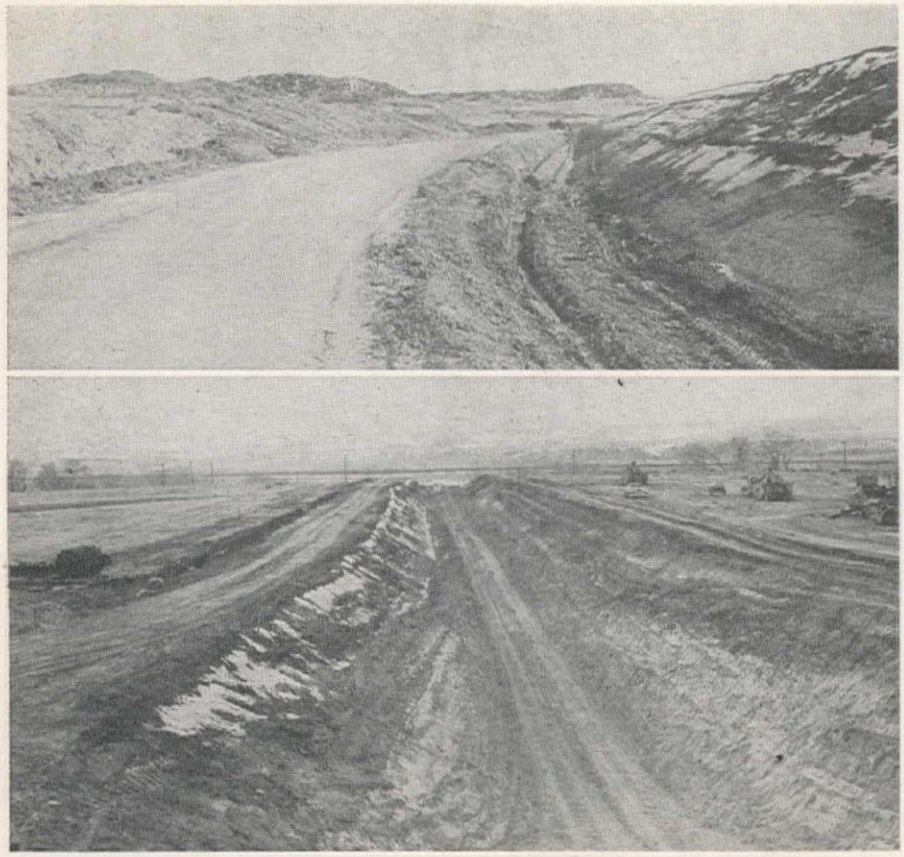
The total estimated project cost is $1,111,660 and the estimated construction period is fifteen months. The estimated annual maintenance cost is $3,500. The ratio of estimated annual charges to annual benefits is 1 to 1.235. The construction of the channel will provide a total of approximately 1,000.000 man-hours of employment of which 427,000 man-hours will be "on-site" labor and 573,000 man-hours will be "off-site" labor.

The Floodway is now under construction and is under the direction of the District Engineer, Albuquerque, New Mexico. The Northwestern Engineering Company of Denver, Colo., has the contract for the Floodway and Nick Pinello has subcontracted the "dirt" work. Separate contracts were entered into with the Colorado State Highway Department and the Atchison, Topeka & Santa Fe Railway Company for the construction of a double lane highway bridge and a single track railway bridge. This work is being performed by L. J. Hester of Denver, as a subcontractor for the two above-named agencies.

Narrowing from 125 to 12 feet

Excavation for the Floodway channel is nearing completion and work on the two bridges is well under way.

The Floodway is designed for a maximum probable discharge peak from Templeton Gap of 14,000 cu. ft. per sec., which is 1.45 times the maximum experienced discharge of 9,700 c.f.s., which



EXCAVATION SITE for riprap of granite boulders is along an old stream bed, top. The boulders are rooted out and piled with a rock rake. Bottom, a view near the terminal end of the floodway. Slope increases rapidly here so a reinforced concrete bottom will be placed.

occurred in 1932. The project is 10,590 ft. long. From Templeton Gap to a point approximately 8,700 ft. west, near the A. T. & S. F. Railway, the new channel will have a bottom width of 125 ft., a depth of 13 ft., and side slopes of 1 on 2. The left bank of this reach will be faced with riprap, whereas the right bank, as well as the bottom, will be unlined. Continuing westward from the above-referenced point to the outlet of Monument Creek, a distance of about 1,900 ft., the trapezoidal channel will have a reinforced concrete bottom of 12 ft. wide, a depth of approximately 15 ft. and concrete paved slopes of 1 on 1.5. At a point near the railroad a concrete transition structure, 238 ft. long, is included in the floodway to gradually reduce the bottom width from 125 ft. to 12 ft. The water approaching this transition will be flowing at a relatively slow velocity in the 125-ft. channel. Upon entering the transition the slope increases, causing increased velocity to the point where the flow will be contained in the 12-ft. channel under the bridges and to the point where it will be discharged into Monument Creek.

Shaking down the channel

Approximately 1,500 ft. of the partially lined channel passes over an area characterized by conical holes some 10 to 20 ft. in diameter and 5 to 10 ft. deep, caused by the failure of the roof of abandoned coal mine workings. The designers considered the possibility that some of the rooms of the abandoned workings remained unfilled and provided that the danger area be consolidated by a system of dynamite charges exploded in holes drilled systematically throughout the area. During construction a representative area composing approximately ten per cent of the total undermined area was drilled and blasted, using varied hole spacing and charge size. While some settlement resulted from this trial blasting, the apparent advantage was not sufficient to warrant further expenditure. The attempted consolidation was therefore discontinued in accordance with a special provision of the specifications provided for this purpose.

Blending the filter material

The material used as a filter blanket under the dumped riprap on the left bank of the partially lined reach was obtained by the blending of two natural deposits of decomposed granite found in the flood plain of Monument Creek some two miles southwest of the project. By laboratory analysis the material was found to be durable to the extent necessary for use as a filter. The blending was accomplished by stockpiling the material with tractor drawn scrapers in the proportions desired and then loading by power shovel from a near vertical face in the stockpile. Careful control disclosed an extremely uniform material, well within the specified limits.

For his operations in placing the filter material on the side slopes, the contractor is using a unique machine designed expressly for this job. It consists of a long conveyor belt supported from a central A-frame which is mounted on a metal sled, so that it can be towed into position by a tractor. At the receiving end of the belt, a hopper is mounted at proper height to receive material from dump trucks which use the floor of the channel as a roadway. By keeping the placing machine moving gradually forward, an even distribution of filter material is obtained.

Spreading riprap on the slopes

The riprap material consists of granite boulders found in the stream bed of Pine Creek, one of the tributaries of Monument Creek some ten miles northwest of the floodway. The boulders are piled for easy power shovel loading by means of a rock rake (three-inch vertical bars on 12-in. centers) mounted in lieu of a dozer blade on a D-7 tractor. The shovel then loads the rock into a hopper, where it passes over the "grizzly" bars and into trucks.

On the site the contractor is able to spread the riprap by means of a D-7 dozer operating in the toe ditch and approximately three-fourths the way up the slope. The remainder of the riprap is dumped from the top of the levee. Using this method some hand placement is necessary to obtain the desired results.

Tractors, assisting the scrapers up steep slopes from the excavations being made for the bridges, instead of working as pushcats, pull them up the slopes by means of a heavy steel hitch with a large ring that engages a hook on the scraper. Tournapulls, Le Tourneau scrapers, and Caterpillar tractors are being used to advantage and are well adapted to the various haul lengths necessary for grading operations.

The concrete work will be started early this spring with the advent of favorable weather.

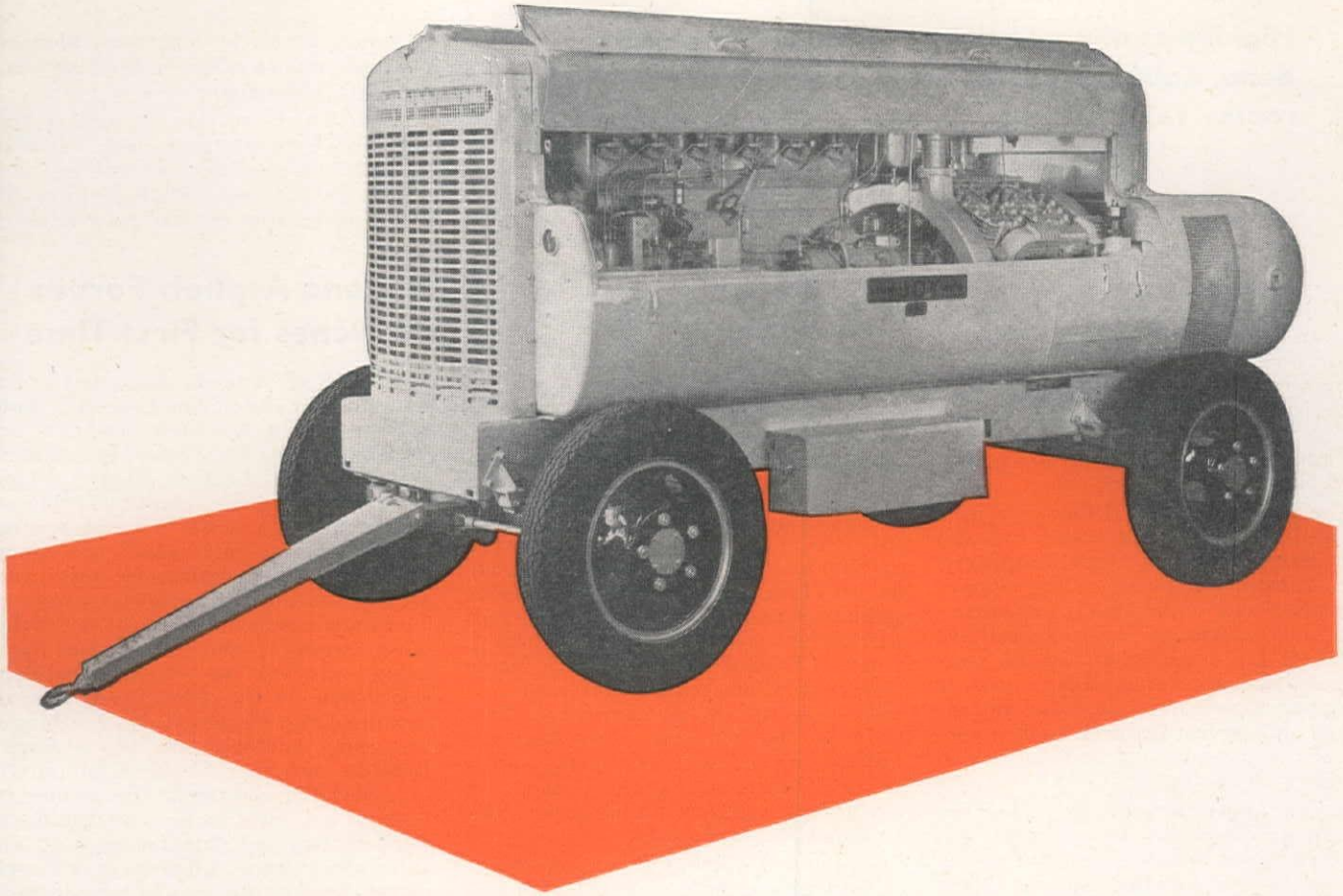
Personnel

The administrative personnel connected with the project are Fred Burns, superintendent for Northwestern Engineering Co.; R. W. Thomas, superintendent of the bridge work; F. M. Babcock, Resident Engineer for the Colorado State Highway Department; Dave Kriegh, Resident Engineer for the Santa Fe Railroad; Lt. Col. John C. Potter, Jr., Project Engineer; and Edgar C. Althaus, Assistant Project Engineer for the Corps of Engineers.

Montana Programs Buildings

FIFTY new buildings at four units of the Montana State University system have been approved for construction during the next 25 years at a total cost of more than $25,000,000. Plans for the vast improvement program were prepared by John Paul Jones, architect of Seattle, Wash., and approved by the Montana Board of Examiners.

Some of the buildings are already under construction, and others are planned for construction soon. Schools where new facilities will be constructed under the program are: Montana State University, Missoula; Montana State College, Bozeman; Eastern Montana College of Education, Billings, and Northern Montana College at Havre.



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Medical Building Expertly Designed

Highlights of new brick medical building at Pasadena, Calif., are color harmonization in interior, rooms tailored for efficient use by tenants and gypsum blocked partitions

THE ONLY medical building in the nation, according to its designers, completely tailored to the specifications of its tenants and employing modern color psychology in its interior decoration, is the new Thatcher Medical Center in Pasadena, Calif. Located on a U-shaped 100 by 200-ft. site at 960 Green Street, the $1,500,000 building is the latest addition to Pasadena's booming Lake Street shopping center.

The Thatcher Medical Center houses 34 medical and dental specialists and was designed by Hamilton-Dougherty, Inc., of Beverly Hills, a leading planner in medical and dental building construction in association with consultant architect Lester G. Scherer. Each individual office, according to Hamilton, is equipped with modern medical instruments and service features built-in specifically for the physician or dentist who occupies the suite.

Major innovation of the Thatcher Medical Center was the thought and expense given to color harmony by the designers. Pre-building surveys were conducted among patients and medical men to determine the most restful, nerve-relaxing color combinations for the office interiors, waiting room, corridors and rest rooms.

Gustave Plochere, nationally known expert on psychological color harmonization was assigned as color consultant. He combined subdued colors and wall paper motif in the main and waiting rooms. Color "clashing" was avoided and tones were selected to induce maximum relaxation for the patient and an efficient psychological working atmosphere for the nurses and technicians. In the operating rooms, the colors are bright and cheerful with the contrasting color combinations of the glazed wall tile creating a psychological feeling of complete cleanliness.

Color harmonization, according to surveys made to the occupying staffs, has increased their efficiency by ten per cent and decreased end-of-day fatigue by a comparable percentage.

Structurally, the building is designed class "A"; has a steel frame, brick walls, gypsum blocked partitions and concrete floors. There are two full stories above ground and one below; a Mansard roof with dormer windows gives the effect of a partial third story. Beige brick facing and continuous ornamental iron balconies result in an attractive New Orleans-type exterior. The Mansard roof is finished with black tile, and is an exact copy of an old French tile exclusively used on buildings in New Orleans 150 years ago.

Equipment includes an automatic elevator, water softening plant and an elaborate air-conditioning system. The air-conditioning system, installed by Western Air Refrigeration, Inc., was designed to conform with the specific requirements of each tenant. These requirements were that it would be necessary to have temperature controls in each room, using no re-circulating air. A double-duct system was employed. Thermostatic temperature controls in each office is one of the features of the building. In addition to the professional suites, the building houses a pharmacy and cafeteria. The center was built as a memorial to M. D. Thatcher, pioneer Colorado industrialist, by his daughter, Mrs. Ada Huntzinger.

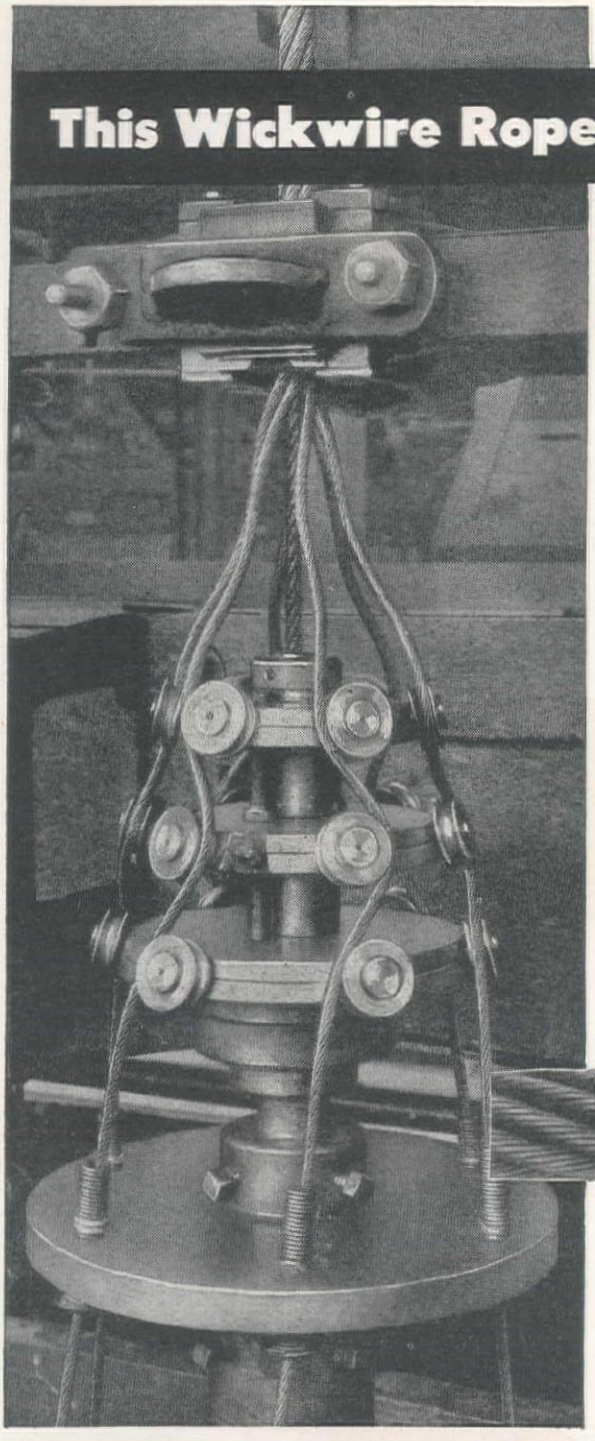
McNeill Construction Co. of Los Angeles was general contractor; William D. Coffey of Los Angeles was the structural engineer, and Ralph Phillips of Los Angeles, the mechanical engineer.

BEIGE BRICK facing and continuous ornamental iron balconies give the medical center an attractive New Orleans-type exterior, bottom. Right, a view in one of the interior rooms, where new color and material combinations detract from that "hospital" atmosphere.

Arizona Asphalt Forum Convenes for First Time

THE FIRST Arizona Asphalt Forum sponsored by the Pacific Coast Division of the Asphalt Institute was held on Apr. 22 at Hotel Westward Ho in Phoenix with J. M. Lackey, District Engineer of the Asphalt Institute, acting as chairman. A number of interesting papers were presented covering various phases of the manufacture, tests and uses of the different grades of paving, liquid and emulsified asphalt. After the presentation of the papers, an open forum was held in which recent developments in the asphalt world were explained and discussed. W. A. Bugge, managing engineer of the Asphalt Institute and F. S. Scott, of Union Oil Co., were the chairmen. Discussions in the use of asphalt for canal linings, ditch linings and dam facings and for curbs and gutters on highways attracted particular attention. The conference was well attended by Arizona engineers and contractors. Lunch was served to 105 guests.

This Wickwire Rope Gets a Permanent Wave



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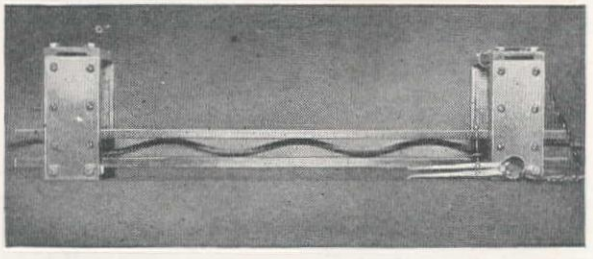

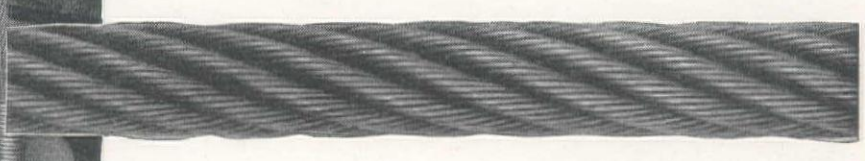

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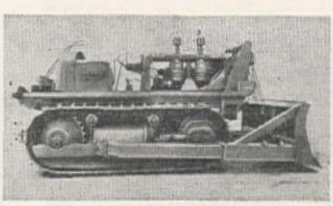
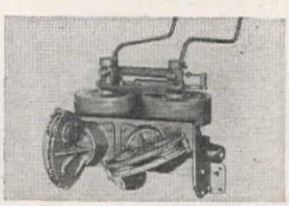


BULLDOZERS and Trailbuilders for all standard makes of tractors.



POWER CONTROL UNITS: Two-drum winches for use with all standard tractors.

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HOW IT WAS DONE

JOB AND SHOP TIPS FROM THE FIELD

Compressor-Earth Auger Team Drills Anchor Holes on Production Basis

THE COMPRESSOR-AUGER team, above, operated by two men, has stepped up production of anchor holes from 8 to 42 in an 8-hr. working day.

REQUIRED installation of 15,000 anchors for the farm electrification program of Manitoba Power Commission of Canada is being carried out on a mechanized, production line basis. Through the use of an air compressor-earth auger team, anchor installation has been stepped up from 8 to 42 per day and costs reduced $1.20 per anchor. Each hole has to be dug to the correct angle, to the proper depth and at minimum cost.

Guy wires are secured by driving a 6-ft. rod through the ground to an 8-in. hole drilled at a 45-deg. angle with the ground level. A 6- x 15-in. plate for clay or solid soil (or 8- x 24-in. plate in wet, sandy locations) is then hooked on the end of the rod to secure the guy wire.

Formerly, a three-man crew supplied with 9-in. augers, ½-ton pickup truck for transportation and the necessary small tools, averaged 8 anchor holes and guy installations in an 8-hr. day. At this rate, sixteen crews working twenty days a month would be required to complete the entire program along with other phases of the program.

A Ka-Mo (LeRoi manufactured) air-operated auger mounted on a combination 105 air compressor and 35-h.p. wheel-type LeRoi Tractair tractor is now being used as a satisfactory combination. On the back of this unit is mounted a 9-ft. high utility boom to support the 7½-ft. auger and a 74-lb. air motor. The utility boom has a hand-operated winch for raising and lowering the auger. The design of the auger is such that in average Manitoba farm areas the weight of the air motor is sufficient to make the auger self-feeding. Stones and tree roots have some effect on the speed of the auger, but 3- to 4-in. stones are cleared with the earth, and roots up to 1½-in. diameter can be cut.

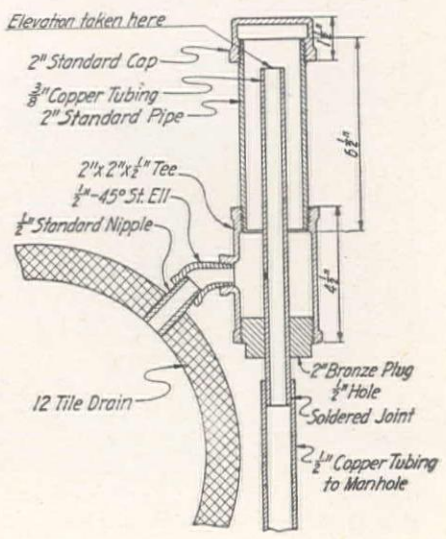
As the auger starts into the earth, the winch line is let out, so that the head of the auger can be held to the desired angle. When the hole has been sunk to the proper depth, the air motor is stopped and lifted slightly by means of the winch, just sufficient to clear the cutting edge. The motor is then restarted and the auger withdrawn, leaving a clean hole.

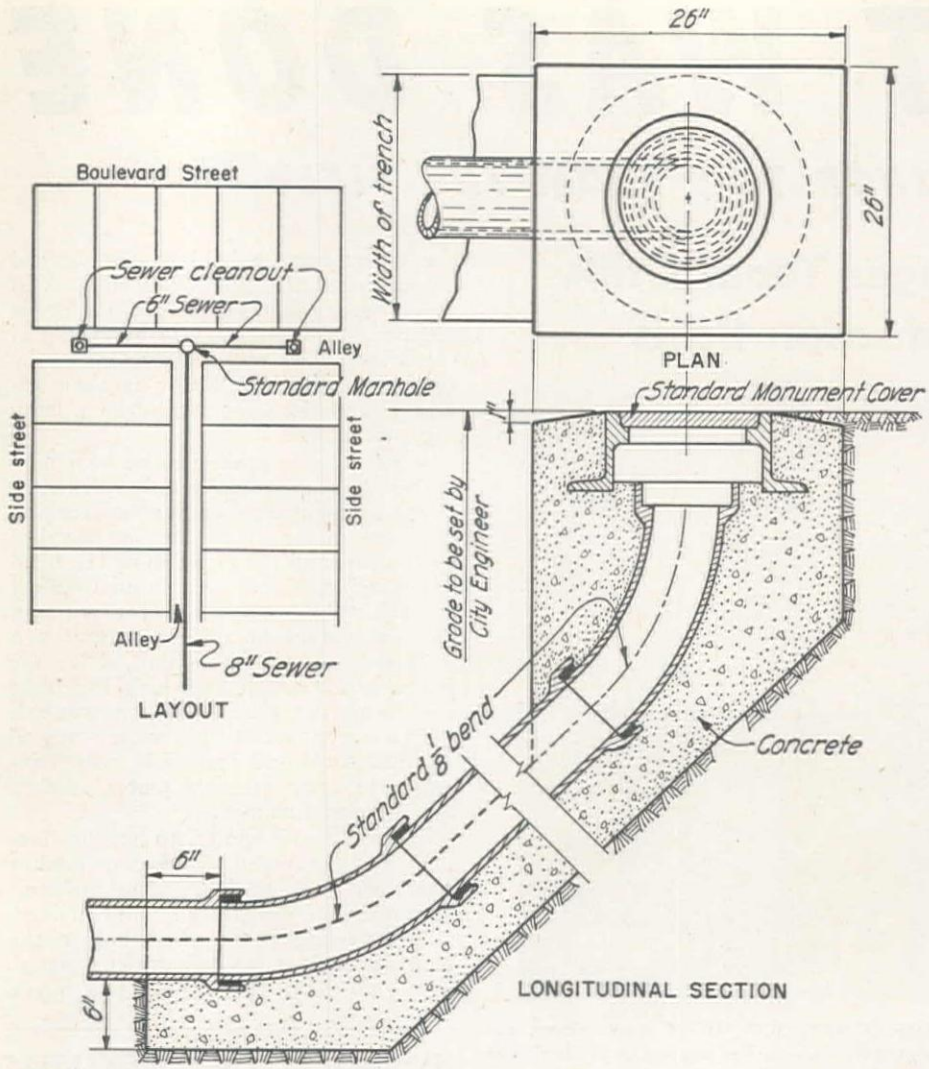
After a little practice, the two men required to operate the unit work as a team, knowing the amount of tension required on the winch line, the speed of the motor, and the position of the head of the auger, so that a minimum of effort is required. An additional three-man crew made up of a lineman and two groundmen, follow this unit, drive the anchor rod, install and lock the plate and hang the guy. A ½-ton truck is used to transport this latter crew as well as their tools and materials, which include the anchors, rods, plates, shields, guy wire and clamps.

Since the unit went into use, production has averaged forty-two anchor holes per working day. Farms in Manitoba are widely scattered, and considerable traveling is required before the feeder and farm tap-offs are completed. The unit has a road speed of 12 m.p.h.

MANOMETERS FIND BURIED LEVELS

THE DETAIL shows the overflow end of the settlement-measuring device used by the Los Angeles Dept. of Water and Power at the Baldwin Hills Reservoir. Ten of these units, working on the manometer principle, are being installed to find reservoir settlement. The ½-in. copper tube runs from the device to a manhole, then upward to the approximate elevation of the overflow. Water is poured into the tube at the manhole end until an overflow is indicated by a maximum reading. The settled elevation of the overflow is then found by the manhole water level, and compared to the elevation at installation.





STANDARD CLEANOUT REDUCES MANHOLE COSTS FOR CITY OF PHOENIX

SHOWN in the sectional view and plan to the left, this "standard clean-out" for sanitary sewers is used by the city engineering department of Phoenix, Ariz., to meet conditions as shown on the small map insert. Many blocks are laid out 330 ft. by 660 ft., with the short end of the block fronting on a boulevard with five lots, as shown. To serve these five lots economically and to avoid the cost of two standard manholes, the clean-out, which costs about 20 per cent of the cost of a manhole, is used. In general, 6-in. pipe is used when only two lots on each side of the regular manhole are to be served, as shown at the end of the alley in the sketch, for the run is seldom longer than 125 ft.

—Contributed by Richard Bennett, hydraulic engineer for the city of Phoenix.

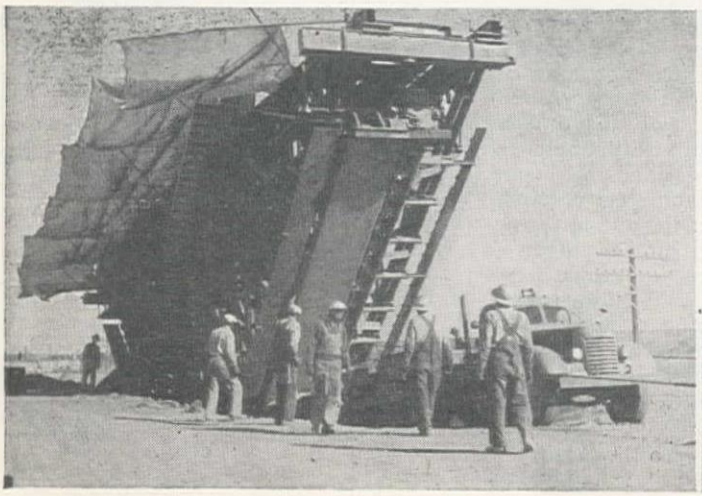
Big Trailers Carry Canal Building Jumbos Up and Around Obstructions

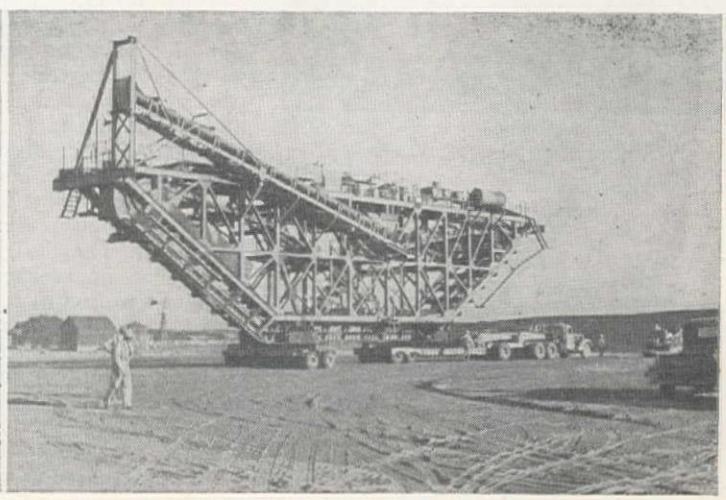
CONSTRUCTION of the Delta-Mendota Canal in California has presented many unprecedented problems the solution of which constituted a "first." Hauling concrete slipforms that weight 150 tons, without dismantling wholly or in part, is the latest to deserve inclusion in that category. During construction of the canal, certain obstructions such as existing highways, railroads and pipe lines are encountered. At times, when the mammoth canal building equipment encounters such obstructions as railroads, it is necessary either to "shoofly" the railroad, dismantle the machinery or move it around the obstruction intact.

The difficulties involved in the movement will be appreciated when it is recalled that two pieces of machinery used on the lining operation are known to the trade as "trimmer" and a "slipform." These units shaped to fit the canal cross-section, are used to excavate and trim to final grade and to line the canal with concrete. The dimensions of the machines are 110 ft. long, 13 ft. wide at the base and from 38 to 54 ft. high. Weights are in excess of 150 tons.

For economy reasons, a method of moving the machinery intact from the bottom of the canal, up and around the obstruction and back down to the canal bottom, was developed by the Condick Co., Berkeley, Calif. To execute the plan of removal, it was necessary to excavate approaches at right angle to the canal in order to furnish in and out roads for the mobile equipment. As of this writing, the huge undertaking has been accomplished successfully four times, making a total of sixteen individual mammoth jobs.

Preparatory to the undertaking, the Condick Co. designed and built two 16-wheel dollies mounted on pneumatic tire wheels, two 75-ton capacity jack beams and one 11-ft. bolster. After the machinery had been elevated 55 in. by jacks, the dollies were positioned under the far end of the machine. A Fruehauf





A "SLIPFORM" rides up and out of the canal, left. At right, the trailer with its big load turns on a radius of 200 ft. around the obstruction.

CPT-50 Carryall trailer, owned by the T. Donald Hagerty Drayage Co., Berkeley, then was positioned beneath the forward end of the machine. The load then was transmitted to the trailer through the jack beam which rested on the movable 11-ft. bolster. This allowed for turning and maneuverability. The Fruehauf had sixteen wheels and rocking-beam axles. The trunnion axles permitted independent action by each wheel in overcoming surface irregularities.

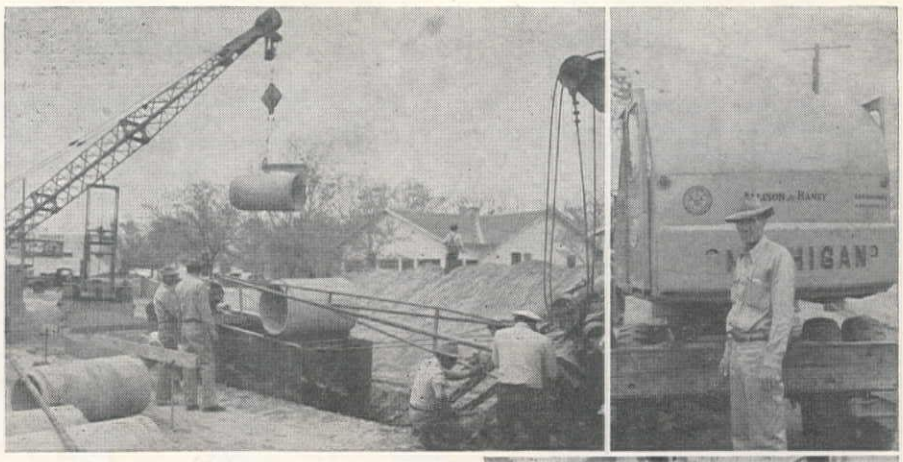
The forward end of the trailer is of "gooseneck" construction. It is coupled to a "jeep," or auxiliary trailer also of the "gooseneck" type. In turn, the "jeep" is coupled to the truck-tractor. This combination of vehicles placed sixty-six pneumatic tires under each load.

The access roads averaged about 160 ft. long and 25 ft. wide. The grade from canal-bottom level to berm-level was so severe that additional towing units were required to negotiate it with the 150-ton loads. Two "cats" aided the truck-tractor on the up-hill pull. Upon reaching surface level, the truck-tractor could handle the load unassisted. Some of the hauls were 4,000 ft. long. To make turns with the loaded equipment required a radius of approximately 200 ft.

New Unit Both Digs and Screens Sand and Gravel

AN AUTOMATIC rotary screen loader that separates sand and gravel as it digs and loads into trucks has been introduced into the Western construction field by N. P. Nelson Iron Works, Clifton, N. J. The unit consists of a Nelson Rotary Screen mounted on a self-powered Nelson Q-10 Heavy Duty Bucket Loader. In operation, the screen is synchronized with the bucket loader of the conveyor. Two chutes at right angles direct the flow of the separated materials. When digging and loading materials that do not require screening, a throw-out clutch enables the operator to disengage the screen and deflect material through the lower chute. Screening capacity of dry mixtures ranges from one to two cubic yards a minute, depending on the size of the screen openings and the mixture of material to be screened.

The loader, on which the rotary screen is mounted, is engineered to dislodge the material and spiral it into the buckets. Braced struts, pivoted on the frame of the loader chassis, keep the screen rigid in the operating position and in traveling position. Size of the screen is 3 ft., 4 in. in diameter and 4 ft., 10 in. in length. The screen assembly weighs approximately 1,800 lb., and weight of the loader on which it is mounted is approximately 14,500 lb. The plant is considered to be an economical means of developing mixed sand and gravel pits of small and medium sizes.



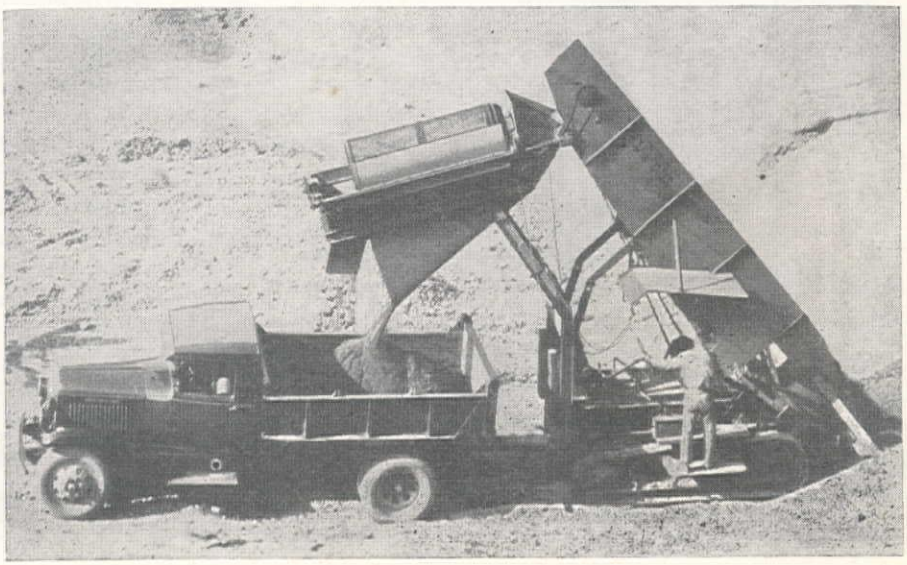
Sliding Walls Help on Albuquerque Trench Job

LIMITED only by Albuquerque's speed limit, Allison & Haney, general contractors of Albuquerque, are laying reinforced concrete pipe through a residential area as part of the City's $100,000 program for block-to-block extension of sanitary sewers. The contractor's best speed record to date is the trenching, laying of 21- and 27-in. pipe, and backfilling of 276 ft. of line in one 8-hr. shift.

The most interesting part of the job is along Taft Street, where the trench is 11 ft. deep and surrounded by pure sand. At the start of this section, numerous minor cave-ins slowed progress on the job. The contractor then used Yankee ingenuity, Western style, and in one week built a boot, or sliding box sleeve, that isolates completely the open end of the pipe. As the trencher moves ahead on line, the boot follows and provides sliding walls against the sand on both the sides and end.

The boot is 52 in. wide, 14 ft. long, and 12 ft. deep, made of 3/32-in. steel plate. Additional plates extend vertically from the boot to the endless bucket belt, guiding and preventing sand from falling into the trench between the bucket and the boot.

H. M. "Slim" Thomas, supervisor for Allison & Haney, is using a rubber-tired Michigan crane for handling of pipe, a Buckeye trencher, a Wagnermobile combination dozer and front-end loader, and a D-8 Caterpillar tractor. The drag from the boot is enough that the Buckeye tracks slip in the sand, and the "Cat" is used for extra traction. Exterior and interior views of the job are shown above. That's "Slim" Thomas at upper right.



IN OPERATION, a bucket loader brings mixed material to a rotary screen loader from whence two chutes at right angles to each other direct flow of the separated materials as desired.

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We want to tell you more about new Shell Rimula Oil

Call the Shell lubrication Engineer—he will gladly advise you on any of your engine lubrication problems.

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These conditions demanded this new oil:

Engines, particularly Diesels, seldom encounter *ideal* operating conditions. Low-grade fuels.. wide variations in load . . . long periods of light-load operation . . . subnormal jacket temperatures . all are too-common conditions heretofore associated with high maintenance costs and short engine life.

You run into such trouble on many construction jobs, in pumping installations, in standby service and in marine auxiliary units . . . to name just a few. And . . . highly supercharged Diesels frequently magnify the effects of extreme operating conditions.

Shell Research scientists regarded the situation as a challenge, and went to work on an entirely new concept of engine lubrication. The result is Shell Rimula Oil . . the *first* engine lubricant to effectively counteract high wear under *both* extremes —heavy and light loads . . . and the *first* to permit operation *without penalty* on low-grade fuels.

Shell Rimula Oil combines the above qualities with full detergent-dispersant action that keeps valves and rings free . . reduces lacquer and carbon deposits to the point of harmlessness.

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NEWS OF WESTERN CONSTRUCTION

MAY 15, 1949

USBR Plans World's Longest Tunnel for Idaho Irrigation

CONSTRUCTION of the world's longest tunnel is being contemplated by the Bureau of Reclamation as part of the Payette unit of the Mountain Home irrigation project in Idaho. The tunnel will be more than 30 mi. long, 19-ft. in diameter, and would carry irrigation water from the Payette River to the Boise River in southwestern Idaho.

The Bureau is now making studies to determine economic feasibility of the Mountain Home irrigation project. Chief Engineer Leslie N. McClellan and the Bureau's engineers at the Denver headquarters have already decided that the tunnel is feasible from an engineering standpoint. It would replace a 51-mi. long aqueduct over another route, outlined in original plans. The tunnel will probably be built if Congress authorizes the Mountain Home project and appropriates funds.

If undertaken, the tunnel would pass through the mountainous area between the upstream end of Garden Valley near Banks, Ida., to Mores Creek in the Boise River Basin. It would pass under several mountain ridges and at one point, would be 2,400 ft. below the peak. An estimated six to eight years would be required to complete the structure, with an estimated 1,000 to 1,500 men employed at the height of construction. The tunnel would have a fall of 137 ft. and a capacity of 2,700 cu. ft. per sec. It would be horseshoe-shaped and lined with approximately an 18-in. thickness of concrete.

According to R. J. Newell, Regional Director of the Bureau, contractors would have to drill access shafts, some of them 1,800 ft. deep, through which workers and materials could be lowered and blasted rock and debris lifted to the surface. Shafts would be spaced so work could be done on several sections of the tunnel at once.

The Mountain Home project would provide about 250,000 kw. of hydroelectric power in four plants and would eliminate flood damages in the Payette Valley, according to the Bureau. Under the Bureau plan, Boise River water would be transferred to the Mountain Home project and, in exchange, surplus Payette River water would be brought into the Boise River Valley through the 700,000-ac. ft. Cascade Reservoir and a series of four diversion dams and reservoirs. Water from the Garden Valley reservoir could be released through two channels, either the Payette River watershed to satisfy existing water rights, or through the proposed tunnel into the authorized Lucky Peak Reservoir in the Boise River Basin for irrigating a part of the Mountain Home area and to replace Boise River water used on other portions of the newly-reclaimed land. A total of 192,000 ac. would be irrigated in the Mountain Home project.

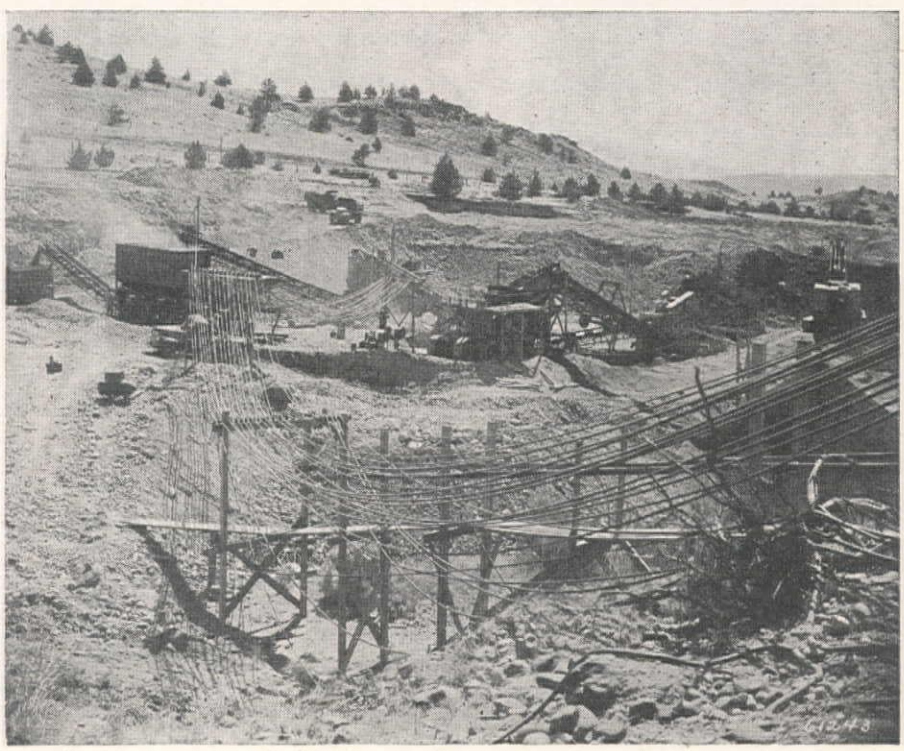
Bureau of Reclamation engineers said the proposed tunnel would exceed in length such major tunnels as those of the Delaware Aqueduct through which the City of New York gets its domestic water supply, the famous 24-mi. Hetch Hetchy domestic water supply tunnel of the City of San Francisco, and vehicular tunnels through the Swiss Alps.

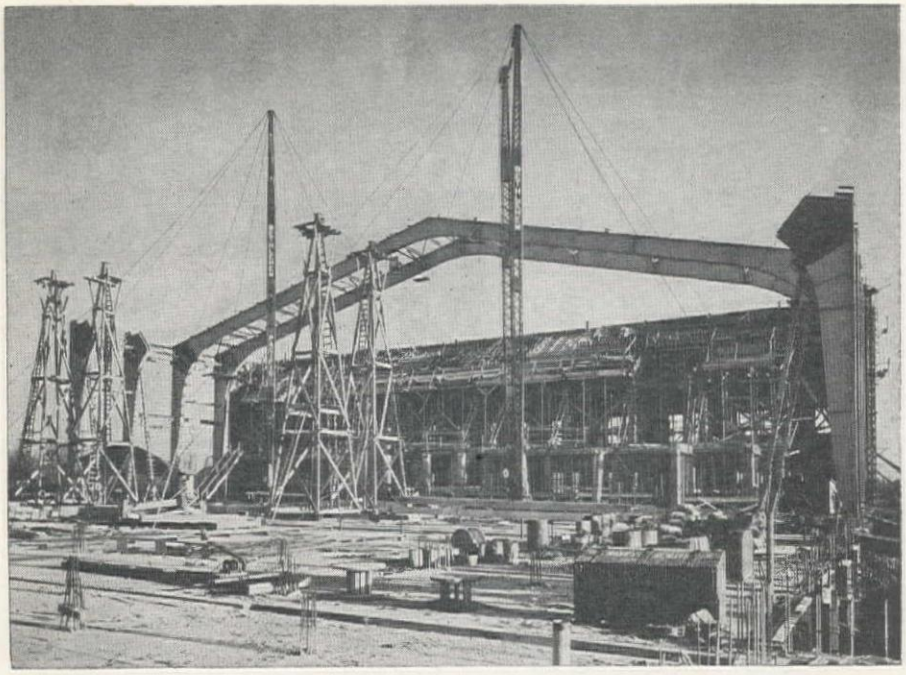
Congress Gets Columbia Valley Authority Plan

IN A SURPRISE move, Senator Harry P. Cain, Republican of Washington, introduced the Democratic administration's bill calling for creation of the Co-

MANY LINES FEED POWER TO CRUSHING PLANT ON OREGON ROAD JOB

FOR SURFACING of 25 mi. of the road between Warm Springs and Portland, Ore., Rogers Construction Co. of Portland set up their rock crushing plant near the aggregate site and placed two Caterpillar Diesel electric sets remotely on a nearby hillside (just out of picture to the right). With the electric power, the plant is producing 2,000 cu. yd. of one-inch minus material in a 17½-hr. working day.





RIGID STEEL FRAME ARCH ONE OF LARGEST IN COUNTRY

SOME 1,000 tons of steel are being erected by contractor J. G. Watts, Seattle, for Oregon State College's 10,000 capacity pavilion. It is 260 ft. long, 222 ft. wide, and 84 ft. high. Structural design is by Miles Cooper, Portland; fabrication by Bethlehem.

lumbia Valley Administration in the Pacific Northwest. It had been expected either that Senator Warren Magnuson, Democrat of Washington, or Southern Democratic Senators would sponsor the bill before the Senate. Paradoxically, Cain also introduced a bill last month to authorize the Bureau of Reclamation and Corps of Engineers to spend $1,000,000,000 to develop their coordinated plan for development of the Columbia River Basin. Cain explained that he believes "every constructive suggestion and plan (for maximum development of Columbia Basin) should be minutely analyzed and studied by Congress."

In offering the CVA measure, Cain stated, "I have thought it proper to introduce the administration's CVA plan in order that all of the proposed development programs for the Pacific Northwest might be before . . . the Congress at the present time."

The administration's CVA measure was introduced in the House of Representatives last month by Representatives Mitchell and Jackson, Democrats of Washington.

Authorize Construction Of Colorado Toll Road

CONSTRUCTION of the $5,300,000 toll road between Denver and Boulder in Colorado may begin next September, if tests of the constitutionality of the legislative approval of the project are positive. Both houses of the state's legislature passed a resolution April 18 authorizing construction of the 22-mi. freeway, with surprisingly little opposition in either house.

The resolution was passed as a companion piece to a previous bill approving the principle of toll roads. Opponents have insisted on decrying the toll road measure as the "opening wedge" in authorizing toll roads between every little hamlet in the state. Proponents claimed that toll roads might improve Colorado highway planning and that the legislature could act as a check on any indiscriminate authorization of other toll roads in the state. The success of toll projects in the East was cited.

Bond experts have indicated that it might be necessary to test the constitutionality of the toll road measure before the project could be financed satisfactorily. A test case would require at least four months, and would delay letting of contracts for the Denver-Boulder highway by that long. The road should be completed about a year after work begins. Four or five contracts will be awarded on different sections of the route.

The highway, according to preliminary specifications, will be 22 mi. long and will consist of two 24-ft. wide roadways separated by a 30-ft. parkway. It will connect with Federal Boulevard in northwestern Denver and will have only one access point enroute. Fees of 25 cents a car and 40 cents a truck have been suggested.

The state guarantees up to 30 per cent of the cost, and amortization of the road will be based on a 20- or 30-year period, after which it will become a free state highway.

University of Colorado student survey parties originally surveyed the route under the direction of Professor Roderick L. Downing, who has supported the plan since its inception some years ago. The route will save 7¾ mi. of driving as it proceeds almost on a direct line between Denver and Boulder, location of the University.

USBR Will Ask Bids on Major Western Projects

MAJOR PROJECTS upon which invitations to bid will be issued by the Bureau of Reclamation include two large canal jobs. Bid invitations will be issued about May 25 for construction of earthwork and structures for 8.5 mi. of the Wellton-Mohawk Canal on the Gila Project about 15 mi. east of Yuma, Ariz. This job includes 3,625,000 cu. yd. of excavation. About May 27, bid invitations will be issued for construction of earthwork and structures for about 16 mi. of the Courtland Canal near Superior, Neb. About 1,200,000 cu. yd. of excavation is involved. Specifications and bid forms may be obtained from the office of the Chief Engineer in Denver or from regional offices of the Bureau.

On May 18, bid calls will be issued for reconstruction of Rock Creek diversion dam and intake canal with compacted and cobble fill on the Bitterroot Project about 14 mi. south of Hamilton, Mont., and for construction of a 16,000-ft. trench for a domestic water supply line at Cascade, Idaho.

About May 20, bid calls will be issued for relocation of 2 mi. of State Highway at the Palisades Reservoir southeast of Idaho Falls, Idaho; for construction of channel improvements below Keechelus Dam about 65 mi. northeast of Yakima, Wash., and for construction of a wasteway reservoir about 5 mi. north of Ogden, Utah.

On May 25, invitations will be issued to bid on construction of the Williston Substation on the Fort Peck Project in North Dakota. This job includes furnishing and erection of steel structures and installation of all electrical equipment. Also, bid invitations will be issued on that date for construction of reinforced concrete dispatcher's building to house power and communication system controls on the Davis Dam Project in Phoenix, Ariz.

On May 31, bids will be invited for excavation and construction of the foundation for Culbertson Dam on the Republican River 2.5 mi. west of Trenton, Neb. Total excavation will be 3,600,000 cu. yd. and earth fill will be 2,450,000 cu. yd. A total of 300 days will be allowed for completion of this job.

During the next two months, the Bureau expects to invite bids on the following projects:

Canals: Earthwork, concrete lining and structures for 18.5 mi. of the Delta-Mendota Canal near Newman, Calif.; earthwork and structures for 17 mi. of the Superior Canal near Superior, Neb.; earthwork and structures for 12 mi. of the Wyoming Canal north of Riverton, Wyo.; excavation of 6.6 mi. of the Potholes East Canal on the Columbia Basin Project west of Warden, Wash.; earthwork and structures for 6.5 mi. of the Cambridge Canal near Arapahoe, Neb., and construction of 70 mi. of concrete pipe lines and structures for laterals, sublaterals and wasteways of the Coachella

Valley distribution system near Thermal, Calif.

Electric installations: Construction of 88 mi. of 115-kv. wood-pole transmission line between Sterling, Colo., and Ogallala, Neb.; 68 mi. of 115-kv. wood-pole transmission line between Oak Creek and Green Mountain, Colo.; 63 mi. of 69-kv. transmission line from Yuma, Ariz., to Holyoke, Colo.; 26 mi. of 115-kv. wood-pole transmission line from Loveland to Lafayette, Colo.; 41 mi. of 69-kv. wood-pole transmission line near Bismarck, N. D., 18 mi. of double-circuit and 54 mi. of single-circuit, 230-kv. steel-tower transmission line between Elverta and Tracy, Calif. and stringing 57 mi. of 230-kv. line between Oroville and Elverta, Calif.; 18 mi. of 115-kv. wood-pole transmission line between Boysen and Thermopolis, Wyo.; stringing conductor and overhead wire for 70 mi. of 230-kv., 3-phase single-circuit line between Davis Dam and Parker Dam and for 64 mi. of 230-kv. single-circuit line between Davis Dam and Hoover Dam.

Miscellaneous: Relocation of the remaining 13.6 mi. of county road, including construction of two bridges, about 16 mi. northwest of Cascade, Ida., on the Boise Project; construction of three pumping plants on the Wellton-Mohawk Canal near Yuma, Ariz.; construction of four relift pumping plants on the Boise Project near Caldwell, Ida.; construction of two concrete-lined equalizing reservoirs on the Ogden River Project in Utah; construction of three 1,000-ft. concrete siphons on the Paonia Project in Colorado; clearing the reservoir site (69 acres) at Platoro Dam on the San Luis Valley Project in Colorado.

First Work to Begin at Idaho Atom Plant Site

DIRT will begin to fly next month at the eastern Idaho site of the Atomic Energy Commission's huge reactor testing plant, but construction work will not build up momentum until next year and will not reach a peak until 1954, according to Leonard E. Johnston, manager of AEC's Idaho operations. Employment on the project will be small at first because a great deal of exploratory work, planning and designing remains to be done. Initial work at the site will consist of deep well drilling to assure an adequate water supply, according to Johnston. The plant will require huge quantities of water for its operation.

Selection of an eastern Idaho city (either Pocatello, Idaho Falls or Blackfoot) has not yet been made for location of administrative offices for the huge project. The reactor testing plant itself will be located on a portion of the 400,000 ac. of desert land in the vicinity of Arco. The Arco plant will be spread over a large area to insure a high safety factor.

As preliminary work proceeded at the Idaho site, Montana interests had succeeded in forcing Joint Congressional Atomic Energy Commission hearings in Washington, D. C., attempting to obtain the big plant for Fort Peck, Mont.

Coordinated Columbia Basin Program Outlined by USBR and Engineers

THE DEPARTMENT of the Interior and Army have submitted to the President an agreement on principles and responsibilities for the parts of the comprehensive plan of development of the Columbia River Basin with which the two agencies are directly concerned.

The action was an important step in carrying out the President's instructions of last June and September to review the respective long-range basin development plans of the Army Engineers and the Bureau of Reclamation in light of the 1948 floods, and to coordinate them fully with other affected agencies of the Department of the Interior, the Department of Agriculture and the Federal Power Commission. While the plans of these other agencies are not set forth in the agreement between the Departments of the Interior and the Army, the agreement will permit these two departments to go forward in submitting coordinated programs to the governors of the Northwestern states for their views and comments.

The agreement provides the basis for further Federal development of the region's water resources efficiently and in consonance with the views and needs of the people of the region. In this respect it provides an inventory and framework which would be extremely valuable to the proposed Columbia Valley Administration recommended by the President but opposed by local interests.

The Departments agreed as to which of them would be the more appropriate agency to build the projects recommended for construction and also agreed on areas of primary responsibility for future investigations and project planning. Agreement was also reached that the two Departments would recommend that power revenues should be pooled to extend financial assistance for irrigation development.

"The coordinated plan," according to the joint statement of the agencies, "is comprehensive in scope and is designed not only to meet the most pressing current needs of the basin, but also to provide a basis for incorporation of future projects into the program as they become necessary."

The related plans for the lower Columbia River fisheries, for a hydrometeorological reporting network, and for necessary power transmission facilities, presented in the Army Report, are agreed to by the two agencies.

Neither the Glacier View Dam, which conservation spokesmen have opposed, nor the possible alternate Paradise Dam, which has some opposition in Montana, is recommended at this time, pending further study.

The agreement contemplates no change in responsibilities for presently authorized projects but proposes joint

RAILWAY RELOCATED ON WASHINGTON SHORE AT McNARY DAM SITE

RELOCATION of the Spokane, Portland & Seattle Railway's line along the Washington shore of the Columbia River at McNary dam site is being carried out by White Bros. of Walla Walla. Relocated site is through the bluff at the right of the present line. Work on the Washington shore at McNary Dam is being stepped up steadily.

preparation of construction schedules in cooperation with the states and other Federal agencies, through such means as the Columbia Basin Inter-Agency Committee.

With respect to multiple-purpose projects for future development, the agreement contemplates that the Army Corps of Engineers will have the primary responsibility for further investigations concerning the main stream of the Columbia River below Grand Coulee Dam; the main stream of the Snake River below the mouth of the Grand Ronde River; the Kooskia project; the Willamette River basin; the Kootenai River basin; the Spokane River basin; and the Pend-Oreille River basin below and including Pend-Oreille Lake.

The Bureau of Reclamation would have primary responsibility in the Snake River basin up stream from and including the mouth of the Grand Ronde River, which is approximately at the corner where the States of Oregon, Washington, and Idaho join; the basins of streams which are tributary to the Snake River below the mouth of the Grand Ronde River; the Clark Fork basin above Pend-Oreille Lake; and the basins of streams flowing into the Columbia within the United States except the Willamette and Spokane Rivers.

The projects covered by the agreement which are now authorized or under construction, together with those recommended for early authorization are:

Bureau of Reclamation, project and status

Anderson Ranch*
Deschutes North Unit*
Boise, Payette Division*
Ochoco Dam Rehabilitation‡
Hungry Horse*
Columbia Basin Project*
Yakima Project, Roza Division*
Upper Star Valley†
Lewiston Orchards*
Missoula Valley—North Side Unit†
Palisades‡
Arrowrock F. C. Outlets‡
Canby†
Hells Canyon†
Cambridge Bench†
Council†
Mann Creek†
Bitterroot Valley†
Vale, Bully Creek Unit†
Kennewick Div., Yakima Project‡
Crooked River†
Grand Coulee Flood Control Operation†
Mountain Home†
The Dalles, West Unit†

Corps of Engineers, project and status

McNary*
Dorena*
Ice Harbor‡
Chief Joseph‡
Meridian*
Hills Creek†
Fall Creek: Middle Fork†
Willamette
Dexter†
Waldo Lake†
Detroit*
North Santiam
Big Cliff‡
Lucky Peak‡
Albeni Falls†
Lower Monumental‡
Libby†
Cougar†
Blue River—McKenzie†
Gate Creek†
Green Peter†
Cascadia†
Wiley Creek—South Santiam†
White Bridge†
Willamette Falls Lock‡
Willamette Falls Fish Ladder†
Little Goose‡
Holley†
John Day†
Lower Granite‡
Priest Rapids†
The Dalles†
Lewisville†
Tum Tum†

*Under construction.
‡Authorized.
†Recommended.

Cheyenne Plans Sewage Plant

DETAILS of the new $1,100,000 outfall sewer line and sewage disposal plant at Cheyenne, Wyo., have been released. Eighty per cent of the cost of the new facilities will go for the new plant, which will be of the "trickling filter" type.

Twenty per cent of the cost is represented by the new outfall sewer, which will consist of 36- and 30-in. pipe.

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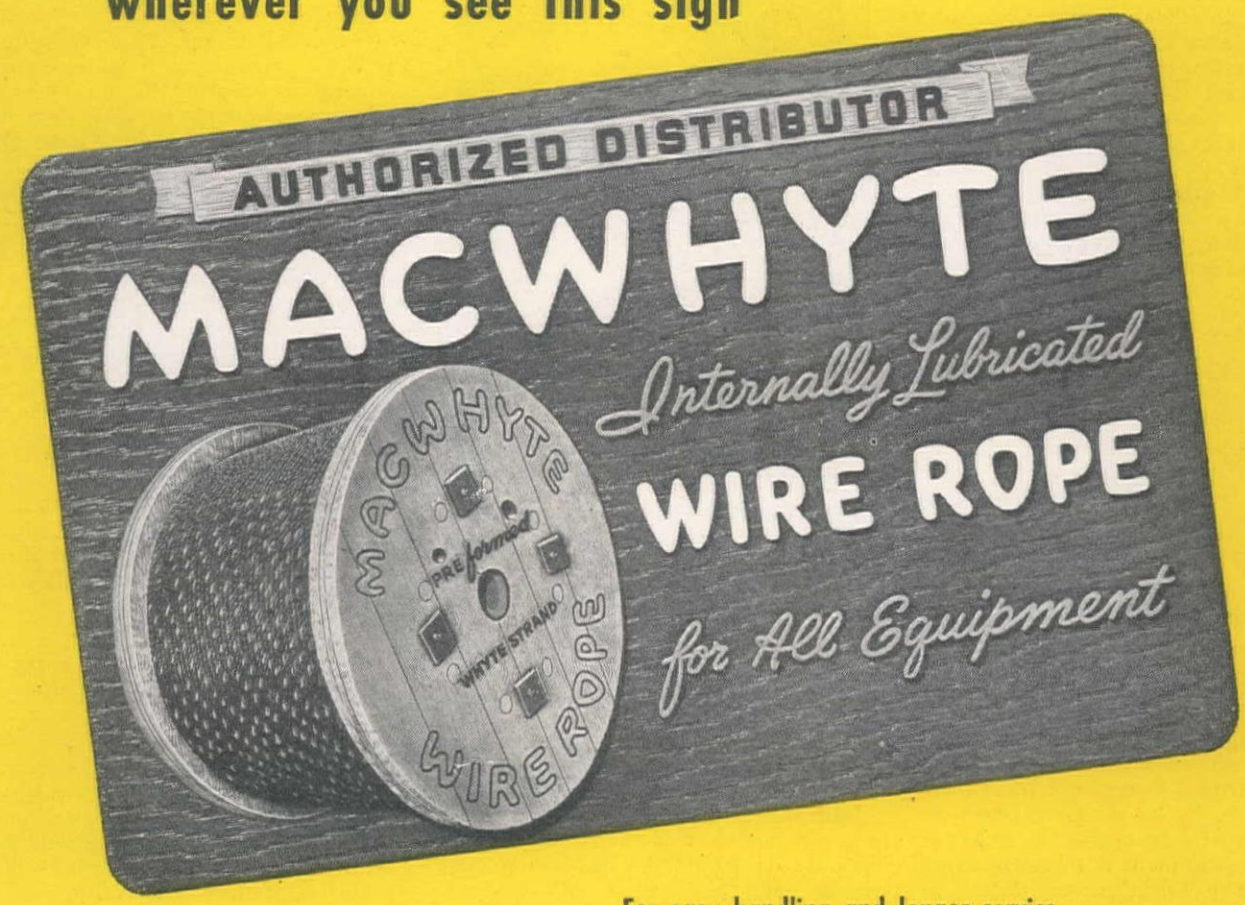

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PERSONALLY SPEAKING

The firm of Crocker and Ryan, Denver, Colo., which was organized in 1941 when **Alfred J. Ryan** became a partner of **Colonel Herbert S. Crocker** in his consulting engineering business, was dissolved March 1. On that date **Forrest S. Crocker,** son of Herbert S. Crocker, who has been associated with the firm since 1944, withdrew from the organization to re-enter the field of general construction as an associate of the newly formed firm of Crocker & Ellett, Inc., with offices at 1863 Wazee St., Denver. Ryan will carry on the engineering practice at 1340 Glenarm Place in Denver as successor to Crocker and Ryan.

* * *

Clarence E. Stahl, formerly Chief of the Management Division of the Army Corps of Engineers for the Missouri River Division at Omaha, was installed April 1 as Chief Engineer of the Montana State Highway Commission. Stahl was for five years location engineer for the Minnesota Highway Commission and held a similar post with the Missouri highway department. He succeeds **Scott P. Hart,** who becomes head of the Commission's division of highway planning.

* * *

Col. Dwight F. Johns, Corps of Engineers, has been appointed a member of the Board of Engineers for Rivers and Harbors, by **Major Gen. Lewis A. Pick,** Chief of Engineers, U. S. Army. This new assignment is in conjunction with Colonel Johns' other duties as division engineer, South Pacific Division, and president of the California Debris Commission, with offices at the Oakland Army Base, Oakland, Calif. The Board of Engineers for Rivers and Harbors is a consulting board of engineer officers of outstanding professional achievements to pass upon the engineering and economic features of all river and harbor and flood control projects proposed for authorization by the United States prior to their submission to Congress.

* * *

Clarence B. Shain, former Washington state highway director, has been named city engineer for Pasco, Wash., on a full-time basis.

* * *

Miles Drake is now city engineer and building inspector of Auburn, Wash., succeeding **Earl G. Forbes.**

* * *

Brig. Gen. Samuel Sturgis of St. Paul, Minn., has been named to succeed **Maj. Gen. Lewis A. Pick** as Missouri River Basin Division Engineer.

* * *

Donald C. Davis was recently named city engineer of Hawthorne, Calif. He was formerly city administrator of Monterey Park, and has been city engineer and manager of public works of Turlock, and was also employed as planning engineer for Modesto. He is on the staff of Quinton Engineers, Ltd. of Los Angeles, with whom the city recently made a contract for engineering services.

JOHN BLUME, Structural's President

* * *

John L. Savage of Denver, Colo., honorary member of the American Society of Civil Engineers, has been named winner of this year's Washington Award, joint award of the four founders societies and the Western Society of Engineers, for "accomplishments which pre-eminently promote the happiness, comfort and well-being of humanity." As Chief Designing Engineer for the Bureau of Reclamation, Savage has engaged on such work as the Hoover, Grand Coulee and Shasta Dams and the All-American Canal. A specialist under the U. S. Department of State's cultural cooperation program, he outlined plans for the development of water resources in India, Palestine, China and other countries.

JOHN SAVAGE, award as humanitarian

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The delegates to the Structural Engineers Association of California met recently in San Francisco to elect officers for the first year under the new constitution. The officers-elect are: **John A. Blume,** San Francisco, president; **Ernest D. Francis,** Sacramento, vice-president; and **John E. Rinne,** San Francisco, secretary-treasurer. The other delegates constituting the Board of Directors together with the officers are: **Arthur A. Sauer,** Sacramento; **S. B. Barnes, George E. Brandow, Murray Erick,** all of Los Angeles; **Richard W. Ware,** Pasadena; and **Mark Falk** of San Francisco.

* * *

Harold Linke has replaced **Ed. H. Watson** as State Engineer of Utah.

* * *

Lewis Dodson, director of sanitation for the Denver, Colo., city health department, has resigned and will move to Amarillo, Tex., where he will work part time as a consulting engineer in the field of sanitation. The retiring sanitation engineer had completed 50 out of 55 recommendations for improvement of sanitation conditions in Denver made after a 1947 survey.

* * *

Robert L. Lewis, head of the department of civil engineering at Colorado A & M College, Fort Collins, Colo., has resigned to become chairman of the department of civil engineering at New York University Sept. 1.

* * *

David Swenson, engineer with the Washington State Highway Department at Spokane and Olympia for the past two years, has left for Afghanistan where he will be an engineer with Morrison-Knudsen Co., Inc.

* * *

Marvin E. Ray, city engineer of Vancouver, Wash., has accepted the newly-created position of city supervisor of Pullman, Wash. Pullman is planning an intensive program of improvement of streets, sewer lines and water facilities.

* * *

M. F. Dixon, filtration plant superintendent at Billings, Mont., is the elected chairman of the Montana Section of the American Water Works Association. He succeeds **John B. Hazen,** water

works superintendent at Butte. **M. E. Henderson,** city manager at Bozeman, was elected vice-chairman. **Harry McCann** of the Montana Power Co. at Missoula and **Arthur L. Johnson,** water superintendent at Kalispell were elected trustees. **C. W. Brinck,** assistant director of sanitary engineering for the Montana State Board of Health, was reappointed secretary-treasurer.

* * *

Associated Contractors, organization of road building contractors in New Mexico, has re-elected **W. T. Bookout** of Las Vegas as president. **Marshall Wylie** of Albuquerque was named vice-president and **A. J. Haney** of Albuquerque was named secretary-treasurer.

* * *

WILEY

At the business meeting held at the conclusion of the 29th annual convention of the Wyoming Engineering Society held at Cheyenne, **John E. Wiley,** public relations engineer, Wyoming State Highway Department, was elected president; **O. P. Reed,** district superintendent, Cheyenne Light, Fuel & Power Co., Cheyenne, was elected vice-president, and **Kirby H. Olds** was re-elected secretary-treasurer.

* * *

A. H. Winter has been named president of the Victoria, B. C., Contractors' Association. **Archie Whiteman** was elected vice-president and **P. M. Townsend,** secretary-treasurer. Executive committee includes: **Albert Evans, Dave Donaldson, William Bartlett, Herb Bradley, Malcolm Browne, J. Kissinger** and **L. McCrimmon.**

* * *

Oren King, city manager of Pendleton, Ore., for the past two years, has left to take a similar position at Eugene, Ore. **C. V. Signor,** ex-city manager of Grants Pass, Ore., has been named to the Pendleton post. Signor has served in Grants Pass as water superintendent and city engineer.

* * *

Lee H. Corning, since 1935 Assistant Manager of the Portland Cement Association's Structural and Railways Bureau, has been appointed Manager of the Bureau. His appointment fills the vacancy created by the recent death of **Arthur J. Boase.**

* * *

M. J. Miller is the administrative head for the Bureau of Reclamation at Yuma, Ariz., for the Lower Colorado River District, now handling the Imperial Division of the All-American Canal, the Yuma Project and the Gila Project. **George E. Tank** is Chief Engineer of construction for the district, and **Joseph**

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P. Colloy is in charge of operations. Assistant to Colloy is **William A. Steenberger. Waldo Freeman** is maintenance engineer and **William McCaig** is maintenance engineer in charge of rehabilitation work. **Roy E. Goss** is in charge of the Bureau's laboratory at Yuma. **Clyde Shields** is field engineer, **John T. McGrew** is in charge of office design work and **Lovel Meyers** is office engineer. **R. G. "Bob" Harding** and **Harold Hosea** are in charge of land acquisition.

* * *

Col. Lyle E. Seeman, who since February, 1947, has been serving with the Central Intelligence Agency in Washington, D. C., has been assigned to Anchorage, Alaska, where he has relieved **Col. William E. Potter** as Alaska district engineer. En route, he stopped off in Portland to discuss details of his new assignment with **Col. Theron D. Weaver,** North Pacific division engineer. Colonel Seeman's responsibilities in Alaska will include the recently announced "308" type survey of the vast region. The survey will plan for the development of Alaska's rapidly expanding population need for power, flood control, navigation and other water uses comparable in scope to the Corps of Engineers' Columbia Basin development plan.

Colonel Potter, who served as Alaska district engineer for the past year left for Washington, D. C., for assignment in the Office of the Chief of Engineers.

* * *

Colonel Claude H. Chorpening, District Engineer of the Tulsa District, Corps of Engineers, has been called to Washington, D. C., by **Major General Lewis A. Pick,** Chief of Engineers, for duty in that office. During his 3-year assignment of duty with the Tulsa District, Colonel Chorpening has brought to completion the $10,000,000 Canton Reservoir, and construction was started on the Fort Gibson, Hulah, Heyburn, Tenkiller, Wister and Fall River Reservoirs.

* * *

J. S. Marriott, former Director of the Office of Aviation Safety of the Civil Aeronautics Administration at Washington, D. C., has returned to his former post as Administrator of the Sixth Region of CAA in Los Angeles. The appointment was made at his request.

* * *

Raymond M. Rogers has been appointed city engineer of Ventura, Calif. He has been associated with Clyde C. Kennedy, consulting engineer of San Francisco.

* * *

Milton H. Irvine has been named city engineer of Riverside, Calif. Other new city officers include **E. M. Gifford,** building inspector, and **Orval Addington,** street superintendent.

* * *

Raymond R. Garnet, in charge of channel clearing near Pocatello, Idaho, for the Corps of Engineers, has moved to Rigby, Idaho, to be in charge of emergency flood control work on the upper Snake River.

COL. SEEMAN, to Alaska

* * *

Herbert J. Summers has been appointed by the city council of Bell, Calif., to the combined position of city engineer and street superintendent. He replaces **D. W. Ulmer,** former city engineer, and the late **William Webb,** who was superintendent of streets. Summers was formerly city engineer of Torrance.

* * *

Col. O. E. Walsh, Portland district engineer, has announced the appointment of **Major Robert J. Hall** as his special assistant in charge of all flood control design and construction programs in the Portland district, except those in the Willamette Basin. Major Hall succeeds **Lieut. Col. John W. Miles** who has been named resident engineer for Detroit Dam on the North Santiam River.

* * *

H. H. Tarzain recently left for the Philippine Islands where he will be engaged on bridge projects for the Public Roads Administration. He was until recently with the California State Division of Highways, employed in Sacramento as an engineer in the bridge department. He expects to remain in the Philippines for about three years.

* * *

Edward W. Benes, civil engineer of Brigham City, Utah, has moved to California, where he is connected with the State Division of Architecture at Sacramento.

* * *

T. W. Rodgers, having completed his assignment in Fresno for the California State Division of Highways, is now in the bridge maintenance section in Sacramento.

* * *

Howard W. Brod, until recently city engineer and water superintendent of Sierra Madre in southern California, has been appointed as the first city manager of San Carlos in San Mateo Co. He will also act as city engineer in combination with his other duties.

OBITUARIES . . .

Colonel Herbert S. Crocker, 82, consulting engineer and senior member in the firm of Crocker & Ryan, Denver, Colo., died recently. Colonel Crocker was past president of the American Society of Civil Engineers (1932), and prior to that had been a Director, Vice-President and Secretary of the National Society. He was elected to an Honorary Membership in A.S.C.E. in 1938. He was most noted for his work on transportation structures, including the long Colfax-Larimer Viaduct in Denver, and other structures in Salt Lake City and Chicago. The Crocker & Ryan firm was formed in 1941.

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Charles A. Laws, 72, retired building contractor of Los Angeles, died April 18.

* * *

John Ralph Boddy, 62, building contractor of Seattle, Wash., died April 3 after a long illness.

* * *

Ben C. Johnston, 82, former civil engineer with the Great Northern Railroad at Great Falls, Mont., died April 7. His last job was as County Surveyor and Commissioner of Cascade County, Mont. He was retired and living in California.

* * *

S. E. McCullough, superintendent for Brown & Root, Inc., Houston, Texas, died recently.

* * *

George E. Chambers, Chief Clerk on the Hungry Horse Project in Montana, died recently of a heart attack. "Paddy," as he was known to his fellow workers and friends, had worked for the Bureau of Reclamation for 25 years on various projects throughout the West.

* * *

Sam Rosenberg, secretary-treasurer for Pacific Pavements Co., Ltd., of San Francisco, died March 29.

* * *

Harry L. Coon, 51, president of the Pacific Crane & Rigging Co., Inc., of Los Angeles, died April 14.

* * *

James D. Offutt, 64, building contractor of Los Angeles, died March 5.

* * *

John Wilson, 69, retired president of the National Steel Construction Co., died April 12 at Seattle.

SUPERVISING THE JOBS

George Hansel is general superintendent and **O. H. Tucker** is project manager for Morrison-Knudsen Co., Inc., on construction of public utilities for the City of San Francisco under a $3,994,840 contract. The work comprises many small projects under one heading, and consists of paving and drainage work and installation of sewerage facilities, water supply works and electrical facilities. About 400 men are employed on the work. **Buck Hope** is grading superintendent on the project; **Tex Smith** is pipeline superintendent, and **Lex Hobson** is master mechanic. **Gene Hargraves** is the job office manager. The project should be completed by the end of this year.

* * *

Lee Arnold is superintendent for MacDonald, Young & Nelson, Inc., San Francisco, who are acting as construction managers for Stoneson Brothers of San Francisco on development of apartment buildings at 19th Ave. and Lake Merced in San Francisco. About $30,000,000 worth of construction is contemplated, and two projects totaling $6,000,000 are now under way. The modernistic apartments will include approximately 783 rental units. Other key men on the project are **Ed Kemp, Frank Atkinson, Paul Beach, George Touey** and **Elmer Koske. Jerry Peters** is the job office manager. Initial portions of the development will probably be completed in mid-1950.

* * *

David R. Lewis is the superintendent for construction of the $1,500,000 steel frame and concrete building for the Sailors Union of the Pacific at First and Harrison Streets in San Francisco. M & K Corporation of San Francisco are the contractors. Foremen on the job are **W. T. Lahti** and **William Hodges. Harry M. Pittman** is inspector for the architect, **William Gladstone Merchant.** The building will be a monument to San Francisco mariners, and will be of marine-type architecture. It will be completed by the end of this year.

DAVID R. LEWIS

* * *

E. F. Brophy is general superintendent and **Les E. Benton** is job superintendent for Vinson Construction Co., Phoenix, Ariz., for construction of the bridge on South Central Ave. in Phoenix. **Gerald M. Snow** is the assistant superintendent. **P. Edwards** is general foreman, and **Jim McFeelers** is the job office manager. **A. F. "Gus" Rath** is resident engineer for the Arizona State Highway Department. **Guy Lewis** is foreman on the job for Bethlehem Pacific Coast Steel Corp., who have the contract for erecting steel work for the bridge. The bridge is being built parallel to the existing structure to make it into a 4-lane road.

* * *

Ronald McAlpin is superintendent for H. P. Adams Co., contractors of Yuma, Ariz., who have under construction the St. Francis Church at Yuma and a remodeling job at 4th Ave. and 8th Ave. in Yuma is in charge of **Wes Martin.**

* * *

R. Babler of Babler Bros., Portland, Ore., is general superintendent on the firm's road resurfacing job on the Alcan Highway, between Tok Junction and Johnson River in Alaska. This is a $1,126,000 contract covering 65 mi. of surfacing, and work is expected to be finished by Oct. 1, this year. **Howard McInroe** in the capacity of foreman is one of the key personnel on the job.

* * *

R. G. Cunningham as general superintendent, and **Dale Lockett** as foreman, are working on construction of the First National Bank at Antioch, Calif. The building is of concrete design and work was recently contracted at $72,000 to Moore & Roberts, Inc., contractors of San Francisco.

* * *

Ed Jones is general superintendent for Marwell Construction Co., Ltd., Vancouver, B. C., on construction of the $1,086,326 nurses' residence at Vancouver, B. C. **Ken Amundsen** is the estimating engineer.

* * *

Nick A. Artukovich is the job superintendent for Papac & Artukovich of Montebello, Calif., on construction of the $464,938 sewer system for Panorama Sanitation District in Kern County, Calif. **Leo M. Lopez** is general foreman on the job and **Thomas H. Lockridge** is the job office manager.

GEORGE WATERS is project manager for S-U-H-B, joint venture firm of Oakland, Calif., on construction of Delta-Mendota Intake Canal and pumping plant near Tracy, Calif. The job includes 5 million cu. yd. of excavation.

* * *

Morris Christensen is superintendent for C. O. Johnson & Son, contractors of Phoenix, Ariz., on construction of the First Baptist Church in Phoenix. He has been with the firm for the last 15 years.

* * *

Clarence Glans is superintendent on a new plant being built for the Central California Ice Co. at Delano, Calif. L. H. Hansen and Sons, Fresno, Calif., have the contract.

* * *

Ernie Becker is superintendent for Pittsburgh-Des Moines Steel Co., who are erecting a new water tank for the California Water Service at Bakersfield, Calif.

* * *

Wesley Smith is superintendent for the Tawco Construction Co. of Fresno, Calif., on their $351,000 contract for the erection of the Delano Academic High School building at Delano, Calif. **H. A. Yost** is carpenter foreman and **Jerome Snow** is office manager.

* * *

J. T. I'Anson has retired from the building firm of Ianson & Richardson, Limited, Duncan, B. C., and the name of the company has been changed to A. V. Richardson, Limited. The business partnership of I'Anson and **A. V. Richardson** was formed in 1939, and was subsequently incorporated in January, 1946.

* * *

C. H. Ingersoll, who formerly worked as master mechanic with Marshall, Haas

& Royce, contractors of San Mateo, Calif., on the Coachella Canal flood control project at Indio, Calif., is now employed in the same capacity by these contractors on the Friant Kern Canal on a location between Exeter and Lindsay.

* * *

R. R. "Dick" Thomas is general superintendent and **C. C. Burrell** is job superintendent for William Curlett of Long Beach, Calif., on the erection of a high school at San Gabriel, Calif. The structure is of concrete and gunite construction. **Eric Davis** is carpenter foreman on the job. Dick Thomas was for many years a superintendent for Del E. Webb Construction Co., and is now general superintendent on all work for the Curlett firm. The firm has under construction many unique industrial and office buildings in the Los Angeles area.

* * *

Ole Remmem is superintendent for V. O. Brunzell Co., Gardena, Calif., on the Northrup School in Alhambra, Calif. **Gei Bazter** is carpenter foreman. Brunzell was awarded this contract on a bid of $388,000.

* * *

C. H. Brown is the superintendent for Swinerton & Walberg of San Francisco on construction of the $5,000,000, 22-story annex to Standard Oil Company's office building in the heart of San Francisco's financial district. **Art Smith** is the project manager. Steel framing is being completed this month. Final completion of the project is scheduled for June, 1950.

FLOYD RUPP, in center at right, is superintendent for MacIsaac and Menke Co. of Los Angeles for construction of the big Fairmont Theater building at Vermont and Imperial in Los Angeles. L. W. "MARTY" MARTIN, left, is foreman for the concrete work on the job, and RAYMOND BOSSAERT, right, is the labor foreman.

* * *

H. E. Rosson is the job superintendent for Smith Hi-Line Co., Nashville, Tenn., who have the $1,025,096 contract for erection of the Casper-Gering 115-kv. transmission line on the Missouri Basin Project in Wyoming and Nebraska. Other key men on the project are **H. Jones** and **C. Jordan.**

* * *

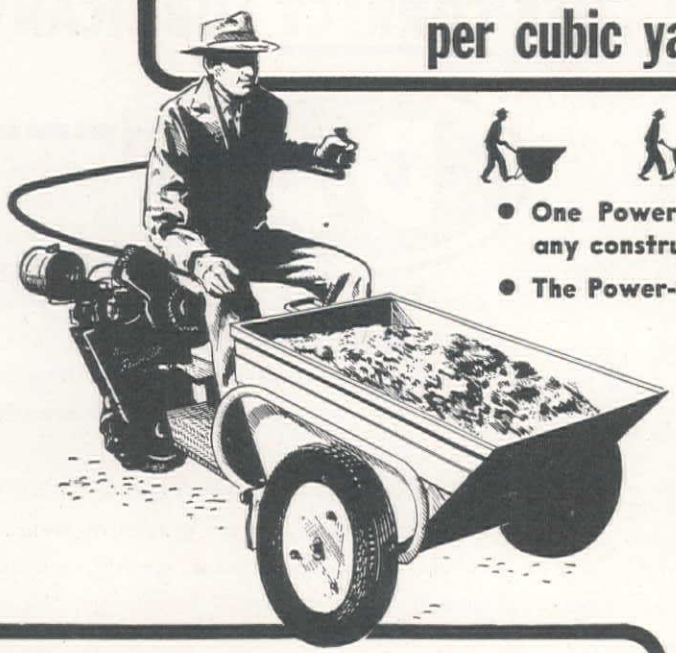
John Hogue is the job superintendent for Walter Groshong, Long Beach, Calif., contractor on construction of the $197,754, 12-million gallon reinforced concrete storage reservoir at Long Beach.

Al Travers is job superintendent for the Bank Building and Equipment Co. of America, San Francisco, who have the $300,000 contract for construction of a 2-story reinforced concrete bank building for the Union National Bank of Pasadena, Calif. **J. B. Gauder** is president of the building firm, and **L. J. Orabka** is vice-president. **Fred R. Bader** is supervisor on the job.

* * *

Joe Nussbaum is the superintendent and **Len Trimlett** is project manager for Swinerton & Walberg Co. of San Francisco on construction of the Mt. Zion Hospital at Divisadero and Post Sts. in San Francisco. **Charles Westfall** is the general foreman, **George Westfall** is in charge of grading work, **Warren Garde** is labor foreman, and **Don Griffin** is detail man.

GAR-BRO *Power-cart* (PAT PEND.) **saves up to 25c per cubic yard of concrete placed**



- **One Power-Cart replaces 4 hand-pushed carts on any construction job.**
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Gar-Bro Power-Cart carries 1800 lbs. of concrete; loads direct from hopper or mixer. Turns on 4-ft. radius; will go through 40" door; handles full load up or down steep inclines. Powerful 7 H.P. engine; single tiller controls steering, forward, reverse. Foot-operated release latch controls balanced 9 or 12 cu. ft. tray for quick dumping. Available also in flat bed models. All standard parts.

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UTAH—Arnold Machinery Co., 427 W. 2nd So. St., Salt Lake City 1

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NEWS BRIEFS

NORTHWEST UTILITY PLANS BIG PROGRAM—Mountain States Power Co. has budgeted $4,350,000 for new construction in 1949. The total will be spent for additions and improvements to company properties in Montana, Idaho, Wyoming and Oregon.

DAMAGE TO OREGON HIGHWAYS ESTIMATED—Frost and flood damage to Oregon's primary and secondary highways during the last winter has been estimated at $2,580,000 by R. H. Baldock, State Highway Engineer. This is a half million dollars higher than the figure set in a preliminary appraisal last month. Snow removal operations and sanding of highways cost the state an additional $200,000 above normal. The Oregon State Highway Commission has set up $8,000,000 in its current budget for highway maintenance, and contracts are now being awarded for the restoring of some of the damaged highways.

COLORADO UPPER BASIN COMPACT NOW EFFECTIVE—President Truman last month signed the bill making effective the Upper Colorado River Basin Compact. Intended as a basis for the development of projects in the Basin, the new compact apportions 7,500,000 acre-feet of water a year from the Colorado River as follows: To Arizona, 50,000 ac. ft. a year, and of the remainder, Colorado will receive 51.75%; New Mexico, 11.25%, Utah, 23%, and Wyoming, 14%. Entire text of the agreement appeared in *Western Construction News* for December, 1948.

ARIZONA BUDGETS SCHOOL BUILDING FUNDS—The Board of Regents for the University of Arizona has approved plans for buildings worth approximately $2,750,000 at the school's site in Tucson. Largest building will be a new liberal arts edifice, to cost $1,136,328. James Macmillan, Tucson architect, is preparing plans for this building. Second largest will be the student union building, $950,000. Architects are drawing plans for a library addition, $525,000; women's dormitories, $500,000; a classroom and administration building, $1,000,000, and a home economics building, $250,000.

WASHINGTON PLANS $2,500,000 HIGHWAY—The Washington State Highway Department plans to spend $2,500,000 during the next two years for the planning and construction of a 4-lane highway over Snoqualmie Pass in northwest Washington. The highway will be about 10 mi. long, and portions will be covered by snow sheds.

NORTHWEST FLOOD CONTROL COST SET—The Corps of Engineers have estimated $2,000,000 as the cost of flood control work in eastern Washington and northern Idaho. Plans and specifications will be released soon for projects at Cle Elum, Wash., and Bonners Ferry, Idaho. Preliminary plans are under way for projects on the Kootenai, Yakima, Okanogan, Entiat, Methow, Wenatchee, St. Joe and Pend Oreille Rivers.

ALASKA AIRPORT WORK BEGINS — Morrison-Knudsen Co., Inc., is beginning work this month on their $2,845,728 contract for construction of the airport at Fairbanks, Alaska. The work includes clearing, grading, draining, paving and lighting of the Civil Aeronautics Administration airport.

ENGINEERS ERECT BRIDGE IN THREE DAYS—A two-lane bridge was erected in three days early this month by Corps of Engineer troops to replace the span destroyed by ice and debris on the Pasco-Richland Highway in Washington. The completed Bailey bridge is of single-unit construction, forming a center span of 130 ft. to join remaining portions of the old structure.

LARGE HOUSING PROJECT PLANNED AT COLORADO SPRINGS—A total of 180 apartment houses, to cost about $1,500,000, will be built this summer by Garrett-Bromfield & Co. of Denver, Colo., at Colorado Springs. Work on

When Summer Comes... USE CORRECT LUBRICANTS

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When summer comes, cost-wise operators of heavy-duty equipment reduce repair bills, obtain smoother operations, and increase the wear-life of their machines by making a seasonal change in lubricants.

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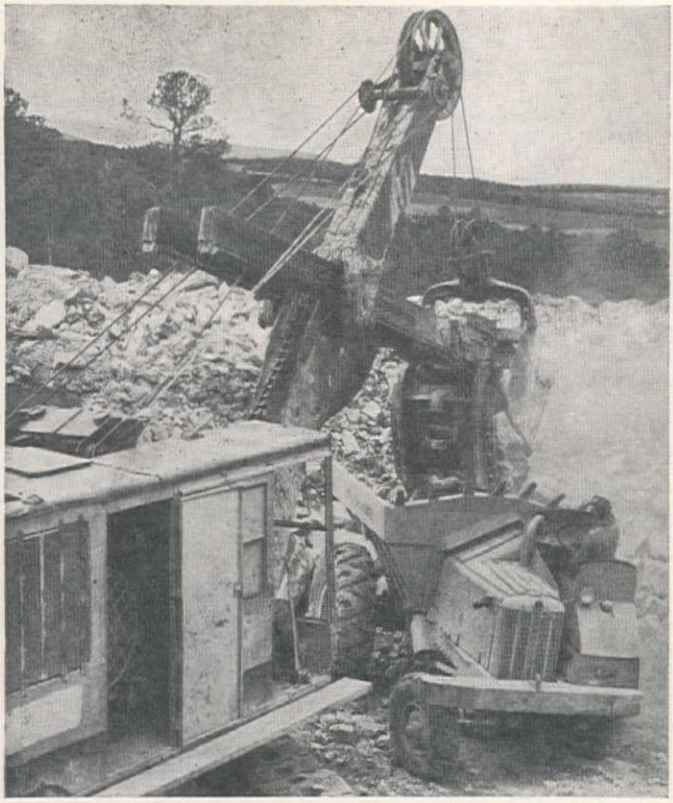

ROUTE 66 STRAIGHTENED OUT EAST OF ALBUQUERQUE

A KOEHRING Dumptor is shown near Tijeras Pass summit on a job reaching 7,000-ft. elevation in places. Contractor W. T. Bookout, Las Vegas, placed the 2-cycle GM Diesel-powered rigs here on a 3-min. round trip schedule, including 1 min. for loading and 2 min. for the 200-yd. 12% grade haul, dump, return.

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the first twenty units has begun, and the entire project will take about a year. The FHA-insured buildings will be two stories each, of frame construction, and will be placed about 1½ mi. northeast of downtown Colorado Springs.

WYOMING ENGINEERS OPPOSE VALLEY AUTHORITIES—The Wyoming Engineering Society passed a resolution at its annual meeting last month opposing the creation of any regional or valley authority to handle water problems. The engineers also indicated their favor of protection of state rights and interests in the formation and administration of a proposed federal stream pollution abatement law.

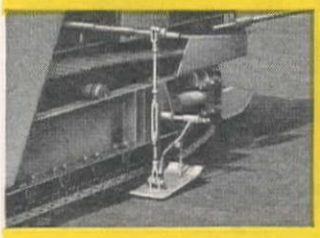
SEATTLE-YAKIMA CO-AXIAL CABLE GOING IN—Telephone crews have resumed work on the $4,000,000 project to lay a co-axial cable from Seattle to Yakima in Washington. The project calls for the burying of four tubes of 3-in. lead-sheathed cable.

SANTA BARBARA PLANS HARBOR WORK—The Santa Barbara, Calif., Harbor Development Board has drafted plans for extension of the city's present breakwater and the building of a new breakwater from East Cabrillo Beach. The plans also call for a standby dredge to keep sand from filtering into the harbor. The dredge would be placed near the end of the two breakwaters to keep the sand moving along Cabrillo Beach rather than allowing it to enter the harbor. Dredging costs now total about $60,000 a year.

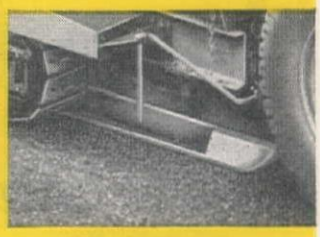
BRIDGE SADDLE SHAKEN LOOSE BY QUAKE—A 23-ton saddle was shaken loose from a bridge tower on the Tacoma Narrows Bridge in Washington by the recent earthquake. It dropped 500 ft., sinking a machine shop barge at the foot of the tower. Several workers were on top of the bridge towers when the saddle was jolted loose, but managed to hang on. The saddle was located by divers, and hoisted unharmed back into its proper position.

DID UTAH ROAD CREWS REPAIR COLORADO ROADS?—A Colorado newspaper reported last month that

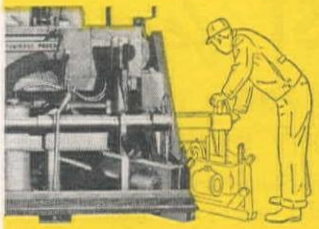
the Paver of the future
JAEGER'S BP-5



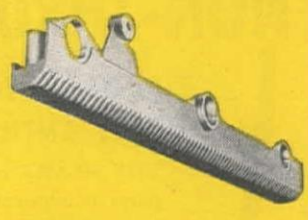
Automatic Grade Matching



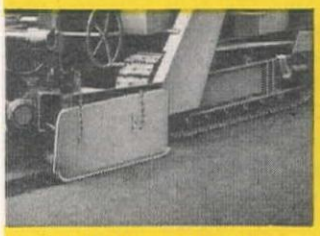
12' Equalizing Runners



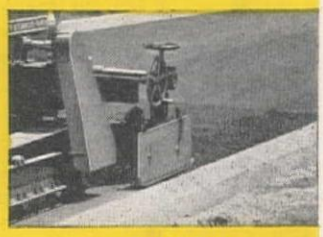
Instant Width Change up to 12½'



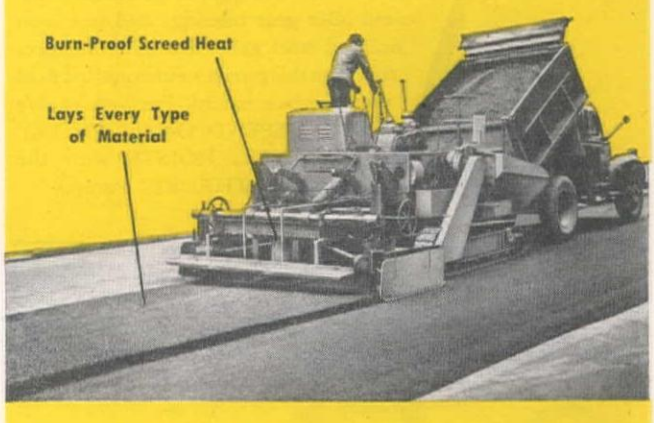
Oscillating Bevel-Tooth Screeds



No Weight to Seal New Mat



Lays Flush to Curbs



To the basically correct principles of paver design long-proved in earlier model Jaeger pavers, the Model BP-5 adds many important improvements in automatic precision and adaptability to the varied materials and conditions encountered in road, street and airport work. For complete information, see your Jaeger distributor or send for Catalog BP-9. Early deliveries will be limited to orders already on hand.

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The
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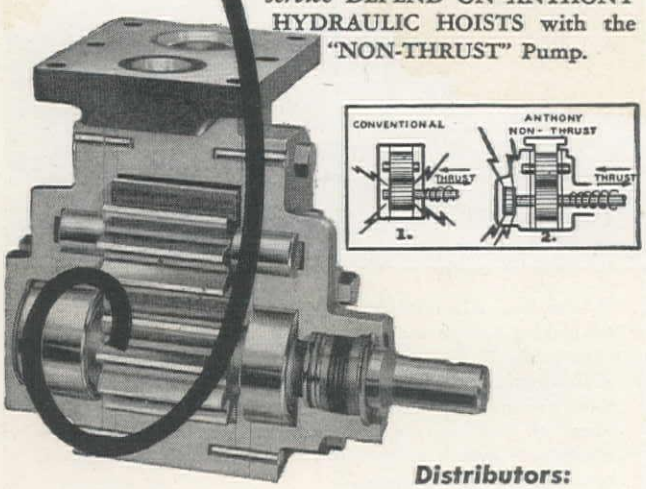
THE HEART of a dump truck—the pump—plays as important a part in the operation of a dump truck as your heart does to you. And when the pump fails, the hoist fails and the truck stops working. That is why Anthony engineers place such emphasis on the pump. The amazing patented "NON-THRUST" design of the Anthony roller-bearing pump is found in no other hoist at any price. Unlike conventional pumps, its design eliminates the No. 1 cause of pump failure — destructive mechanical thrust on the gears. (See drawings below.) Large roller bearings, extra thick reversible bronze wear plates, pressure lubricated idler gear bearings and precision finished steel gears are other features that give this pump an unequalled field performance record. For *dependable service* DEPEND ON ANTHONY HYDRAULIC HOISTS with the "NON-THRUST" Pump.



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STREATOR, ILLINOIS

Utah equipment was used to improve 45 mi. of a county road in Rio Blanca, Garfield and Mesa Counties in Colorado, east of the Utah-Colodaro border. Utah officials investigated, but the road crews said "no." They said a crew couldn't have made a trip that far into Colorado and return on schedule to their Utah maintenance shops.

PROVO RIVER PROJECT WORK PUSHED—Contractors are working on a six-day schedule attempting to meet the deadline for completion of the Provo reservoir canal and tunnel lining on the Provo River Project in Utah. Failure to complete the program, begun in January, will result in serious losses to water users who are depending on water to be delivered by the system to 42,000 acres. The tunnel, located near Olmstead in Provo Canyon, was drilled in 1914. The tunnel was enlarged from 9 ft. to 11 by 14 ft. Present work consists of guniting the concrete lining into place. The canal system is being re-lined.

CONSTRUCTION OF $16,000,000 REFINERY IS SPEEDED—Construction on the new $16,000,000 electrolytic refinery plant for the Kennecott Copper Corp. at Garfield, Utah, is back on schedule after being delayed by adverse weather conditions. The refinery's initial capacity will be 12,000 tons of copper a month, cast in the form of wire bars. The company is planning construction of an anode casting plant, to cost $3,000,000 and to furnish anodes for the refinery.

NORTHERN CALIFORNIA ROAD PLANNED—The California State Highway Commission has authorized a study of plans for reconstruction of the Big Oak Flat road through Tuolumne County. Improvement of the road would make possible year-around travel over that route into Yosemite National Park.

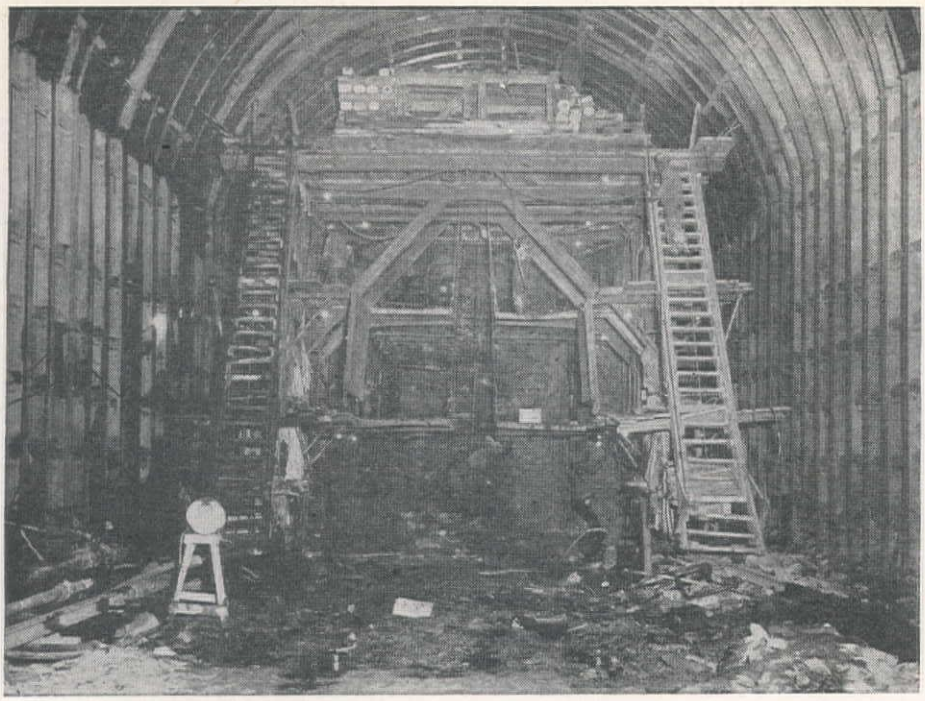
SPOKANE RIVER BRIDGE STUDIED—Surveys are under way for location of a new bridge across the Spokane River west of Monroe Street in Spokane, Wash. Approximately $800,000 has been budgeted by the Washington Legislature for the survey and purchase of necessary right-of-way. As part of the project, the route of State Highway No. 10 will be changed to become an east-west freeway, according to present plans.

COUNTY WINNING FIGHT FOR MONTICELLO DAM—The California Senate Water Resources Committee has turned down a measure sponsored by Napa County to set up a $34,000 fund to study whether or not Solano County could get fresh water from other sources than the Putah Creek. Solano County has been planning construction of a dam at Monticello in Napa County to impound a fresh water supply from the Putah. Napa County claims the dam would inundate hundreds of acres of its land.

NORTHWEST RAILROAD IMPROVING FACILITIES—The Spokane, Portland and Seattle Railway Co. has started work on two major projects. A $400,000 Diesel locomotive shop is now under construction at Vancouver in British Columbia, and installation of a $200,000 automatic signal system has been started on the company's main line between Wishram and Pasco in Washington. Wegman & Co. has the contract for the Diesel shop. Completion of the signal system will give the railroad a continuous automatic signal installation on its main line from Portland to Spokane.

UPPER COLORADO BASIN PROGRAM—Secretary of the Interior Julius Krug stated last month that he will submit for approval by Congress a program for development of the Upper Colorado River Basin.

URGE POWER NEGOTIATIONS WITH CANADA—Columbia Basin officials are urging approval of a plan before the International Joint Commission to construct a dam at Arrow Lakes on the Columbia River in Canada to store 7 million ac. ft. This would be released during dry periods to flow downstream and eventually through the Grand Coulee generators. Under the plan, the British Columbia government would build the earth and rock fill dam and be paid for the water by receiving one-half of the increased power revenue from Grand Coulee. First steps in the plan would be the power negotiations and engineering survey of the proposed damsite.



Du Pont Products Help Drive Largest Double-Track Railway Tunnel

The N&W Railroad's new Elkhorn Tunnel, between Coopers and Maybeury, West Virginia, will be 7052 feet long and have a cross-section 35' 4" wide by 34' 8" high in the rough. This is believed to be the largest double-track tunnel on record.

The rock is hard grey sandstone with some shale. Both ends are being driven by the full face method, using four level jumbos mounting 15 drills (top photo). Each round consists of slightly over 200 holes, including a double V-cut, and uses about 1750 pounds of dynamite.

This tunnel is being driven by Haley, Chisholm and Morris under the direction of Supt. R. E. Parker. They chose Du Pont 60% Special Gelatin for this job because it is strong, dense and plastic and has excellent water resistance and fumes. It has long been a favorite for tunnel driving. Du Pont "MS"-100 Delay Electric Blasting Caps are used for the "baby" cut and Du Pont "Series B" Delays, 1st thru 10th periods, in the other holes. A straight parallel hook-up with 440-volt A.C. fires the blast.

For complete information on Explosives and Blasting Supplies, for all types of Contracting work, see your Du Pont Explosives Representative.

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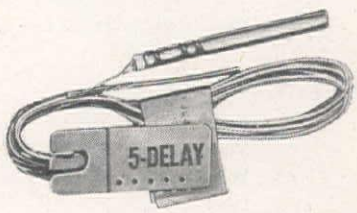
DU PONT SPECIAL GELATIN

. . . used in the Elkhorn Tunnel has long been a favorite with contractors. It's a strong, plastic, cohesive, water-resistant dynamite with excellent fumes.

DU PONT "GELEX"*

. . . economical, semi-gelatinous dynamite also frequently used in tunnels is supplied with or without perforated cartridges. Plastic, extremely water-resistant, good fumes.



DU PONT "SERIES B" DELAY ELECTRIC BLASTING CAPS

. . . a recent addition to the extensive line of Du Pont Caps. The "Series B" is designed to eliminate misfires due to arcing or "water hammer."

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BETTER THINGS FOR BETTER LIVING
...THROUGH CHEMISTRY

Contracts . . .

Summary of Major Construction Contracts Awarded Last Month

The contract for design and construction of a cement mill, estimated to cost $15,000,000, has been awarded to **McNeil Construction Co.**, 5860 Avalon Blvd., Los Angeles. The mill, with a capacity of 10,000 bbl. per day, will be located near Palm Springs in Riverside County, Calif., and will be built for Samuel A. Guiberson of Hollywood. Work is now getting under way and completion is scheduled for June, 1950.

J. A. Terteling & Sons, Inc., P. O. Box 1428, Boise, Idaho, will build the Bureau of Reclamation's North Dam and complete the Feeder Canal for the Columbia Basin Project irrigation system near Coulee Dam, Wash. The total contract is at $4,718,725. The earth and rock North Dam will block the Upper Grand Coulee and form the northerly barrier for the 27-mi. Equalizing Reservoir of the irrigation system. The dam will be 1,400 ft. long and contain 1,235,000 cu. yd. of fill. The Feeder Canal will lead from Grand Coulee Dam to the Equalizing Reservoir. Robert Ross, superintendent for Terteling, states the firm will employ about 300 men at the peak of construction. 600 days are allowed for completion.

The contract for construction of Canyon Ferry Dam and Powerhouse, 17 mi. east of Helena, Mont., has been awarded to **Canyon Constructors, Inc.**, who submitted the low bid of $11,896,425 on April 6. The firm is composed of **Brown & Root, Inc.**, Houston, Texas; **Wunderlich Contracting Co.**, Jefferson City, Mo.; **Griffith Co.**, Los Angeles, and **Maguire & Co.**, Los Angeles. Canyon Ferry Dam will be a concrete gravity type structure, with a height of 212 ft., 172 ft. of which will be above stream bed. Crest length will be approximately 1,000 ft. The Bureau of Reclamation's final plans for the power plant provide for an installed capacity of 50,000 kw. in three identical generating units. The multiple-purpose project will make possible the irrigation development of about 310,000 ac. of new land, will control floods, regulate stream flow and generate hydroelectric power.

Morrison-Knudsen Co., Inc., Hoge Bldg., Seattle, Wash., was awarded the $6,136,234 contract for construction of earthwork, concrete lining and structures on the West Canal of the Columbia Basin Project in the vicinity of Ephrata, Wash. 900 calendar days are allowed for completion.

A $1,220,693 contract has been awarded by the Corps of Engineers, Los Angeles District, to **Matich Bros. & E. L. Yeager**, Box 87, Riverside, Calif., for improvements to the Los Angeles River Channel from Tujunga Wash to Whitsett Ave. in Los Angeles. The job includes drainage structures, clearing of the site, bridge construction, steel sheet piling, diversion and control of water, etc. The job will be concluded in 300 days.

The general contract for construction of the Camarillo State Hospital at Camarillo in Ventura County, Calif., has been awarded by the State of California to **William & Burrows, Inc.**, and **Carl N. Swenson Co.**, 10 California Drive, Burlingame, Calif., on their bid of $2,570,715. The three buildings under the contract will be of reinforced concrete.

Award of the construction contract for Agate Pass Bridge in Washington has been awarded to the **Manson Construction & Engineering Co.** of Seattle, on their bid of $1,398,439. The steel-cantilever span will connect Bainbridge Island with the Kitsap County peninsula on Puget Sound. The bid was made late last year but was held up awaiting financing arrangements by the state.

American Pipe & Construction Co., 4635 Firestone Blvd., Los Angeles, have been awarded a $2,888,196 contract by the Los Angeles Department of Water and Power to construct an inlet line to connect the Baldwin Hills Reservoir (under construction) with its source of supply at Franklin Reservoir. **United Concrete Pipe Corp.**, P. O. Box 425, Baldwin Park, was awarded the $2,088,356 contract for construction of the outlet line from the Baldwin Hills Reservoir, which will lead from the storage basin to distribution mains.

Moore & Roberts, 693 Mission St., San Francisco, with a bid of $1,594,777, were awarded the general contract for construction of four buildings at the Mendocino State Hospital, Talmadge, Calif.

A $1,579,000 contract has been awarded to **Baruch Corp.**, 5655 Wilshire Blvd., Los Angeles, for construction of a wholesale hardware plant on a 27-ac. site opposite the main depot of the Union Pacific Railway in East Los Angeles. The contract for structural steel was awarded to **Consolidated Western Steel Corp.** of Los Angeles on their bid of $230,295. The plant will include an office and sales building, a merchandise building, a steel warehouse and a heavy hardware building.

Associated Dredging Co., Industrial Road, Pittsburg, Calif., have been awarded a contract for construction of a 4,000-ft. levee on the Marin Canalways and Development Company's project for the reclaiming of 1,000 ac. of tidelands on the outskirts of San Rafael, Calif. The project, to eventually cost approximately $15,000,000, will include provision of industrial sites, a 500-ac. airport, a seaplane base, transportation terminals and a deep-water canal for ocean-going vessels.

Brennan & Cahoon, contractors of Pocatello, Idaho, have been awarded a $1,219,160 contract for construction of the Twin Falls Hospital at Twin Falls, Idaho.

A number of large contracts were awarded last month for work in the Territory of Alaska. The Alaska District, Corps of Army Engineers awarded the following projects: To **Reed & Martin**, Fairbanks, a $611,500 contract for construction of 141 bachelor officers' quarters at Ladd Airfield Base; to **Peter Kiewit Sons' Co.** and **Morrison-Knudsen Co., Inc.**, Seattle, Wash., a $2,063,000 contract for construction of 8-family quarters at Ladd Airfield Base; to **J. B. Warrack Co.**, Seattle, Wash., a $687,000 contract for construction of 8-family quarters at Fort Richardson; to **S. Patti Construction Co.**, Kansas City, Mo., and **McDonald Construction Co.**, St. Louis, Mo., a $277,813 contract for construction of officers' quarters at Fort Richardson, and to **Henrik Valle Co.**, Seattle, Wash., a $725,000 contract for construction of a warehouse building on the Army Dock at Whittier, Alaska.

Awards were also made by the Alaska District, Corps of Engineers to **Morrison-Knudsen Co., Inc.**, and **Peter Kiewit Sons' Co.** at $1,588,584, for construction of outside utilities at Fort Richardson; to **S. Birch & Sons**, at $738,985, for construction of twelve 44-man barracks at Eielson Air Force Base and to **Selid Construction Co.**, at $596,858, for construction of outside utilities at Eielson Air Base. **Reed & Martin**, with a low bid of $703,000, were awarded the contract for construction of an airfield lighting system and control house at Eielson Air Base.

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Fred Wagar was awarded a $662,400 contract for construction of outside utilities at Eielson Air Base, and **B & M Construction Co.** was awarded the $2,260,500 contract for outside utilities at Ladd Air Force Base.

Morrison-Knudsen Co., Inc., Peter Kiewit Sons' Co. and **Bechtel & Pomeroy** of Seattle, Wash., were awarded the $1,331,225 contract for construction of condenser water cooling facilities and installation of a boiler and turbo-generator at Fort Richardson.

Morrison-Knudsen Co., Inc., Boise, Idaho, were awarded the $2,845,728 contract by the Civil Aeronautics Administration for construction of an airport near Fairbanks, Alaska. The **Lewis Construction Corp.,** Lowman Building, Seattle, were awarded a $720,332 contract for construction of a laboratory building and six residences for the Geophysical Institute at College, Alaska.

Allison Honer Co., Box 84, Santa Ana, Calif., is beginning construction on a million-dollar department store for the Buffum Company in Santa Ana. The new store will employ light-weight steel framing and will have two floors and full basement.

The Seattle, Wash., Board of Public Works awarded two large contracts last month. **Northwest Construction Co.** of Seattle, with a bid of $808,546, was awarded the contract for paving along 47th Ave. and nearby streets. A contract for construction of water mains along East 85th St. was awarded to **Argentieri & Colarossi** of Seattle on their bid of $537,886.

Highway construction in California is going into high gear with award of a number of large contracts last month by the California Division of Highways. Included among the awards were the following: **United Concrete Pipe Corp.,** P. O. Box 425, Baldwin Park, Calif., $1,067,954 for the grading and PCC paving of 7.2 mi. of the highway between Mariposa Road south of Stockton and Calaveras River north of Stockton, and between Wilson and New Route 4 in Stockton; **Peter Kiewit Sons' Co.,** 345 Kieways Ave., Arcadia, $874,114 for highway improvements in Los Angeles County on 6.7 mi. of the Ridge Route near the junction with State Highway Route 59; **Piombo Construction Co.,** 1571 Turk St., San Francisco, $668,708 for improving 3.8 mi. of highway in Humboldt County; **Fredericksen and Kasler,** 212 Thirteenth St., Sacramento, $779,093 for grading and plant-mix surfacing on 4 mi. of highway in San Bernadino County; **Fredrickson & Watson Construction Co.,** 872 81st Ave., Oakland, $742,432 for the grading and plantmix surfacing of 5.8 mi. of highway in Shasta County; **A. Soda & Son,** 5231 Grove St., Oakland, $684,930 for construction of a railroad overhead structure on the Eastshore Freeway in Alameda County; **J. E. Haddock, Ltd.,** 3538 East Foothill Blvd., Pasadena, $424,341 for construction of two reinforced concrete overcrossings on the Santa Ana Parkway in Los Angeles, and **Granite Construction Co.,** P. O. Box 900, Watsonville, $434,455 for the grading and plant-mix surfacing of 2.1 mi. of highway in San Luis Obispo County.

Bosko Construction Co., 3844 Whiteside Ave., Los Angeles, was awarded a $427,913 contract by the Los Angeles City Board of Public Works for construction of sanitary sewers and appurtenant work for the Etiwanda Avenue Interceptor Sewer Trunk in Los Angeles.

Dodge Construction Co., Fallon, Nevada, have been awarded a $450,644 contract by the Nevada State Highway Dept. for the grading, draining and plant mix surfacing of 10.9 mi. of State Highway between Henderson and Boulder City. The job includes construction of a reinforced concrete bridge.

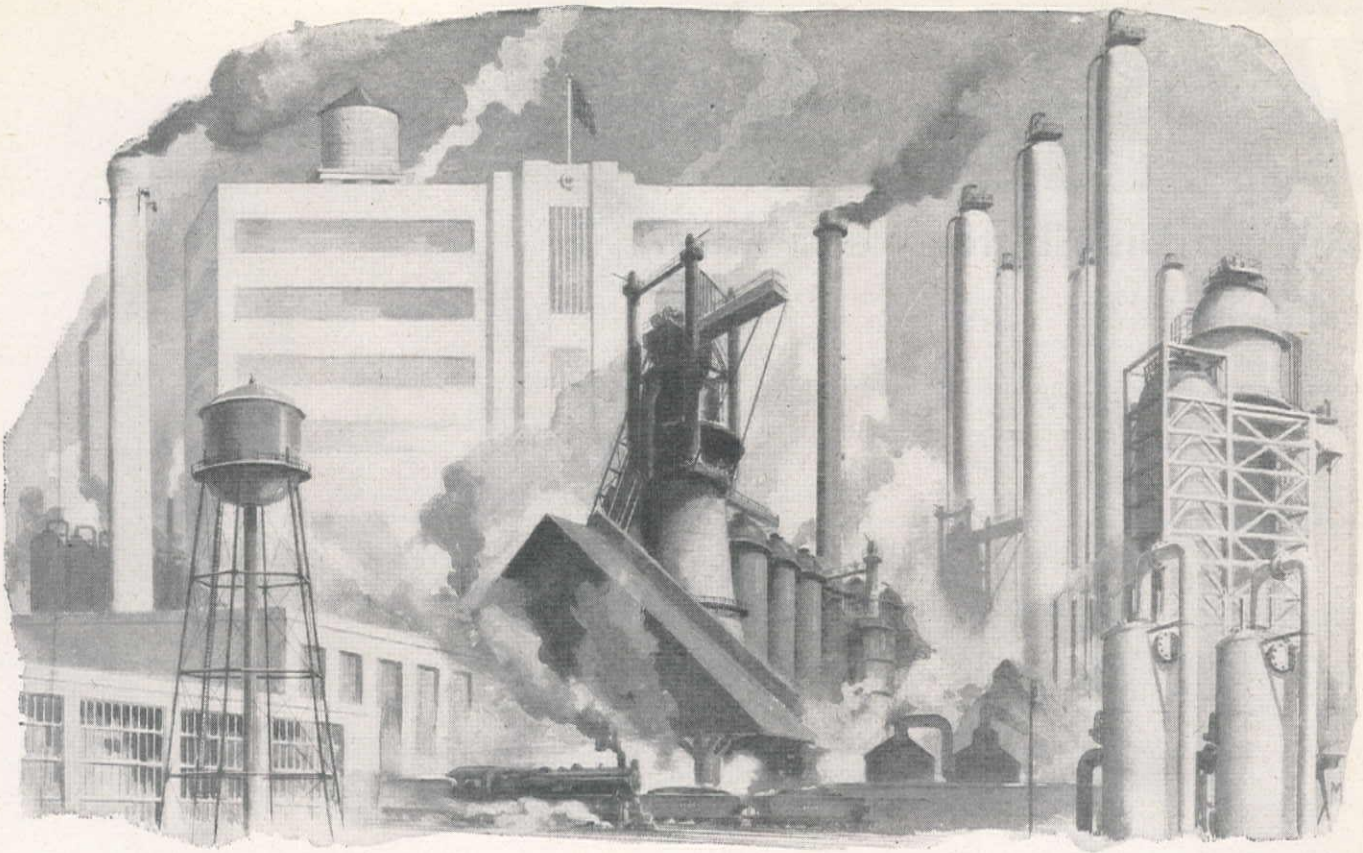
Daley Construction Co. and **Acme Materials Co.,** 2400 S. 16th St., Phoenix, Ariz., were awarded the $465,140 contract by the Salt River Valley Water Users' Association for construction of works preparatory to the installation of spillway gates at Horseshoe Dam on the Verde River in Maricopa County.

Carl N. Swenson Co., P. O. Box 558, San Jose, Calif., was awarded the $754,000 contract by the Board of Supervisors of Mendocino County for construction of a reinforced concrete county jail and courthouse.

Two large contracts were awarded by the Arizona State Highway Department last month. **Arizona Sand & Rock Co.,** P. O. Box 596, Phoenix, were awarded the $362,585 contract for the grading, draining and bituminous surfacing of 4.8 mi. of the Phoenix-Rock Springs Highway. **Vinson Construction Co.,** 2020 W. Grant St., Phoenix, were awarded $349,479 for construction of a 3-span steel truss bridge on the Safford-Clifton Highway.

Roy T. Earley Co., Tacoma, Wash., with a bid of $304,727, was awarded the contract for construction of a 190-ft. steel swing bridge across the Wishkak River at Aberdeen, Wash.

C. S. Lambie Co. of Amarillo, Texas, was awarded two projects totalling $540,000 for a woman's domitory building and a student center at Eastern New Mexico College in Portales.



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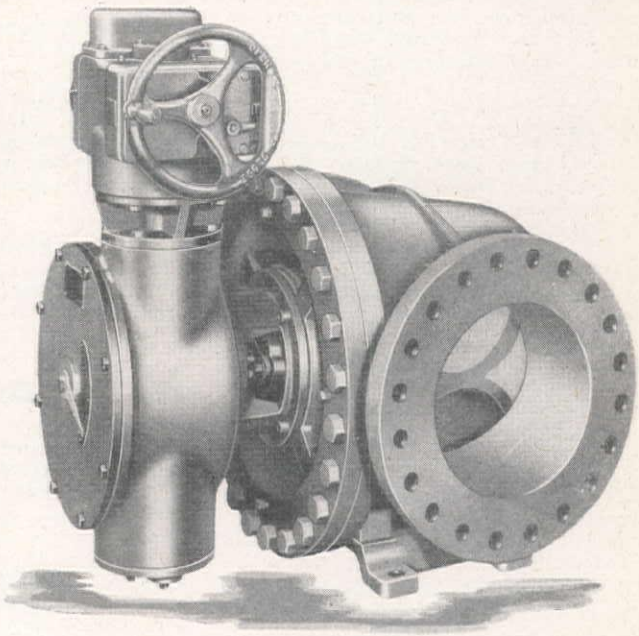

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TRADE WINDS

News of Men Who Sell to the Construction West

Western Distributor News Round-up

RICH STEEL CO., through its principals **Gus** and **Sig Rich,** recently announced its move to new and larger plant and warehouse facilities at 2435 East 37th St., Vernon, Calif. An innovation in company services will be the availability of space for public storage of steel by manufacturers who are in need of it.

☆ ☆ ☆

George Philpott, president of GEO. M. PHILPOTT CO., announces the appointment of **Jack Bell,** formerly San Francisco office sales manager, as manager of the Northwest territory with headquarters in Portland, Ore. and the appointment of **Tom Loveless,** in charge of handling all equipment orders for the Northwest territory with headquarters in Portland. Philpott recently made a trip to the Gardner-Denver plants at Quincy, Ill., and Denver, Colo.

☆ ☆ ☆

CRAMER MACHINERY CO. of Portland, Ore., were recently appointed distributors for Buckeye division of Gar Wood Industries for northern Oregon. They were also appointed distributors for Willard Truck Mixers for the state of Oregon.

☆ ☆ ☆

CONTRACTORS EQUIPMENT CO., Portland, Ore., were recently appointed distributors for Oshkosh Motor Truck Co. and The Foote Co., Inc.

☆ ☆ ☆

Hal Frost, formerly of Brown-Bevis Co., Los Angeles, has been appointed to the sales force of MERRILL-BROSE CO., San Francisco. Merrill-Brose Co. are distributors for Bucyrus-Erie and other construction equipment lines. Frost will cover the Sacramento Valley territory.

☆ ☆ ☆

NEZ PERCE TRACTOR & EQUIPMENT CO. of Lewiston, Idaho, recently celebrated its 20th year as a distributor for equipment manufactured by the Caterpillar Tractor Co. **J. J. Church** has been manager of the company since 1942.

☆ ☆ ☆

WOOD TRACTOR CO. of Portland, Ore., recently announced election of new officers as follows: **Roy E. Wood,** president and general manager; **C. E. O'Hollaren,** vice-president; **E. L. Aikins,** secretary, and **A. S. Wherity,** assistant general manager.

☆ ☆ ☆

INTERMOUNTAIN EQUIPMENT CO., Spokane, Wash., were recently appointed distributors for Construction Machinery Co. of Waterloo, Iowa. They will handle the complete line for the company in eastern Washington and western Idaho.

☆ ☆ ☆

Verne Cooperrider has been named Seattle manager for W. BURKE & CO., Seattle distributors of concrete construction specialties. The new manager comes to Seattle from the San Francisco office where he served for 3½ years as sales engineer for the company.

☆ ☆ ☆

BURAN EQUIPMENT CO., of Oakland, Calif., announce their appointment as distributors for Union Wire Rope Co.

☆ ☆ ☆

GENERAL MACHINERY CO., Spokane, Wash., have been appointed distributors for the Butler Buildings manufactured at Richmond, Calif.

☆ ☆ ☆

WESTERN EQUIPMENT CO., Spokane, Wash., were recently appointed distributors for the equipment manufactured by Blaw-Knox Co. of Pittsburgh, Pa.

☆ ☆ ☆

FRED M. VILES & CO., INC., Spokane, Wash., were recently appointed distributors for the equipment manufactured by Le Roi Co. of Milwaukee, Wis.

☆ ☆ ☆

Wesley E. Stout was recently appointed manager of CUMMINS DIESEL SALES of Spokane, Wash. He was formerly manager of Spokane Pacific Freight lines and more recently manager of Eland-Stewart Motor Freight, Spokane. His territory comprises East Washington, North Idaho and West Montana.

☆ ☆ ☆

STANDARD MACHINERY CO., San Francisco, recently announced their appointment as northern California distributors for The Osgood Company and The General Excavator Co. **Frank Johnson,** San Mateo, Calif., is Division Sales Manager for the Osgood Co. and General Excavator Co.

☆ ☆ ☆

YARDLEY EQUIPMENT CO., Yardley, Wash., distributor of contractors' equipment, have elected officers for 1949 as follows: **Fred M. Viles,** president; **H. C. Lyng,** vice-president, and **Gertrude Combs,** secretary.

☆ ☆ ☆

SCHULER & JAMES, INC., of Los Angeles, Calif., dealers in contractors' equipment, have opened a branch at 1629 Grand Ave., in Phoenix, Ariz. The branch is in charge of **Hugh Hall** and **Bob Rasmussen.**

☆ ☆ ☆

WESTERN MACHINERY CO., Spokane, Wash., have added **Kenneth Hines** to their sales staff. He will cover Eastern Washington sales, according to **H. A. Myers,** manager.

☆ ☆ ☆

George Lett, formerly office manager of the Seattle office of FEENAUGHTY MACHINERY CO., has been transferred to the Spokane, Wash., office, where he will have the same position. **Dan Winter** has been appointed to succeed Lett.

☆ ☆ ☆

Lee J. Moreman was recently appointed to the sales staff of STAR MACHINERY CO., Spokane, Wash., according to **Robert H. Lampman,** District Manager. Moreman's territory will comprise Eastern Washington.

☆ ☆ ☆

Roy Paul Nelson of Portland, Ore., has been added to the staff of the AMERICAN FOREST PRODUCTS INDUSTRIES, Washington, D. C., as an assistant to the editorial director.

☆ ☆ ☆

L. M. Stout, San Francisco Manager of Harnischfeger Corp., announces the recent appointment of the SACRAMENTO VALLEY TRACTOR CO., Sacramento, Calif., as a new distributor for their line of excavators.

Manufacturer Activity in California

To cover more effectively the Los Angeles area, SIGNODE STEEL STRAPPING CO. of 440 Seaton St., Los Angeles, announces the appointment of two additional salesmen under the supervision of Los Angeles District Manager **J. F. Beckman. K. F. Fitzpatrick** will assist Beckman out of the Signode Los Angeles District office on city sales. Already favorably and widely known to shippers in the area, Fitzpatrick advances from his former status as sales trainee. **H. E. Yarpe** has been advanced from sales trainee to regional sales representative, and will serve in the counties of Kern, San Bernardino, San Luis Obispo, Santa Barbara, Ventura and part of Los Angeles County. The company is nationally-known as a producer of steel strapping, strapping tools and seals for shipment protection.

FITZPATRICK YARPE

☆ ☆ ☆

NOBLE CO., Oakland, Calif., manufacturer of bulk materials handling equipment, has set up an industrial engineering department expressly for designing and supervising the erection of industrial installations. **Les Horton** is field representative for this new department.

☆ ☆ ☆

Appointment of **Ewart M. Parnum** as forest engineer has been announced by **E. T. F. Wohlenburg,** general manager of MASONITE CORPORATION'S hardboard plant now under construction at Ukiah, Calif. To join Masonite, Parnum resigned as resident engineer for the Powell River Co. at Vancouver, B. C.

☆ ☆ ☆

KAISER CO., INC., has announced that it is broadening its marketing areas and stepping up the competitive position of

its Fontana, Calif., steel plant by granting certain freight allowances. Effective April 20, freight allowances were made on structural shapes, carbon bars, alloy bars, hot rolled strip, hot rolled sheet and cold rolled strip to destinations considered to be within Fontana's marketing areas.

☆ ☆ ☆

Russell W. Mumford has been named vice-president in charge of technical operations for AMERICAN POTASH & CHEMICAL CORP., Los Angeles. He succeeds **Samuel Cottrell,** resigned.

☆ ☆ ☆

Donald S. Grubbs has been named manager of the California Division of OIL WELL SUPPLY CO., a United States Steel subsidiary. Formerly, he was secretary and treasurer of Adel Precision Products Co., Burbank, Calif. **William F. Parker,** long identified in California sales for the company, assumes the newly-established position of sales manager in the division. Both will headquarter at Los Angeles.

☆ ☆ ☆

F. M. Rich, vice-president in charge of operations for KAISER CO., INC., at their Fontana, Calif., steel mill, is being transferred to the Oakland, Calif., home office of the company. He will continue to be responsible for all manufacturing and mining operations of the company. **George B. McMeans,** general superintendent, will be in charge at Fontana.

☆ ☆ ☆

Andy Ruben, Sales Manager of MARLOW PUMP CO., was a recent visitor to the Pacific Coast.

☆ ☆ ☆

Manufacturer Activity in The Pacific Northwest

D. A. Herzog, formerly sales engineer with the Puget Sound Bridge and Dredging Co., Seattle, is now in business for himself in the erection of bridges and other steel structures, and also as a manufacturer's representative for numerous firms producing contractors' supplies, structural steel and equipment in the Northwest and Alaska. Pending opening of headquarters in Anchorage, he is operating from his office at 3201 Judkins St., Seattle.

☆ ☆ ☆

To achieve a more central location for serving Cummins Diesel users in the Pacific Northwest, the Northwest Regional Office of CUMMINS ENGINE CO., INC., of Columbus, Ind., has moved from Portland, Ore., to Seattle. The Seattle address is 809-10 Securities Building. With **R. H. Wills** as Regional Manager, **Robert Miller** as Assistant Regional Manager, and **C. J. Wilhite** as Regional Service Representative, the new location of Cummins' Northwest Regional Office provides more convenient coverage of Washington, Oregon, British Columbia, Alberta, Alaska and the western portions of Montana and Idaho.

☆ ☆ ☆

Loren D. Thacker has been appointed production manager for PACIFIC WIRE WORKS CO., Seattle. A man of broad experience, Thacker will be responsible for quality control, scheduling, and research.

☆ ☆ ☆

J. A. Hill, manager of the Electric Tool Division of INDEPENDENT PNEUMATIC TOOL CO., was a recent visitor

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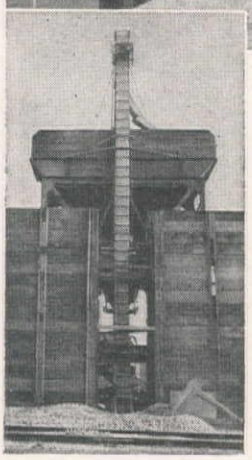
Conveying Equipment



This Ready-Mix Plant gets peak capacity with Baughman *HI-SPEED* Bulk Materials Handling Equipment. Three Baughman units — the *HI-SPEED* Belt and Bucket Elevator for the elevation of sand and gravel to hoppers . . . the Auger Type Conveyor carrying cement from the building to the truck under the hopper . . . the Heavy-Duty Undertrack Unloader charging the Belt and Bucket Elevator . . . All work as a team to make a very smooth, quiet and economical operation with *HI-SPEED* performance. Baughman standardized production methods cut your equipment costs. Quality materials and expert construction minimize your maintenance expenses.

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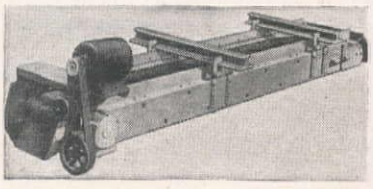
Some Distributor and Dealer territories still open . . . Write for further information.



MODEL 190 Heavy-Duty Troughed Belt Unloader

MODEL "Q" *HI-SPEED* Screw Conveyor

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TRADE WINDS

to the West Coast. While in Seattle, he looked over the new service department recently added to the branch there. **R. N. Weigel,** District Manager of the Seattle Branch, accompanied Hill on part of his trip.

☆ ☆ ☆

C. H. Dirks, formerly attached to the Seattle office of GARDNER-DENVER CO., has been appointed resident salesman in Portland, Ore. His territory will comprise Oregon and South Washington, according to **Bill D. Elliot,** District Manager at Seattle.

☆ ☆ ☆

Ward Mayer, President of TIMBER STRUCTURES, INC., Portland, Ore., announces the appointment of **Sherman L. Merriam, Jr.,** as Spokane District Manager. Merriam began his work in the Seattle division of the firm in 1946, where he became an estimator, later specializing in production control and sales.

☆ ☆ ☆

Don Heinze, formerly office manager for the Seattle Branch of GARDNER-DENVER CO., has been appointed salesman for the Seattle territory, according to **Bill D. Elliot,** District Manager. **D. E. Mitchell** has been appointed to the sales staff of the company in the Seattle area.

☆ ☆ ☆

New district manager of industrial sales in the Western division of the HYSTER CO. at Portland, Ore., is **William Kilkenny,**

KILKENNY

CAIRNS

formerly salesman for the company in the Portland area. Territory now under his jurisdiction includes the 11 Western states, parts of Canada and all of Alaska and Hawaii. **Jack A. Cairns,** formerly assistant to the Western Division sales manager, has been transferred to a sales engineer position in the Los Angeles area. He will sell Hyster lift trucks and attachments, straddle trucks and mobile cranes in and around Los Angeles.

☆ ☆ ☆

Paul R. Ehrgott, General Sales Manager for LIMA-HAMILTON CORP., was a recent visitor to the West Coast. He spent 4 weeks in the Pacific Northwest and 2 weeks in northern California.

☆ ☆ ☆

Firms Expanding in the Intermountain Region

Paul V. Galvin, president of MOTOROLA, INC., Chicago, has announced the opening of his company's new research laboratory in Phoenix, Ariz. The new laboratory will be devoted exclusively to electronic research in military fields. Motorola is the major source of two-way mobile radio communications equipment. The laboratory will be under the direction of **Daniel E. Noble,** Director of Research and Vice-President in Charge of Communications of the Communications and Electronics Division of Motorola.

☆ ☆ ☆

PACIFIC STATES CAST IRON PIPE CO. of Ironton, Utah, has dedicated its new $3,500,000 centrifugal cast iron pipe plant at Provo, Utah. The new plant has a capacity of 100,000 tons per year, equivalent to four times the capacity of the previous plant at Ironton, which has operated for 23 years.

☆ ☆ ☆

John A. Elliott has been appointed by THE PARAFFINE COMPANIES, INC., as the Paint Sales Supervisor for Pabco's Southern District. Elliott and his sales force, with headquarters in Los Angeles, will service all independent Pabco paint dealers in Southern California, Arizona, New Mexico, Texas and Colorado.

☆ ☆ ☆

Roy Grant is now District Manager of ARMCO DRAINAGE AND METAL PRODUCTS CO. with headquarters in Denver, Colo. **Del Stoker** has been named Manager of the Utah-Idaho Branch.

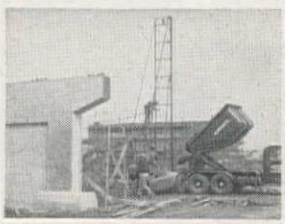
☆ ☆ ☆

U. S.-MENGEL PLYWOODS, INC., which operates 11 warehouses and distribution units, has moved its headquarters from 12th and Dumesnil Streets to 1215 South 7th St., in Louisville, Ky. **L. B. Olmsted** is the company's general manager.

A NEW UTILITY BODY FOR THE NATION'S BIG HIGHWAY PROGRAM

The Low-Cost Dumpcrete

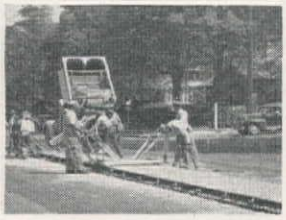
PAVING



BRIDGES

CURB AND GUTTER

WIDENING



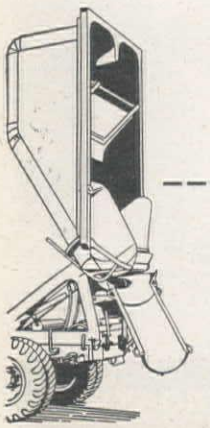
MEDIAN STRIPS

SAND, GRAVEL, EARTH

If you handle a variety of paving jobs—Here's a proved way to get more yardage at less cost. Set up a central mixer (a paver or portable mixer) for *close control* of your mix. Then haul in the fast, low-cost Dumpcrete and place *uniform* loads.

If you handle big paving jobs—The low-cost Dumpcrete can pick up from your paver for off-the-slab pours . . . culverts, bridges, turnouts, sidewalks, curb-and-gutters.

About the Dumpcrete—It's a non-agitating concrete body designed especially to haul air-entrained concrete (a must for extra durability and workability). The Dumpcrete costs less to buy, to run and to maintain. It loads fast and places fast. Learn how it can cut your costs. Mail the coupon today. There's no obligation.



The lower cost Dumpcrete is lightweight, watertight, with 13-foot chute, controlled higher discharge and lower center of gravity. Hauls sand, gravel, and coal too. Available in 2, 3, and 4 yard sizes.

Send me facts about the cost-cutting Dumpcrete for paving work.

Name_____

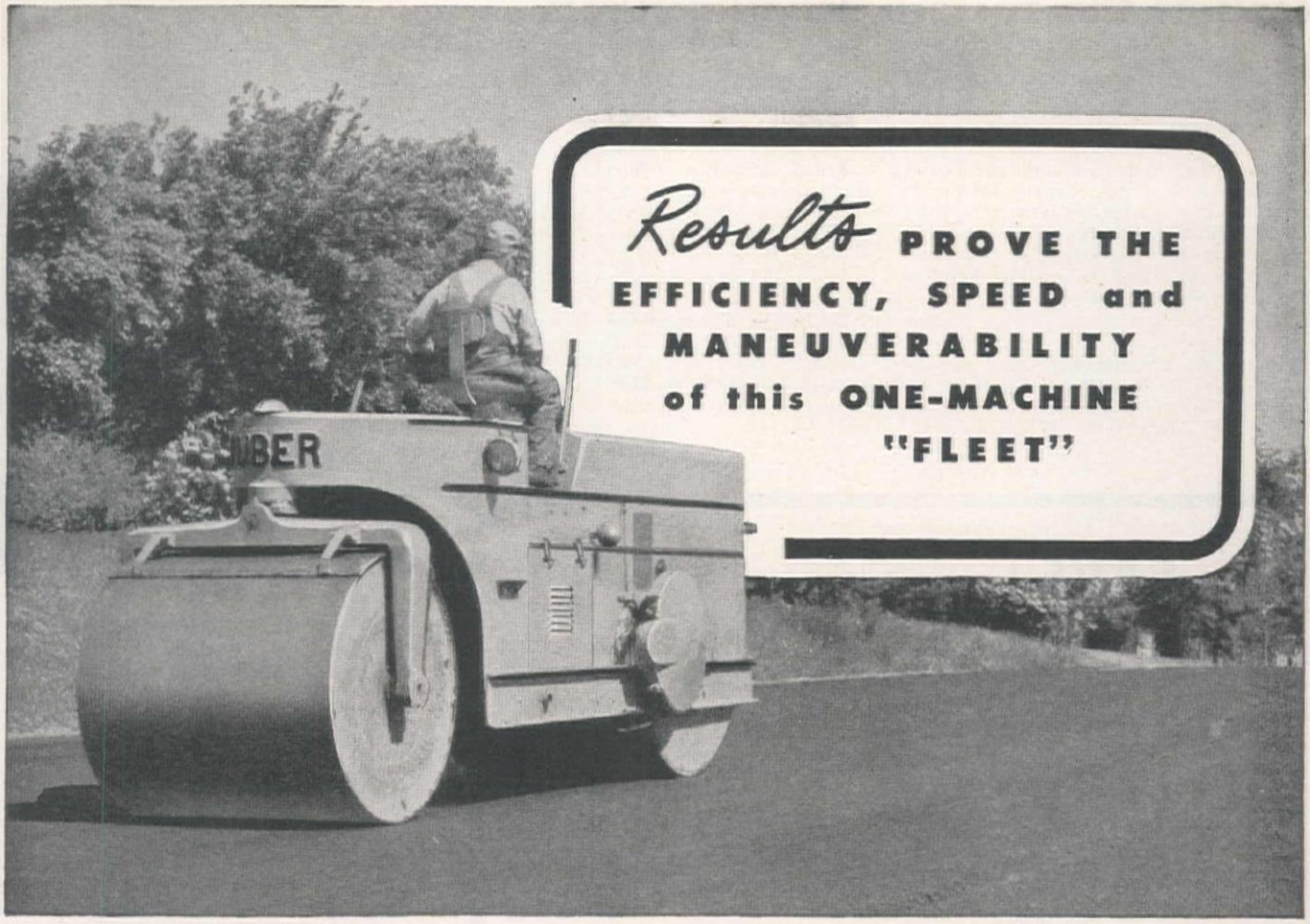
Firm_____

Address_____

DUMPCRETE

DIVISION, MAXON CONSTRUCTION CO., INC.

541 Talbott Bldg., Dayton 2, Ohio



Results PROVE THE EFFICIENCY, SPEED and MANEUVERABILITY of this ONE-MACHINE "FLEET"

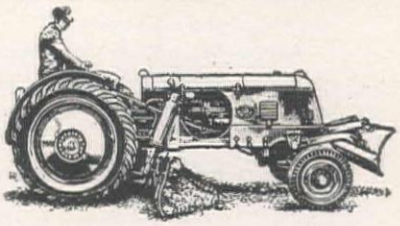
THE COMPLETE HUBER TANDEM LINE

Gives You A ROLLER FOR ANY COMPACTION JOB

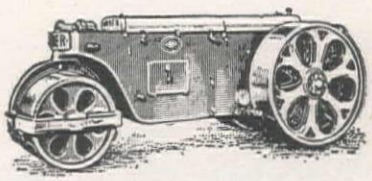
Make versatility the keynote in selecting your new road machinery. The ability of the Huber Tandem roller to do the work of a number of different size rollers with equal satisfaction is cutting investment and maintenance costs for many contractors.

You'll save money too, on actual operations—Huber rollers being known the world over for rugged construction that keeps them on the job . . . speed and maneuverability that gets the job done . . . power and stamina that makes any job easier. Mechanical features of the tandem line include: 3 speeds forward and reverse, hydraulic steering, dual controls, gasoline or Diesel engine power, and anti-friction bearings.

Before you buy road machinery of any type check Huber's complete line of 3-wheel rollers . . . maintainers . . . tandem rollers . . . and trench rollers. They are designed to save—built to last—and sure to satisfy your road machinery demands. Write today for bulletins and name of dealer nearest you.



THE HUBER MAINTAINER
with bulldozer, patch roller, berm leveler, lift loader, mower, broom or snow plow attachments.



HUBER 3-WHEEL ROLLERS
4 models — 5 to 12 tons

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

LEE & THATRO EQUIPMENT CO.....Los Angeles 21, California
JENKINS & McCLOUD.....Reno, Nevada
CONTRACTORS' EQUIPMENT & SUPPLY CO.....Albuquerque, New Mexico
NEIL B. McGINNIS CO.....Phoenix, Arizona
FEENAUGHTY MACHINERY CO.....Portland 14, Oregon
FEENAUGHTY MACHINERY CO.....Boise, Idaho
FEENAUGHTY MACHINERY CO.....Seattle 4, Washington
FEENAUGHTY MACHINERY CO.....Spokane 2, Washington
EDWARD F. HALE CO.....Hayward, California
EDWARD F. HALE CO.....San Francisco 7, California
FOULGER EQUIPMENT CO., INC.....Salt Lake City 8, Utah
THE COLORADO BUILDERS' SUPPLY CO.....Denver 9, Colorado
THE COLORADO BUILDERS' SUPPLY CO.....Scotts Bluff, Nebraska
THE COLORADO BUILDERS' SUPPLY CO.....Casper, Wyoming

News of the Eastern Manufacturers

J. B. Stam, Northwestern Sales Manager for BUCYRUS-ERIE CO., has been promoted to the position of Assistant to **P. H. Birckhead,** Vice-President in Charge of Sales, and will shortly make his headquarters at the company's general office at South Milwaukee, Wis. Stam's successor as Northwestern Sales Manager at Seattle is **C. W. Buehler.** For the past few years, Buehler has been attached to Bucyrus-Erie's New York office and has handled sales in the North Atlantic states.

☆ ☆ ☆

William A. Clayton has been named Eastern Sales Representative for the Construction Machinery Division of CHAIN BELT CO., Milwaukee, Wis., manufacturer of Rex Construction Machinery. He will have his headquarters at the New York District Office of the company.

☆ ☆ ☆

Frank Edwards, formerly in charge of small equipment sales in the Los Angeles territory for the HARNISCHFEGER CORP., has been transferred to their main office in Milwaukee.

☆ ☆ ☆

Dr. G. V. Slottman has been appointed director of research and engineering for the AIR REDUCTION PACIFIC CO., according to **John A. Hill,** president of the company. Slottman joined Air Reduction in 1934, served as manager of the technical sales division, and later was appointed tech nical assistant to the vice-president charge of sales, a position he held until h recent appointment.

☆ ☆ ☆

V. L. Snow has been appointed Domest Sales Manager of the EUCLID ROA MACHINERY CO., Cleveland, Ohi succeeding the late **W. W. Paape.** Sno was connected with the Columbia Axle C

BLOOMQUIST

SNOW

of Cleveland in engineering and sale capacities before joining Euclid in 193 Succeeding Snow as Assistant Sales Man ager is **J. W. Bloomquist,** who joine Euclid as District Representative for th Minnesota territory in 1945.

☆ ☆ ☆

The election of **Stanley M. Hunter** to fi the newly-created post of Executive Vice President is announced by **H. O. Wash burn,** president of AMERICAN HOIS & DERRICK CO., St. Paul, Minn. Th company states that expanding busines has made it necessary to create the ne managerial post. Hunter joined the sale department of the company in 1936, an has been a member of the Board of Direc tors since 1945.

☆ ☆ ☆

James M. Darbaker has been appointe general manager of sales for CARNEGIE ILLINOIS STEEL CORP., subsidiary c United States Steel Corp. Darbaker ha been manager of operations, Chicago Dis trict. **Stephen M. Jenks,** general superin tendent at the Gary Works, has been ap pointed to succeed Darbaker. His head quarters will be in Pittsburgh, Pa.

☆ ☆ ☆

Raymond E. Danto has joined the sale staff of Detroit Diesel Engine Division o GENERAL MOTORS CORP., Detroi Mich., as a market analyst, according to **V C. Genn,** General Sales Manager. Danto i a familiar figure in Detroit industria circles, having been prominently associate with important automotive research pro grams for several large manufacturers.

☆ ☆ ☆

Walden W. Paape, domestic sales man ager of EUCLID ROAD MACHINERY CO., Cleveland, Ohio, died recently at hi home in Willoughby, Ohio. He joined th company in 1945 as district manager an was appointed domestic sales manager i 1947. He had previously served in executiv sales capacities for La Plant-Choate Manu facturing Co. and Caterpillar Tractor Co.

☆ ☆ ☆

Because of continuing high demand an an easing up of the materials situation HERCULES STEEL PRODUCTS CORP., Galion, Ohio, has resumed pro duction of its popular Split Shaft Powe

SAVE DAYS AND DOLLARS

WITH *"Packaged Bridges"*

You can simplify and speed construction of small bridges, culverts and large sewers by using ARMCO MULTI-PLATE Pipe, Arch and PIPE-ARCH.

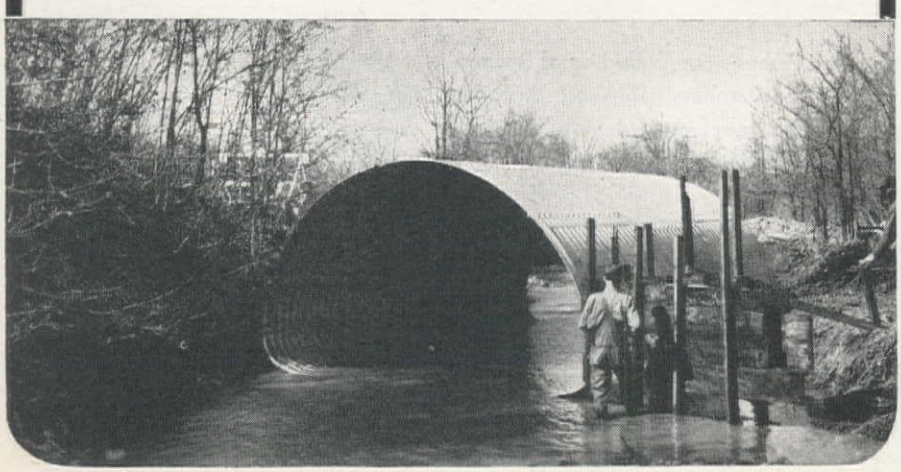
The easily-handled, pre-curved corrugated metal plates are nested together to save space in shipping, hauling and storing. On the job, unskilled men quickly install your "packaged" structure with the simplest equipment and small tools.

The MULTI-PLATE "form" is the completed structure. There is no curing, no waste, no delay. Backfilling is done directly against the metal and traffic can roll.

ARMCO MULTI-PLATE has ample strength and durability to provide lasting, dependable service. You can always be sure of a first-class job. Write us today for complete information.

ARMCO DRAINAGE & METAL PRODUCTS, INC.
CALCO—NORTH PACIFIC AND HARDESTY DIVISIONS
Berkeley—Los Angeles—Seattle—Spokane
Portland—Salt Lake City—Denver

ARMCO MULTI-PLATE



TRADE WINDS

ke-Offs, discontinued for some time due shortages. The company again offers ect, offset, side and dual drives for long d short wheelbase trucks, according to **J. Nymberg,** sales manager.

☆ ☆ ☆

Peter A. Becker has been named general perintendent at the Melrose Park Works INTERNATIONAL HARVESTER DUSTRIAL POWER DIVISION, icago, Ill. He replaces **Brooks McCor-ck,** who has been transferred to Kansas ty, Mo., as assistant district manager of e general line and industrial district ice.

☆ ☆ ☆

Henry H. Jiles, formerly road machinery es representative at the branch factory the HEIL CO., at Hillside, N. J., was cently appointed Sales Manager, Road achinery Division. He succeeded **Dan erce.**

☆ ☆ ☆

Lloyd L. Bower has been appointed nief Engineer of WAUKESHA OTOR CO., Waukesha, Wis., succeed-g **James B. Fisher** (retired January 31). ower has been active in the company's gineering department more than 20 ars.

☆ ☆ ☆

Paul E. Lundquist has been named sales anager of the newly-formed Construction quipment Division of PETTIBONE-ULLIKEN CORP., Chicago, Ill. He as formerly vice-president of Republic rill and Tool Co.

hasta Dam's Powerhouse oes Into Full Operation

HE LAST of Shasta Dam's five hydro-ectric generators has gone into action. n Apr. 28, following three weeks of sting, the fifth and last 75,000-kw. gen-ator was added to Shasta's other four, inging California's largest hydroelec-c plant up to its ultimate name-plate pacity of 375,000 kw.

Installation of the final generator this ring is a timely development, since a ir water year and installation of asta Dam's new drum-gates will pro-de enough storage of water to keep five spinning through the heavy daily ad peaks this summer, if it should be cessary to do so. The latest addition the line will add materially to the orthern California power capacity. he output of this one generator will sufficient to supply the entire electric eds of a city the size of Sacramento.

Full operation of Shasta power house ll bring into the Government's coffers rge revenues for the purpose of paying f the operation and construction costs the Central Valley Project. These venues will amount at current prices about $7,000,000 a year. So far the le of Shasta power since 1944 when ere were only 2 units has brought in ore than $17,500,000. The power is ing sold now to the Pacific Gas and ectric Co. on a day-to-day basis.

HERE'S Your Answer
—TO LOWER COSTS
—TO GREATER SAFETY
On All Jacking Jobs

Use SIMPLEX Ratchet Lowering JACKS

Simplex No. 22 Jack shown above lifts full 10 ton capacity on cap or toe with versatility typical of the complete Simplex line.

SAFER, FASTER ACTION
SAVES TIME AND MANPOWER

Maximum power and safety! Easier, faster operation! Greater versatility! Longer service! These are the qualities that put Simplex Ratchet Lowering Jacks at the top of the list today for *safe* savings on construction jacking.

Simplex engineering gives these Simplex Jacks the foolproof advantages of a smooth, positive working ratchet and pawl mechanism with adjustable cadmium plated springs, plus rugged construction at every point that adds years to jack life. All models lift full capacity *on cap or toe.* Capacities from 1½ to 35 tons. Send for Bulletin: Industrial 49.

NEW DESIGN! NEW EFFICIENCY!

SIMPLEX HYDRAULIC JACKS

Here's easy acting, *safe* hydraulic jacking power. Simplex Hydraulic Jacks operate in either horizontal or vertical position; are easily portable and produce maximum power with minimum weight. High pressure packing seals of Neoprene; single pump (or double pump on larger capacity models) action; spring controlled, non-sticking valves. Eight models in capacities from 3 to 100 tons. Safety tested to 50% over rated capacities. Send for Bulletin: Hydraulic 48.

Model 100 HJ
100 Tons Cap.

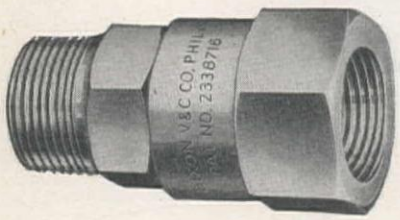
Model 12 HJ
12 Tons Cap.

1899 50th Year 1949

Simplex
LEVER - SCREW - HYDRAULIC
Jacks

TEMPLETON, KENLY & COMPANY
1004 South Central Ave., Chicago 44, Illinois

New DIXON SWIVEL CONNECTION



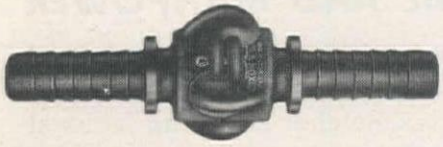
U. S. PAT. NO. 2338716

PREVENTS TWISTING AND KINKING IN HOSE CARRYING AIR, WATER, HYDRAULICS, ETC.

Turns freely with the hose under all conditions — the result of an entirely new principle of design and construction. Requires no lubrication or adjustment. For end or intermediate connections. Leakproof under all normal working pressures. Made in cadmium plated steel, in ½" and ¾" I.P.T. sizes.

The DIXON Swivel is adaptable to other standard hose coupling. In air service, it is especially suitable for use with the

"AIR KING"



QUICK-ACTING, UNIVERSAL TYPE

The "AIR KING" has a reputation for reliability and safety on nearly all indoor or outdoor air hose applications. Quickly connected, and leakproof under both pressure and vacuum. Plain design — no parts to get out of order. Corrugated hose shanks are extra long. All locking heads — male and female, shank and threaded — are same size, in all hose sizes up to 1". Malleable iron (cadmium plated) or bronze.

PATENTED LOCKING ARRANGEMENT

For positive safety in services involving excessive twist or vibration. Connecting ends are fastened together in such a way that they cannot come apart until locking device is removed.

Stocked by Manufacturers and Jobbers of Mechanical Rubber Goods

IF IT'S A DIXON PRODUCT

IT'S DEPENDABLE

DIXON
VALVE & COUPLING CO.
Main Office and Factory: **PHILADELPHIA, PA.**
BRANCHES: CHICAGO · BIRMINGHAM · LOS ANGELES · HOUSTON

UNIT BID SUMMARY

Power . . .

California—Shasta County—Bur. of Recl.—Hydro-Plant

C. M. Elliott & John C. Gist, contractors of Sacramento, Calif., were low bidders before the Bureau Reclamation, at $1,239,409, for completion of the Bureau's Keswick Dam and Powerplant situated abo 4 mi. northwest of Redding, Calif., on the Sacramento River. Completion of the dam calls for placement concrete in block 22 and miscellaneous structures, installation of 50-ft. fixed wheel gates and counterweigh construction of right abutment earth-fill and rock-fill portions of the dam, and installation of miscellaneo piping and electrical facilities. Completion of the power plant calls for installation of turbines, electrical equi ment and power-plant equipment, installation of transformers, roofing, waterproofing, and miscellaneo accessories. Unit bids were submitted as follows:

(1) C. M. Elliott & John C. Gist.....$1,239,409
(2) Stolte, Inc., & United Concrete Pipe Co. & Ralph A. Bell..... 1,247,585
(3) Underground Construction Co. and Eichleay Corp. 1,269,176
(4) Peter Kiewit Sons' Co.....$1,347,1
(5) Donovan-James 1,440,9
(6) Guy F. Atkinson Co..... 1,469,6

		(1)	(2)	(3)	(4)	(5)	(6
50	cu. yd. excav., all classes, for dam	22.00	8.00	7.50	10.00	18.80	30.
63,000	cu. yd. excav., common, for road	1.12	1.10	1.48	1.57	1.04	.
21,000	cu. yd. excav., rock, for road	1.12	1.10	1.48	1.57	2.51	.
870	cu. yd., excav., all classes for appurt. structs.	5.00	9.00	5.30	2.90	4.46	8.
60	cu. yd. excav., all classes, for tower ftgs.	14.00	16.00	23.00	26.00	22.17	23.
370	cu. yd. excav., all cl., for pipe trenches	16.00	17.00	9.80	6.80	21.60	18.
820	cu. yd. backfill	4.00	3.60	6.70	3.50	4.40	2.
260	cu. yd. campacting backfill	5.00	5.00	4.00	7.00	4.73	6.
630	earth fill in dam embankment	2.00	1.40	2.20	2.70	4.67	5.
900	cu. yd. campacted fill	2.70	.80	2.20	1.15	2.50	1.
160	cu. yd. dumped riprap	2.70	10.00	4.10	3.10	4.62	11.
350	cu. yd. placing sand and gravel backfill	7.00	8.70	5.75	4.40	3.30	3.
40	lin. ft. furn. and laying 18-in. dia. corru. metal pipe	4.50	6.00	6.30	4.90	7.22	5.
130	lin. ft. furn. and laying 24-in. diam. corru. metal pipe	7.00	8.00	7.15	7.20	8.60	7.
2,230	ton crusher run base	4.20	4.00	3.20	3.80	3.75	3.
7	ton liquid asphalt prime coat	50.00	50.00	50.00	83.00	56.70	70.
880	ton min. aggre. for bitum. surfacing	5.00	5.60	3.70	5.60	4.20	6.
60	ton liquid asphalt for bitu. surfacing	40.00	33.00	41.40	48.00	48.80	35.
80	ton stone chips for seal coat	7.00	9.00	10.80	10.00	12.52	10.
6	ton asphaltic emulsion for seal coat	60.00	56.00	55.00	83.00	62.70	75.
800	lin. ft. furn. and constructing guardrails	4.00	3.60	4.80	6.00	8.78	3.
4,500	lb. placing metal pipe and fittings for foundating grouting and drainage	.22	.25	.21	.25	4.20	.
2,400	lin. ft. drilling drainage holes in stage between depts of 0 and 25 ft.	6.00	5.50	5.50	6.90	5.56	6.
2,200	lin. ft. drilling drainage holes in stage between depts of 25 and 50 ft.	6.00	5.50	5.50	6.90	5.56	6.
100	lin. ft. drilling drainage holes in stage between depths of 50 and 75 ft.	6.00	5.50	5.50	6.90	6.04	6.
65	lin. ft. laying sewer pipe with cem. jts.	2.20	1.00	1.85	1.00	1.13	2.
730	lin. ft. laying sewer pipe with open jts.	1.00	.40	.35	.50	.43	1.
150	lin. ft. drilling BX holes in stage betw. depths of 0 and 50 ft.	6.00	5.00	3.85	4.90	7.50	4.
150	lin. ft. drilling BX holes in stage betw. depths of 50 and 100 ft.	6.00	5.00	3.85	4.90	7.50	4.
30	lin. ft. drilling holes in concrete	15.00	20.00	15.40	20.00	20.56	20.
6,800	lin. ft. drilling grout holes in stage betw. depths of 0 and 35 ft.	2.30	2.40	2.35	3.00	3.49	2.
4,700	lin. ft. drilling grout holes in stage betw. depths of 35 and 60 ft.	2.30	2.40	2.40	3.00	3.40	2.
7,500	lin. ft. drilling grout holes in stage betw. depths of 60 and 110 ft.	2.30	2.40	2.35	3.00	3.38	2.
300	lin. ft. drilling grout holes in stage betw. depths of 110 and 160 ft.	2.30	2.40	2.35	3.00	3.32	2.
6,500	cu. ft. pressure grouting foundations	1.75	1.30	1.30	1.60	1.87	1.
13,100	cu. ft. pressure grouting foundations with packers	2.00	1.50	1.50	1.85	2.18	2.
400	cu. ft. pressure grouting contraction jts.	3.00	1.50	1.30	1.60	2.30	1.
700	lin. ft. drilling holes for anchor bars and grouting bars in place	2.20	2.00	1.30	2.85	3.00	3.
440,000	lb. placing reinforcement bars	.06	.05	.09	.055	.075	.
12,540	bbl. furn. and handling type II portland cement	5.50	4.90	6.20	6.60	5.81	4.
2,900	cu. yd. concrete in dam	12.50	11.70	7.40	13.00	7.75	13.
1,840	cu. yd. conc. in spillway-gate hoist house	104.00	70.00	80.00	77.60	93.00	135.
370	cu. yd. conc. in spillway gate counter-weights	46.00	39.00	90.00	36.00	40.30	70.
30	cu. yd. concrete in blockouts	250.00	180.00	200.00	300.00	336.00	220.
25	cu. yd. conc. in conduit for fish trap	200.00	300.00	352.00	310.00	351.60	300.
20	cu. yd. concrete in parapets	80.00	46.00	60.00	60.00	68.55	75.
2,800	sq. ft. concrete in cover slabs	.30	.47	.30	.60	.68	1.
20	cu. yd. concrete in septic tank	100.00	77.00	116.00	106.00	132.60	140.
100	cu. yd. concrete in tower footings	50.00	43.00	51.00	45.00	50.00	60.
30	cu. yd. miscellaneous concrete	70.00	140.00	120.00	106.00	71.70	200.
500	lin. ft. preparing existing metal seals for concrete placement	1.00	.76	1.25	1.00	2.53	1.
90	lin. ft. installing metal sealing strips	1.50	2.30	4.00	1.30	3.00	2.
3,000	sq. ft. placing joint filler	.40	.70	.50	.40	.45	1.
250	cu. ft. chipping and replacing defective concrete in existing structs.	10.00	5.00	15.00	5.10	12.80	15.
500	ea. cleaning and packing shee holes	1.50	.80	2.40	1.20	6.10	1.
2,000	lin. ft. removing exist. joint filler from expansion joints in power plant	.50	.30	.70	.85	1.70	1.
42	connections reliquefying asphalt seals	125.00	290.00	60.00	73.00	126.00	400.
400	track ft. removing railroad track	2.75	1.50	1.00	2.00	2.05	2.
400	track ft. laying railroad track	6.50	4.00	1.25	7.00	3.20	3.
300	ton ballasting railroad track	6.50	3.00	5.50	2.30	6.93	6.
30	M.B.M. removing timber handrails and stairways	40.00	60.00	114.00	70.00	200.00	90.
58	ea. finishing lighting recesses	2.50	1.00	7.00	1.50	10.00	10.
32,000	sq. ft. placing coal-tar saturated-felt roofing	.38	.30	.18	.35	.28	.
2,800	sq. ft. placing membrane waterproofing	.38	.22	.23	.25	.49	.

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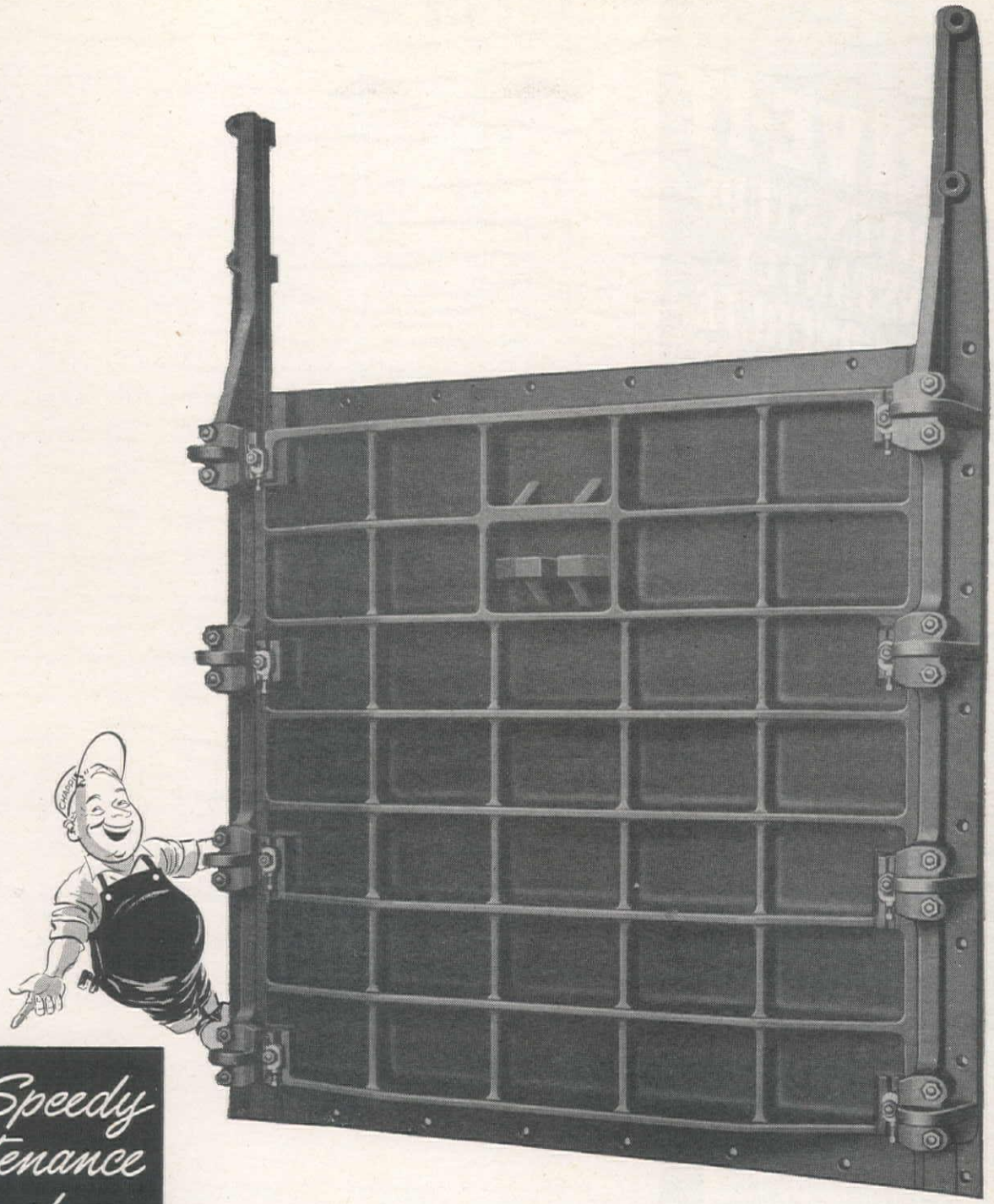

For Speedy Maintenance Specify:

CHAPMAN STANDARDIZED SLUICE GATES

Chapman Sluice Gates are *standardized* for faster installation... easier maintenance. All parts are completely interchangeable... match-marking in the field unnecessary. Repairs and replacements can be speedily made without time-consuming field alterations.

You can get Chapman Sluice Gates with any type of operating control—manual, hydraulic cylinder, or motor unit. Installation of the totally enclosed, weatherproof motor is simply a matter of connecting the power leads. Write today for complete information.

The Chapman Valve Mfg. Company
INDIAN ORCHARD, MASSACHUSETTS

DRIVE-IT

DRIVES STUDS INSTANTLY INTO CONCRETE MASONRY-STEEL

DRIVE-IT CUTS COSTS on any construction job where anchorages are required. DRIVE-IT, using inexpensive cartridges, eliminates all drilling, hammering or use of expansion bolts. This nine-pound tool delivers over 12 tons driving action with SAFETY! Over 40 different types studs, rivets, bushings available.

Write today for illustrated literature.

DRIVE-IT

Manufactured by

POWDER POWER TOOL CORP.

0709 S.W. WOODS ST., PORTLAND 1, ORE.

Distributed in Canada by Ammo Power Tool Co., Ltd.
Foot of McLean Drive, Vancouver, B. C.

1,500	sq. yd. bonded concrete floor finish	6.00	4.50	5.50	6.50	5.81	10.00
160	lin. ft. concrete wall bases	1.50	2.70	2.25	1.50	.68	3.00
3,700	sq. ft. 1½-in. terrazzo floors and stair landings	1.70	1.65	1.35	1.80	1.56	2.00
8,400	sq. ft. 3½-in. terrazzo floors and stair landings	1.70	1.65	1.40	1.70	1.57	2.00
380	lin. ft. 8-in. terrazzo wall bases	2.00	2.70	2.35	3.00	2.50	2.30
290	lin. ft. 6-in. terrazo wall bases	1.80	2.70	2.25	2.90	2.50	2.20
750	lin. ft. 4-in. terrazzo wall base around floors and stair landings	1.80	2.70	2.25	2.70	2.50	2.20
240	lin. ft. 4-in. terrazzo wall bases along stairs	3.50	2.70	2.25	3.00	2.50	4.30
110	lin. ft. 1-in. terrazzo wall base	1.20	2.70	2.25	2.70	1.25	1.50
30	lin. ft. terrazzo curbs	3.50	4.80	4.15	6.00	2.47	4.30
800	sq. ft. 1½-in. terrazzo on stairs	2.70	3.70	3.15	4.00	2.82	3.10
5,200	sq. ft. furn. and install stand. asph. tile	.50	.40	.42	.50	.44	.65
100	sq. ft. furn. and install grease-proof asph. tile	1.00	.55	.55	.60	.57	1.50
360	lin. ft. furn. and install asph. cove bases	1.00	.65	.45	.50	.88	1.50
670	sq. ft. furn. and install 7/16 in. thick struct. glass wainscots	6.00	7.00	5.35	7.00	7.50	6.60
170	sq. ft. furn. and install ⅞ in. thick struct. glass toilet-stall partitions	7.50	11.00	8.00	11.00	9.48	10.00
40	sq. ft. furn. and install 1¼ in. thick struct. glass urinal partitions and toilet stall stiles	20.00	25.00	16.50	25.00	46.37	20.00
40	sq. ft. furn. and install wood toilet-stall doors	8.00	3.70	6.20	7.00	4.62	10.00
Lump sum,	furn. and install marble shower stalls	$1,000	$1,000	897.00	$1,125	$2,004	$1,500
650	sq. ft. installing glazed metal room partitions	2.00	3.50	3.50	2.10	1.45	2.00
600	sq. ft. installing metal room partitions	2.00	2.80	2.80	1.00	1.25	2.00
30	lin. ft. furn. and install metal toilet-stall partitions and urinal partition	20.00	20.00	31.30	30.00	10.80	30.00
4,000	lb. steel framework for partitions	.50	.35	.20	.40	.48	.60
480	sq. yd. metal lath and three-coat plaster on partitions	6.60	9.60	3.30	10.00	8.15	9.00
80	sq. yd. two-coat plaster on concrete base	4.50	4.50	2.20	4.00	5.00	6.00
820	sq. yd. three-coat paster on conc. base	5.50	6.60	2.80	5.00	6.26	7.00
450	sq. yd. suspended metal lath and three-coat plaster ceilings and soffits	8.25	8.60	6.60	10.00	9.60	10.00
1,600	sq. ft. furn. and install suspended accoustical tile ceiling	2.50	2.30	1.80	2.00	2.34	2.00
530	sq. ft. installing steel accordion door	2.00	3.70	1.85	1.70	2.24	2.50
1,100	sq. ft. installing steel sliding door	2.20	2.00	1.20	2.10	1.69	2.00
1,020	sq. ft. installing steel swinging doors in concrete walls	3.60	1.70	3.20	3.20	2.37	3.00
190	sq. ft. installing steel swinging doors in plaster partitions	2.00	1.70	4.45	3.40	1.82	3.00
1,110	sq. ft. installing steel-sash windows	1.90	2.00	1.50	2.30	2.25	2.20
350	lb. installing steel stationary louvers in power plant	1.40	1.20	.85	1.00	1.15	1.00
15	sq. ft. installing metal ceiling louver	3.00	2.40	5.50	2.00	4.30	3.00
8,100	lb. installing metal louvers in hoist house	.40	.45	.30	.70	.82	.70
6	ea. furnishing and installing lavatories	150.00	100.00	109.00	100.00	88.60	100.00
7	ea. furn. and installing water closets	150.00	280.00	126.00	245.00	252.00	280.00
4	ea. furn. and installing urinals	150.00	210.00	132.50	212.00	192.75	200.00
2	ea. furn. and installing service sinks	150.00	120.00	212.00	100.00	107.00	120.00
1	ea. furn. and installing kitchen sink	200.00	200.00	180.00	205.00	184.00	200.00
1	ea. furn. and install Alberene stone sink	150.00	120.00	207.00	120.00	108.00	120.00
2	ea. furn. and install showers	50.00	55.00	48.00	55.00	49.10	60.00
3	ea. installing storage water heaters	50.00	35.00	49.00	35.00	31.73	40.00
2	ea. installing elect. drinking water coolers	25.00	30.00	41.00	30.00	26.65	35.00
Lump sum,	installing kitchen assembly	.....	.....	.....	.....	.....	.....
7	ea. furn. and install toilet-paper holders	15.00	25.00	3.00	14.00	8.00	15.00
3	ea. furn. and install cabinets for folded-paper towels	20.00	16.00	8.00	14.00	16.00	20.00
10,500	sq. ft. painting generators in power plant	.12	.47	.33	.22	.25	.25
155,000	lb. installing gate frames and guides for spillway regulating gates and gate counterweights	.11	.132	.04	.122	.06	.19
1,700,000	lb. installing spillway regulating gates and metalwork for gate counterweights	.07	.067	.07	.077	.108	.075
640,000	lb. installing gate hoists	.07	.057	.07	.037	.04	.08
10,000	lb. installing 7½ ton traveling crane	.10	.13	.10	.22	.27	.10
35,500	lb. installing runway beams and rails	.10	.07	.10	.07	.062	.07
5,500	lb. installing track rails	.05	.09	.07	.08	.20	.09
3,000	lb. install. metal railings in power plant	.35	.19	.22	.20	.33	.20
35,000	lb. installing metal railing on dam	.16	.14	.22	.08	.205	.12
660	lb. installing metal frames for pipe trench cover plates in power plant	.25	.20	.32	1.35	.18	.20
9,000	lb. erecting steel for temporary support structures for duct bank	.20	.27	.12	.14	.213	.30
42,100	lb. installing metal stairways and ladders	.16	.20	.18	.14	.133	.16
3,200	lb. installing frames and hatchways, manholes, floor plates, and gratings	.27	.22	.30	.10	.35	.35
9,700	lb. installing metal gratings and covers for floor openings	.10	.16	.15	.10	.129	.14
13,000	lb. installing 15,000-gal. water storage tank	.20	.30	.16	.25	.155	.24
12	ea. placing steel stubs in foundations	100.00	20.00	30.00	60.00	18.80	50.00
726,000	lb. erecting struct. steel for transformer circuits and switchyards	.045	.05	.056	.053	.057	.07
100	lb. furn. and install chromium-plated pipe, couplings and escutcheon plates	3.00	2.00	1.10	2.00	1.68	2.00
87,000	lb. installing metal pipe, fittings, and valves less than 6 in. in diam	.25	.40	.40	.445	.314	.35
42,200	lb. installing metal pipe, fittings, and valves, 6 in. and larger in diam	.20	.25	.36	.25	.20	.20
Lump sum,	installing and testing one 72-in. by 86-in. jet pump	$16,000	$17,000	$7,703	$17,076	$16,892	$25,000
Lump sum,	installing and testing three 34,600 h.p. vertical-shaft hydraulic turbines	$66,500	$84,500	$57,000	$107,416	$80,537	$84,200
10,300	sq. ft. furn. and install sheet metal air ducts for heating and ventilating systems	1.70	2.40	2.85	1.80	3.44	1.80
12,500	lb. installing centrifugal-type fans, propeller type fans, surface coolers, unit coolers, and air filters for heating and ventilating systems	.30	.86	.28	.20	.37	.20
8,400	lb. installing grilles, registers, air diffusers, and dampers for heating and ventilating systems	.12	.54	.10	.25	.57	.25
Lump sum,	installing elect. unit heaters for heating and ventilating systems	900.00	——	960.00	854.00	$1,030	$1,200
55,000	lb. removing existing metal pipe	.03	.07	.057	.07	.063	.10

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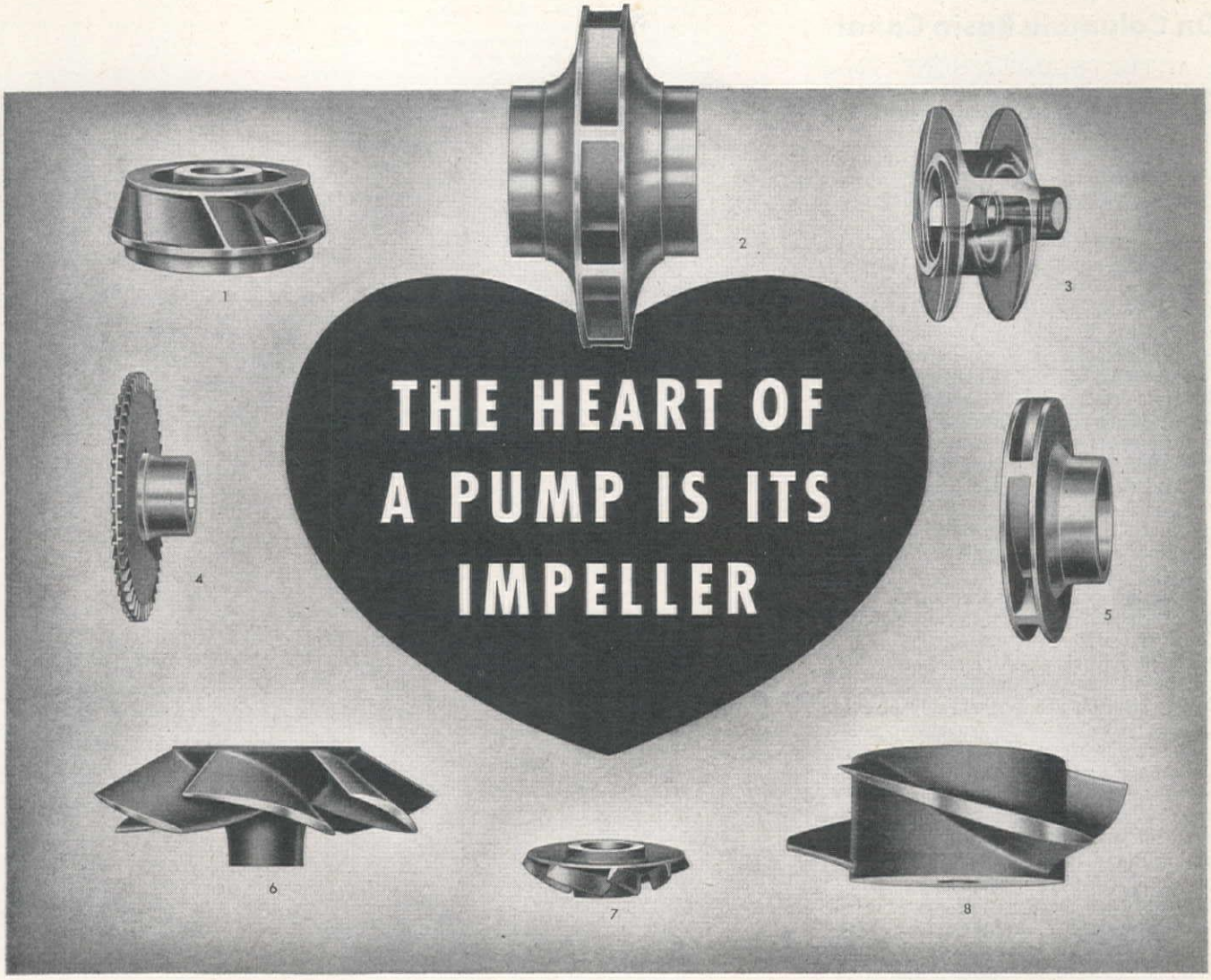


Peerless Pumps utilize many different impeller designs to meet various fluid conditions

What makes a pump "tick?" Its heart is an impeller!

Pictured above are eight Peerless impeller designs for varying fluid conditions. No. 1 forces water upward from deep wells. No. 2 is a double suction design for high capacity horizontal pumps. No. 3 pumps solids in suspension. No. 4 handles all liquids in small capacities, at high heads. No. 5 is of single suction design for process services. No. 6 combines both radial and axial flow. No. 7 is a semi-open impeller for small diameter deep wells. No. 8 is an impeller that "propels" large liquid volumes.

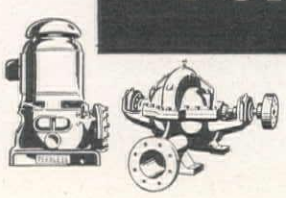
The point is—capacities, lifts, heads, temperatures, chemical analysis, clarity, shaft speeds are seldom common to different pump services and installations. Because fluid conditions vary, Peerless pump designers are versatile and Peerless pumps utilize this versatility in different impellers for varying fluid conditions, successfully pumping most liquids in all industries.

Peerless horizontal pumps are available for general purpose pumping, for handling sewage and other materials in suspension, for most all process services, for moving chemicals and oils, for acids and caustics and for such specialized applications as l-p gases.

Peerless vertical turbine pumps are available for lifting water from deep wells or close-coupled for wet or dry pit installation and for drainage, drydock, canal diversion and flood control services.

Plan with Peerless for all your needs for pumps. Individual descriptive Bulletins on each of the types of Peerless Pumps described above are available upon request.

Peerless
VERTICAL AND HORIZONTAL
Pumps



PEERLESS PUMP DIVISION
FOOD MACHINERY AND CHEMICAL CORPORATION

Los Angeles 31, California — Indianapolis, Indiana
District Offices: New York 5, 37 Wall Street; Chicago 40, 4554 N. Broadway; *Atlanta Office:* Rutland Building, Decatur, Georgia; Omaha, Nebraska, 4330 Leavenworth Street; Dallas 1, Texas; Fresno, California; Los Angeles 31, California

Terteling Firm's Bid Low On Columbia Basin Canal

J. A. TERTELING & SONS, Boise, Idaho, submitted low bid of $8,029,762 to the Bureau of Reclamation for building a 16¾-mi. extension to the East Low Canal of the Columbia Basin Project, constructing the 6½-mi. Rocky Coulee Wasteway and building two earth-fill dikes.

Seven firms submitted bids for the work. Other bidders included Winston Bros. Co. & Utah Construction Co., Azusa, Calif., $8,199,222; Peter Kiewit Sons' Co., Longview, Wash., $8,539,347.50; Western Contracting Corp., Westley, Calif., $8,547,248; Bressi & Bevanda and Guy F. Atkinson Co., North Hollywood, Calif., $8,966,357.50, and the Morrison-Knudsen Co., Seattle, $9,003,957.40. The James Construction Co. and the Donovan Construction Co., both of Seattle, bid $2,309,055 for building three siphons only, but its offer in this schedule was higher than Terteling's.

Included in the specifications are three giant siphons totaling 6,465 ft. They are Broken Rock No. 2, Black Rock, and Rocky Coulee siphons. Each will be 19 ft., 4 in. in diameter. Rocky Coulee siphon, the longest, will be 3,445 ft.

The two protective dikes for the canal system are similar to earthfill dams and might be considered dams elsewhere, but they are dwarfed by the massive earth-fill dams being built in the Columbia Basin Project. One dike, 1,450 ft. long and containing 45,000 cu. yd. of material, will halt runoff water from Sand Coulee for drainage into Black Rock Lake. The second, Rocky Coulee Dike, will control runoff water from Rocky Coulee for diversion into a channel leading to the Rocky Coulee Wasteway. This dike will contain 80,000 cu. yd. and will be 2,100 ft. long.

Acting District Manager R. B. Williams said the bids will be sent to the Bureau's Regional Offices in Boise and the Chief Engineer's office in Denver for review, and final decision as to an award will be made by Reclamation Commissioner Michael W. Straus.

If a contract is awarded, the successful bidder would have 900 days to complete the job. Quantities reflect the immensity of the job; more than 13 million lb. of steel, 252,000 barrels of cement, and 5 million cu. yd. of excavation will be required.

Idaho Power Company Asks Permit for Snake River Dam

IDAHO POWER CO. has filed an application with the Federal Power Commission for a 36-month preliminary permit to secure priority of application for an FPC license while getting data necessary to prepare the application for a hydroelectric project on the Snake River in southwestern Idaho. A preliminary permit does not authorize construction and gives no assurance that a license will be issued.

The proposed project, to be located

20	ea. installing fire-hose cabinets and serv. cabinets	27.00	50.00	33.50	48.00	43.90	50.00
Lump sum,	installing and testing carbon-dioxide fire-extinguishing systems	$3,400	$6,200	$1,958	$5,508	$5,328	$7,500
Lump sum,	installing remote indicating instruments	270.00	260.00	612.00	620.00	237.35	400.00
60	lin. ft. installing embedded elect. metal conduit ½ in. in diam.	.20	.35	.28	.30	.21	.25
2,610	lin. ft. installing embedded elect. metal conduit 1 in. in diam.	.33	.88	.76	1.00	.376	.40
650	lin. ft. installing embedded elect. metal conduit 1¼ in. in diam.	.55	.40	.33	.40	.59	.70
500	lin. ft. installing embedded elect. metal conduit 2 in. in diam.	.70	.62	.53	.70	.766	.85
110	lin. ft. installing embedded elect. metal conduit 3 in. in diam.	1.15	1.10	.88	1.10	1.30	1.50
20	lin. ft. installing exposed elect. metal conduit ½ in. in diam.	.60	1.30	.83	1.10	.54	.60
1,400	lin. ft. installing exposed elect. metal conduit ¾ in. in diam.	.60	1.35	.88	1.20	.66	.80
5,890	lin. ft. installing exposed elect. metal conduit 1 in. in diam.	.75	1.00	.70	1.00	.80	1.00
1,100	lin. ft. installing exposed elect. metal conduit 1¼ in. in diam.	1.00	.76	.48	.70	1.00	1.20
1,510	lin. ft. installing exposed elect. metal conduit 1½ in. in diam.	1.10	.90	.59	.80	1.20	1.40
130	lin. ft. installing exposed elect. metal conduit 2 in. in diam.	1.40	1.00	.66	.90	1.52	1.80
60	lin. ft. installing exposed elect. metal conduit 2½ in. in diam.	2.00	1.30	.83	1.20	1.99	2.30
20	lin. ft. installing exposed elect. metal conduit 3 in. in diam.	2.20	1.60	1.10	1.50	6.05	2.60
50	lin. ft. installing exposed elect. metal conduit 4 in. in diam.	3.25	2.40	1.65	2.30	3.55	4.00
825	lin. ft. installing embedded elect. non-metallic conduit 2 in. in diam.	.30	.50	.44	.50	.35	.30
120	lin. ft. installing embedded elect. non-metallic conduit 3 in. in diam.	.35	.70	.55	.60	.40	.35
3,900	lin. ft. installing exposed elect. non-metallic conduit 2 in. in diam.	.45	1.00	.61	1.00	.426	.70
650	lin. ft. installing exposed elect. non-metallic conduit 3 in. in diam.	.50	1.10	.66	1.10	.475	.70
470	lin. ft. installing No. 14 Awg. insulated electrical conductors	.04	.07	.06	.10	.04	.05
21,070	lin. ft. installing No. 12 Awg. insulated electrical conductors	.05	.12	.105	.11	.05	.06
23,130	lin. ft. installing No. 10 Awg. insulated electrical conductors	.06	.12	.105	.14	.063	.07
16,370	lin. ft. installing No. 8 Awg. insulated electrical conductors	.07	.16	.125	.16	.075	.08
715	lin. ft. installing No. 6 Awg. insulated electrical conductors	.08	.06	.05	.06	.087	.09
400	lin. ft. installing No. 4 Awg. insulated electrical conductors	.10	.07	.05	.06	.10	.10
2,355	lin. ft. installing No. 2 Awg. insulated electrical conductors	.12	.10	.08	.10	.125	.12
4,700	lin. ft. installing No. 3/0 Awg. insulated electrical conductors	.15	.20	.17	.20	.18	.20
45	lin. ft. installing No. 4/0 Awg. insulated electrical conductors	.20	.20	.17	.20	.22	.25
800	lin. ft. installing No. 1/0 Awg. bare, crane-trolley electrical conductors	.45	.35	.26	.35	.475	.50
550	lin. ft. installing 7/c, 19/25 Awg. trench-lay cable	.40	.26	.21	.25	.45	.50
9,810	lin. ft. installing 250,000-circular mil insulated electrical conductors	.22	.28	.24	.30	.242	.30
1,380	lin. ft. installing 400,000-circular mil insulated electrical conductors	.28	.36	.29	.35	.31	.35
2,500	lin. ft. installing 500,000-circular mil insulated electrical conductors	.32	.41	.37	.45	.352	.40
42	ea. furn. and install wood cable clamps	5.00	5.80	4.62	5.80	5.16	6.00
6	ea. installing lighting standards	20.00	70.00	62.70	80.00	25.00	25.00
37	ea. installing incandescent lighting fixtures in dam parapets	10.00	3.00	2.75	3.40	10 60	15.00
26	ea. installing incandescent lighting fixtures in power plant	4.00	3.00	2.75	3.40	4.00	4.00
85	ea. installing fluorescent lighting fixtures in power plant	10.00	7.00	6.16	8.00	10.60	15.00
5	ea. installing incandescent lighting fixtures in service bldg. and in terminating bldg. EYA	4.00	3.00	2.75	3.50	3.87	4.00
11	ea. installing fluorescent lighting fixtures in service building	10.00	7.00	5.60	7.00	10.55	15.00
2	ea. installing incandescent outdoor flood-lights on service building roof	4.00	7.00	5.50	7.00	4.22	4.00
78	ea. installing incandescent switchyard lighting fixtures on switchyard towers	12.00	4.00	3.85	5.00	13.44	15.00
2,720	lb. installing elect. distribution cabinets and spillway-gate-hoist-motor-control cabinets in dam	.70	.65	.25	.30	.56	.60
660	lb. installing lighting transformers in dam	.30	.30	.11	.15	.375	.40
200	bd. ft. installing wood formwork for manhole No. 2 in block 22 in dam	.50	1.00	1.60	1.65	.37	2.00
260	lin. ft. furn. and install machine shop bus duct in power plant	16.00	12.00	10.45	13.00	17.78	20.00
45	lin. ft. installing 4-in. by 6-in. sheet metal raceway in service building	8.00	6.00	5.50	7.00	8.42	10.00
500	lb. installing switches and cabinets in service building	.70	.66	.28	.35	.75	.80
350	lb. installing cabinets, contactor, and time switch in terminating bldg. EYA	.40	.50	.17	.20	.40	.50
1,500	lb. installing transfer switches, distribu. cabinets, and special junction boxes in the switchyards	1.10	.72	.33	.40	1.19	1.30
1,700	lb. completing the installing of grounding system in power plant & spillway struct.	1.20	1.15	.88	1.10	1.05	1.20
325	lb. completing installation of grounding system in switchyards	6.00	1.80	1.65	2.10	8.31	10.00
12	ea. driving ground rods and connecting to tower angles	20.00	39.00	33.00	41.00	42.42	50.00
1,750	lb. installing elect. cabinet in power plant	.75	.72	.33	.60	.75	.80
150	lb. fabricating and installing carbon-dioxide test cabinets in power plant	1.80	2.80	1.65	1.70	2.25	3.00
Lump sum,	installing transformers at power plant	$14,000	$19,000	$36,300	$21,757	$13,354	$18,000
Lump sum,	installing testing generator bus structs. in power plant	$18,000	$23,000	$32,760	$17,320	$21,058	$24,000

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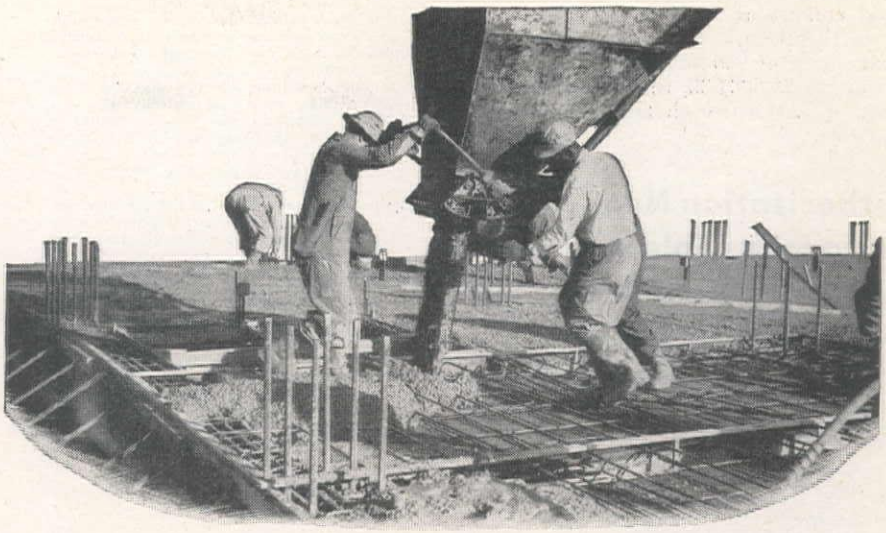
Here They Are— Harbor's four star performers... each designed and engineered for specific needs and service...



★★★ SUPER-Harbord PLYCRETE

Bearing the industry grade-mark: EXT • DFPA • AA

For multiple re-use form work demanding relatively high architectural treatment, Harbor hot-press bonded with phenol-type resin adhesive. ALL veneer is jointed, which eliminates appreciable voids. All defects in centers and cross-bands are repaired, eliminating weak areas and concealed voids. All panels are rehumidified after pressing, reducing tendency to warp. These exclusive Harbor extras mean longer service on your form work. Sanded smooth both sides. Factory edge-sealing and oiling optional.

★★ Harbord PLYCRETE

Bearing the industry grade-mark: INTERIOR • AA • DFPA

Harbord PLYCRETE has the same AA (Sound) veneer faces as SUPER-Harbord Plycrete, but is bonded with 10-cycle moisture-resistant glues instead of the waterproof adhesives used in the Exterior-type panels. A superior form panel, sanded smooth on both faces. Will withstand many re-uses, but cannot, of course, be expected to deliver the service established by Harborite or SUPER-Harbord Plycrete. Ideal for average jobs where limited re-use will write off the cost. Factory edge-sealing and oiling optional.

★ HARBOR PLYFORM

Bearing the industry grade-mark: PLYFORM • DFPA • BB

The standard DFPA PlyForm panel, manufactured to Harbor Plywood Corporation's strict quality standards. Bonded with highly water-resistant 10-cycle glues (not waterproof), it will withstand a reasonable number of re-uses. Both faces are BB (solid) veneer, with surfaces free from open defects, but admitting neatly made plugs, tight splits, and slightly rough grain, sanded smooth. Factory edge-sealing and oiling optional.

You Get the LOWEST COST Per-Foot-Per-Use With

★★★★ HARBOR Harborite

Trade Mark Registered. Patents 2,150,697—2,150,698—2,150,841 and 2,343,740

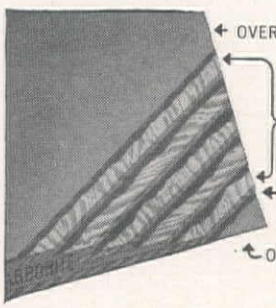
The Superior Multiple Re-Use Concrete Form Panel

Harbor's exclusive manufacturing process — hot-press bonding of a phenolic-type resin-impregnated overlay to a core-body of genuine SUPER-Harbord — makes ★★★★ HARBORITE *the* concrete form panel for better, more economical, multiple re-use!

Mark a star on each of these advantages—★Hard, check-free, durable overlay surfaces! Tough, abrasion-resistant! Holds oil, sealers or lacquers better! ★Permanent reddish-brown color will NOT run or discolor! ★Superior core body of genuine SUPER-Harbord! ★Can be used and re-used until literally worn away!

Harborite sizes: Widths—36″ up to 48″; Lengths—96″ up to 144″; Thicknesses—¼″ to 1-3/16″. Thickness tolerance—1/64″. Edge-sealing and mill-oiling optional.

Specify Harborite for your *finest* form work!



Like any other quality product, most satisfactory results are gained by using approved procedures. For full data on Harborite use, write requesting instructions.

For information on any Harbor Concrete Form Panel Contact:

HARBOR PLYWOOD CORPORATION
Hoquiam, Washington
or any of the following:

California - Geo. E. Ream Co., 235 S. Alameda St., Los Angeles 12; Harbor Plywood Corporation (of California), 540 Tenth St., San Francisco 3 **Colorado** - Donald B. Richardson, 1650 Eleventh St., Denver 4 **District of Columbia** - Harbor Sales Co., Inc., 4th and Bryant Sts. N. E., Washington **Florida** - Harbor Plywood Corporation, 2355 Dennis St., Jacksonville 4; Harbor Plywood Corporation, Box 265, Buena Vista Sta. (3627 N. E. 1st Court), Miami 37; Harbor Plywood Corporation, P. O. Box 2168 (802 No. Rome Ave.), Tampa 1 **Georgia** - Harbor Plywood Corporation, 1161 Ridge Ave. S. W., Atlanta 3 **Illinois** - Harbor Plywood Corporation, 1444 W. Cermak Road, Chicago 8 **Indiana** - E. W. Camp Plywood Co., Inc., 1001 E. New York St., Indianapolis 7 **Kentucky** - E. W. Camp Plywood Co., Inc., 825 S. 9th St., Louisville 2 **Maryland** - The Harbor Sales Co., Inc., 1501 S. Warner St., Baltimore 30 **Massachusetts** - Kimball Lumber Co., 148 Waltham St., Watertown; Lawrence R. McCoy & Co., Inc., 332 Main St., Worcester 8 **Missouri** - H. H. Horton, Harbor Plywood Corporation, 1301 R. A. Long Bldg., Kansas City 6; Fry-Fulton Lumber Co., 148 Carroll St., St. Louis 4 **Nebraska** - W. R. Stelzer, 200 Foster-Barker Bldg., Omaha 2 **New Jersey** - J. R. Quigley Co., 811 Market St., Gloucester City **New York** - Plunkett-Webster Lumber Co., Inc., 815 East 136th St., New York 54; Plunkett-Webster Lumber Co., Inc., 271 North Ave., New Rochelle; Kimball Lumber Corporation, P. O. Box 625, Schenectady **Ohio** - E. W. Camp Plywood Co., Inc., Commerce at Plum St., Cincinnati 2 **Pennsylvania** - J. R. Quigley Co., Front and Railroad Sts., Cressona; J. R. Quigley Co., 1290 S. Cameron St., Harrisburg; J. R. Quigley Co., 309 Harrisburg Ave., Lancaster; J. R. Quigley Co., 1028 N. Delaware Ave., Philadelphia 25; G. A. Whitmeyer, Harbor Plywood Corporation, 1028 N. Delaware Ave., Philadelphia 25; Wholesale Distributing Co., 36th St. and A. V. R. R., Pittsburgh 1 **Washington** - Harbord Mercantile, Port Dock, P. O. Box 998, Aberdeen; Lundgren Dealers Supply, P. O. Box 1373 (440 E. 25th St.) Tacoma 1

in Ada, Canyon and Owyhee counties, would consist of a reinforced concrete and earth-fill dam which would form a storage area of 950 ac. Preliminary cost estimate is $6,500,000, to be financed in whole or part through the issuance of securities.

Authorization Near for California's Folsom Dam

MAJOR WATER DEVELOPMENT plans for Northern California were approved in the U. S. House of Representatives as the House passed and sent to the Senate a bill authorizing $111,000,000 for construction of a multiple purpose water project in the American River watershed. It reauthorized construction of Folsom Dam and reservoir with a capacity of one million ac. ft.

The Bureau of Reclamation was also authorized to construct a 120,000 kilowatt hydro-electric power plant at Folsom Dam; irrigation works on Sly Park and Camp Creeks in El Dorado County; and studies of additional canals to the north and south of Folsom Dam to serve lands and municipalities in El Dorado, Sacramento, Placer, Contra Costa, Alameda, Santa Clara, and San Benito counties.

F. P. C. Permission Asked for Colorado Natural Gas Line

THE COLORADO INTERSTATE GAS CO. recently asked permission from the Federal Power Commission to construct a $4.3-million pipe line to bring an additional 62 million cu. ft. per day of natural gas into Denver and Northern Colorado. The project involves 38 mi. of 20-in. line on the pipe line leading into Denver from the Hugoton gas field in Kansas. In addition, the gas company plans to install three new 1200-h.p. compressor units at the Lakin station in the Hugoton field, and a new compressor station in Cheyenne County, Colo., between the field and Denver.

Friant-Kern Canal in Use

THE CENTRAL VALLEY PROJECT will furnish water for the first time since its start 15 years ago to the dry areas of the San Joaquin Valley. This summer, water will flow southward through the Friant-Kern Canal early enough to be of benefit to irrigated farms in parts of Fresno and Tulare counties. Although the canal is not completed, the benefits will extend as far south as the St. Johns River, 90 mi. below Friant Dam.

Open Bayshore Freeway Bids

GUY F. ATKINSON CO. and Charles L. Harney, Inc., of San Francisco, were low bidders for work on a 1.3-mi. unit of the Bayshore Freeway between Augusta and Twenty-fifth streets in San Francisco. The State Highway Division announced the low bid at $2,819,378.

Lump sum, installing generator-bus air circuit breakers in power plant	$1,900	$1,600	$1,500	$1,301	$1,508	$2,000
30,000 lb. installing nine 230-kv suspension-type lighting arresters at power plant	.15	.11	.06	.07	.10	.11
270,000 lb. installing oil circuit breakers in switchyard	.02	.03	.03	.03	.019	.02
370,000 lb. installing selector-type and disconnecting switch in switchyard	.02	.038	.035	.04	.012	.02
2,300 lb. installing 1-in. copper tubing	1.10	.20	.19	.20	.94	1.00
14,000 lin. ft. installing No. 4/0 Awg. copper overhead conductors betw. power transformers at power plant and the 115-kv. switchyard	.25	.25	.22	.30	.25	.30
8,500 lin ft. installing 795,000-circular mil ACSR overhead conductors betw. power transformers at power plant and the 230-kv. switchyard	.60	.48	.43	.50	.60	.65
5,700 lin. ft. installing No. 4/0 Awg. copper, main, auxiliary and jack busses in the 115 kv. switchyard	.93	.44	.49	.50	1.22	1.30
7,500 lin. ft. installing 500,000-circular mil expanded-type main, auxiliary, and jack busses in the 230-kv. switchyard	.85	.58	.50	.60	1.10	1.20
6,100 lin. ft. installing 3/8-in. 7-strand steel overhead ground wires	.09	.09	.08	.10	.14	.15
5,700 lin. ft. installing 1/2-in. 7 strand steel overhead ground wires	.11	.11	.10	.13	.15	.16
1,500 lb. installing distribution transformers in terminating bldg. EYA, service bldgs. and switchyards	.42	.22	.20	.25	.40	.40
19 ea. installing potential device adjusting units on service building wall	19.00	12.00	10.45	13.00	15.60	20.00
108,000 lb. installing current transformers in switchyards	.04	.048	.03	.035	.063	.05
23,000 lb. installing coupling capacitors in switchyards	.05	.04	.04	.05	.106	.11
5,000 lb. installing wave traps in switchyards	.17	.14	.10	.12	.10	.13
Lump sum, removing existing transformer bank and accessories at power plant	900.00	600.00	$2,200	826.00	594.00	$7,000
700 tons transporting government furnished equipment and material from Shasta Dam to Keswick dam site	10.00	14.00	8.00	11.00	23.19	20.00
500 ton transporting Government furnished equipment and matls. from Silverthron, California, to Keswick dam site	9.00	9.00	8.00	9.20	23.19	20.00

Tunnel . . .

California—Santa Barbara County—Bur. of Recl.—Concrete Lined

Wunderlich Contracting Corp., Omaha, Neb., at $5,482,865, was low before the Bureau of Reclamation for construction of the 6.4 mi. long Tecolote Tunnel on the Santa Barbara Project near Goleta, Calif. However, all bids were rejected as too high. The job includes 1.7 mi. of access road. Unit bids were submitted by the following:

(1) Wunderlich Contracting Corp. $5,482,865
(2) Peter Kiewit Sons' Co. 5,947,776
(3) United Concrete Pipe Corp., Stolte, Inc., and Ralph A. Bell 6,869,250
(4) S. A. Healy Co. 7,087,545
(5) Walsh Construction Co. $7,439,158
(6) M. F. Kemper Construction Co., Condon-Cunningham Co., Ed. H. Honnen Construction Co., Gunther & Shirley Co. and Grafe-Callahan Construction Co. 8,932,660

	(1)	(2)	(3)	(4)	(5)	(6)
6 acres clearing access road	600.00	375.00	$2,000	$2,000	187.00	$1,000
70,000 cu. yd. excavation, common, for roadway	1.00	.50	1.00	2.50	.60	2.00
1,000 cu. yd. excavation, rock, for roadway	4.00	7.00	1.00	6.00	3.60	2.00
300 cu. yd. excavation, common, in open cut	2.30	1.20	20.00	6.00	1.90	10.00
500 cu. yd. excavation, rock, in open cut	6.00	7.00	20.00	8.00	3.60	10.00
73,300 cu. yd. excavation, all classes, in tunnel	54.00	52.00	62.00	52.00	56.00	70.00
750 cu. yd. excav., all classes, for shaft and gate chamber	50.00	68.00	50.00	52.00	63.00	70.00
3,000 cu. yd. excavation, common, for structures	2.50	4.00	5.00	4.00	2.40	4.00
3,300 cu. yd. backfill	.70	2.20	2.00	2.60	1.20	2.70
1,300 cu. yd. compacting backfill	2.00	4.00	5.00	3.00	3.60	2.00
3,000 cu. yd. compactg. embank. to bridge approaches	1.25	1.80	.50	3.00	.60	1.00
720 cu. yd. sand road surfacing	2.50	1.70	2.00	5.00	1.00	2.00
450 cu. yd. gravel road surfacing	5.00	4.25	4.00	6.50	3.60	3.00
1,020,000 lb. furn. and install perm. steel tunnel supports	.15	.15	.25	.30	.30	.40
732 M.B.M. furn. and erect perm. timber'g in tun.	200.00	265.00	300.00	345.00	430.00	400.00
655,000 lb. furn. and install steel tunnel-liner plates	.15	.16	.25	.30	.54	.50
1,300 cu. yd. washed gravel or spalls outside of plate-steel tunnel-liner plates	4.00	20.00	20.00	20.00	22.00	20.00
25,000 lin. ft. drilling feeler or pilot holes	.50	2.10	2.00	3.25	3.50	2.00
15,000 lin. ft. drilling grout holes not more than 10 ft. deep	.80	2.10	1.00	3.25	2.30	1.00
15,000 lb. furn. and placing grout pipe and connections	.35	.80	1.00	.60	1.50	1.00
30,000 cu. ft. pressure grouting	1.00	3.00	2.00	3.00	5.30	10.00
20,000 lb. furn. and install weep pipes in tunnel lining	1.75	.60	1.10	.60	1.50	1.00
5,000 lin. ft. drilling weep holes	.75	2.10	2.00	.60	2.80	4.00
20,480 cu. yd. concrete in tunnel lining	30.00	54.00	49.50	79.00	77.80	77.50
375 cu. yd. concrete in shaft and gate chamber	75.00	75.00	100.00	90.00	90.00	100.00
100 cu. yd. concrete in structures	90.00	75.00	100.00	90.00	116.00	100.00
30,720 bbl. furn. and handling cement	6.00	3.75	6.00	7.75	5.40	12.00
75,000 lb. furn. and placing reinforcement bars	.12	.16	.16	.19	.14	.15
200 lb. furn. and placing metal water stops in joints	1.25	3.00	1.50	.80	1.10	2.00
1,370 lin. ft. furn. and laying 18-in. diam. corru. metal pipe	3.00	4.50	10.00	9.00	3.60	6.00
80 lin. ft furn. and laying 24-in. diam. corru. metal pipe	5.50	8.00	12.00	12.00	5.50	7.00
60 lin. ft. furn. and laying 30-in. diam. corru. metal pipe	7.00	9.00	15.00	15.00	6.70	9.00
108 lin. ft. furn. and laying 60-in. diam. corru. metal pipe	25.00	25.00	40.00	45.00	22.50	25.00
80 lin. ft. furn. and laying 72-in. diam. corru. metal pipe	30.00	30.00	60.00	70.00	28.50	40.00
21 M.B.M. furn. and erecting timber in bridge	250.00	350.00	300.00	400.00	375.00	500.00
Lump sum, removing timber bridge	$1,000	500.00	$1,000	$3,800	$1,400	$1,500
Lump sum, furn. and install doors and douvers for control house	$1,200	$3,000	500.00	600.00	$1,200	500.00
36,500 lb. furn. and installing metalwork	.50	.50	.50	.55	.60	1.00
34,500 lb. installing metalwork	.10	.20	.30	.07	.27	.30

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2. **Natural Gas, Crude Oils and Products Transmission**
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5. **Reconditioning Operations**
6. **Gathering Systems**
7. **Recycling Operations**

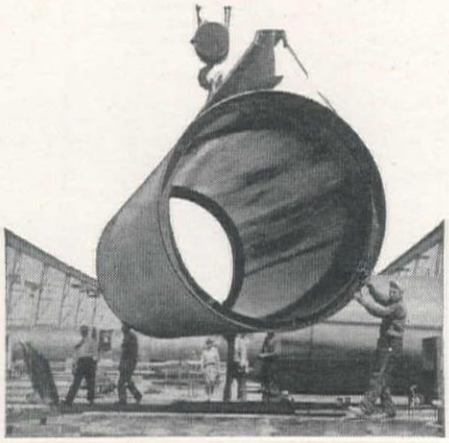
Materials and Application Procedure for
THE WATER INDUSTRIES

Barrett* Waterworks Enamels are manufactured specifically to fulfill the service requirements of the water industry. They neither flow nor sag in temperatures as high as 160°F.; nor do they crack in temperatures as low as 20° below zero.

Moreover, Barrett enamels possess sufficient flexibility and ductility to accommodate the "breathing" of the pipe, and to withstand the weight of the backfill when the pipe is not full of water.

When used to line the inside of a pipe, Barrett enamel prevents tuberculation, thus enabling the pipe to maintain its original capacity. The Hazen-Williams coefficient of flow can be increased from 100 to 150 by coating with Barrett enamel. Thus, 50% more water can be put through the pipe with the same expenditure of horsepower.

The Barrett organization will be glad to advise you on any pipe coating problems.



When Barrett enamels are used, no loss of bond occurs at the inter-faces of steel, primer and enamel.

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

*Reg. U. S. Pat. Off.

Northwest Quake

. . . Continued from page 66

structures should be made, to detect inherent points of weakness, and to enable corrective measures to be taken. In California, after the Long Beach disaster, laws were passed requiring all buildings for human occupancy to be constructed to withstand a moderate earth shock, and requiring all school buildings to be reinforced on a *0.1 g* basis. The Pacific Northwest states have not awakened to their danger, and have required nothing.

Adequate reinforcement of new buildings to resist earthquake shock on the basis of *10% g* or to withstand a horizontal force of 1/10 of the weight of the building above any point, applied in any direction, increases their cost approximately 5%—a small sum for safety and far less than earthquake insurance would cost during a normal building lifetime. Can the public be aroused to demand this protection, particularly on schools, places of public assembly and public institutions?

To place the blame for the existence of unsound buildings upon any group or groups of persons is impossible. Except in California, which has required adequate protection of buildings to resist earth shock, the responsibility rests, in the last analysis, on the now-drooping shoulders of John Q. Taxpayer who, ignorant of the principles of sound construction, has complained about the high cost of building, has insisted upon quantity and appearance rather than upon quality and stability, has opposed as unnecessary and unwarranted all legislation designed to correct building codes and by harassing building officials in various ways has made difficult the adequate improvement, if not enforcement, of existing codes in his community.

HIGHLIGHTS OF THE QUAKE

THE ONLY damage to the Seattle Central Library was a badly broken window glass. When librarian John S. Richards commented on the strange fact that the quake had shattered only that particular glass, an assistant volunteered: "Oh, the quake didn't do that—a man did it—taking off in a hurry during the shocks!"

☆ ☆ ☆

MORE than $2 million in earthquake insurance was taken out in Seattle 2 hours before the earthquake. Are people getting psychic?

☆ ☆ ☆

IN Puyallup during the shocks little geysers of water shot up in basements and back yards, some being 10 ft. or more in height. Basements were partially filled with sand and water. The water table in Puyallup is about 3 ft. below the ground and the soil is fine silty sand.

Bridge and Grade Separation . . .

Washington—Kitsap County—State—Steel Cantilever

Manson Construction & Engineering Co., Seattle, Wash., have been awarded $1,398,439 contract for construction of the 0.233-mi. steel cantilever Agate Pass Bridge, to connect the north end of Bainbridge Island in Puget Sound with the Kitsap County mainland. Unit bids were submitted by the following:

(1) Manson Construction and Engineering Co. $1,398,439
(2) General Construction Co. 1,441,150
(3) Cascade Contractors, Inc., and M. P. Butler $1,444,135
(4) MacRae Bros. 1,489,141

	(1)	(2)	(3)	(4)
6,730 cu. yd. structure excavation	6.00	10.00	7.50	7.00
Lump sum, shoring and cribs	$112,000	$118,000	$212,000	$162,600
1,220 cu. yd. concrete, Class "A" in place	85.00	70.00	50.00	75.00
4,260 cu. yd. concrete, Class "F" in place	40.00	45.00	45.00	45.00
3,670 cu. yd. concrete, Class "H" in place	30.00	30.00	25.00	25.00
415 lin. ft. reinf. conc. bridge railing in place	9.00	12.00	12.00	8.00
848,000 lb. steel reinforcing bars in place	.09	.11	.11	.092
822,000 lb. structural carbon steel in place	.21	.20	.20	.223
299,000 lb. structural low alloy steel in place	.24	.23	.23	.253
44,500 lb. cast steel in place	.40	.40	.36	.42
32 only, bridge drains complete in place	80.00	75.00	80.00	65.00
290 lb. copper seals in place	2.00	2.00	2.00	3.00
12,960 lin. ft. furnishing steel piling	3.40	4.00	3.00	3.60
216 only, driving steel piles in place	45.00	100.00	30.00	42.50
54 only, pile splices	25.00	50.00	30.00	30.00
1 only, driving steel test piles	$1,000	$2,000	$1,000	$1,342
420 lin. ft. downspouts in place	5.00	5.00	4.50	3.50
Lump sum, lighting system in place	$4,500	$3,800	$5,000	$3,860
50 days mechanical tampers	75.00	48.00	35.00	40.00

Montana—Yellowstone County—State—Steel and Conc.

W. P. Roscoe Co., Billings, Mont., with a bid of $623,848, was low before the State Highway Commission of Montana for construction of a 1,022-ft. steel and concrete bridge over the Yellowstone River on the Billings-Pompey's Pillar Road. Unit bids were submitted by the following:

(A) W. P. Roscoe Co. $623,848
(B) Northwest Engineering Co. 627,795
(C) Inland Construction Co. 637,328
(D) McLaughlin Construction Co. 643,090
(E) Riedesel Construction Co. $652,083
(F) J. C. Boespflug Construction Co. 653,468
(G) Cahill Mooney Construction Co. 659,783
(H) Utility Builders, Inc. 663,998

(1) 1,464,400 lb. structural steel
(2) 189,800 lb. reinforcing steel.
(3) 1,329.5 cu. yd. Class A concrete
(4) 803.7 cu. yd. Class AD concrete
(5) 1,944.6 lin. ft. steel bridge rail
(6) 2,708 cu. yd. structure excavation
(7) 225 cu. yd. unclassified excavation
(8) Lump sum, remove ex. structure

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	.218	.215	.222	.22	.22	.227	.22	.235
(2)	.15	.16	.152	.15	.16	.147	.145	.19
(3)	73.00	75.00	68.00	68.00	60.00	67.00	65.00	70.00
(4)	73.00	75.00	78.00	80.00	77.00	80.00	85.00	70.00
(5)	8.50	10.00	10.00	9.90	15.00	10.50	12.00	10.90
(6)	26.50	27.50	27.00	28.00	28.00	26.00	30.00	29.00
(7)	5.00	3.00	1.00	3.00	4.00	2.00	3.50	2.00
(8)	$31,000	$28,000	$37,500	$42,000	$52,000	$48,500	$50,000	$34,300

California—Los Angeles County—State—Undercrossing

Chas. MacClosky Co. of San Francisco and Los Angeles, at $506,752, was low before the California Division of Highways for construction of a reinforced concrete box girder undercrossing on Hollywood Parkway at Heliotrope Drive in the City of Los Angeles. Unit bids were submitted by the following:

(A) Chas. MacClosky Co. $506,752
(B) W. J. Disteli and R. J. Daum construction Co. 509,497
(C) Spencer Webb Co. 514,559
(D) Chas. J. Rounds and Lars Oberg 516,013
(E) C. B. Tuttle Co. 527,586
(F) J. E. Haddock, Ltd. $528,519
(G) Guy F. Atkinson Co. 536,613
(H) Peter Kiewit Sons' Co. 553,729
(I) Granite Construction Co. 564,826
(J) Davies, Keusders & Brown 570,271

(1) 18 cu. yd. removing concrete
(2) Lump sum, clearing and grubbing
(3) 10,500 cu. yd. roadway excav.
(4) 1,100 cu. yd. struct. excav.
(5) 5,100 cu. yd. struct. excav. (undercrossing)
(6) 5,300 cu. yd. struct. backfill (undercrossing)
(7) 5,940 cu. yd. Class "A" P.C.C. (struct.)
(8) 500 lin. ft. rubber watetrstops
(9) 14,300 lb. misc. iron and steel
(10) 1,656 lin. ft. steel railing
(11) 15,800 lin. ft. furnish steel piling
(12) 722 ea. driving piles
(13) 72 ea. steel pile splices
(14) 10 cu. yd. P.C.C. (curbs, gutters & sidewalks)
(15) 125 lin. ft. timber guard railing
(16) 72 lin. ft. 6-in. perf. metal pipe
(17) 6 cu. yd. fitter material
(18) 58 lin. ft. 4-in. cast iron pipe
(19) 1,284,000 lb. bar reinf. steel
(20) Lump sum, electrical equipment
(21) Lump sum, engineer's office

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)	(J)
(1)	10.00	7.00	5.00	10.00	5.00	10.00	5.00	15.00	10.00	9.25
(2)	$1,500	$1,500	$4,500	$2,500	$1,000	$2,500	$3,000	$1,348	$5,000	$1,400
(3)	.70	.75	.50	.75	.70	.63	.60	.73	.35	.92
(4)	3.60	6.50	5.00	4.00	2.00	2.10	2.00	2.75	2.40	15.50
(5)	2.15	1.50	4.00	1.25	2.00	1.85	1.50	1.15	2.00	8.00
(6)	2.00	2.05	2.30	2.00	2.00	2.00	1.40	1.15	2.10	2.20
(7)	47.00	47.00	44.00	48.00	47.00	49.50	50.00	53.00	52.00	45.00
(8)	4.00	2.50	2.50	2.50	3.00	2.30	2.50	1.65	2.00	2.68
(9)	.35	.30	.35	.35	.35	.29	.30	.30	.40	.30
(10)	9.25	9.75	10.00	9.50	11.00	10.00	10.00	11.50	10.00	10.69
(11)	2.65	2.45	2.50	2.50	2.80	2.75	2.40	2.50	2.50	3.07

(Continued on next page)

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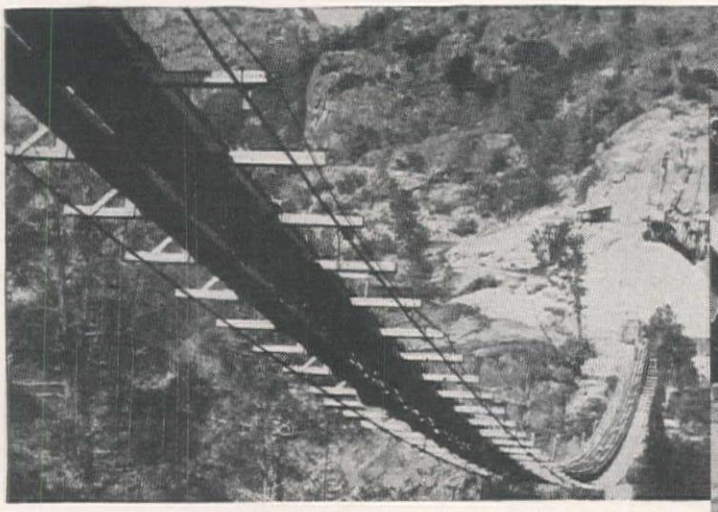

STRANGE! Construction men have their likes and dislikes about equipment for certain jobs and back their ideas with arguments, orders, and specifications. But when buying hose or belt, they will accept whatever is available.

Do they think that "All Rubber Goods Are Alike?" "TAIN'T SO, MISTER." Constructions and Compounds in Rubber Products can vary just as much as design in machinery; *however, the difference is not visible.*

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Company Asks Control of Dakota Power Facilities

MONTANA-DAKOTA Utilities Co. is seeking Federal Power Commission authorization to merge or consolidate electric facilities by taking over and operating utility properties which the company is to construct in North Dakota for the Dakotas Electric Cooperative, Inc.

The company also asked FPC for authority to assume, upon purchase of the facilities, the securities evidencing a rural electrification loan made by the Rural Electrification Administration to the cooperative to finance the construction.

Under an agreement with the cooperative, the company is to construct and operate for the cooperative facilities consisting of a 7,500-kw. electric generating plant in the vicinity of Beulah, N. D., and a 69-kv. transmission line extending from Beulah to Bismarck, Linton, Wishek, Ashley and Ellendale.

Estimated cost of the facilities is $4,033,000. The company said it will be reimbursed by the cooperative for construction costs up to $4,033,000; and then, after completion of the construction, the company will operate and maintain the facilities, making payments to the cooperative. When the principal amount of the cooperative's debt to the United States has been reduced to $2,419,800 in about 18 years, the application continues, the company proposes to acquire the facilities and assume the loan obligations. However, the company said it has the option to purchase the facilities any time prior to that date upon assumption of the notes, mortgage and loan contract.

Montana-Dakota Utilities Co. said the proposed transaction would increase its facilities available for transmission of power in North and South Dakota and make electricity available to Rural Electrification Cooperatives in the entire area at the same Bureau of Reclamation rates.

Baldwin Hills Reservoir

. . . Continued from page 82

The work is being done by the Water System of the Department of Water and Power under the general direction of Samuel B. Morris, General Manager and Chief Engineer of the Department of Water and Power; Laurance E. Goit, Chief Engineer of the Water System; and S. B. S. Nelson, head of the Construction Division.

R. R. Proctor, who is head of the Field Engineering Division and is a pioneer in the field of rolled-earth dams and applied soil mechanics, designed the unusual compacted fill structure and has engineering supervision of the work.

N. M. Imbertson is Supervising Engineer and Loring E. Tabor is Assistant Supervising Engineer.

In the field, Hugh Mulholland and Robert E. Brady are the Construction Superintendent and Resident Engineer, respectively.

(12)	23.00	24.00	35.00	27.00	25.00	27.50	30.00	16.00	27.00	32.0
(13)	20.00	18.00	20.00	16.00	15.00	23.00	15.00	23.00	20.00	23.1
(14)	70.00	40.00	40.00	40.00	40.00	36.00	40.00	44.00	40.00	32.4
(15)	6.00	3.50	3.50	4.00	3.00	6.00	3.00	8.00	5.00	3.0
(16)	3.00	2.00	1.20	2.00	1.00	2.00	2.00	2.25	1.50	1.3
(17)	10.00	6.00	6.00	5.00	10.00	6.00	8.00	8.00	5.00	6.6
(18)	4.00	3.00	2.50	2.00	3.00	1.75	2.00	3.50	2.00	3.8
(19)	.08	.085	.085	.085	.095	.085	.095	.10	.10	.092
(20)	$4,600	$4,600	$5,000	$4,500	$4,814	$4,500	$5,130	$5,336	$4,728	$4,95
(21)	$1,500	$1,200	$1,000	$2,000	$1,000	$1,000	$2,000	$2,185	$5,000	850.0

Highway and Street . . .

Oregon—Tillamook County—State—Grade, Pave and Struct.

Edwin C. Gerger of Oregon City, Ore., submitted the low bid of $792,215 before the Oregon State Highway Commission, Portland, for construction of the Tillamook-Pleasant Valley Section of the Oregon Coast Highway, Federal Aid Project No. F-137 (3). The work will consist of grading and paving of 5.74 mi. and the construction of four reinforced concrete bridges and seven concrete box culverts. The job requires approx. 433,000 cu. yd. of excavation, 3,800 lin. ft. of pre-cast concrete piling, 140 tons of liquid asphaltic material and 26,000 tons of asphaltic concrete pavement. Unit bids were submitted by the following:

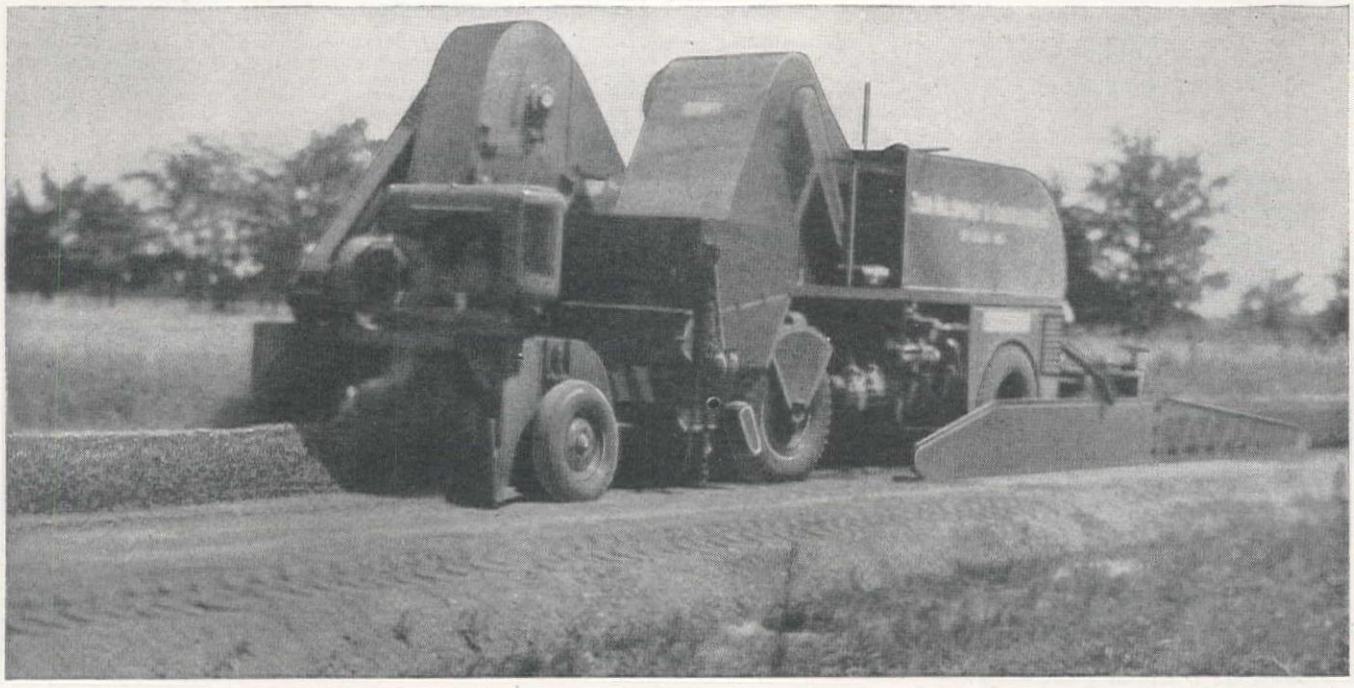
(A) Edwin C. Gerger $792,215
(B) Warren Northwest, Inc. 809,609
(C) Babler Bros. and Rogers Construction Co. 832,554
(D) Porter W. Yett 859,043
(E) J. N. & M. J. Conley $862,944
(F) Peter Kiewit Sons' Co. 890,056
(G) Leonard & Slate Oreg, Ltd. 897,675
(H) E. C. Hall Co. 901,962

(1) Lump sum, clearing and grubbing
(2) 3,500 sq. yd. removal of pavement
(3) 400 sq. yd. removal of walks and driveways
(4) 1,300 lin. ft. removal of concrete curbs
(5) 4 only, removal of catch basins
(6) 100 sq. ft. falling danger trees
(7) 400 rods re-establishment of wire-mesh fence
(8) 6 rods re-establishment of picket fence
(9) 5,100 cu. yd. structural excav., unclassified
(10) 2,100 cu. yd. trench excav., unclassified
(11) 210,000 cu. yd. borrow excav., unclassified
(12) 202,000 cu. yd. general excav., unclassified
(13) 324,000 cu. yd. sta. short overhaul
(14) 3,000 cu. yd. sta. long overhaul
(15) 420,000 yd. mi. truck haul on borrow
(16) 14,600 cu. yd. excav. and placing topsoil
(17) 2,200 yd. mi. truck haul on topsoil
(18) 5.74 mi. finishing roadbed and slopes
(19) 15,500 lin. ft. rounding cutbanks
(20) 170 lin. ft. 15-in. corru. metal pipe, nested type
(21) 170 lin. ft. 30-in. corru. metal pipe, nested type
(22) 300 lin. ft. 60-in. corru. metal pipe
(23) 500 lin. ft. 12-in. concrete pipe
(24) 270 lin. ft. 18-in. concrete pipe
(25) 400 lin. ft. 24-in. concrete pipe
(26) 600 lin. ft. 30-in. extra strength conc. pipe
(27) 220 lin. ft. 8-in. perf. conc. drain pipe
(28) 1,400 lin. ft. 8-in. sewer pipe
(29) 600 lin. ft. 12-in. sewer pipe
(30) 900 lin. ft. 15-in. sewer pipe
(31) 1,400 lin. ft. 18-in. sewer pipe
(32) 1,100 lin. ft. extra for installing pipe under pavement
(33) 200 lin. ft. salvaging culvert pipe
(34) 30 cu. yd. rock or gravel backfill in drains
(35) 3,800 lin. ft. furn. pre-cast conc. piling
(36) 146 only, drive piles
(37) 1,100 cu. yd. Class "A" concrete
(38) 186,000 lb. metal reinforcing
(39) Lump sum, removal of old bridges and maint. of traffic
(40) 2 only, Type "A" manholes
(41) 8 only, Type "B" manholes
(42) 24 only, concrete inlets
(43) 3 only, adjust manholes
(44) 320 cu. yd. conc. curbs and gutters
(45) 70 sq. yd. concrete driveways
(46) 20 cu. yd. concrete traffic islands
(47) Lump sum, recess for reflectorized markers
(48) Lump sum, electrical work
(49) 58,000 cu. yd. 3-in. - 0-in. material in base
(50) 12,800 cu. yd. ¾-in. - 0-in. material in base and shoulders
(51) 1,500 M-gals. sprinkling
(52) 770 cu. yd. ¾-in. - 0-in. material in binder course
(53) 26,000 tons Class "B" asphaltic concrete
(54) 120 lin. ft. asphaltic concrete traffic markers
(55) Lump sum concealed irrigating system
(56) 52 sq. ft. lawn construction
(57) 16 acres fertilizing and seeding
(58) 140 tons furn. and placing RC-3 asphalt in binder course

	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	$7,500	$19,000	$50,000	$25,000	$15,000	$3,500	$16,000	$5,000
(2)	.50	.75	.80	1.00	.20	1.15	.50	.75
(3)	.40	.50	.80	.50	1.00	1.15	.35	1.25
(4)	.20	.20	.60	.20	.25	1.15	.35	.50
(5)	20.00	25.00	25.00	15.00	15.00	25.00	20.00	50.00
(6)	3.00	5.00	3.00	2.00	6.00	4.00	5.00	1.00
(7)	4.00	9.00	15.00	18.00	8.25	10.00	5.00	5.00
(8)	10.00	9.00	30.00	25.00	100.00	15.00	25.00	40.00
(9)	4.00	3.50	3.00	5.00	3.00	2.00	3.00	2.00
(10)	3.00	2.00	2.00	5.00	2.00	1.30	1.00	2.00
(11)	.32	.40	.40	.40	.45	.43	.55	.58
(12)	.35	.44	.40	.40	.65	.48	.50	.63
(13)	.02	.02	.02	.02	.01	.95	.02	.015
(14)	.50	.50	.55	.60	.50	1.00	1.00	.50
(15)	.13	.17	.17	.22	.15	.22	.20	.25
(16)	1.20	1.30	.90	1.25	.80	1.00	1.50	.90
(17)	.20	.25	.30	.30	.20	.30	.30	.30
(18)	500.00	750.00	600.00	500.00	500.00	$1,100	$1,000	600.00
(19)	.15	.20	.20	.18	.20	.25	.15	.20
(20)	3.50	4.00	3.00	3.00	3.30	3.90	3.00	3.00
(21)	10.00	7.00	6.00	5.50	7.00	8.85	6.00	7.00
(22)	20.00	25.00	22.00	22.00	25.00	27.00	25.00	24.00
(23)	2.00	1.60	1.80	1.30	2.00	2.00	2.00	1.75
(24)	3.00	3.00	3.00	2.00	3.50	3.60	3.00	3.00
(25)	5.00	4.50	5.00	3.60	4.50	5.15	4.50	6.00
(26)	6.50	8.00	6.00	5.00	6.50	7.35	6.00	8.00
(27)	2.00	1.00	1.00	1.10	1.50	1.20	1.00	1.50
(28)	1.50	1.00	1.00	1.30	1.40	1.00	1.50	1.40
(29)	2.00	1.50	2.00	1.80	1.80	1.75	2.00	1.80
(30)	3.50	2.00	2.50	2.25	2.20	2.35	2.50	2.40
(31)	4.00	3.00	3.00	3.25	4.00	3.15	3.50	2.60
(32)	3.00	3.00	2.00	5.00	5.00	3.90	1.00	2.00
(33)	2.00	2.50	2.25	1.25	2.00	1.80	2.50	2.00
(34)	6.00	6.00	5.00	5.00	4.50	6.80	5.00	4.00
(35)	6.00	5.50	5.50	5.00	5.50	6.00	5.50	5.00
(36)	90.00	75.00	75.00	65.00	75.00	80.00	75.00	70.00
(37)	70.00	53.00	53.00	60.00	60.00	60.00	53.00	65.00
(38)	.12	.12	.12	.12	.12	.13	.12	.13
(39)	$8,000	$6,000	$5,000	$5,000	$7,000	$12,000	$5,000	$2,000
(40)	260.00	250.00	250.00	350.00	350.00	275.00	250.00	250.00
(41)	200.00	200.00	150.00	250.00	175.00	165.00	150.00	200.00
(42)	75.00	80.00	90.00	70.00	75.00	100.00	90.00	75.00
(43)	40.00	50.00	100.00	25.00	75.00	110.00	100.00	60.00
(44)	55.00	50.00	50.00	50.00	55.00	55.00	50.00	50.00
(45)	4.00	5.00	6.00	4.00	4.50	6.50	6.00	4.00
(46)	50.00	55.00	50.00	50.00	55.00	55.00	50.00	50.00
(47)	150.00	100.00	200.00	100.00	75.00	220.00	200.00	500.00
(48)	$1,500	$3,000	$3,000	$1,500	$1,500	$1,900	$1,500	$1,750
(49)	1.50	1.10	1.40	1.25	1.40	1.55	1.75	1.25

(Continued on next page)

Picking it up and laying it down . . . in one continuous operation . . . with the



H&B Moto-Paver and Moto-Loader

Showing aggregate being dumped directly from truck into front hopper of the Moto-Paver.

Where it is necessary to use aggregate that has been windrowed on the road surface, the H & B Moto-Loader, used in conjunction with the Moto-Paver, gives highly efficient results. The Moto-Loader is small, inexpensive, readily portable and designed specifically for this purpose. It is propelled by the Moto-Paver, and is equipped with a 25 hp engine for driving the gathering flights and bucket line. Blade height, with relation to the road, is adjustable by a simple hydraulic mechanism, assuring clean pick-up at all times.

The aggregate may also be dumped directly from trucks into the front hopper of the Moto-Paver, as shown in the illustration at the left. In either case, uniform results are obtained, because the proportioning of the aggregate and bitumen is done in the machine and is not dependent upon the uniformity of the windrow. The mixed material is spread and struck off on the road surface, ready for rolling. Write for Bulletin MP-47

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Davis Dam Progress

. . . Continued from page 80

ties to deliver increasing amounts of power to the load centers of Arizona, southern California and southern Nevada under a schedule geared to the installation of units in the Davis powerplant. All five of the powerplant's 45,000-kw. generators will be in operation by June, 1951, furnishing about a billion kilowatt-hours of electrical energy annually. This is approximately a fifth of the Hoover Powerplant's annual output.

The Davis Dam Project will have about 900 mi. of transmission lines. Major lines under active construction include the Parker and Davis-Hoover interconnections, the Davis-Prescott-Mesa line, the Phoenix-Tucson line, and the second Parker-Gila line. Associated substations at terminal points of the lines are also under construction.

The dam will create a reservoir with a capacity of 1,820,000 ac. ft., extending to the tailrace of Hoover Dam. Administered as part of the Lake Mead Recreational Area of the National Park Service, the lake will open up a new haven for the tourist.

Contractors Increase Tempo Of Work at McNary Dam Site

PRESENT CONSTRUCTION at McNary Dam on the Columbia River on the Oregon-Washington border is being stepped up steadily by the contractors although peak employment probably will not be reached before late fall. All of the work is now on the Washington side of the river where the north cofferdam has been pushed well into the river and first pouring of concrete of the dam spillways took place recently. In addition, much effort is going into the huge locks, a major section of the total construction job. Three shifts are now being worked six days a week by Guy F. Atkinson Co., general contractors on the project.

First work on the Oregon side, to be advertised for bids this spring, will include a cofferdam, similar to that on the north side of the river.

The McNary locks, which will have the highest lift in the world until the projected Ice Harbor dam is built, are designed to fill and empty in 15 minutes. Design of the many side openings through which the water comes represents a delicate problem in flow hydraulics, to get maximum speed of flow with minimum turbulences. The solution to design problems at McNary will simplify designing of the lower Snake River dams, since all are similar to McNary, although smaller.

In order to pour the two side walls of the locks, a huge trestle was constructed down the middle. On this trestle run two gantry cranes, electrically operated and running on rails. Each crane has a boom arm 90 ft. long to swing a bucket of concrete out for the pour. Concrete is being batched in a plant near the west end of the locks that can handle a maximum of 4,000 cu. yd. per day.

(50)	2.45	3.00	2.00	2.75	2.50	2.15	3.00	2.4
(51)	2.50	3.50	2.00	2.00	2.00	3.00	3.00	2.5
(52)	3.50	4.50	4.00	3.25	3.90	4.00	4.50	4.4
(53)	7.50	6.80	7.50	7.40	7.50	8.20	7.25	7.3
(54)	2.00	2.00	2.00	1.20	1.50	1.25	2.00	2.0
(55)	700.00	400.00	$1,200	400.00	400.00	$1,500	$1,000	$1,50
(56)	10.00	40.00	30.00	20.00	50.00	50.00	50.00	50.0
(57)	150.00	725.00	60.00	400.00	60.00	200.00	150.00	200.0
(58)	45.00	48.00	45.00	60.00	48.00	65.00	47.00	45.0

Nevada—Pershing County—State—Grade and Surf.

Dodge Construction Co. of Fallon, Nevada, with a bid of $142,951, was low before the Nevada Department of Highways at Carson City for construction of a portion of the State Highway System from 3 mi. south of a junction with U. S. 40 near Perth to 5 mi. south thereof, from 2½ mi. west of Lovelock to Cemetery Road, and from 2 mi. northeast of Lovelock, 4 mi. to a junction with U. S. 40. The distance totals 7.142 mi. The work involves 18,250 cu. yd. of roadway excavation, 68,500 cu. yd. of borrow, and roadmix asphalt surfacing on the entire length. Unit bids were submitted by the following:

(1) Dodge Construction Co. $142,951
(2) Silver State Construction Co. 146,087
(3) Nevada Constructors, Inc., and Sauer & Margrave 164,468
(4) Isbell Construction Co. $169,439
(5) Hoops Construction Co. 173,330
(6) C. J. Hostetler and B. H. Soutenberg 185,058

	(1)	(2)	(3)	(4)	(5)	(6)
Lump sum, signs	500.00	500.00	839.45	500.00	$1,500	$1,500
Force account, clearing	$1,800	$1,800	$1,800	$1,800	$1,800	$1,800
4,660 lin. ft. remove fence	.10	.05	.05	.05	.12	.10
107 cu. yd. remove concrete	10.00	10.00	7.50	5.00	10.00	15.00
292 lin. ft. remove culvert pipe	2.50	1.00	1.00	1.00	1.00	1.50
9 ea., remove headwalls	10.00	20.00	10.00	10.00	10.00	15.00
11 ea., remove timber culverts	50.00	100.00	40.00	25.00	50.00	75.00
18,250 cu. yd. roadway excav.	.25	.24	.35	.32	.40	.50
8,960 cu. yd. drainage excav.	.50	.24	.35	.35	.40	.50
23 sta. V-type ditches	5.00	5.00	5.00	4.00	8.00	7.50
68,500 cu. yd. borrow	.25	.14	.30	.20	.25	.22
358,260 yd. sta. overhaul, yd. sta.	.01	.02	.01	.02	.01	.02
98,030 yd. mi. overhaul, yd. mi.	.11	.15	.15	.15	.20	.175
1,690 cu. yd. structure excav.	2.00	2.00	1.00	2.00	3.00	1.75
1,580 cu. yd. backfill	1.50	1.00	1.00	1.50	1.00	1.25
4,150 M. gal. water	1.00	1.00	1.00	1.00	1.50	1.00
Lump sum, furnish water equipment	250.00	$1,000	500.00	$2,400	500.00	$2,000
200 hr. power roller	5.00	5.00	5.00	6.00	6.00	8.00
6,170 ft. hr. tamping roller	.50	.40	.34	.50	.50	.60
5,040 ton selected material surface	.60	.50	.65	.60	.60	.55
29,800 ton gravel surface	.55	.59	.85	.90	.80	1.10
54 ton liquid asphalt, Type MC-2 (Seal)	32.50	35.00	41.00	45.75	40.00	40.00
700 ton liquid asphalt, Type SC-3 (roadmix)	30.00	33.00	38.70	31.00	32.00	34.00
7.14 mi. roadmix	500.00	650.00	800.00	850.00	600.00	800.00
3,300 sq. yd. roadmix intersections	.10	.10	.25	.12	.10	.20
415 cu. yd. Class A concrete	50.00	55.00	45.50	65.00	60.00	57.50
59,440 lb. reinforcing steel	.12	.12	.12	.12	.13	.12
98 lin. ft. 15-in. corru. metal pipe	3.00	2.50	2.80	2.50	3.00	3.00
476 lin. ft. 24-in. corru. metal pipe	4.50	4.00	4.90	4.40	4.50	4.50
82 lin. ft. 30-in. corru. metal pipe	5.75	5.00	5.80	5.40	6.00	5.75
120 lin. ft. 36-in. corru. metal pipe	8.50	7.00	8.50	8.25	8.00	8.25
60 lin. ft. 43-in. x 27-in. corru. metal arch pipe	9.00	8.00	8.80	9.00	8.00	9.00
8 lin. ft. 72-in. x 44-in. corru. metal arch pipe	23.50	25.00	18.00	21.00	25.00	25.00
16 lin. ft. 24-in. reinforced concrete pipe	5.00	5.00	6.35	9.00	8.00	5.00
64 lin. ft. 36-in. reinforced concrete pipe	10.00	10.00	10.25	13.00	10.00	10.00
104 lin. ft. relay culvert pipe	1.50	1.00	1.00	1.00	4.00	1.50
248 lin. ft. beam type metal guard rail	2.75	5.00	5.00	4.25	3.00	4.00
55 ea. culvert markers	6.00	5.00	5.00	6.00	6.00	6.00
104 ea. guide posts	5.00	5.00	5.00	6.00	6.00	6.00
5,180 lin. ft. construct fence	.20	.30	.30	.25	.25	.30
81 lin. ft. reconstruct fence	.50	.20	.20	.20	.40	.30
3 ea. 16-ft. metal gates	50.00	50.00	75.00	135.00	60.00	50.00
20 ea. right-of-way markers	6.00	5.00	5.00	8.00	6.00	6.00
1 ea. 30-in. slide headgate	150.00	150.00	130.00	130.00	175.00	150.00
2 ea. 30-in. meter gates	175.00	150.00	160.00	165.00	225.00	200.00

California—Madera County—State—Grade and Pave

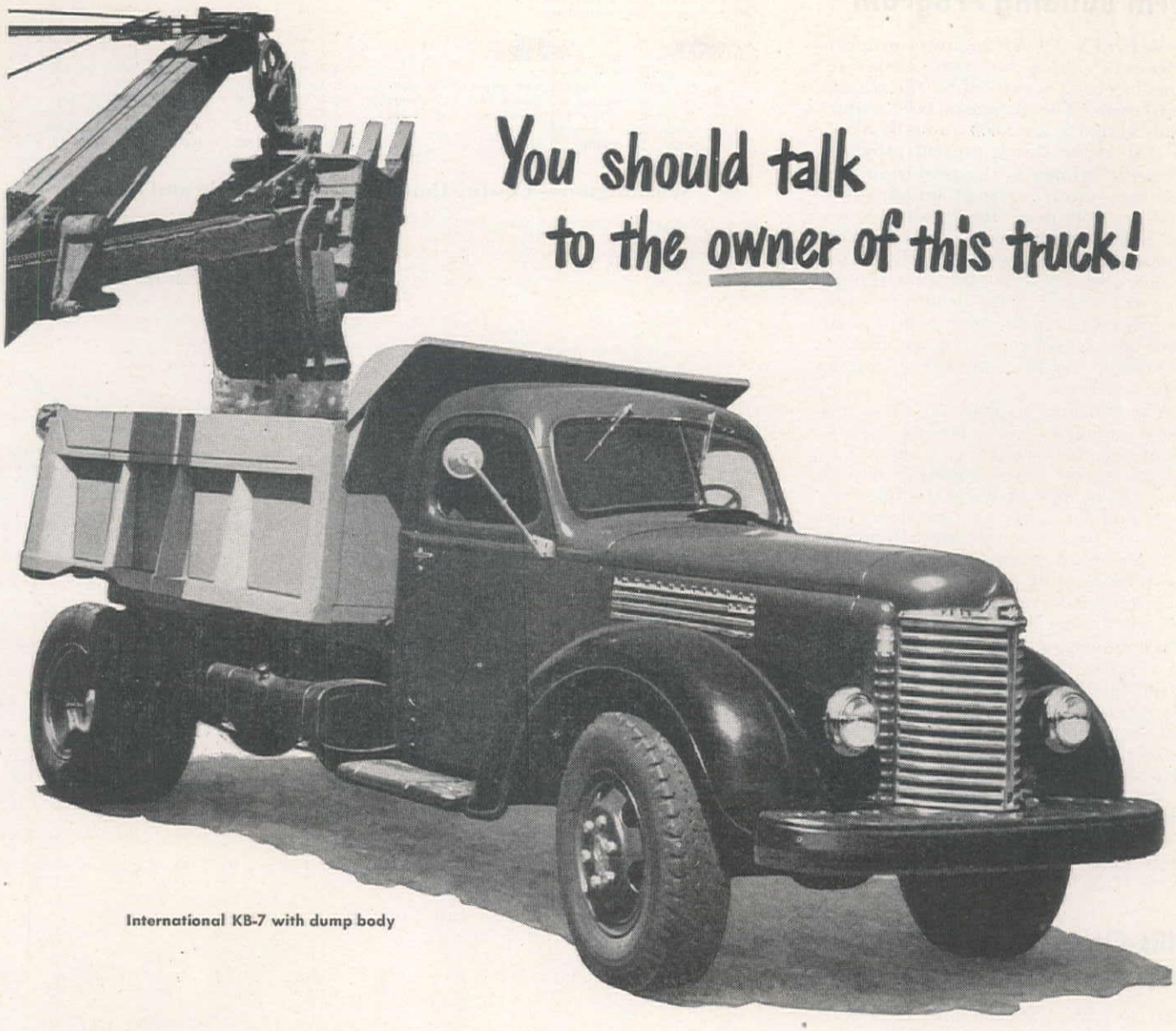
Guy F. Atkinson Co., South San Francisco, submitted the low bid of $338,882 to the California Division of Highways for construction of State Highway from north of Dry Creek to north of Berenda, a distance of 2.7 mi. This length is to be graded and paved with Portland cement concrete on cement treated subgrade and plant-mixed surfacing on untreated rock base. The work includes a small reinforced concrete slab bridge across Berenda Creek. Unit bids were submitted as follows:

(1) Guy F. Atkinson Co. $338,882
(2) Fredrickson Bros. 342,989
(3) M. J. B. Construction Co. 348,513
(4) Granite Construction Co. 349,243
(5) N. M. Ball Sons 359,243
(6) A. G. Raisch Co. $366,541
— Fredrickson & Watson Construction Co. 367,010
— Harms Bros. 372,537
— Cox Bros. Construction Co. and J. E. Haddock, Ltd. 373,537

	(1)	(2)	(3)	(4)	(5)	(6)
150 cu. yd. removing concrete	3.30	3.50	7.00	5.00	3.00	2.35
Lump sum, clearing and grubbing	$2,400	$1,750	$1,000	756.00	$3,500	885.00
22,000 cu. yd. roadway excavation	.36	.35	.45	.30	.62	.36
900 cu. yd. structure excavation	3.40	2.25	3.00	2.85	3.00	2.95
25 cu. yd. ditch and channel excavation	4.25	1.25	3.00	4.40	3.00	6.00
69,000 sq. yd. compacting original ground	.05	.05	.05	.03	.06	.05
100,000 cu. yd. imported borrow	.50	.55	.50	.53	.60	.63
2,500 cu. yd. imp. top soil	1.00	1.10	1.50	.75	1.00	1.45
7,000 sq. yd. cultivation (prep. landscape tr.)	.12	.06	.10	.025	.07	.12
40 tons straw (slope erosion protection)	67 00	60.00	50.00	35.00	60.00	59.00
Lump sum, dev. water supply and furn. watering equip.	$1,200	$2,500	$5,000	$3,687	$1,000	$2,000
8,000 M. gal. applying water	1.10	1.50	1.30	1.90	1.30	1.75
143 sta. finishing roadway	7.50	12.50	15.00	13.00	20.00	12.00
37,000 sq. yd mixing and compacting (cem. tr. subgd.)	.25	.32	.30	.23	.27	.30
1,200 bbls. Portland cement (cem. tr. subgrade)	3.60	4.25	4.50	4.32	4.00	4.50
8,000 tons untreated rock base	2.95	2.65	2.85	2.50	2.80	3.00
60 tons asph. emulsion (curing seal, paint bdr. and seal ct.)	56 00	35.00	40.00	49.00	43.00	44.00
210 tons screenings (seal coat)	5.00	4.65	5.00	4.90	6.00	4.25
46 tons liquid asph. SC-2 (prime ct.)	26.00	29.00	32.00	38.00	30.00	30.00
7,100 tons mineral aggregate (plant-mix surf.)	4.85	4.75	4.75	5.12	4.70	4.90
380 tons paving asph. (plant-mix surf.)	24.00	27.00	23.00	27.70	25.30	27.00
800 lin. ft. raised bars	1.25	1.00	1.50	1.00	.90	.90
8,500 cu. yd. Cl. "B" Portland cem. concr. (pavemt.)	13.50	13.80	14.00	14.75	14.00	15.00
5,750 ea. pavement tie bolt assemblies	.55	.45	.50	.50	.50	.50
110 lin. ft. timber bridge railing	3.35	3.00	4.00	4.00	5.60	4.00

(Continued on next page)

You should talk to the owner of this truck!



International KB-7 with dump body

THE OWNER of this International KB-7 uses a dozen International Trucks in his engineering work. (Four are dump trucks, 2 flat beds, 1 oil spreader and 5 Concrete Ready-mix.) He knows what they can do, and how well they do it.

He speaks from experience when he says:

> "The new KB-7 dump truck is a pleasure to drive, and has been getting 9½ miles to the gallon of gas under conditions which should use a good deal more—that is, a lot of starting and stopping and short hauls."

And we aren't exactly speaking as amateurs in the business when we tell you this:

International Trucks are the products of 42 years of real truck engineering. They are available in 22 basic models, 1000 truck combinations, gross weight ratings from 4,400 to 90,000 pounds—to give you the truck that's specialized right for your job. And, they're backed by the nation's largest exclusive truck service organization.

Talk to any International Truck owner. Talk to any International Truck driver. Then you'll know why it will pay you to see your International Truck Dealer for the very next truck you buy. Call him soon.

International Harvester Builds McCormick Farm Equipment . . . Farmall Tractors . . . Industrial Power Motor Trucks . . . Refrigerators and Freezers

Tune in James Melton and "Harvest of Stars" NBC, Sunday afternoons

INTERNATIONAL TRUCKS

INTERNATIONAL HARVESTER COMPANY · CHICAGO

Kansas Blueprints Long Term Building Program

A TWENTY-YEAR highway program in Kansas calling for many major reforms has been approved by the Kansas Legislature. The program will require an additional $32,873,000 annually above the cost of the state's present program.

Biggest reform is the provision of a scientific system of road building priorities to eliminate the "pressure system" which is claimed to have brought patchwork development and high maintenance costs. A reclassification of highways will be part of the program. Counties will now be permitted to shift roads from one classification to another as continuing studies indicate changing traffic patterns.

In presenting the program, the Legislature provided a clear definition of the job of the State Highway Commission, and gives the state's highway department clear-cut responsibility for technical and engineering decision. The function of the Commission will now be that of broad policy making without interference in or dictation of the work of the highway engineer in carrying out policies. Kansas has a six-member, part-time commission.

To raise the additional money required for the program, the Legislature raised the state gasoline tax from 3 to 5 cents a gallon, increased the ton-mile tax on trucks, allocated part of the state sales tax to highways, and allocated part of the expected taxes from the new Kansas liquor business to highways. Also, the system of exempting non-highway users of motor fuels from paying state gasoline tax was abolished.

Allis-Chalmers Low Bidder For Ice Harbor Turbines

A BID of $3,542,010 submitted by Allis-Chalmers of Milwaukee, Wis., was lowest of three received by the Corps of Engineers for the design and manufacture of three hydraulic turbines for Ice Harbor Dam on the Snake River in Washington, according to Col. William Whipple, Walla Walla District Engineer.

Baldwin Locomotive Works of Philadelphia bid $3,590,365 and S. Morgan Smith Co. of York, Pa., $3,610,160.

Bids were asked at this time by the Army Engineers to permit work on the powerhouse design for the Ice Harbor project to keep pace with the schedule, Col. Whipple explained. The turbine design and the manufacturer need to be known in order to properly design the powerhouse. The design work now has reached that stage.

Under the government's specifications, the work is divided into two phases, the first covering design and model tests and the second the manufacture and installation. It is understood by the bidders that no fabrication is to be initiated under phase two until funds are made available by Congress and authority to proceed with construction of the dam is received.

330 cu. yd. Class "A" Portland cem. concr. (struct.)	52.00	52.00	60.00	49.00	56.00	48.00
46,000 lbs. bar reinforcing steel	.12	.09	.10	.11	.12	.10
215 cu. yd. Class "A" Portland cem. concr. (curbs)	58.00	44.00	40.00	44.00	46.00	40.00
42 ea. right-of-way monuments	6.25	4.50	7.00	5.00	5.00	4.10
20 ea. center line monuments	18.00	4.50	12.00	5.00	4.50	18.00
1,100 ea. barrier posts	5.25	4.50	4.50	4.40	4.50	4.10
60 ea. instal. met. culvert and mon. markers	2.40	2.50	4.00	3.15	2.00	2.35
1,800 lin. ft. chain link fence	1.20	1.20	1.30	1.40	1.25	1.30
0.8 mile new property fence	900.00	$1,150	$1,200	$1,000	$1,400	$1,400
178 lin. ft. 18-in. corrugated met. pipe (16 gauge)	3.00	3.10	3.70	3.00	3.50	3.15
502 lin. ft. 24-in. corrugated metal pipe (14 gauge)	4.75	4.60	4.50	4.50	5.00	4.55
50 lin. ft. 36-in. corrugated metal pipe (12 gauge)	8.75	8.65	9.00	8.40	9.00	8.85
30 ea. horiz. reflector units	9.00	4.50	4.00	15.00	6.00	11.80
9 ea. timber barricades	61.00	50.00	70.00	45.00	110.00	29.50

Washington—Cowlitz County—State—Grade and Drain

Guy F. Atkinson Co., Portland, Ore., with a bid of $1,084,359, was awarded the contract by the Washington Department of Highways for clearing, grading and draining on 3.595 mi. of Primary State Highway No. 1 along the Kalama River to Longview Wye, Section 2. The work involves about 53 ac. of clearing, 89,000 cu. yd. of common excavation, 615 cu. yd. of solid rock excavation and borrow, 139,000 cu. yd. sta. and 36,000 cu. yd. sta. of overhaul, and 2,230 lin. ft. of drain and culvert pipe. Unit bids were submitted by the following:

(A) Guy F. Atkinson Co. $1,084,359
(B) Peter Kiewit Sons' Co. 1,139,064
(C) Kuckenberg Construction Co. 1,160,458
(D) N. Fiorito Co. 1,162,134
(E) K. L. Goulter & Co. 1,214,927
(F) Leonard & Slate Oreg Ltd., and E. C. Hall Co. 1,280,616
(G) White Bros. Co. 1,290,305
(H) J. N. & M. S. Conley and K. F. Jacobson Co., Inc. 1,295,943

(1) 52.98 ac. clearing
(2) 26.50 ac. grubbing
(3) 89,370 cu. yd. common excav. incl. haul of 600 ft.
(4) 565,760 cu. yd. solid rock excav. incl. haul of 600 ft.
(5) 275 cu. yd. common trench excav. incl. haul of 600 ft.
(6) 49,950 cu. yd. solid rock borrow incl. haul of 600 ft.
(7) 139,760 cu. yd. sta. overhaul
(8) 36,228.82 M. cu. yd. stas. overhaul
(9) 770 cu. yd. excav. of unsuitable foundation matl.
(10) 1,215 cu. yd. structure excav.
(11) 7,225 cu. yd. special struct. excav.
(12) 26 days smooth-wheeled power roller
(13) 26 days tamping roller
(14) 25 days pneumatic-tired roller
(15) 46 days mechanical tamper
(16) 9,290 lin. ft. slope treatment Class A
(17) 254.8 stas. (100) finishing roadway
(18) 127 M gal. water in place
(19) 675 cu. yd. sand filler including haul
(20) 1,270 cu. yd. gravel backfill for foundations in place
(21) 60 cu. yd. gravel backfill for drains in place
(22) 4,905 cu. yd. rock backfill for foundations in place
(23) 980 cu. yd. selected rock material in place
(24) 4,075 tons selected roadway borrow in place
(25) 2,160 tons cr. stone surf.-top crse. in place
(26) 3,435 tons cr. stone surf.-base crse. in place

Type I-1 Asphaltic Concrete Pavement

(27) 102 tons Class C wearing course in place
(28) 248 tons Class E base course in place

Miscellaneous Items

(29) 682 cu. yd. concrete Class A in place
(30) 10.1 cu. yd. concrete Class C in place
(31) 117,800 lb. steel reinforcing bars in place
(32) 400 lin. ft. conc. or V.C. drain pipe 8-in. diam. in place
(33) 48 lin. ft. pl. conc. culv. pipe 12-in. diam. in place
(34) 264 lin. ft. std. reinf. conc. culv. pipe 12-in. diam. in place
(35) 405 lin. ft. std. reinf. conc. culv. pipe 18-in. diam. in place
(36) 297 lin. ft. std. reinf. conc. culv. pipe 24-in. diam. in place
(37) 144 lin. ft. std. reinf. conc. culv. pipe 36-in. diam. in place
(38) 555 lin. ft. std. reinf. conc. culv. pipe 42-in. diam. in place
(39) 28 lin. ft. pl. corr. met. culv. pipe No. 16 ga. 18-in. diam. in place
(40) 2 only pl. corr. met. culv. pipe ells 34° 18 in. diam. in place
(41) 96 lin. ft. bit. coat. corr. met. pipe T. No. 2, No. 16 ga., 8-in. diam. in place
(42) 12 lin. ft. relaying conc. pipe 12-in. diam.
(43) 3,110 lin. ft. removing existing guard rail
(44) 1,556 sq. yd. removing exist. cem. conc. pave.
(45) 812.5 lin. ft. std. bm. gd. rail. ty. No. 1 or No. 2, Des. No. 6, in place
(46) 71 only, reinf. conc. right-of-way markers in place
(47) 4 cu. yd. hand placed riprap in place

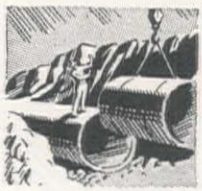
	(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)
(1)	490.00	385.00	750.00	500.00	580.00	750.00	600.00	350.00
(2)	200.00	450.00	400.00	400.00	500.00	400.00	250.00	350.00
(3)	1.02	.90	.40	.50	.38	1.10	.50	1.20
(4)	1.02	.90	1.20	1.14	1.22	1.10	1.35	1.20
(5)	3.00	2.00	5.00	3.00	1.00	2.00	3.00	3.00
(6)	.95	.90	.90	1.10	1.22	1.10	1.00	1.20
(7)	.015	.02	.02	.02	.02	.02	.02	.02
(8)	4.25	8.85	5.00	6.00	6.00	8.00	6.00	7.00
(9)	.80	2.00	2.00	2.00	2.00	1.00	4.00	3.00
(10)	6.00	3.35	4.00	3.00	3.00	3.00	4.00	3.00
(11)	1.10	1.50	2.50	1.50	1.00	2.00	3.00	2.00
(12)	95.00	65.00	40.00	50.00	80.00	60.00	40.00	48.00
(13)	105.00	65.00	20.00	25.00	80.00	75.00	70.00	90.00
(14)	60.00	50.00	20.00	50.00	80.00	75.00	50.00	55.00
(15)	44.00	35.00	2.00	40.00	40.00	35.00	30.00	35.00
(16)	.20	.20	.25	.25	.20	.20	.20	.20
(17)	25.00	25.00	20.00	20.00	20.00	16.00	18.00	14.00
(18)	5.00	2.00	3.50	2.00	3.00	3.00	3.00	2.00
(19)	5.00	1.90	3.50	3.00	4.50	2.50	3.00	3.50
(20)	5.50	2.60	3.50	5.00	5.00	3.00	3.00	3.00
(21)	7.00	5.00	4.50	5.00	5.00	6.00	3.00	5.00
(22)	2.80	1.35	2.50	2.00	2.50	2.00	3.00	3.00
(23)	9.00	1.75	3.00	1.50	3.00	3.00	3.00	5.00
(24)	1.20	1.55	2.50	1.50	2.00	2.50	2.00	2.30
(25)	3.70	4.00	3.00	2.75	3.00	3.50	3.00	3.30
(16)	3.50	3.70	3.00	2.75	3.00	3.50	3.00	3.30
(27)	15.00	14.50	14.00	15.00	15.00	13.00	11.00	12.50
(28)	15.00	14.50	14.00	15.00	15.00	13.00	11.00	12.50
(29)	65.00	52.00	65.00	65.00	65.00	60.00	60.00	55.00
(30)	90.00	77.00	65.00	100.00	65.00	70.00	60.00	75.00
(31)	.12	.125	.11	.15	.13	.12	.12	.13
(37)	1.70	1.50	1.00	1.55	1.00	1.50	1.60	1.00
(33)	2.25	2.00	1.75	2.70	1.50	2.00	2.00	1.70
(34)	2.75	2.40	2.25	3.00	2.50	2.50	2.30	2.30
(35)	5.00	3.85	3.25	4.25	3.50	4.00	3.85	4.00
(36)	7.00	5.55	4.50	5.50	5.50	5.50	5.50	6.00
(37)	11.00	10.00	9.00	8.00	10.00	8.00	12.00	10.50
(38)	14.00	14.00	12.50	12.50	15.00	11.00	15.00	14.50
(39)	4.50	5.00	3.00	5.00	3.25	5.00	4.00	3.00
(40)	35.00	20.00	20.00	20.00	20.00	25.00	17.00	20.00
(41)	2.75	2.50	2.00	7.00	2.00	2.25	2.00	2.00
(42)	3.00	2.00	1.50	2.70	1.00	2.00	1.30	2.00
(43)	1.30	.50	.50	.75	1.00	.75	1.00	.40
(44)	.75	.45	.50	1.00	1.00	1.00	1.00	.50
(45)	3.60	3.90	3.50	3.00	3.50	4.50	3.00	4.00
(46)	7.50	6.00	15.00	10.00	6.00	10.00	5.00	8.00
(47)	20.00	15.00	20.00	25.00	10.00	25.00	10.00	10.00

They had a Problem..

STANDARD

BRICK MIX

POZZOLAN



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The FRED J. EARLY, JR. COMPANY, Inc., General Contractors on the Redwood City (Cal.) Sewage Disposal Plant, were faced with an unusual problem in concrete construction. The concrete in this 4,000,000 gallon capacity plant would not only be exposed to the corrosive effects of the sulphates and nitrates normally present in sewage, but because of a large tannery in the immediate vicinity, the soil surrounding the concrete feed pipe and booster-pump housing was saturated with tannic acid from the tannery wastes discharged nearby. It has been shown that exposure to tannic acid causes serious deterioration in concrete made of ordinary types of cement.

Because of the problem involved, FROST & BRIAN, of Redwood City, Designing Engineers of the Project and HARRY N. JENKS, of Palo Alto, Consulting Sanitary Engineer, specified concrete made of PERMANENTE SULPHATE RESISTANT Portland Cement; a specially made cement for use where alkali, acid or sulphate reactions are encountered.

PERMANENTE SULPHATE RESISTANT Portland Cement conforms to A.S.T.M. Specifications C-150, Type V, and Federal Specifications SS-C-192, Type V.

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NEW EQUIPMENT

MORE COMPLETE INFORMATION on any of the new products or equipment briefly described on the following pages may be had by sending your request to Equipment Service, Western Construction News, 503 Market Street, San Francisco 5, Calif. For quicker service, please designate the item by number.

501

Tilt-Type Trailer

Manufacturer: C. R. Jahn Co., Savanna, Ill.

Equipment: Low-price trailer of 3-ton capacity.

Features claimed: Model JT-203 Tilt Trailer was expressly designed to haul the Buckeye Model 40 Ditcher, and also

handles other pieces of small equipment such as mixers, compressors, and tractors. An important feature is a platform height of only 14½ in., which keeps the loading incline at the minimum when the platform is tilted. No jacks or loading ramp are required. The balance of the platform makes one man operation possible, and an automatic safety lock holds the platform in position when loaded or empty. Other features include a 56 by 132-in. platform, dual wheels, and four 6.50/20 6-ply tires. The Jahn Trailer can be used behind any standard ½-ton truck with a standard pintle hook. Approximate weight of the trailer is 1800 lb. Standard equipment includes reflectors, safety chains, lash rings, and standard highway orange paint.

502

Concrete Joint Sealing Strip

Manufacturer: Servicised Products Corp., Chicago, Ill.

Equipment: Pre-molded Para-Plastic for vertical and overhead concrete joints.

Features claimed: The rubberized asphalt sealing strip is a development of the hot-poured Para-Plastic, used in the construction of highways, airport runways, dams, reservoirs, and wherever water and vapor-tight seal of joints is needed. The sealing strip can be nailed directly to the concrete form, or heated until tacky and applied directly to concrete. It may be prepared for application also by freshening with kerosene or gasoline.

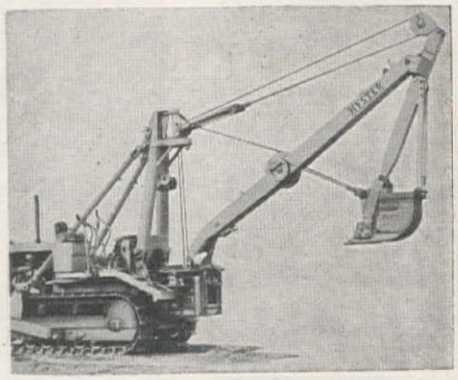
503

Hoe Front

Manufacturer: Hyster Co., Portland, Ore.

Equipment: Hyster Hystaway ½-cu. yd. hoe front.

Features claimed: Installation of the hoe front on the D7 and D8 Hystaway can be



accomplished without major alterations to existing machines. The hoe dipper has a cutting width of 33 in., and for narrow ditching requirements an optional dipper of 23-in. width may be substituted. The hoe with its fast swing and abundance of power has proved to be an exceptionally speedy excavator in all classes of digging. Because the center of swing is beyond the crawlers,

CLEVELANDS *are so versatile— so fast—so easy to handle—so rugged— so economical—*

THAT THEY **PAY OFF** ON ALL TYPES OF TRENCHING—LONG LINES—SHORT LINES—CONDUIT—DRAINAGE—IRRIGATION....

CLEVELANDS have attained this unsurpassed performance because built into them are such essential characteristics as:—wheel-type design—full, wide crawlers—all-welded frame and boom—unit-type construction—extreme compactness—absence of dead weight—more than 30 transmission-controlled speed combinations—all controls within instant reach of operator with work always visible—ample power, correctly applied. Call your CLEVELAND distributor or write direct for details and specifications.

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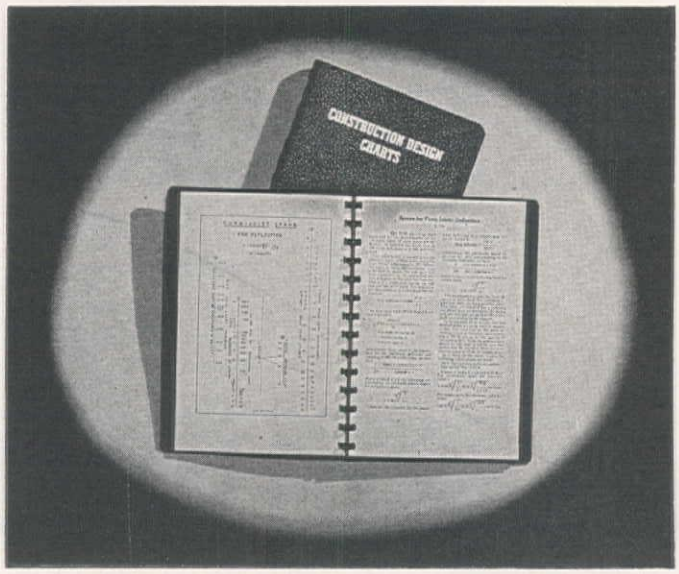

This is the fourth reprinting of CONSTRUCTION DESIGN CHARTS, and greatly enlarged over all previous editions. Contains 100 design charts and 215 pages filled to the brim with valuable information that is a sure-fire hit with construction men. Handsomely bound in sturdy black Fabrikoid with gold stamped letters. A special metal binding allows each page to lie flat for easy reference.

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the hoe can reach farther into the excavation than other conventional machines of comparable size. Quick change over from one front end attachment to another is easily accomplished. Utility use of the bulldozer is possible even with the Hystaway installed, and it takes only one hour to dismount the Hystaway to allow full production bulldozer use. The entire unit may be mounted on the tractor in about two hours, following the initial installation.

504

Lull Traveloader

Manufacturer: Lull Manufacturing Co., Minneapolis, Minn.

Equipment: Combined loader, carrier, and motor truck.

Features claimed: Available in three models, 3, 10, and 30 thousand pounds lifting capacity, the Lull Traveloader self-loads from the side onto the carrying deck and then transports its load through narrow aisles or over the road. The loader operates at speeds up to 30 m.p.h. and features four wheel drive, full hydraulic control, and full power hydraulic loader operation. The unit is a combined loader, carrier, and motor truck.

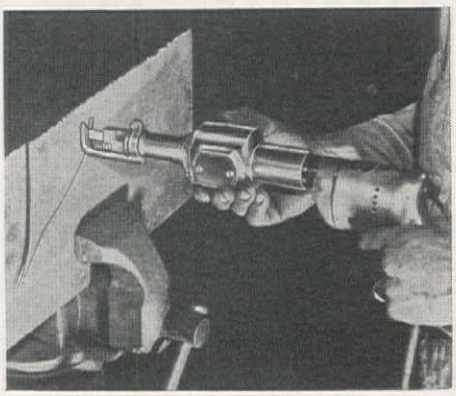
505

Portable File and Power Saw

Manufacturer: Producers and Distributors, Inc., Oakland, Calif.

Equipment: Redesigned Key-Hack portable power saw with file attachment.

Features claimed: Key-Hak attaches to consumer's own electric or air drill or motor driven flexible shaft of either ¼ in. or 5/16 in. Jacob's Chuck capacity. This new unit is finished in triple chrome plate, weighs less than 4 lb., and is 11½ in. in length with no bulkiness, so as to require a minimum of space to operate. It is a sturdy heavy-duty unit and can be subjected to extremely rough use. Key-Hak has proved to be an asset in maintenance and repair, auto body work, sheet metal work, truck and trailer manufacture, structural steel work, and similar industries. Key-Hak will quickly cut through all metals, including plate stock, with ease and accuracy for both straight line and radius cuts. It will leave a clean, burr-free finish without bending or stretching material.



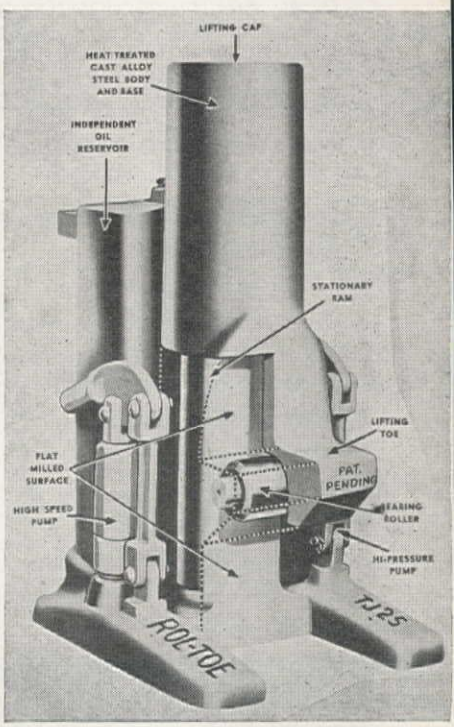
506

Hydraulic Jack

Manufacturer: Wm. S. Pine Co., Los Angeles, Calif.

Equipment: Heavy duty "Rol-Toe" jack.

Features claimed: The heavy duty 25-ton hydraulic jack employs a new principle for increasing the lifting capacity on the toe of the jack. The ram itself is stationary and is part of the base of the jack. The body of the jack is the moving part and performs the lift. When lifting by the toe, the lateral or off-set stress is carried on the steel roller which moves along the flat milled surface of the stationary ram. The result is that the Rol-Toe jack has the same lifting capacity at the toe as it has at the cap. It is provided with two hydraulic pumps, one for high speed, the other for heavy duty. The oil reservoir is separate from the hydraulic cylinder so that no pressure is imposed on the reservoir. This eliminates a frequent cause of leakage. The illustration shows a cutaway view in which may be seen the flat surface of the stationary ram and the roller which increases greatly the toe lifting capacity. The jack operates equally well in either horizontal or perpendicular position.



507

New Twin-Diesel "Euc"

Manufacturer: Euclid Road Machinery Co., Cleveland, Ohio.

Equipment: Tandem-axle rear-dump Euclid Model FFD.

Features claimed: The new model FFD is powered by two Diesel engines, mounted side by side, of 190 h.p. each for a total of 380 h.p. Each of these engines drives one of the rear axles through a torque converter and torqmatic transmission, thus eliminating the conventional inter-axle power divider. There is no clutch pedal or manual shifting of gears, the operator can change to the proper gear under full power at any travel speed. Top speed with full 68,000-lb. payload is 25.4 m.p.h., and total braking surface is 1620 sq. in. The two planetary drive axles, with reductions at each wheel, are mounted on free floating springs; this mounting prolongs spring life because it eliminates twisting of the leaves on rough roads. Improved steering geometry and hydraulic booster steering make this big "Euc" exceptionally easy to handle in close quarters; steering brakes on the drive wheels permit very short turns for a tandem axle unit. Payload capacity is 20 cu. yd. struck and 34 short tons.

New LIGHTWEIGHT ELECTRIC PLANT

5000 WATTS D.C.

Weighs only 315 lbs.!

Model 5CK-115M, 5,000 watts, 115 volts D.C.

Use fast-working electrical tools on any construction or maintenance job with this high capacity, portable, compact electric plant. Equipped with four-receptacle box for direct plug-in of tools or lights. Available with carrying frame, or dolly-mounted. Powered by Onan 10 HP, two-cylinder, 4-cycle, air-cooled engine. Shipped complete . . . ready to go!

NEW ONAN "CK" ELECTRIC PLANTS are available in 5000 watts D.C., 115 and 230 volts; 2000 and 3000 watts A.C. in all standard voltages.
COMPLETE ELECTRIC PLANT LINE INCLUDES: A.C.—350 to 35,000 watts in all standard voltages and frequencies. D.C.—600 to 15,000 watts, 115 and 230 volts. Battery Chargers—500 to 6,000 watts, 6, 12, 24, 32 and 115 volts.
ONAN AIR-COOLED ENGINES—CK: 2-cylinder opposed, 10 HP. BH: 2-cylinder opposed, 5½ HP. IB: 1-cylinder, 3¼ HP.

Onan PRODUCTS

Write for catalog

D. W. ONAN & SONS INC.
6125 Royalston Ave., Minneapolis 5, Minn.

ONAN ELECTRIC PLANTS

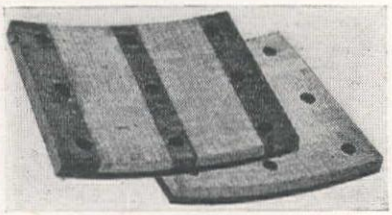
508

Brake Blocks

Manufacturer: Gatke Corp., Chicago, Ill.

Equipment: Combination woven and molded brake blocks.

Features claimed: Originally developed to meet the requirements of flame hardened



drums, MW brake blocks are a combination of quick, positive-acting woven asbestos and smooth, non-grabbing moulded asbestos. The blocks are non-compressible and the moulded backing provides secure anchorage for bolt heads.

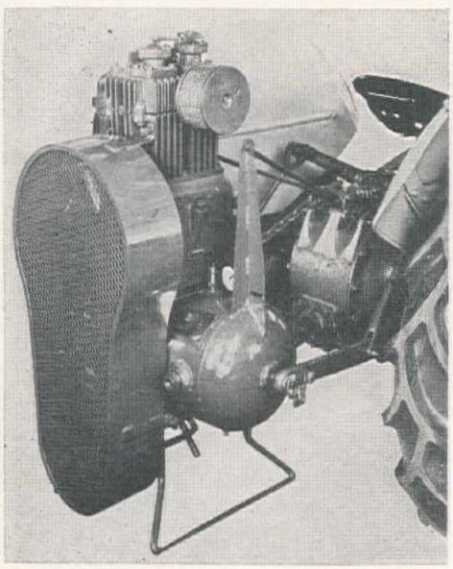
509

Air-Compressor Units

Manufacturer: Miller-Robinson Co., Los Angeles, Calif.

Equipment: Compressor units for direct attachment through universal joint couplings to tractor power take-offs.

Features claimed: The new units, identified as Models PTO-3F and PTO-5F, with displacements of 17 and 30 cu. ft. per min., respectively, can be attached to the regular linkage of Ford and Ferguson tractors and hydraulically equipped Jeeps, and are easily adapted to other makes by use of simple brackets. Relatively light and port-



able, they can be used in place of cumbersome and expensive engine-driven compressors for a wide variety of air-operated equipment such as lifts, air-hoes, shovels, light jack-hammers, etc.

510

Dry Transformer

Manufacturer: Marcus Transformer Co., Inc., Hillside, N. J.

Equipment: Dry type distribution transformer.

Features claimed: No inflammable oil or toxic liquids are present in the air-cooled type ACO transformer. The use of superior class B and C insulation such as fibreglass, mica, porcelain, and similar inorganic materials results in a transformer that can withstand the overloads that normally would damage an ordinary class A (cotton and paper) insulated oil filled unit. The type ACO is currently available in sizes to 100 kva. and voltages to 5,000 volts.

511

Power Concrete Cart

Manufacturer: Gar-Bro Mfg. Co., Los Angeles, Calif.

Equipment: Gasoline engine-powered cart that climbs 20% grades with a 2000-lb. load.

Features claimed: The new model cart is powered by a 7-h.p. 4-cycle gasoline engine, and has improved design in the frame, clutch, and roller bearings. Steering is done by a tiller which turns the rear wheel through a 180-degree arc, allowing the machine to turn on a 4-ft. radius. The cart is of welded steel plate and tube, 85 in. long and 39½ in. wide, and will side dump on standard 5-ft. runways. Concrete capacity is 9 cu. ft., or with side boards is 12 cu. ft. A chain drive gives speeds of 8 to 10 m.p.h. Empty weight is 685 lb.

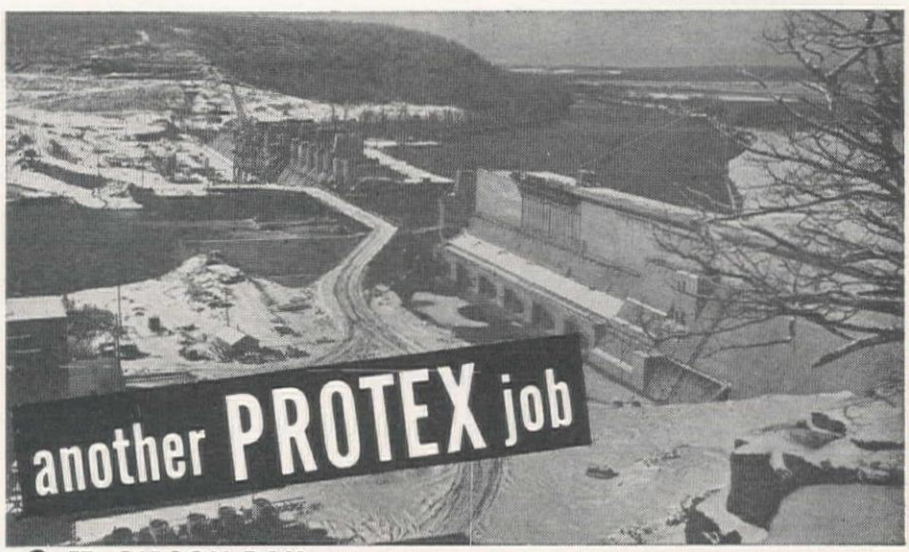
512

Diesel-Powered Trucks

Manufacturer: International Harvester Co., Chicago, Ill.

Equipment: Two new models for heavy-duty operation.

Features claimed: Models KBD-12 and KBRD-14, with Gross Vehicle ratings of 31,500 and 35,000 lb. respectively, are available in wheel bases from 155 to 215 in. Power plant of the new models is the new



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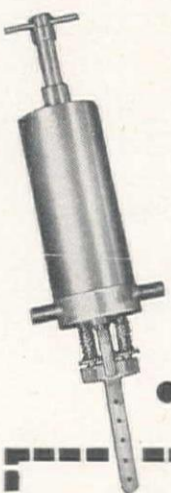
More and more concrete is being placed using *Protex* Air Entraining Solution . . . on jobs where it is desired to have economical placement of *good, durable* concrete.

AEA Pays for Itself Protex Air Entraining Agent more than pays for itself because it reduces the amount of fine, expensive sand required, gives increased yield . . . and speeds up the job through improved workability and placability of concrete, saving both time and labor.



Produces Good, Durable Concrete Concrete placed with Protex Air Entraining Agent gives resistance to freezing and thawing, cracking and spalling; reduces bleeding of water from mix; keeps segregation of aggregate to a minimum; increases slump for any given water-cement ratio; decreases sag on slopes; allows smoother, faster finishing; increases resistance to sulphate corrosion.

Uniform, Accurate Control with Protex Protex is a completely saponified air-entraining solution that *cannot settle out* under any condition . . . and will not gum up the dispenser. Thus, Protex is always the same and you are assured of uniform, accurate control. Approved and used by governmental agencies

Protex . . . fully approved under ASTM C-175-48T and Federal spec. SS-C-192

● **LOW COST PROTEX DISPENSER . . . *AUTOMATICALLY* DISPENSES PREDETERMINED AMOUNT OF AEA.**

FREE BOOK ON AIR ENTRAINMENT

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Industrial & Research Division, Denver 9, Colorado

Please send me your book, "Facts on Modern Placement of Concrete Through Air Entrainment."

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*Address*_____

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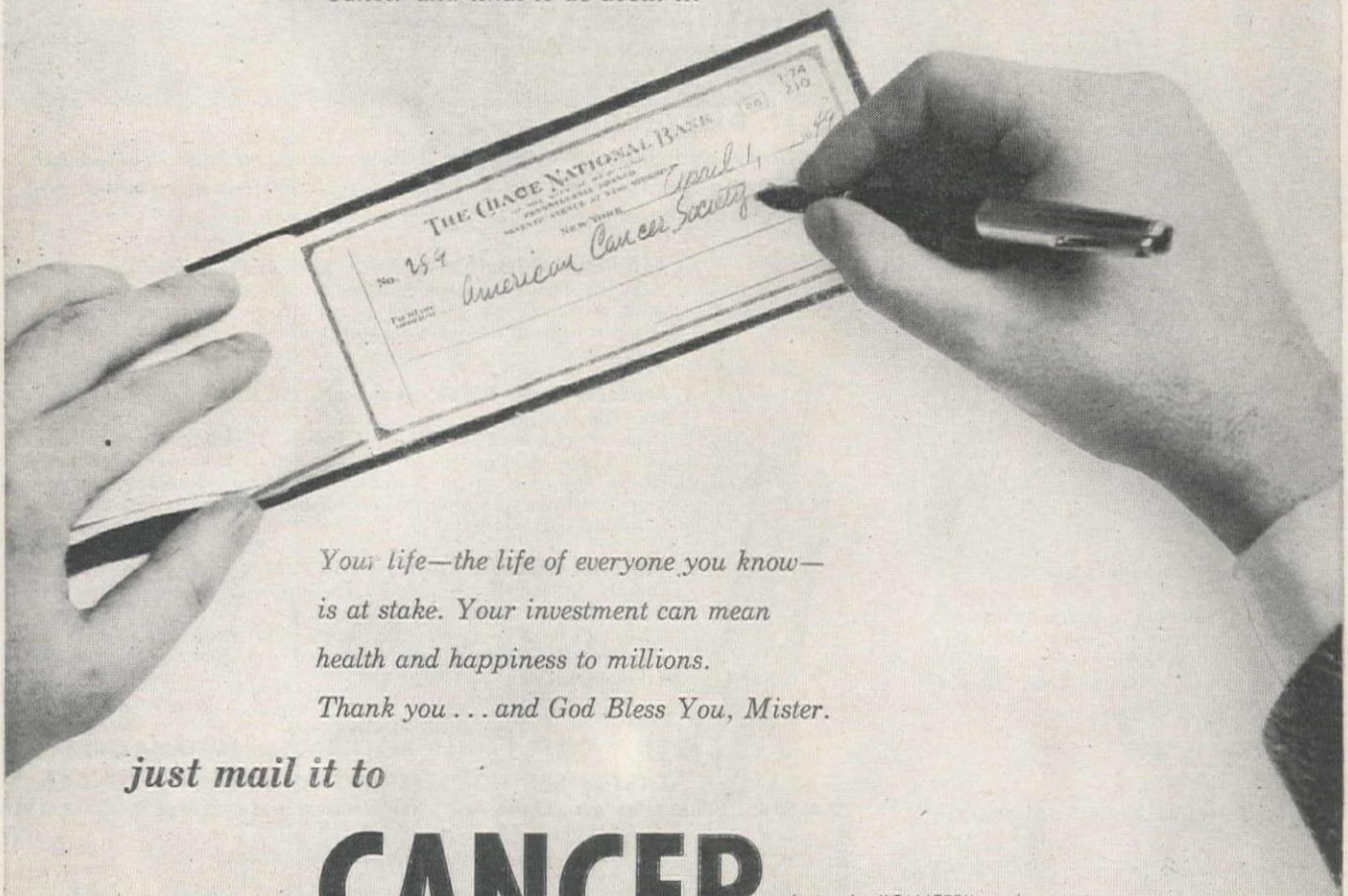
...thousands of Cancer patients are grateful to you!

Cancer's annual toll of 200,000 lives is grim proof of the need for your continued generosity. The money you contribute to the American Cancer Society helps pay for the development of methods of treatment which are now saving about one-quarter of the people who are stricken with Cancer... people who might otherwise have died. Your money supports the work of more than a thousand specialists who are fighting to find the cause and cure of Cancer. And it finances a vast education program that trains professional groups, tells the public how to recognize Cancer and what to do about it.



Your life—the life of everyone you know—is at stake. Your investment can mean health and happiness to millions. Thank you... and God Bless You, Mister.

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CANCER

Just write "CANCER" on the envelope containing your contribution. It will be delivered to the American Cancer Society office in your state.

HRB-600 Cummins Diesel, which develops 165 maximum horsepower at 1800 r.p.m. The new engine has a 5⅛-in. bore, 6-in. stroke and a displacement of 743 cu. in. Transmissions of both models are of the five forward speed type with either direct in fifth or overdrive fifth speed. These new Internationals are designed to meet the rigid requirements of heavy-duty operators requiring more power, improved performance and maximum fuel economy.

513

Anti-Rust Paint

Manufacturer: Speco, Inc., Cleveland, Ohio.

Equipment: Rustrem Super Aluminum Paint.

Features claimed: The new paint utilizes a recently developed aluminum paste, giving an aluminum content approximately double that of many aluminum paints. It

is guaranteed to "leaf" on all surfaces and will not turn brown under adverse weather conditions. Super Aluminum can be applied right over rust without wire brushing or scraping. It penetrates and seals the surface, preventing further rust action. It is suitable for both interior and exterior use and is furnished in proper consistency for either brush of spray application.

514

Bantam Truck-Mounted Unit

Manufacturer: Schield Bantam Co., Inc., Waverly, Iowa.

Equipment: Combination shovel, hoe, dragline, clam, piledriver, crane.

Features claimed: The new Bantam model M-49 is a truck-mounted unit that combines six machines in one, with interchangeable booms and buckets, and is easily converted from shovel to trench hoe, dragline, clam, piledriver, or crane. It mounts on any 1½-ton truck chassis or larger and is also available on half-trucks. The new model is offered with an independent spur gear drive boom hoist that permits the boom to be powered up or down, or lowered on the brake for fast operation. Engineering features include Timken tapered roller bearing mounting of jack, drum, and swing shafts. Drums, swing gears, and vertical swing shaft roll on pre-lubricated, sealed-for-life ball bearings. Sealed-in triple roller chain drive runs in an oil bath. Improved hook roller design incorporates three larger adjustable cam hook rollers, and redesigned turntable rollers have larger axles and bushings. Machined bull gear is bolted in place and may be rotated if necessary to distribute wear. Additional features are the new cab design that improves visibility and gives greater convenience in servicing, simplified controls, and a heavy duty 14-ft. trench hoe boom with cast steel head permitting larger, stronger axle and bushing to compensate for twisting strain. The machine has a capacity of 60 cu. yd. per hour when used as a shovel or dragline. Crane capacity is five tons.

515

Air-Powered Cranking Motor

Manufacturer: Leece-Neville Co., Cleveland, Ohio.

Equipment: Starter motor for heavy engines.

Features claimed: Weighing only 43 lb., the new product occupies no more space than does an electric starter and can be installed with the same three bolts used for

DAREX AEA
THE APPROVED AIR ENTRAINING AGENT
has an unsurpassed background of 17 years of research in co-operation with the cement industry. It is fully approved by government agencies and has the outstanding record of successful usage in over 60,000,000 cubic yards of concrete in every type of construction, with every type of aggregate—in concrete blocks and pipe.

Specify DAREX AEA
It does a better job for less!

NOTHING BUT...
AIR ENTRAINED CONCRETE

The U. S. Bureau of Reclamation uses *nothing but air entrained concrete*, and a majority of the highway departments in the nation have tried, adopted and NOW REQUIRE *air entrained concrete*. These significant facts were firmly established at a session of the American Concrete Institute Convention held recently in New York. *And furthermore* . . . it was unanimously agreed by all ten speakers who covered the subject, that air entrained concrete saves costs, completely resists pavement scaling from salt treatment, reduces volume change in mass concrete, is more workable and cures and finishes more easily.

THAT'S THE DAREX AEA STORY—THAT'S WHY . . .

DAREX AIR ENTRAINED CONCRETE actually *costs less* than ordinary concrete, because the small initial cost of *Darex AEA, only a few cents per cubic yard of concrete, is offset many times over by savings in time, labor and materials. You get more uniform, durable concrete and effect substantial savings when you use Darex AEA!

ASK YOUR NEAREST DEALER ABOUT DAREX:
Pacific Coast Aggregates, San Francisco; Blue Diamond Corporation, Los Angeles; Denver Fire Clay Co., Salt Lake City; Baker-Thomas Lime & Cement Co., Phoenix; Ray Corson Machinery Co., Denver; Mason's Supply Co., Portland; Darco, Inc., Great Falls; Hawaii Builders Supply Co., Honolulu.

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Darex AEA Distributors for Dewey & Almy Chemical Corporation in 11 Western States, Alaska & Hawaiian Islands.
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AGGREGATE SCREENS TO FIT ANY MACHINE

Rely upon Pacific 4-S Aggregate Screens and you need never worry where or how to get screens for your machines. Here at Pacific Wire Works Company, we maintain a complete library of catalogues and specifications covering all makes of vibrators, shakers, cones, cylinders. Just tell us your make and model and we'll have a screen for you in a hurry . . . a Pacific 4-S screen, made right for long life and maximum output. Insist on 4-S.

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mounting the latter. One motor can crank engines up to 1000 cu. in. displacement under average conditions. Two motors may be used for larger engines. It is well adapted to use in the heavy construction industry where sufficient compressed air is nearly always available on the job, and where gasoline or electric starters may not be available.

516

Electric Shovel

Manufacturer: Marion Power Shovel Co., Marion, Ohio.

Equipment: Marion 93-M Ward-Leonard all-electric shovel.

Features claimed: The 93-M Ward-Leonard machine, which carries a 2½-cu. yd. dipper and 28-ft. boom as standard equipment, is designed for heavy-duty, long-life service on a variety of excavating jobs in the coal, quarry, metal mining and heavy construction industries. It is being presented as a "sister" shovel of the Marion 93-M Diesel machine. Smooth operation of the new electric shovel results from the fact that all motions are electrically controlled. Swing machinery is powered by a separate vertical motor, directly geared through two intermediate shafts to the main swing shaft, which is mounted on the upper frame structure. The hoist machinery is powered by a separate motor, first through a silent chain reduction to the intermediate shaft, and then through a single gear reduction to the drum shaft. A separate motor directly geared through an intermediate shaft to the shipper shaft supplies power for the crowd machinery. The motor-generator set on the new shovel consists of an induction driving motor directly connected to three direct current generators in line, and an exciter, al mounted on a self-supporting base. Eac generator is of the Ward-Leonard typ designed for variable voltage control. Th motors themselves are the latest mill type 600-line, shunt wound, 230-volt, direct cur rent, and possess exceptionally low arma ture inertia and high overload capacity They are designed especially for extreme fast-reversing service.

517

Portable Saw

Manufacturer: Chicago Pneumatic Too Co., New York, N. Y.

Equipment: Electric circular saw to cu many materials.

Features claimed: Models 944, 964, and 974 "Hi-Speed Saws" have respective capacities of 2-7/16, 2-13/16, and 3¼ in. and are not limited to wood. Blades are also available for cutting through nails copper, brass, lead, tile, glass, brick, clay products, concrete, marble, flagstone, as bestos, cement products, and Celotex. Al

sizes have the following features: Helica gears permit high blade speeds without re quiring frequent application of specia lubricants. Depth of cut is easily adjuste from zero cut to full capacity. Angle of cu is adjustable from 35 degrees to straigh 90-degree cut. Automatic telescopin safety guard turns on ball bearings as d all other rotating parts. Blade is a worker's right, allowing saw to be used i same manner as a hand saw. Operator ha clear vision of cutting line which is kep clean by air blast from motor's exhaus Cuts within one inch of a wall are possibl All units are furnished with metal carry ing case, rip fence, and 15 ft. of cord.

518

Automatic End Finishing Machine

Manufacturer: Pines Engineering Co Inc., Aurora, Ill.

Equipment: Automatic air operation fo tube and rod deburring.

Features claimed: The small benc model machine designed to operate on th Pine Co. Series 600 tube and rod end finis ing machine uses a foot switch operate air cylinder, leaving the operator's hand free to handle work up to 2 in. in diamete at production speeds of 800 to 1200 tub ends an hour. A vertical mounting base available as an optional accessory whic permits gravity unloading of short wor

ieces so that all the operator is required to do is load the chuck. 'he patented chuck and work-feed action is taken from direct ull of the air cylinder and provides rapid forward and reverse ravel of work to the tool with an adjustable control for feed peed and depth of cut. The high degree of flexibility is indiated by the 60-sec. change-over time of the replaceable chuck aw inserts and threaded tool holder to fit work diameter. A election of eight spindle speeds are obtained from the step heave V-belt drive to secure maximum tool efficiency for any vork diameter within the 2-in. maximum range of the machine. 'ooling can be furnished for such other end finishing operations s center drilling, rod chamfering, drilling, reaming, pointing nd boring, in addition to tube deburring.

519

Aluminum Jack Supports

Manufacturer: Templeton, Kenly & Co., 'hicago, Ill.

Equipment: Simplex standard and alu- inum speed journal jacks.

Features claimed: Made of aluminum lloy, this jack support can be used either s shown or inverted. The companion ournal jack features heavy duty chrome- olybdenum steel thrust bearings, and eat-treated steel elevating sleeve and ears. These journal jacks are for inspect- ig and renewing railway journal brasses, ridge builders, tank and structural steel uilders, shipbuilders, and all other indus- ies where powerful jacks of low height re required. The Simplex aluminum jack upport is especially designed to replace ooden wedge supports and has a two-way pright or inverted use. Weighing 8¾ lb., ie support is light, and ease of placement akes it adaptable on high scaffolds.

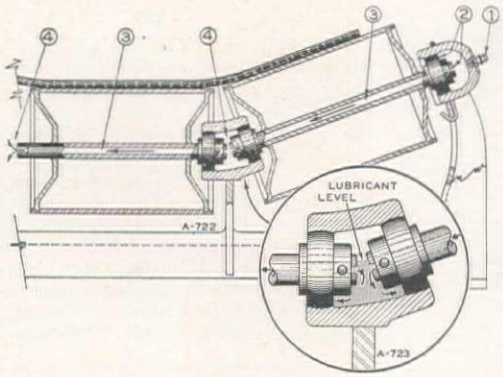
520

Conveyor Carrier

Manufacturer: Stephens-Adamson Co., Los Angeles, Calif.

Equipment: Sealmaster ball bearing belt conveyor carrier with ne-shot lubrication.

Features claimed: The new carriers are rigid, one-piece, welded teel frames, designed to tilt in the direction of the belt travel



nd keep belt centered without need for guide rollers. An in- erted angle base and specially designed end brackets shed ma- rial and keep rollers free. Removable rollers and bearing hous- igs are quickly and easily replaced or interchanged without ools. Six permanently sealed self-aligning Sealmaster ball bear- ig units, independent of their housings, are arranged for one- ot lubrication from either side of the carrier.

521

ong Boom Truck Crane

Manufacturer: Harnischfeger Corp., Milwaukee, Wis.

Equipment: Truck Crane with 155-ft. boom and jib combina- on.

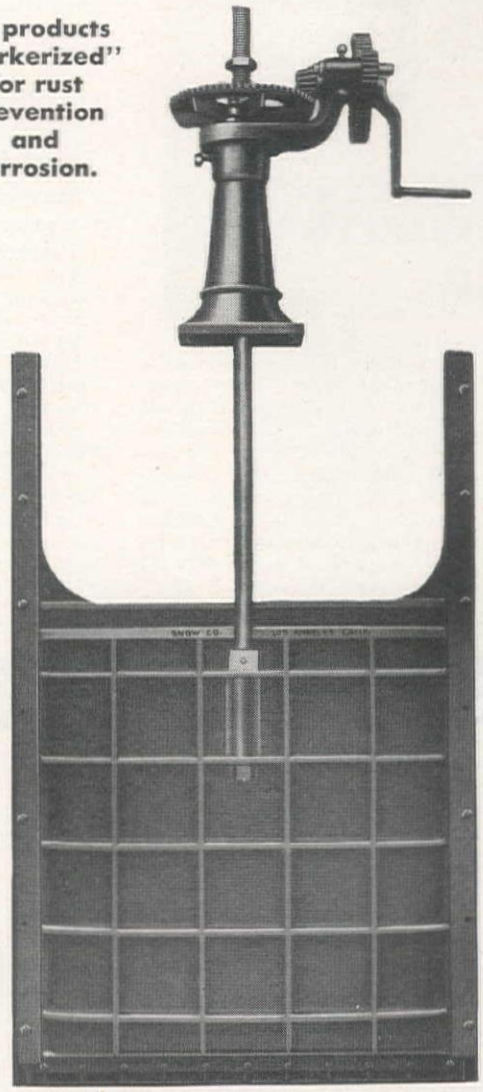
Features claimed: The photograph shows a P & H Model 55-A truck crane with 135-ft. boom and 20-ft. jib (without out- ggers) placing steel on a 148-ft. tower. Erection Supt. R. An- erson rigged the crane, which is owned by Taylor & Gaskin, ontractor handling the steel contract. Another crane was used raise the boom until it reached a 45-degree angle, after hich the P & H completed elevation of the boom. Outriggers ere not necessary because of the machine's good stability,

SNOW HEAVY DUTY INDUSTRIAL GATES

Gates manufactured in sizes up to 72" by 72".

Designs in all cast-iron specifications.

All products "Parkerized" for rust prevention and corrosion.



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Our Engineering Service is available to assist you with your problems. We will be pleased to help you and to quote on any type of water controlling equipment.

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even when making 360-degree swings with a 2-ton load, operating at a 15-degree radius. Design of P & H truck cranes provides greater safety with independent

planetary boom hoist. This mechanism is entirely independent of all other operations and prevents the boom from dropping while raising or lowering. Additional stability is provided by the P & H torsional bar front axle construction. This feature provides greater flexibility in handling loads more safely; snubs front end tipping action, and equalizes the load on the spring while craning. The steel structure shown is to be a church tower.

522

Mixer Chassis

Manufacturer: Available Truck Co., Chicago, Ill.

Equipment: Chassis for truck mixers and agitators.

Features claimed: Four models are available and have the following features: High tractive effort for delivery to remote forms, cab-over-engine design for smaller turning radius and better weight distribution, ample highway speed, and readily obtainable component parts. Wheelbases on all models provide for a minimum of 18 in. between back of cab and mixer, assuring access to auxiliary engine on mixer at all times.

523

Trench Jack

Manufacturer: Acrow, Inc., New York.

Equipment: Adjustable steel trench jack.

Features claimed: The jack is designed primarily for lateral strutting in trench excavations, eliminating the costly cutting of lumber and resultant wedges and nailing. The adjustment feature of the jack, a screwing action, consists of a nut located over a square-cut thread, four threads to the inch, which activates a pin passed through the slot in the outer section, and through closely spaced holes in the inner section. The jack is manufactured in three sizes which cover a range of adjustment from 1 ft., 6 in. to 5 ft., 6 in., and has end plates especially designed to insure positive and safe fixture in trench walings. The jacks are placed in position by one man.

LITERATURE FROM MANUFACTURERS...

Copies of the bulletins and catalogs described in this column may be had by addressing a request to the Western Construction News, 503 Market Street, San Francisco 5, California.

524

DIESEL ENGINES—**Sheppard Diesels Co.,** Hanover, Pa., has released a 16-page booklet describing many of their current model engines and listing both standard and optional equipment. The booklet features diagrams and photographs, specifications, and a graph of power curves for nine models.

525

POWER WHEELBARROW — The **Kwik-Mix Co.,** Port Washington, Wis., a subsidiary of the Koehring Co. of Milwaukee, Wis., recently published a four-page catalog describing the Moto-Bug, a new power wheelbarrow. The catalog features pictures and diagrams of the unit and attachments for application in construction and industrial work. Design and performance data of the 4-h.p., 2 or 4-m.p.h. forward or reverse, 10-cu. ft. or 1200-lb. wheelbarrow are included.

526

POWER JACK—Industrial lifting and lowering jobs, sinking piling, and locomotive and ship repairing are a few of the applications of Duff-Norton air motor power jacks which are illustrated in a colorful eight-page bulletin recently issued by the **Duff-Norton Mfg. Co.,** Pittsburgh, Pa. The bulletin also includes a detailed explanation of the construction and safety features of the jacks, and separate sections are devoted to the specific application and over-all specifications of the 20-ton, 50-ton, and 75 to 100-ton capacity air motor power jacks.

527

DIESEL INFORMATION—Just off the press is a liberally illustrated catalog featuring Mack Truck's newly designed 4-cycle, 6-cylinder, 150-h.p. Diesel engine, the END 672. The text, accompanied by drawings and photographs, presents the new Diesel engine in a non-technical manner, showing the advantages of automatic timing, controlled combustion, and controlled fuel distribution. A companion piece to the above catalog is a highly readable booklet entitled "Understanding the Automotive Diesel." Opening on a general theme involving a brief history of the

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Save it with the
FOOTE KINETIC ASPHALT MIXER

Asphalt is the expensive item in your asphalt mix problems. The unusual mixing method employed by the Foote Kinetic Mixer gives you 8 to 10 batches more out of each barrel of asphalt. The design sets up a mulling action and the asphalt is introduced *under pressure* into the middle and *within* the aggregate stream. Every particle is coated completely and delivers a mix that no other small mixer of any type can equal with outstanding savings in asphalt. Write for Bulletin K-100.

- 3 cu. ft. in 30 seconds
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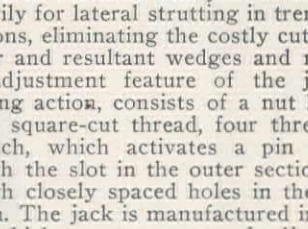
- Fully portable
- New mixing principle gives you 8 to 10 more batches out of every barrel of asphalt



the FOOTE Kinetic mixer

THE FOOTE CO., INC.
Subsidiary of Blaw-Knox Co.
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A BLAW-KNOX PRODUCT

More Dirt Moves Faster When
OWEN BUCKETS
swing over dump trucks

This claim is strongly substantiated by the increasing numbers of excavating contractors who have standardized on Owen Buckets to "Insure a Bigger Day's Work".

Long popular, Owen design and construction characteristics make for consistent "ease of operation" with "A Mouthful at Every Bite" and a clean and rapid discharge.

OWEN BUCKET CO., LTD. Berkeley, California

Dealers: Los Angeles, Spokane, Seattle, Portland, Salt Lake City, Honolulu.

A MOUTHFUL AT EVERY BITE

Diesel engine and its contrasts with other forms of engines, the book proceeds to take up such subjects as Diesel fuels, various combustion systems, 2-stroke and 4-stroke engines, fuel injection, engine control, economy, engine starting and stopping. Full of information about Diesel engines, this 67-page booklet is written in easily understood language and is of interest to Diesel owners and prospective owners. Both of the above publications are released from the **Mack-International Motor Truck Corp.**, New York.

528

AUTOMATIC DRAGLINE BUCKET—The revised edition of "How to Get the Most Out of a Page Automatic Dragline Bucket" is now available from the **Page Engineering Co.**, Chicago, Ill. The 20-page booklet has detailed information on dragline operations, making it a worth while handbook for operators. It includes items on how to select the right size bucket, how the bucket operates, how to use it and care for it to get the maximum production, and other subjects and illustrations.

529

STUD WELDING GUN—**Nelson Stud Welding Div.**, of the Morton Gregory Corp., Lorain, Ohio, has released a new 8-page catalog of manufacturing and construction applications of the Nelson stud welding gun. Typical production units and a wide range of special studs are shown in the 24 picture-paragraphs, along with a concise description of the Nelson method of fastening to metal.

530

PORTABLE BELT CONVEYORS—The all-purpose model 363 portable belt conveyors are the subject of a new eight-page bulletin released by **Barber-Greene Co.**, manufacturers of materials handling equipment and bituminous paving machinery, Aurora, Ill. Specifications and use of the 363's, which are made in lengths of 25, 30 and 35 ft. with plain or cleated belts, are outlined in the booklet. Two pages of applications are helpful in suggesting possible uses that the 363 may be adapted to, and drawings show how the 363 conveyor may be adapted to many conditions.

531

INSIDE GMC—This is the title of a 24-page booklet released by the **G. M. C. Truck and Coach Div.** of General Motors Corp., Pontiac, Mich., that describes production and testing of the trucks. Both field and laboratory tests are explained and illustrated in the new booklet.

532

JAW CRUSHERS — The **Lippmann Engineering Works,** Milwaukee, Wis., has issued a 12-page booklet showing specifications and illustrations of the Lippmann Grizzly King jaw crushers. The booklet features pictures of installations throughout the country.

533

DIESEL LOCOMOTIVE CRANE—The **American Hoist & Derrick Co.**, St. Paul, Minn., has available a catalog covering their 30-ton Diesel locomotive crane. The 20-page catalog contains illustrations of the crane in different types of work, and many mechanical illustrations are included.

534

PULVERIZER—Greater Quantities at Lower Cost is the title and theme of a new 12-page bulletin released by **Lippmann Engineering Works,** Milwaukee, Wis. The bulletin features the use of ag-lime for crop and pasture land, as made by the Lippmann pulverizer. Capacities, dimensions, and specifications for 15 models are listed.

535

BELTING—The **New York Belting & Packing Co.**, Passaic, N. J., has released a 24-page illustrated booklet describing their conveyor and elevator belting. Each section is devoted to the application, features, and construction of the product for industrial and field use.

536

CASEMENTS—A 10-page folder is available from **Soulé Steel Co.**, San Francisco, describing bar sections, installation instruction views, hardware details, and glass sizes for its line of Steeline Residence Casements.

537

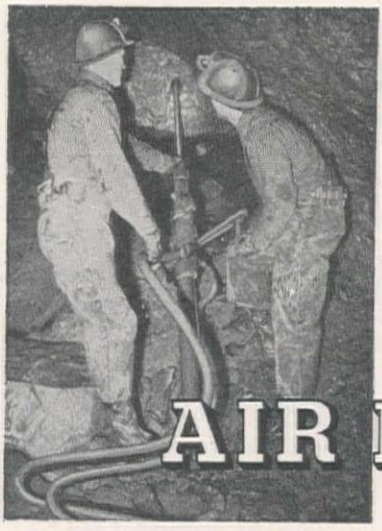
RECIPROCATING PLATE FEEDERS—The **Lippmann Engineering Works,** Milwaukee, Wis., has released a four-page bulletin showing specifications and pictures of their eccentric drive reciprocating plate feeders.

538

CATERPILLAR—Power and speed for high speed hauling are shown in the eight-page booklet, "The Caterpillar Diesel DW10 in Action" issued by **Caterpillar Tractor Co.**, Peoria, Ill. Presenting many applications tailored to the versatility of the unit, the pamphlet offers readers operation and performance features in earth-moving, mine and quarry, agricultural land leveling, shovel loading, and other types of work of which the DW10 is capable.

539

BALL BEARING IDLERS—A compact, detailed handbook on troughing and



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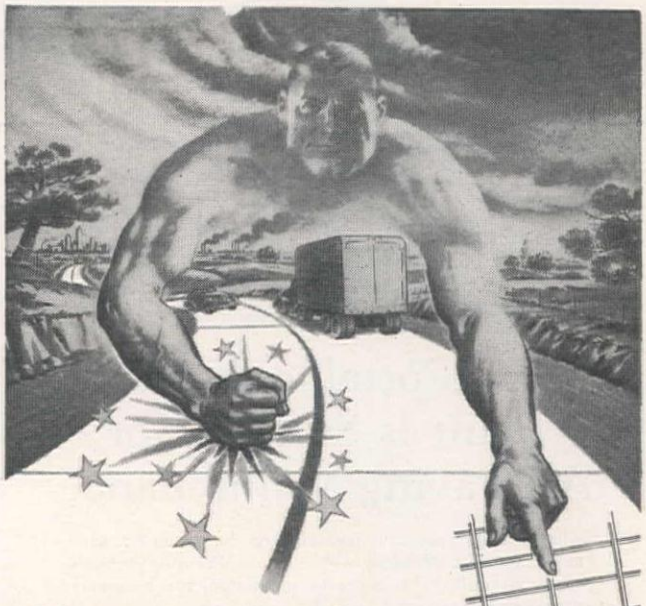

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…rs is presented by **Lippmann …ing Works,** Milwaukee, Wis., in …ew 12-page, two-color bulletin. Giv… …pplications, dimensions, and cutaway …ws of both ball bearing and tapered …oller bearing idlers, the bulletin features the operating economies of Lippmann life-sealed ball bearing idlers. Dimension drawings and tables and cutaway views are given for 11 belt widths from 14 to 60 in., and for 3½, 4, 5, and 6 in. roll diameters for nine different types of idlers.

540

SHAFT SEALS AND LUBRICATING DEVICES — **Gits Bros. Mfg. Co.** has released a 16-page price catalog covering their line of shaft seals and lubricating devices. Included are numerous drawings and descriptions of the equipment.

541

SERVICE MANUAL—A new service manual covering the operation, maintenance, and major repair of the AD-3 and AD-4 motor graders is available for $4.00, from the **Allis-Chalmers Tractor Division,** Milwaukee, Wis. The 278-page book features 26 sections ranging from descriptions and specifications to fits and tolerances. Sections I through IV contain a description of the graders, and illustrated information and instructions on operations and maintenance. For example, among the 11 "checks" listed for engine starting is how to inspect fuel pressure. Sections V through XXXIV provide detailed descriptions of the various assemblies of the graders and instructions for the proper adjustment and repair or rebuilding of these assemblies. Section XXV features the proper fits and tolerances of various assemblies for grader maintenance. The information deals with fit and tolerance of parts when they are new, and the amount of wear permissible before the part must be replaced. A liberal use of line drawings, cutaway views, exploded-part views and nomenclature studded halftones simplifies the contents and makes instructions easily understood. Every effort has been made to help servicemen accomplish efficient repair and maintenance so the A-C graders will maintain the original quality built into them.

542

CURRENT LIMITER — The **Chase-Shawmut Co.,** Newburyport, Mass., has released an eight-page booklet describing and illustrating the Amp-Trap device for interrupting capacity, limiting current, and protecting low voltage circuits. This is the first information on the Amp-Trap to be released.

543

SMALL DIESEL—**Nordberg Mfg. Co.,** Milwaukee, Wis., announces publication of a bulletin on the Nordberg Type 4FS-1 four-cycle, one-cylinder, 4½ by 5¼ Diesel engine. This engine has a rating of 10-15 h.p. at operating speeds of 1200-1800 r.p.m. In addition to a general description and pictures of three models of this engine, the bulletin describes lubrication, fuel system, governor, cooling system, and starting.

544

JACKS—**Templeton, Kenly & Co.,** Chicago, manufacturers of lever, screw, and hydraulic jacks, has recently issued an engineering data bulletin on its Simplex jacks and related equipment for industrial, railroad, oil, building, and bridge fields. Completely revised to bring all specifications and prices up to date, the bulletin is designed for easier reference. Included in the four-page bulletin are detailed descriptions of 12 jacks that are available in a total of 94 models suited specifically to many industrial requirements. Among the jacks listed in detail are single acting ratchet lowering jacks, standard or geared; electrided track jacks, emergency and pole jacks, screw jacks, hydraulic jacks, and many others.

545

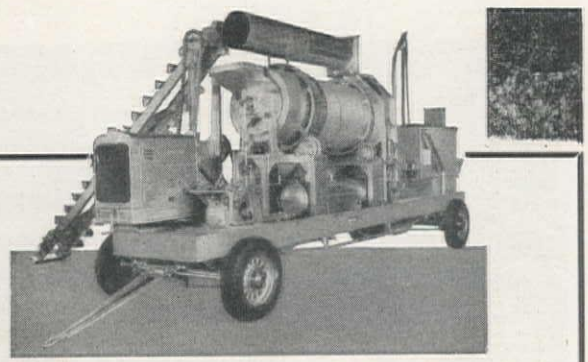
STREET FLUSHER—Street flushing and cleaning equipment is featured in a new eight-page bulletin issued by **Rosco Mfg. Co.,** Minneapolis, Minn. Complete specifications of the standard model, which is built in 1200, 1600, and 2100 gallon capacities, together with truck mounting sketch, weight, and measurement data are included. The bulletin also features two other machines with complete specification data and photographs of each unit.

546

VERMICULITE INSTITUTE—This organization has recently released a booklet from their Chicago, Ill., office on Vermiculite plaster fireproofing. It gives an explanation for the high fire-resistance obtained; an analysis of the savings in dead load and steel by the use of this material; construction views of jobs located in all parts of the country; typical fireproofing details; and a summary of fire tests made on construction using Vermiculite plaster as the fireproofing material.

547

DOWEL VIBRATOR—A new bulletin, covering the operation of the Flex-Plane mechanical dowel installer, has just been released by **Flex-Plane Co.,** Warren, Ohio. The machine vibrates dowels and tie bars into the concrete slab. It rides on forms behind the finisher, and its cost reductions are made chiefly by the elimination of



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dowel holding devices. Optional attachments furnished with the Flex-Plane spotter are tie bar installers and longitudinal dummy joint installers. The transverse joint attachment is standard equipment on all machines, culling the joint at the same time the dowel bars are being installed.

548

TRIANGULAR SCALE—A two-page folder illustrating the new Tri-Fin engineer's and architect's scale is available from the manufacturer, **Wolsey Co.**, Los Angeles.

549

HOSE ACCESSORIES—A new illustrated catalog published by the **Hose Accessories Co.**, Philadelphia, Pa., describes the complete line of Le-Hi hose couplings, hose clamps, air valves, and manifolds. Also illustrated and described are throttle valves for compressed air service, air hammer hose couplings, special high pressure coupling, long shank couplings for low pressure steam and spray hose, and the complete line of hose clamps.

550

CAST IRON WELDING—The **Lincoln Electric Co.**, Cleveland, Ohio, has available a four-page folder describing and illustrating their Ferroweld and Softweld process and equipment for industrial repair work.

551

CRANE CARRIER—A bulletin giving description and specification of the Byers Model 83-CC Crane Carrier has been released by the **Byers Machine Co.**, Ravenna, Ohio. The bulletin describes the crane carrier's independently powered, 35 m.p.h. truck-type chassis upon which is mounted a heavy-duty ¾ cu. yd. upper deck capable of lifting crane loads up to 20 tons and convertible to all front-end attachments. One of the features included in the bulletin is the hinged crane boom minimizing overall length for operation on highways.

552

RENTAL—The **L. B. Foster Co.**, Pittsburgh, Pa., has just published a four-page folder addressed to contractors and featuring their piling rental service. The folder outlines how the rental service is conducted and gives a complete listing of every Foster product.

553

PORTABLE BATCHING BINS—The **Heltzel Steel Form and Iron Co.**, Warren, Ohio, has released a 12-page booklet illustrated in color and describing the Heltzel portable bins and batching bins and their installations. Outside dimensions are given on the equipment drawings.

554

DIESEL ENGINES — The **Cummins Engine Co., Inc.**, Columbus, Indiana, has released a 48-page illustrated booklet in color giving specifications and data on 40 models of their Diesel engines. Full descriptions and pictures are given with each model, and many performance curves are included in the booklet.

555

CONVEYOR BELTS — Containing new information on Cord conveyor belts, a new six-page catalog section has just been published by the **B. F. Goodrich Co.** The catalog fully describes construction of the Cord belt, which is claimed to have from two to six times the impact resistance of fabric belts. Parallel cords, each completely coated with rubber, give the plies of cord and rubber practically the same impact resistance as the cover, because the cords can spread apart under blows. The catalog section also pictures and describes other conveyor belts in the company's line, including several for specialized services.

556

20 QUESTIONS — A new folder has just been released by the **Macwhyte Co.**, Kenosha, Wis., giving 20 questions and answers on PREformed Wire Rope, stating questions normally asked about the product and giving the answers.

557

TRUCK CRANES—Information on the new Model 44 Corsair truck-mounted crane and excavator is contained in a 2-page illustrated catalog which covers complete specification and operational data. Published by the Wayne Crane Div. of the **American Steel Dredge Co., Inc.**, Fort Wayne, Indiana, the catalog describes truck speeds on the highway, tandem drive with 8 or 10 tire traction, and the 5½ r.p.m. swing speed and convertibility to seven crane and excavator applications. Also included is a load capacity chart based on the machine's 10-ton, ½-yard capacities.

558

CENTRIFUGAL PUMPS—The **Peerless Pump Division**, Food Machinery and Chemical Corp., Indianapolis, Indiana, has available a 20-page booklet, illustrated and in color, describing their line of Peerless type A centrifugal pumps. Sectional views, dimensions, capacities, and other data are included in the booklet.

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